EASTLEIGH BOROUGH COUNCIL

One Horton Heath

Appendix 10.4 – Bat Report

1 NON-TECHNICAL SUMMARY

Johns associates have carried out a series of bat surveys across the wider Horton Heath Site in 2018, 2019 and 2020.

Data provided by Hampshire Biodiversity Information Centre returned; 10 records of serotine, 1 record of Brandt's, 5 records of Daubenton's, 4 records of whiskered, 11 records of Natterer's, 21 records of noctule, 52 records of common pipistrelle and 32 records of soprano pipistrelle. These are all field records; no records of roost were returned within the data search.

Ten species have been confirmed to be present on Site through various surveys carried out:

Barbastelle: A very low levels of activity was recorded through static detector surveys however; this species was recorded at all detector locations and in all months with the exception of May. Maximum of 16 passes recorded (median 0.15 passes per night of recording effort).

Serotine: No roosts identified on site. Two adult males recorded during trapping. Low activity levels observed (maximum 1.03 median passes per night in August) despite high detectability and distinctive call structure. Few records (28 passes recorded within emergence window over 1133 recording nights) indicating potential presence of low status non-breeding roost within ZOI. 20 total passes within potential impact height recorded at all crossing point locations.

Brown long-eared: Two maternity roosts present on site (Fir Tree Farmhouse and Chalcroft Farm). Fir Tree Farmhouse (Northern Colony) – static data indicates that these bats are using the two main connective habitats leading both north and south across Fir Tree Lane from the Farmhouse, presumably to the highly suitable foraging habitats in Quobleigh Wood and the central/western stream corridor respectively (ST11 and ST12). Two Post lactating female BLE and one adult male were caught in Quobleigh Wood in August 2020. Chalcroft Farm (Southern Colony) – Maternity roost present in Pond Cottages to the north of Chalcroft pond. Additional satellite roosts identified in tree in Hearts Copse and within the stables building (A6). Key supporting habitats are considered to be Hearts Copse (offsite) with the marshy grassland and riparian corridor of the southwest and western areas of the site. Trapping in the vicinity of Hearts Copse in 2020 caught 4 lactating female bats, two adult males and two juvenile bats (male and female). Key connective corridors are the hedgerows to the south and the riparian corridor to the north and west of Chalcroft Farm. Radiotracking in 2019 recorded a female adult post lactating female from this colony roosting in Round Copse and foraging repeatedly in the central and eastern woodland utilising the central hedgerow east of the solar park and the western riparian corridor. One confirmed tree roost was found (T23) during the survey of a brown long-eared roost which was found on the 20th October and re-checked on the 27th October with the maximum count of 2 individuals present on the 20th October. 10 crossing events were recorded within the collision risk height band (locations CP2 – 5, CP3 – 3 & CP4-2). No crossing events were recorded for this species at CP1 or CP5.

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Natterer's: One roost record on site in B18 in 2018. This building has subsequently been demolished under licence. Static detector surveys are limited to providing additional information at genus level. This genus is represented at all locations sampled. Radiotracking surveys tracked a post lactating female to two maternity roosts to the east of Horton Heath (both tree roosts, colony size 20-30). This bat foraged along the central woodland belt and within a young woodland within the existing housing estate each night of the survey. Trapping surveys recorded a total of 19 Natterers bats with female lactating bats captured in Quobleigh Wood, Hearts Copse and the Central Woodland. Males and juveniles were also present in these areas. Crossing point data recorded 45 crossing events by this genus within the predicted road traffic collision height range with 33 of these at location CP1 (Quobleigh Stream Crossing). This value is likely to be comprised of a high proportion of Daubenton's bats given the riparian habitats present at this location.

Daubenton's: No known roosts present on site. Anecdotal observation of two Daubenton's bats entering oak tree in parkland south of Chalcroft during trapping surveys. 1 male was captured in Chalcroft Farm Parkland in 2018. 8 female (4 adults and 4 juveniles) were caught in Hearts Copse, 14 males (2 adult and 12 juveniles caught in Hearts copse and Chalcroft Farm Parkland. 1 adult female and 3 adult male was caught in Quobleigh Woods. These were predominantly males (18 in total) and juveniles. No evidence of the use of the site of lactating females was recorded. One adult male bat caught in Quobleigh Woods on the 22nd Aug 2019, was radiotagged but the tag failed within minutes of application. Key locations are considered to be the riparian corridors, particularly the western site boundary connecting Quobleigh Wood and the habitats south of the site to the River Itchen and to Itchen Valley Country Park. Crossing point data recorded 45 crossing events by this genus within the predicted road traffic collision height range with 33 of these at location CP1 (Quobleigh Stream Crossing). This value is likely to be comprised of a high proportion of Daubenton's bats given the riparian habitats present at this location.

Nathusius Pipistrelle: 51 passes over 1133 recording nights, 26 of which at location ST16. 41 of these were recorded in October 2020. No records in July or August. Not recorded during crossing point surveys.

Noctule: The majority of records for this species were recorded at ST1, ST2, ST3, ST5, ST6 and ST16 with ST5 recording the highest median number of recordings in total. Tree 19 (an Ash next to the pond at Chalcroft Farm) has been confirmed as a meting roost. Noctule were heard lekking from the tree in 2018 and emergence surveys on the tree in September 2020 confirm 3 noctules emerging from a tear out at the top of the tree. In total 4 adult noctules were caught (2 post-lactating females and 2 males) all in Chalcroft Parkland. 55 crossing were recorded in total across all the crossing point locations by noctule. Of those only 1 at CP4 and 2 at CP3 were within the highest collision risk category.

Common pipistrelle: Common pipistrelle were recorded at high levels at all static locations. The majority of records for this species were recorded at ST1, ST5 and ST14. The median bat passes per hour per month found April, June and July to have the highest activity for common pipistrelle which is within the peak maternity period for this species. ST14 recorded the highest number of pre-sunset recordings with 100 recordings, Recordings made within the species-specific emergence window (Russ J. , 2012) are considered to give an indication as to the likelihood of a roost being nearby. Therefore, recordings made close to or pre-sunset are likely to give a stronger indication of a roost nearby. 40 common pipistrelle were captured during the trapping surveys; 18 females (4 post lactating and 6 juveniles) and 22 males (12 adults and 10 juveniles). They were caught in all years and at all locations. Crossing point surveys recorded; 20 at CP1, 26 at CP2, 125 at CP3, 87 at CP4 and 181 at CP5 at the highest collision risk category for this species. CP1, 3 and 4 are considered to be on commuting routes while CP2 and 5 recorded more foraging activity.

Soprano pipistrelle: The majority of static records for this species were recorded at ST1, ST2 and ST4 with ST2 recording the highest median number of recordings in total. The median bat passes per hour per month found April recorded the highest level of recordings with the lowest number of recordings in May and then a similarly low level of recordings for the remaining months. 18 soprano pipistrelle were captured during the trapping surveys; 5 females (2 parous and 1 juveniles) and 13 males (10 adults and 3 juveniles). They were caught in all years and at all locations. Crossing point

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surveys recorded; 2 at CP1, 8 at CP2, 16 at CP3, 1 at CP4 and 2 at CP5 at the highest collision risk category for this species. CP1, 3 and 4 are considered to be on commuting routes while CP2 and 5 recorded more foraging activity.

2 INTRODUCTION

This report presents the result of bat surveys undertaken in 2018, 2019 and in 2020 by Johns Associates Ltd in support of the development proposals and planning application of Horton Heath.

The planning application boundary is hereafter referred to as the 'Site'. The potential Zone of Influence of the development associated with badgers is the whole planning application boundary. This reflects the mobility of the species and general guidance for potential future badger licencing (see https://www.gov.uk/government/collections/badger-licences).

The aim of the surveys was to update the historic baseline and to confirm the continuing presence or likely absence of badger within the Zone of Influence. These surveys were also used to identify possible constraints to development and opportunities that could be delivered through the development proposals

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3 METHODOLOGY

3.1 HABITAT SUITABILITY

A formal phase 1 habitat survey of the wider Horton Heath site including the areas due to be affected by construction Phases A1 and A2. The Phase 1 habitat survey was completed on between 25th – 6th August 2018 Jenny Bennett BSc MSc MCIEEM PIEMA and Jasmine Walters BSc (Hons) GradCIEEM from Johns Associates.

The survey identified the habitat types currently present across the Site and in immediately adjacent areas. The survey followed the standardised system for classifying and mapping British Habitats Handbook for Phase 1 Habitat survey – a technique for environmental audit (Joint Nature Conservancy Council, 2010). The main output of this survey was an annotated habitat map and target notes together with descriptions of the recorded habitat types. All flora follow the nomenclature detailed in New Flora of the British Isles (3rd Edition) (Stace C. , 2010).

This survey was completed in accordance with Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017) and BS 42020:2013 Biodiversity - Code of practice for planning and development (British Standards Institute, 2013)

During the course of the survey, available habitats were assessed for their suitability to support a range of bat species for roosting, commuting and foraging purposes.

Survey results were then digitised into geographical information system mapping software (GIS) to facilitate the calculation of the extents of each habitat type (see Appendix 10.2 Phase 1 Habitat Survey as part of the ES Chapter).

3.2 TRANSECT SURVEYS

Transect surveys were designed to comply with current industry guidelines (Bat Conservation Trust, 2016).

The transect routes (see Figure 1, Figure 2 & Figure 3) were surveyed on dates detailed in Table 1, Table 2 & Table 3 respectively. The surveys were designed to sample all habitats present on site with a focus of habitats identified as having moderate or high suitability for bats. Surveys were undertaken in suitable weather conditions (above 15°C with no rain and light wind). All surveys commenced at sunset and continued for approximately 2 and a half hours.

Elekon Batlogger M detectors were used for all surveys with GPS data for all recordings logged.

All surveys were undertaken and lead by an appropriately qualified ecologist with an assistant. The routes were walked at a slow but constant pace pausing when bats were seen / heard, and their location and behaviour noted. Attention was focused on areas of particularly suitable bat habitat such hedgerows. The start / end points were alternated on consecutive visits to reduce survey bias.

All bat calls were recorded using an Elekon Batlogger M ultrasonic bat detector which provides high definition and GPS referenced recordings in combination with direct observations i.e. number of bats, flight direction, flight height and behaviour (e.g. commuting or foraging).

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Figure 1 - Blue Transect Route – High Suitability Habitat Area



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Figure 2 - Orange Transect Route – Moderate Suitability Habitat Area



JOHNS ASSOCIATES

OPA FRP Phase 1 (Scenario 1) Boundary
OPA Site Boundary
Start/End Points
Transect Route

CLIENT Eastleigh Borough Council

PROJECT OHH - OPA - Ecology Support 2020

TITLE Appendix 10.4 Orange Transect Route

SCALE @ A3	CREATED BY	CHECKED BY
1:5,000	JS	LW
REFERENCE	**REVISION**	**DATE ISSUED**
J00556-023		6/11/2020

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Figure 3 - Green Transect Route – Low Suitability Habitat Area



JOHNS ASSOCIATES

OPA FRP Phase 1 (Scenario 1) Boundary
OPA Site Boundary
Start/End Points
Transect Route

CLIENT	Eastleigh Borough Council
PROJECT	OHH - OPA - Ecology Support 2020
TITLE	Appendix 10.4 Green Transect Route

SCALE @ A3	CREATED BY	CHECKED BY
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Table 1 - Red route – Activity Transect dates

Survey visit	Date	Dusk/Dawn	Lead Surveyor	Temperature start/end	Cloud Cover (0/8 – Oktas)	Wind (Beaufort Scale)	Rain
1	16/04/19	Dusk	LW	14/11	8	2	0
2	24/04/19	Dusk	LW	14/10	8	3	0
3	07/05/19	Dusk	KW	15/11	8	1	0
4	22/05/19	Dusk	LW	15/9	2	2	0
5	04/06/19	Dusk	LW	17/14	6	1	0
6	21/06/19	Dusk	JB	15/12	0	0	0
7	23/07/18 24/07/18	Dusk Dawn	LW	22/22 19/18	1/8 1/8	2 1	0 0
8	08/08/18	Dusk	LW	19/16	8/8	2-3	0
9	29/08/18	Dusk	LW	18/17	8/8	1	0
10	11/09/18	Dusk	KW	19/20	2/8	0	0
11	27/09/18	Dusk	LW	19/13	1/8	1	0
12	11/10/18	Dusk	KN	15/15	4/8	2	0
13	24/10/18	Dusk	KW	19/9	0	0	0

Table 2 - Orange route – Activity transect dates

Survey visit	Date	Dusk/Dawn	Lead Surveyor	Temperature start/end	Cloud Cover (0/8 – Oktas)	Wind (Beaufort Scale)	Rain
1	24/04/19	Dusk	KW	11/9	8	3	0
2	07/05/19	Dusk	KN	15/10	8	1	0
3	27/06/19	Dusk	CM	18/16	0	3	0
4	23/07/18 24/07/18	Dusk Dawn	KW	20/18 17/13	1/8 1/8	0 1	0 0
5	29/08/18	Dusk	KW	19/18	8/8	0	0
6	11/09/18	Dusk	TJ	18/17	8/8	1	0
7	11/10/18	Dusk	TJ	16/15	2/8	2	1

Table 3 - Green Route – Activity transect dates

Survey visit	Date	Dusk/Dawn	Lead Surveyor	Temperature start/end	Cloud Cover (0/8 – Oktas)	Wind (Beaufort Scale)	Rain
1	08/05/19	Dusk	KN	12/13	4	2	0
2	08/08/18 09/08/18	Dusk Dawn	KW	19/18 18/15	8/8 8/8	1 1	0 1
3	29/08/18	Dusk	KW	19/18	8/8	0	0
4	11/09/18	Dusk	BM	19/19	8/8	1	0

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3.2.1 Limitations

As the majority of the site is currently in use as grazed pasture some of the fields contained cattle. If livestock were deemed unsafe by the surveyor or the surveyor was advised not to enter by the landowner, then that particular field was avoided during that survey. As this only applied to 1 or 2 fields over the course of the survey period it is not considered to be a notable limitation as major field boundary were generally still accessible for the purpose of this survey from adjacent safe fields.

3.3 AUTOMATED DETECTOR SURVEYS

Elekon Batlogger C and Elekon Batlogger A+ high sensitivity omnidirectional automated ultrasonic detectors using Kingston Technology SD cards were deployed in fixed locations (Table 4 & Figure 4) around the site. These units have been selected as they are extremely durable and reliable whilst displaying best in class sensitivity. This is of key importance on sites with known presence of bat species that are difficult to detect (e.g. long eared bats). Solar panels have been used with the C units to supplement the power supply to ensure that there is the lowest likelihood of power failures. The configuration of trigger settings is detailed in Table 6.

Table 4 Automated Detector Locations

Location	Lat/ long Reference	Location Description
ST1	50.956532 -1.3105919	Alder on east/west tree line adjacent to stream. Microphone located 8m high on branch facing east over bridge to detect north and south of field boundary.
ST2	50.952361 -1.3033786	Oak on north/south tree line. Microphone located 6m high on limb facing north to detect both east and west of tree line.
ST3	50.9540777 -1.3092792	Blackthorn in gap of east/west tree line. Microphone located 5m high facing east to detect lane and field entrance.
ST4	50.9514651 -1.3034636	Oak on east/west tree line. Microphone located 5m high on limb facing east to detect both north and south of tree line.
ST5	50.94422 -1.3022427	Oak in field boundary. Microphone located 5m high facing south over field gate to detect both east and west of boundary fence.
ST6	50.9395116 -1.3024619	Blackthorn on north/south boundary hedgerow. Microphone located 3m high extending 0.5m high of hedgerow facing west with clear detection radius of both sides of hedgerow.
ST7	50.9496202 -1.3108287	Alder in northern corner of field adjacent to stream. Microphone located 3m high facing south to detect east/west of hedgerow.
ST8	50.9465633 -1.3053984	Blackthorn on north/south field boundary hedgerow. Microphone located 2.5m high to clear hedgerow facing north with clear detection radius of both sides of hedgerow.
ST9	50.952599 -1.3103353	Hazel on east/west tree line. Microphone located 2m high facing north with clear detection radius along the hedgerow.
ST10	50.9521644 -1.3099297	On the deer stalker on the edge of the southern field boundary hedgerow. Microphone located 4m high facing south-east with clear detection radius along the hedgerow.
ST11	50.9538714 -1.3098691	Oak in north/south tree line. Microphone located 2.5m high and positioned on low limb in large gap in tree line. Microphone facing north with clear detection radius of both sides of tree line.
ST12	50.9558936 -1.3081523	Oak on north/south tree line. Microphone located 3m high on limb facing south to detect both east and west of tree line.

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Location	Lat/ long Reference	Location Description
ST13	50.9471853 -1.3055895	Blackthorn on north/south field boundary hedgerow. Microphone 3m high to clear hedgerow facing north with clear detection radius of both sides of hedgerow.
ST14	50.9520459 -1.3087069	Bramble on northern field boundary hedgerow. Microphone located 1.5m high facing south with clear detection radius along the southern side of the hedge.
ST15	50.9520459 -1.3087069	Blackthorn on southern field boundary hedgerow below the solar park. Microphone located 2.5m high to clear hedgerow facing south with clear detection radius of both sides of hedgerow.
ST16	50.9462238 -1.3065639	Small tree adjacent to the southern field boundary hedgerow. Microphone located 2.5m high to clear hedgerow facing south with clear detection radius of both sides of hedgerow.

In total 16 Elekon BatLogger C high sensitivity omnidirectional automated ultrasonic detectors were deployed within the site boundary and was monitored each month to obtain sufficient volume of data for each location. The locations requirements grew as the site details developed specifically the locations of the new road. These units have been selected as they are extremely durable and reliable whilst displaying best in class sensitivity. This is of key importance on sites with known presence of bat species that are difficult to detect (e.g. long eared bats). Solar panels were used to supplement the power supply to ensure that there is the lowest likelihood of power failures.

Table 5 Survey Design Considerations

Criteria	Requirement	Action
Focus of survey effort	Particular focus on linear features and areas of highest predicted impact	Detector locations chosen to target all key habitats. Microphone locations were designed to detect bats utilizing both sides of linear features by raising the microphone above the vegetation and selecting locations along linear features in breaks in the vegetation.
Number of automated Detectors	Number will respond to number of suitable linear features but the objective would be to sample each habitat component equally.	16 locations were identified to ensure sufficient sample of habitats suitable for commuting and foraging bats considered likely to be subject to negative impacts.
Spatial Distribution of detectors	Enough detectors should be deployed so that each location is monitored	The survey was designed to obtain a minimum of 5 recording nights per location per month.
Volume of survey effort	Period of deployment should aim to achieve a minimum of 35 nights (5 nights per month April – October) out of a possible 214 (~16%).	A total number of 5 recording nights per month was considered appropriate to allow for poor weather and provides a margin for technical faults and other constraints such as vandalism events that are inherent risks in the deployment of automated detectors. Over the survey period the aspiration was to obtain 50 nights of data to ensure that the minimum of 35 nights was achieved.
Temporal distribution of survey effort	35 days from April to October and would include at least one working week (interpreted as 5 days) in each of the months of April, May, August, September and October	Surveys were initiated at the earliest possible point within the survey period and continued through into October. Any shortfalls in a single month were to be mitigated by additional nights in subsequent months to ensure temporal cover.

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Detector deployment periods aimed to record a minimum of 10 consecutive nights of bat activity to allow to allow for power failures etc, this ensured that the survey effort for that month will still qualify.

A stratified detector deployment strategy was adopted, whereby detectors are grouped by factors (such as similar habitat quality or connective value) to ensure that the surveys are systematic, and some semi-quantitative analysis can be conducted to identify areas of high relative importance for bats.

The automated detectors were configured to record for a maximum of 15 seconds after being triggered and would cease to record in the absence of no further trigger events within this period. Pre-trigger and post trigger settings were designed to capture approach and exit phases of bat calls.

The "SD" trigger was used to reduce the large volume of insect recordings recorded and thus preserve battery life and reduce the volume of noise files without compromising the detectability and recording of bat calls. This filter algorithm measures the periodicity of the waveform as it is received so that only sinusoidal waveforms (i.e. calls with an even periodicity such as those created using vocal chords) are recorded. The period trigger parameters were those recommended by Elekon as a suitable compromise between low frequency sensitivity and increased insect noise recordings.

Table 6 Automated Detector Parameters

Parameter	Description	Settings
AUTOTRIG_MAXTIME_MS	Maximal length for automatically triggered recordings in ms	15000
POSTTRIG_TIME_MS	Post-trigger length for automatically triggered recordings in ms	1000
PRETRIG_TIME_MS	Pre-trigger length in ms	500
TRIG_AUTOREC	Trigger event automatically starts recording and recording automatically stops when conditions are no longer met	Auto
TRIG_MODE	Automatic triggering with SD algorithm	SD
TRIG_PAR9	1 high sensitivity and 10 low sensitivity – parameter recommended by Elekon	5
TRIG_PAR7	Minimal frequency for trigger condition in KHz – parameter and setting recommended by Elekon	17KHz

3.3.2 Deployment Procedure

Units were deployed out of the reach of public and grazing animals and fixed securely with padlock and chain to prevent risk of falling or theft. Microphones were placed where range was unobstructed and tied securely with a slight downward angle to prevent rainwater entering into the protective housing. Solar panels (C units only) were placed in locations where risks of falling or theft were considered low, facing south with no overhanging vegetation obscuring it. During each deployment all connections were checked, and microphones tested. The following procedure was adhered to during each re-deployment;

- Battery levels checked and batteries replaced if necessary
- Existing SD card removed and replaced with blank SD card with appropriate BATPARS settings installed
- Date and time checked
- Temperature reading checked
- GPS lock fixed
- GSM lock fixed (C units only)
- Test GSM text sent to allocated number (C units only)
- Start to record – unit displayed sleeping mode and recording times checked.

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3.3.3 Limitations

Johns Associates were only commissioned to conduct surveys on site in late July 2018 therefore there is an absence of bat data for the spring survey season 2018. Early season data was subsequently gathered in the following year.

A small number of automated bat detectors experience battery or technical failures resulting in missed data for months; ST2 – June, ST7 – May, ST11 – April, ST12 – April and ST 13 – August and September. These were largely caused by GSM (Global System for Mobile) faults, disabling the unit preventing the unit from operating without a GSM fix, faulty battery compartments and the theft of one solar panel at location 4. The unit at location 4 was moved to a more secure location when the solar panel was stolen.

Due to new site design plans emerging mid 2019, automated bat detector 14 was only deployed from July 2019 to remotely monitor bat activity within the A2 construction area. Due to this no data was collected for this location from April- June.

In 2020 two additional locations were added to supplement data as the road design became fixed. Due to COVID-19 restriction these detectors were not deployed until late April however, an extended period of deployment was carried out in May to account for this.

With automated recording it is impossible to separate commuting bats from bats foraging within close proximity of the Automated bat detector bat detector. It is possible a high nightly pass rate could relate to one or two foraging bats as opposed to individual commuting bat passes. It is therefore very difficult to draw meaningful relationships between activity levels recorded in terms of passes per night or the use of the site by specific bats for defined purposes (e.g. adult females foraging during the natal period).

Elekon Batlogger C automated detectors are extremely sensitive and are considered to be the best units available at this time. Despite this, a number of bats will not have been recorded (e.g. due to flight path, low call volume etc) the sample recorded is, however considered representative as this will only apply to calls of a low number of species (discussed further below) and the variability between locations is significantly reduced as these units were used in all locations, thus suitably reducing the variation of recording detection between locations to allow an accurate comparison.

However, each automated bat detector location delivered over the total target amount of nights recorded therefore it is considered that the survey effort is sufficient, and the conclusions drawn against these results are valid.

3.3.4 Deployment Summary

The deployment period for the automated detector surveys is detailed in Table 7.

Figures highlighted in red indicate loss due to faults caused by faulty units or time constraints. The unit at location 4 was repositioned following the theft of its associated solar panel and renamed location 4a. Automated detector units for locations 7 and 8 were not available until 22nd August due to other commitments.

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Table 7: Automated Detector Deployment Summary

Automated Detector Deployment; 2018, 2019 & 2020 Total Combined									
Location	April	May	June	July	August	September	October	Total Data Analysed	Delivery against Target (35 nights)
ST1	7	11	9	16	20	24	5	92	+57
ST2	16	13	ND	16	5	16	14	80	+45
ST3	11	13	11	5	26	25	23	114	+79
ST4	14	3	9	16	16	20	16	94	+59
ST5	11	7	13	12	15	27	17	102	+67
ST7	7	ND	19	1	13	28	13	81	+46
ST9	9	19	14	11	13	14	8	88	+53
ST10	5	6	5	4	7	5	5	37	+2
ST11	ND	13	14	16	10	12	14	79	+44
ST12	ND	7	11	9	9	11	15	62	+27
ST13	14	11	17	7	ND	ND	7	56	+21
ST14	ND	ND	ND	22	17	21	9	69	+34
ST15	2	22	4	5	6	5	5	49	+14
ST16	2	20	8	12	6	6	6	60	+25

Table 8 – Automated Detector Deployment in Low Habitat Suitability

Automated Detector Deployment; 2018, 2019 & 2020 Total Combined									
Location	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**Total Data Analysed**	**Delivery against Target (15 nights)**
ST6	10	ND	ND	5	6	5	5	31	+16
ST8	13	ND	ND	ND	15	ND	11	39	+24

3.4 BAT CALL ANALYSIS

3.4.5 Weather Screening

The data has not been screened for suitable weather, rather the sample only includes nights where bat activity was recorded to remove nights of automated detector effort during unsuitable weather. This approach is considered to negate the requirement for weather screening as the presence of foraging bats has been taken as evidence of suitable weather conditions. Different species of bats are reported to have a varying degree of sensitivity to marginally suitable weather, although this information is anecdotal and not supported by research to date. As such, any inter species variation in terms of emerging from roosts to forage (i.e. potentially between common pipistrelle and brown long eared/myotis bats) is not considered to significantly affect this analysis. The frequency at which these species were recorded within the same night throughout the survey period broadly supports this assumption.

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Whilst the prevailing weather clearly has an effect on the distribution of bats across the site at any given moment given the susceptibility of their prey to wind speed and direction and precipitation, this survey has been designed to monitor suitable habitats in all weather conditions to capture the variation in relative importance of habitats for any given period of weather.

3.4.6 Recording Analysis

All echolocation calls were recorded and subsequently analysed to species/group (see Table 11), if possible with a satisfactory level of confidence, using the established call parameters for UK bat species (Barataud, 2016) (Middleton, Froud, & French, 2014) (Russ J. , 2012) by Katherine Newbert BSc (hons) MSc, Kerry White BSc (Hons) GradCIEEM and Lis Weidt BSc (Hons) MCIEEM. All recordings have been manually classified and verified and the auto identification function of BatExplorer has been used to expedite manual classification only.

Where the identification of recordings has not been possible to species (e.g. single/low pulses recordings, clutter call structures, poor signal to noise ratio etc), recordings have been classified to genus/group level. Where the calls were clearly identifiable to having been emitted by a bat, but the species cannot be confidently identified, the recordings have been classified as unknown. Noise files have not been included in the classification and have been removed from the project files (but retained in a backup).

Species of the *Myotis* genus are impossible to conclusively identify to species with a sufficient level of confidence and have therefore been grouped together under the genus name. Additional acoustically similar groups have also been used where calls could not be robustly identified to species.

Grey long eared bats are considered extremely unlikely to be present on site based on the absence of historic records. DNA analysis of dropping taken from long ear bat roosts present in buildings on the wider site confirmed brown long eared as the only species present. In addition, trapping surveys have not recorded any grey long eared bats on site. However, the classification of *Plecotus* has been used on a precautionary basis for all long-eared bat recordings to acknowledge the cryptic nature of these calls and under recorded distribution of this species, as acoustic recordings cannot be conclusively be allocated to a specific species.

The group Nyctaloid has also been used to identify calls belonging to "*nyctalus* like" bats that include serotine, noctule and Leisler's bat species and as there is considerable overlap in the known call parameters that prevents conclusive call identification in all but the most clear and characteristic calls.

Nyctalus genus has also been used where the recording can be confidently identified as either noctule or Leisler's bat.

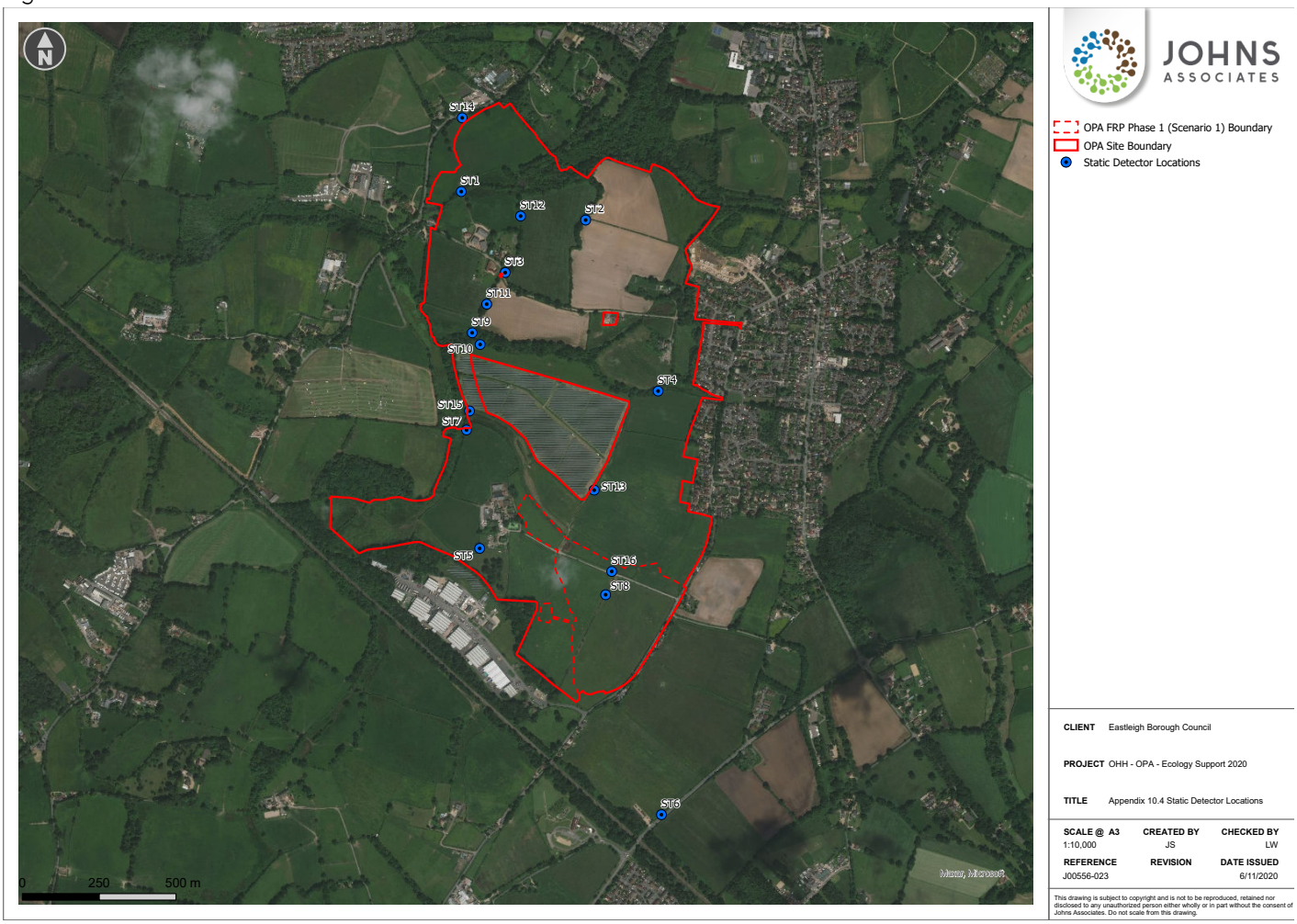
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Table 9 Bat Species and Group Classification

Common Name	Scientific Name
Species level classification:	
Common pipistrelle	Pipistrellus pipistrellus
Soprano pipistrelle	Pipistrellus pygmaeus
Nathusius' pipistrelle	Pipistrellus nathusii
Serotine	Eptesicus serotinus
Barbastelle	Barbastella barbastellus
Common Noctule	Nyctalus noctula
Leisler's (Lesser Noctule)	Nyctalus Leisleri
Genus level classification:	
Plecotus Spp.	Includes both Brown Long-eared and Grey Long-eared species
Myotis Spp.	All species of Myotis bat excluding Greater Mouse Eared bat.
Nyctalus	Noctule and Leisler's
Other:	
NSL	Species included in this group of acoustically similar species include Noctule, Serotine and Leisler's.

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Figure 4 Location of Automated Detectors



3.5 POTENTIAL TREE AND BUILDING ROOST ASSESSMENT

3.5.7 Trees

All trees within the Site were subject to external inspections for potential roost features (PRFs) that could support bats in accordance with Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust, 2016).

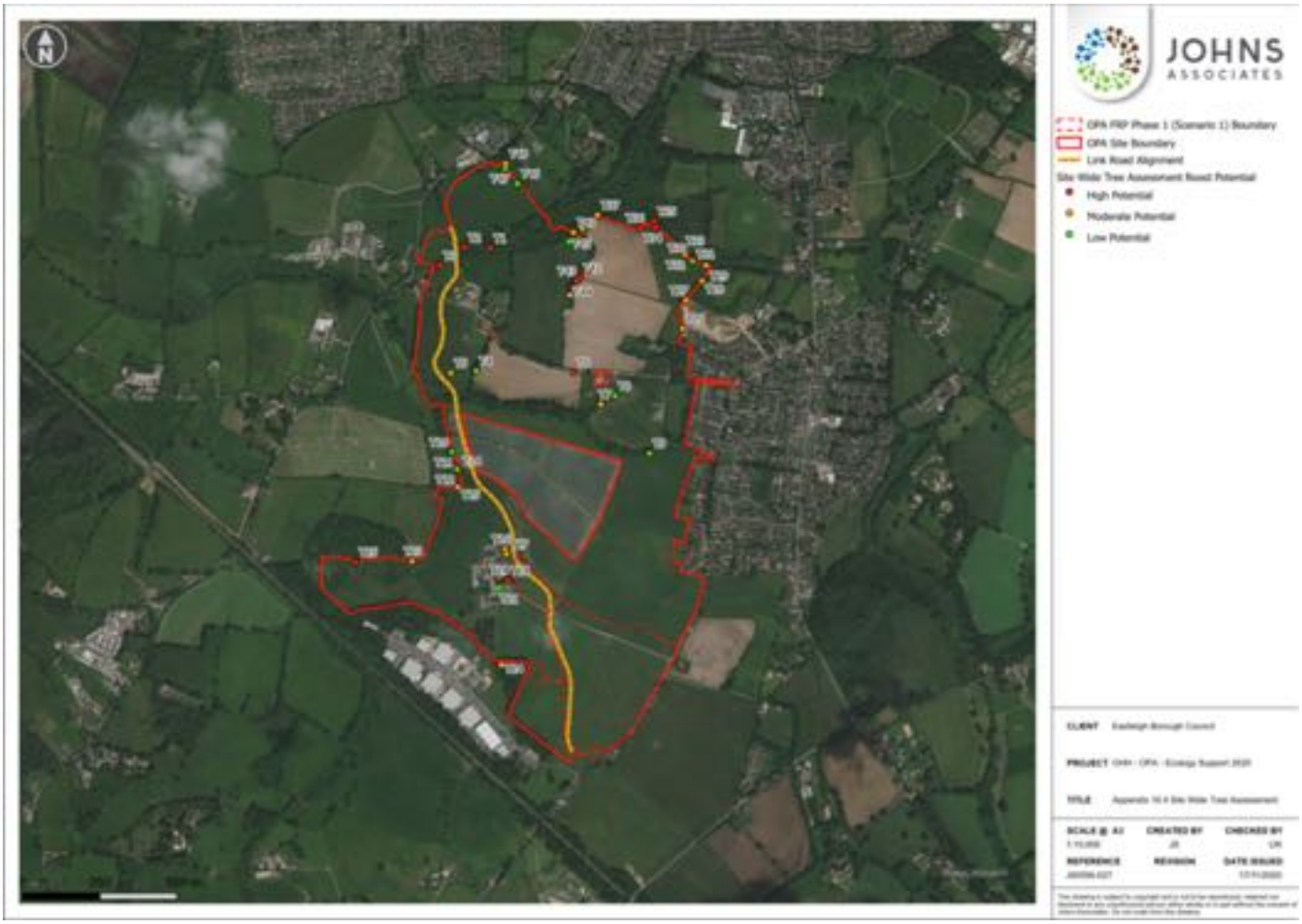
Suitably qualified and experienced ecologist, Ben Mitchell BSc (Hons) MCIEEM, conducted the survey to ensure an accurate evaluation of the suitability of the trees to support roosting bats. This allowed the classification of trees as per Table 12 to inform the requirement for any subsequent surveys to give a sufficient confidence in an absence result. The trees which presented Low, moderate or High suitability were assess and taken forward for further surveys (see Figure 5)

The tree inspections were carried out from the ground, with the use of close focusing binoculars and a high- powered torch, as required.

Where areas were not accessible due to unacceptable safety risks, a precautionary approach was taken to the assessment of the suitability of the structure for bats.

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Figure 5 - Initial Results of Ground Level Tree Assessment



3.5.8 Limitations

At the time of the ground level tree assessment the trees were still in leaf so features may have not been visible. Ground level tree assessment was also only possible from the south of the hedgerow along Allington lane, a northern inspection was not possible due to a narrow the road being narrow with high traffic levels. Survey results have been precautionary on this basis, with any trees that were unable to be subject to full assessment being positively screened for further detailed surveys.

3.5.9 Areal Tree Inspections

Following a ground assessment of the trees found to have Low, Moderate or High Suitability within the areas of the highest potential impact (within 10m either side of the proposed road lay out) were further assessed through aerial assessment.

These potential roost features were inspected using an endoscope from a rope and harness on 20th, 21st, 27th and 28th October 2020 by Lewis Hillier BSc (Hons) ACIEEM, experienced tree climber and class 2 licensed bat ecologist for any evidence of bat use or suitability as a roost site following current guidance on roost assessment in trees (Andrews, 2013).

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All trees outside of the highest potential impact areas will be assessed as the parcels come forward for construction due to the naturally changing nature of natural tree roosts, this will give the best information on these trees at the time as detailed designs are completed.

3.5.10 SURVEY LIMITATIONS

It was not possible to climb a number of the trees to inspect the PRF due to the condition of the trees and presence of dead limbs on the tree making it unsafe to do so. These trees were then subject to emergence surveys in order to form an assessment of the PRF present.

Due to COVID-19 restrictions in place for much of 2020 aerial surveys were not possible until very late in the survey calendar, which meant significant (maternity) roosts were less likely to be present. However, the standard methodology requires an assessment of the likelihood and suitability of a given feature to appeal to bats and this can be conducted at any point in the year.

3.5.11 Tree Emergence Surveys

Due to a delay in being able to carry out areal tree inspections a number of emergence surveys were carried out on trees which were assessed has having high suitability or were unlikely to be accessible via rope and harness due to ash dieback or the general health of the tree leading to health and safety concerns.

Emergence surveys commenced 15 minutes before sunset and continued for 1.5 hours after sunset. Re-entry surveys commenced 1.5 hours before sunrise. This follows the survey guidance as detailed in Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust, 2016). With sufficient surveyors to cover the identified PRFs and assisted by InfraRed (IR) camera equipment (see Table 10) .

Table 10 - Summary of Tree Emergence Surveys

Tree No.	Date	Dusk/ Dawn	Lead Surveyor	Assistant surveyors	Temp (^{O}C) Start/end	Cloud cover (0/8 – oktas)	Rain	Wind (Beaufort scale)
T1	25/08/20	Dusk	MES		19 / 18	8	Light	5
	16/09/20	Dusk	GS		23 / 21	2	None	1
T2	25/08/20	Dusk	MS	JP	18 / 18	8	Light	5
	16/09/20	Dusk	HC		23 / 21	2	None	1
T3	25/08/20	Dusk	KW		18 / 18	7	Light/ none at start	5
	16/09/20	Dusk	RD		23 / 21	2	None	1
T5	21/09/20	Dusk	GS		19 / 17	0	None	0
T6	26/08/20	Dawn	MS	JP	17 / 17	7	None	4
T11	26/08/20	Dawn	MES		18 / 16	7	Light	4
T12	26/08/20	Dawn	KW		18 / 16	7	Light	4
T13	21/09/20	Dusk	GM		19 / 17	0	None	0
T14	15/09/20	Dusk	GS		22 / 20	7	None	0
T15	21/09/20	Dusk	EP		19 / 17	0	None	1
T16	23/09/20	Dusk	MH	CH, RD	15 / 14	8	Light/ intermittent	3
T18	15/09/20	Dusk	CH	RP	22 / 20	7	Light	1
T19	15/09/20	Dusk	MH		20 / 20	5	None	1

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T20	22/09/20	Dusk	MH		17 / 17	7	None	2

Licenced Surveyors:
Giles Sutton – Class Licence Number 2015-14225-CLS-CLS

Assistant Surveyors:
Surveyors – **KW** Kerry White, **MSh** Mark Sherlock, **CM** Cathy Mayne, **GS** Giles Sutton, **RD** Ryan Davies, **SC** Sam Crofts, **MLS** Monica Lozano-Subiranas, **GR** Gareth Ryman, **CH** Cathy Holwill, **RP** Richard Pike, **MS** Myles Sedgwick, **JP** Joshua Pearce.

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3.5.12 Buildings

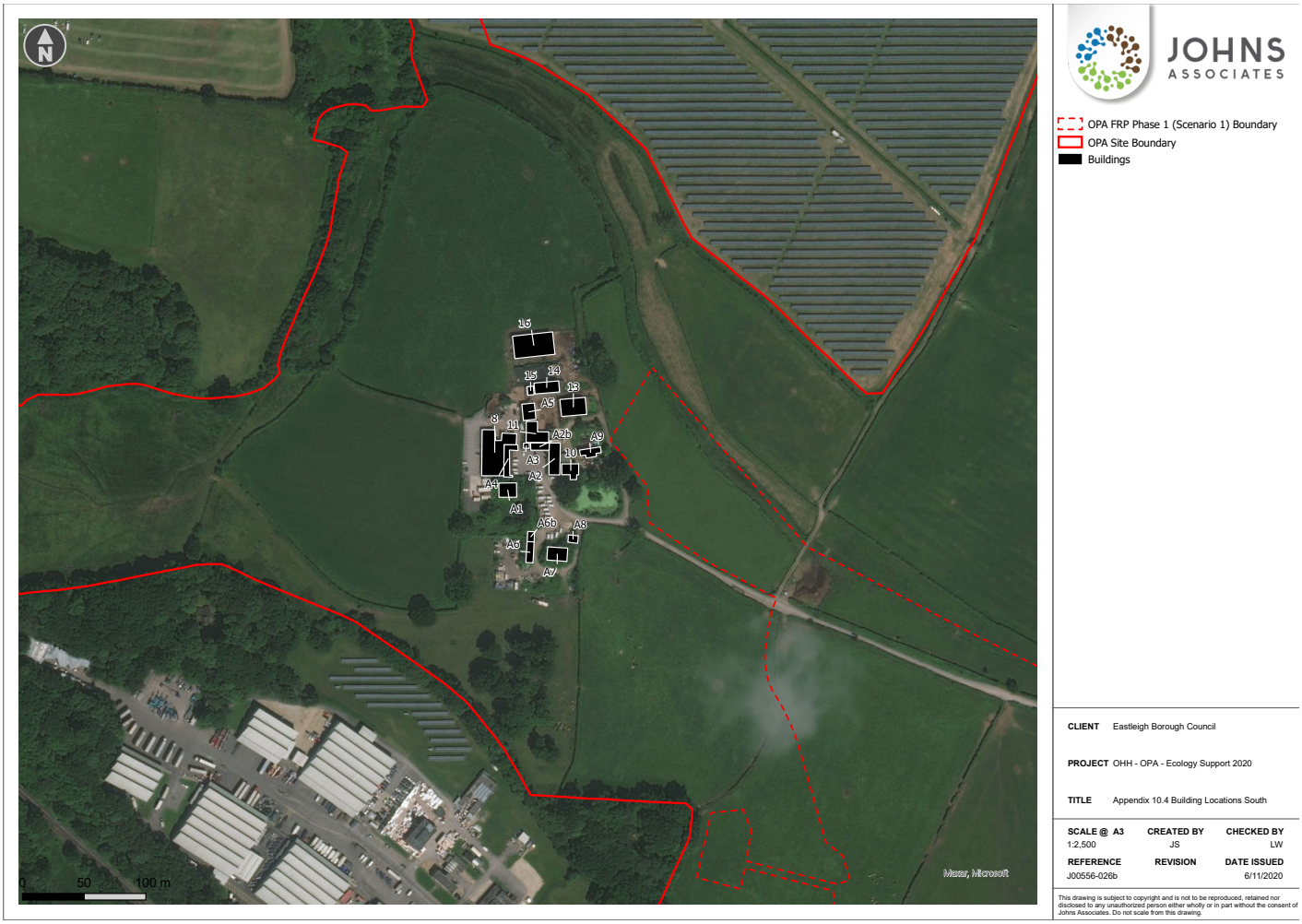
All buildings within Site boundary were subject to both internal and external inspections for potential roost features (PRFs) that could support roosting bats in accordance with Bat Survey Guidelines for Professional Ecologists: (Bat Conservation Trust, 2016), see Figure 6 and Figure 7.

Figure 6 - Building locations and numbering in the North of the Site



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Figure 7 - Building Locations and Numbering in the South of the Site



Highly experienced and licenced bat ecologists, Lis Weidt (Licence number: 2015-10314-CLS-CLS), Jenny Bennett (Class Licence Number 2015-13574-CSL-CLS) and Ben Mitchell (2015-11990-CLS-CLS), conducted the building surveys to ensure an accurate evaluation of the suitability of the structures for roosting bats which were carried out as per Table 11.

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Table 11 - Summary of Building Assessment Dates

Building No.	Date of Assessment	Assessor
A1	16/08/18 No Internal Access due to unsafe building	Lis Weidt
A7	16/08/18 No Internal Access due to unsafe building	Lis Weidt
A2 & A2b	16/08/18	Lis Weidt
A3	16/08/18	Lis Weidt
A4	16/08/18	Lis Weidt
A5	16/08/18	Lis Weidt
A6 & A6b	16/08/18	Lis Weidt
A8	16/08/18	Lis Weidt
8	16/08/18	Lis Weidt
10	16/08/18	Lis Weidt
11	16/08/18	Lis Weidt
13	16/08/18	Lis Weidt
14	16/08/18	Lis Weidt
16	16/08/18	Lis Weidt
B17	05/09/18	Jenny Bennett
B18	05/09/18	Jenny Bennett
B19	05/09/18	Jenny Bennett
B20	05/09/18	Jenny Bennett
B21	29/05/20	Ben Mitchell
B22	22/08/18	Lis Weidt
B23	22/08/18	Lis Weidt
B24	22/08/18	Lis Weidt
B25	08/08/18	Lis Weidt
B26	22/08/18	Jenny Bennett
B27	22/08/18	Jenny Bennett
B28	22/08/18	Jenny Bennett
B29	22/08/18	Jenny Bennett

This allowed the classification of buildings as per Table 12 to inform the requirement for the number of subsequent emergence/re-entry surveys to give a sufficient confidence in an absence result.

The building inspections were carried out from the ground and ladder using close focusing binoculars, an endoscope and a torch, as required.

Where areas were not accessible due to unacceptable safety risks, a precautionary approach has been taken to the assessment of the suitability of this structure for bats.

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Table 12 Guidelines for assessing the potential suitability of proposed development sites for bats, based on presence of habitat features within the landscape, to be applied using professional judgement (Bat Conservation Trust, 2016).

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions (a) and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential (b).	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions (a) and surrounding habitat but unlikely to support a roost of high importance/ value for the local bat population (c).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions (a) and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree- lined watercourses and grazed parkland. Site is close to and connected to known roosts.
a. For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance. b. This system of categorisation aligns with BS8596:2015 Surveying for bats in trees and woodland (BSI,2015). c. Assessment is made with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed		

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3.6 EMERGENCE/RE-ENTRY SURVEYS

Emergence surveys commenced 15 minutes before sunset and continued for 1.5 hours after sunset. Re-entry surveys commenced 1.5 hours before sunrise. This follows the survey guidance as detailed in Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust, 2016).

The number of surveyors is detailed Table 13.

All surveyors were equipped with a highly sensitive Elekon BatLogger M ultrasonic detector. The surveyors were positioned in order to have an unrestricted view of the all elevations and the roof of each building, in particular identified potential roost features within the detection range of the ultrasonic detector.

All bat activity observed during the survey period was recorded with particular attention being given to any emerging or re-entering bats, the number of bats and the number and locations of any points of entry or exit from the building. Bat detector recordings were analysed following the survey in order to confirm the identification of the bats recorded emerging/re-entering during the surveys. Additional notes on particular recordings/species of note will also be included.

Table 13 - Summary of building surveys

Building No.	Date	Dusk/ Dawn	Lead Surveyor	Assistant surveyors	Temp (OC) Start/end	Cloud cover (0/8 – oktas)	Rain	Wind (Beaufort scale)
A1	19/07/18	Dawn	RD	MLS, CH, GR,	13/12	7	0	0
	30/07/18	Dusk	KW	CA, WS, JW	18/18	7	0	0
	23/08/18	Dawn	LW	KW, AL, GH	22/21	8	0	1-2
A7	19/07/18	Dusk	JR	JWa	23/23	6	0	0
	16/08/18	Dawn	LW	KW, MSh	18/17	7	1	3
	30/08/18	Dusk	GS	RD, MLS	16/14	6	0	0
A9	18/07/18	Dusk	RD	MLS, CH, GR,	18/16	3	0	0
	31/07/18	Dawn	KW	CA, JW, WS	18/17	8	1	0
	21/08/18	Dusk	LW	GH, KW, AL	21/18	1	0	0
A6 & A6a	19/07/18	Dusk	LW	WS	24/23	4	0	0
	16/08/18	Dawn	LW	AL	19/19	8	1	3-4
	30/08/18	Dusk	GS	GR, MLS, SC	16/14	6	0	0
A2, A2a & A3	25/07/18	Dawn	BM	JWa, AL, CA,	18/17	1	0	0
	16/08/18	Dusk	RD	MLS, SC, GR	17/14	1	0	2
	30/08/18	Dawn	LW	KW, GH, AL, LWi	14/12	7	0	0
A4	20/07/18	Dawn	LW	JWa, JR, WS	20/20	8	0	0
	15/08/18	Dusk	LW	KW, LWi, AL	19/19	2	0	2-3
	06/09/18	Dusk	RD	SC, MLS, GR	16/15	8	0	2
A5	24/07/18	Dusk	JB	PW, AL, CA, JW	24/22	0	0	0
	17/08/18	Dawn	RD	MLS, SC, GR	10/10	0	0	0
	31/08/18	Dawn	RD	GR, MLS, SC	10/11	7	0	0
B17	09/08/18	Dawn	RD	GR, SC, MLS	14/14	8	1	0
	22/08/18	Dusk	LW	GH, MSh	22/20	8	0	2

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	13/09/18	Dusk	KW	TJ	18/17	7	0	0
B18	09/08/18	Dawn	RD	GR, CH	14/14	8	1	1
	22/08/18	Dusk	LW	AL, KW, LWi	22/20	8	0	2
	13/09/18	Dusk	KW	MS, LWi, CA	19/16	7	0	0
B20	08/08/18	Dusk	RD	MLS, CH, SC, GR	17/16	7	0	2
	05/09/18	Dusk	JB	KW, LW, TJ, CM	20/16	1	0	1
	11/09/18	Dusk	RD	GR, SC, MLS, CH	18/17	8	0	3
B25	30/07/18	Dusk	GS	RP, RD, CH, MLS, SC	17/17	7	0	2
B29	26/07/18	Dusk	GS	CH, RP, MLS,	22/21	6	0	0
	22/08/18	Dawn	LW	KW, GH, AL,	18/16	7	0	0
	06/09/18	Dawn	KW	LW, CM, TJ	12/8	0	0	0
B22	01/08/18	Dusk	GS	MLS	18/17	1	0	1
	21/08/18	Dusk	RD	GR	17/17	0	0	0
	07/09/18	Dawn	RD	MLS	9/8	0	0	0

Lead Surveyors:
Giles Sutton – Class Licence Number 2015-14225-CLS-CLS
Lis Weidt – Class Licence Number 2015-10314-CLS-CLS
Gareth Harris – Class Licence Number 2015-11684-CLS-CLS
Jenny Bennet – Class Licence Number 2015-13574-CSL-CLS

Assistant Surveyors:
Surveyors – **JB** Jenny Bennet, **BM** Ben Mitchell, **LW** Lis Weidt, **JR** Juliet Reid, **KW** Kerry White, **JW** Jasmine Walters, **TJ** Tom Johnston, **LWi** Leo Wirtz, **MSh** Mark Sherlock, **GH** Gareth Harris, **AL** Anna Lucey, **CA** Charlotte Atkins, **CM** Cathy Mayne, **WS** Will Slark, **JWa** Johnny Walker, **PW** Phil Walker, **GS** Giles Sutton, **RD** Ryan Davies, **SC** Sam Crofts, **MLS** Monica Lozano-Subiranas, **GR** Gareth Ryman, **CH** Cathy Holwill, **RP** Richard Pike, **MS** Myles Sedgwick, **JP** Joshua Pearce.

Table 14 - Summary of update building surveys in 2020

Building No.	Date	Dusk/ Dawn	Lead Surveyor	Assistant surveyors	Temp (OC) Start/end	Cloud cover (0/8 – oktas)	Rain	Wind (Beaufort scale)
B29	08/07/20	Dusk	KW	MSh, MS, CM	18/17	6	0	2
B21	16/07/20	Dusk	LW	CM	24/20	7	0	2
	27/07/20	Dusk	MS	JP	19/17	5	0	3
	13/08/20	Dawn	MS	JP	22/21	8	0	1

Licenced Surveyors:
Lis Weidt – Class Licence Number 2015-10314-CLS-CLS

Assistant Surveyors:
Surveyors – **LW** Lis Weidt, **KW** Kerry White, **MSh** Mark Sherlock, **CM** Cathy Mayne, **MS** Myles Sedgwick, **JP** Joshua Pearce.

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3.7 ROAD CROSSING POINT SURVEYS

These were designed to determine whether bats are using regular flightpaths to cross current habitat that will be severed by the link road construction and therefore to enable prediction of the impacts of the proposed road across the site from north to south.

The survey methodology is based on WC1060 Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure (J. Altringham & A. Berthinussen, 2015); and is also based on Johns Associates' experience undertaking crossing point surveys e.g. relating to the A303 Stonehenge improvement scheme in 2017. The survey consisted of visual observations of bats crossing the proposed severance locations at a particular point over 60 min periods post dusk or pre-dawn.

Observations consisted of counts of all commuting bats, with data on flight height, direction and distance from the linear habitat feature (pre-construction), paired with echolocation recordings for species identification.

A total of eight survey visits were completed as detailed in Table 15. The surveys completed in both July and August were "back to back" surveys where the crossing points were monitored at dusk and then dawn in the same night. Two surveyors were deployed at each location on opposite sides of the road. Elekon Batlogger M detectors were used for all surveys.

The location of the crossing points and surveyor locations are contained in Figure 8.

Table 15 - Details of Crossing Point Surveys

CP Number	Date	Dusk/ Dawn	Start/ End Times	Surveyor (s)	Temp. (°C)	Wind (0-12)	Cloud Cover (0-8)	Rain (0-5)
CP1	20/06/2019	Dusk	21:23 – 22:30	LW, CM	18	2	7	0
CP1	02/07/2019	Dusk	21:30 – 22:35	CM, MS	16	2	1	0
CP1	03/07/2019	Dawn	03:55 – 05:00	CM, MS	15	2	6	0
CP1	21/08/2019	Dusk	20:15 – 21:15	LW, CM	16	1	2	0
CP1	22/08/2019	Dawn	05:00 – 06:00	LW, CM	13	1	1	0
CP1	11/09/2019	Dusk	19:29 – 20:29	LW, CM	19	2	8	1
CP2	20/06/2019	Dusk	21:23 – 22:23	LW, TJ	15	1	3	0
CP2	02/07/2019	Dusk	21:30 – 22:35	LW, NR	17	2	1	0
CP2	03/07/2019	Dawn	03:55 – 05:00	LW, NR	15	2	6	0
CP2	21/08/2019	Dusk	20:15 – 21:15	TJ, CA	15	0	5	0
CP2	22/08/2019	Dawn	05:00 – 06:00	TJ, CA	10	0	1	0
CP2	11/09/2019	Dusk	19:29 – 20:29	KN, JW	19	1	7	1
CP3	20/06/2020	Dusk	21:23 – 22:23	KW, NR	15	1	4	0
CP3	04/07/2019	Dusk	21:22 – 22:22	KW, WS	19	0	0	0
CP3	05/07/2019	Dawn	03:58 – 04:58	KW, WS	15	0	5	0
CP3	21/08/2019	Dusk	20:15 – 21:15	KW, WC	18	0	3	0
CP3	22/08/2019	Dawn	05:00 – 06:00	KW, WC	10	0	0	0
CP3	11/09/2019	Dusk	19:29 – 20:29	KW, WC			8	1
CP4	22/06/2020	Dusk	21:23 – 22:23	LW, KN	17	1	1	0
CP4	23/07/2020	Dusk	21:04 – 22:04	LW, CM	19	1	8	0
CP4	24/07/2020	Dawn	04:20 – 05:20	LW, CM	17	0	8	0

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CP4	18/08/2020	Dusk	20:19 – 21:19	LW, KW	19	1	1	0
CP4	19/08/2020	Dawn	05:00 – 06:00	LW, KW	17	3	8	0
CP4	14/09/2020	Dusk	19:20 – 20:20	KN, CM	19	1	0	0
CP5	22/06/2020	Dusk	21:23 – 22:30	KW, CM	16	1	0	0
CP5	23/07/2020	Dusk	21:04 – 22:04	KW, MES	19	2	8	0
CP5	24/07/2020	Dawn	04:20 – 05:20	KW, MES	17	0	8	0
CP5	18/08/2020	Dusk	20:19 – 21.19	KW, MES	20	0	1	0
CP5	19/08/2020	Dawn	05:00 – 06:00	KW, MES	18	2	8	0
CP5	14/09/2020	Dusk	19.20 – 20.20	LW, MW	19	1	1	0

Figure 8 - Crossing Point Locations



3.8 TRAPPING SURVEYS

Three periods of trapping surveys were carried out within the site. The first was carried out in August 2018 as a preliminary survey to inform the potential need for radio tracking surveys. The second was carried out as part of the Radio Tracking surveys (see section 3.9) and the third was carried out in August 2020 as a substitute to planned Radio Tracking survey. Due to COVID-19 restrictions 2020 it was considered that Radio Tracking could not be carried out due to health and safety as social distancing would be difficult to maintain and the application of tags to bats presented an unacceptable risk of COVID-19 transmission to bats in accordance with IUCN and BCT guidance.

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All tapping surveys targets Myotis Species in order to identify if Bechstein's bats are likely to be present within the site and to identify the importance of the site for breeding bats, in particular barbastelle, myotis and serotine bats. Data regarding the sex and breeding status would be used to assess the likelihood of the site being within a Core Sustenance Zone (CSZ) for a maternity colony.

3.8.13 Personnel

Trapping surveys were undertaken by Gareth Harris in 2018 and by Eric Palmer in 2019 (as part of radiotracking surveys) and Daniel Whitby and Eric Palmer in 2020.

Gareth Harris

This work was undertaken by Gareth Harris, who has 10 years' experience of advanced survey techniques for bats including mist netting, harp trapping, use of acoustic lures and radiotracking of species including Bechstein's bat and Barbastelle bat. Johns Associates provided 1-2 field assistants on each night.

Gareth currently holds Licence registration number 2015-11684-CLS-CLS for Bat Survey Class Licences CL19 & CL20. Gareth has been an Accredited Agent on the following licences:

- Project licence of Dr Fiona Mathews, University of Sussex, Brighton. Reference number: 2018-36143-SCI-SCI. Accredited Agent since 2013.
- Project licence in name of Wil Ponting, Wiltshire Bat Group (ref: 20112322, 20121758, 20130812, 2014/SCI/0472). Project licence for the Cotswold Water Park & Braydon Forest.
- Project licence in name of Dr Ian Davidson-Watts (ref: 2017-28589-SCI-SCI-1) with respect to the A303 Amesbury-Berwick Down / Stonehenge Bypass project.
- Project licence in name of Dr Ian Davidson-Watts with respect to Atkins project, Dunsbury Park, Havant. Targeting Bechstein's bats for radiotracking.

Daniel Whitby

Daniel is the managing director of AEWC Ltd and the Principal bat specialist.

Daniel is an experienced ecologist who has specialised on bats for 20 years. During his career, he has specialised in bat work specifically on the rarest UK species and advanced survey techniques, notably trapping, use of ultrasonic lures and radio tracking with extensive experience in use of night vision equipment for surveys. Daniel provides training and advice to individuals and organisations including the Bat Conservation Trust, academic researchers and Natural England and is a research associate with Bristol University, as well as providing training abroad. Daniel has held numerous Natural England scientific project licences which have involved radio- tracking and research into all 17 UK breeding species including all Annex II species, namely Barbastelle, Bechstein's, Greater Horseshoe and Lesser Horseshoe, as well as a number of species abroad. Daniel is specialist in advanced bat identification and was the last person to discover the latest new bat species ion the UK, the Geoffroy's bat and currently leads research in the most recently discovered breeding species, alcathoe, including estimating the UK populations. Daniel's bat expertise is recognised by Natural England, he is a Roost Visitor Trainer for NE and Bat Conservation Trust (BCT) (since 2012) and wrote sections of the BCT survey guidelines as well as being the specialist reviewer for the advanced survey section and currently provides training to the NE bat team. He has been selected by Natural England as a 'registered consultant' to be able to use the low impact class licence which enables them to register sites under their licences for low and temporary impact work to certain bat roosts used by small numbers of common bat species. Daniel was also selected to participate in the trial of the low impact licence and was the only consultant asked to trial the new Annex EPS licence ahead of its release.

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Eric Palmer

Eric currently holds a Natural England Licence for capture and radio-tracking of Bechstein's and Barbastelle bats in Gloucestershire (licence number 2019-40502-SCI-SCI held from 2006 to present). The project has seen the trapping and ringing of 10 species of bats and the radio-tracking of Barbastelle bats in the Leadon Valley, from Highnam Woods RSPB reserve, near Gloucester, and at Lower Woods Gloucestershire Wildlife Trust Nature Reserve in South Gloucestershire. His latest Scientific licence was for capture and radio-tracking of greater horseshoe bats from Dean Hall in the Forest of Dean in 2019 (Licence number 2019-40749-SCI-SCI). Eric has extensive experience of radio-tracking elsewhere, having participated in projects on Barbastelle bats in Savernake Forest and Bechstein's bats at Trowbridge (2002 to 2006; both projects under the licence held by Mr. Steve Laurence of Wiltshire Bat Group). He participated in a project radio-tracking Barbastelle bats in the area around Moccas Park in Herefordshire in 2006 (EN licence: 20062061) and was an accredited agent under this licence. Eric was also an accredited agent under a licence to trap and radio-track greater horseshoe bats from the Pembrokeshire SAC population in 2005-6, (CCW Licence number OTH:CSAB:08:2005 and OTH:SRAB:01:2006).

3.8.14 Licensing from Natural England

This work was undertaken and coordinated by Gareth Harris - Licence registration number 2015-11684-CLS-CLS under the terms of Bat Survey Class Licences CL19 & CL20, permitting the use of mist nets, harp traps and acoustic lures.

3.8.15 Catching bats

A combination of Faunatech AustBat harp-traps and Avinet / Ecotone mist nets with acoustic lures were used to catch bats. Acoustic lures comprised two Sussex Autobats (Hill and Greenaway 2005), broadcasting a series of woodland bat calls, including Bechstein's and Barbastelle bat calls.

All bats trapped were promptly and safely extracted from mist nets and harp traps by experienced fieldworkers. All bats were identified, sexed, biometrics taken, and breeding condition recorded. All data was recorded on field pro formas, digitised and shared with the local records centre and relevant land managers.

3.8.16 Timetable

In 2018 two nights of Trapping were undertaken on 15th and 16th August and in 2020 three nights of trapping were undertaken at the beginning of August on 3rd, 4th and 5th. Both of these periods are towards the end of the maternity period for Bechstein's and Barbastelle bats. Capture of a lactating female would confirm the trapping location was within the maternity area of a maternity colony of Bechstein's bats or Barbastelle bats (see Figure 9 for 2018 locations and Figure 11 for 2020 locations).

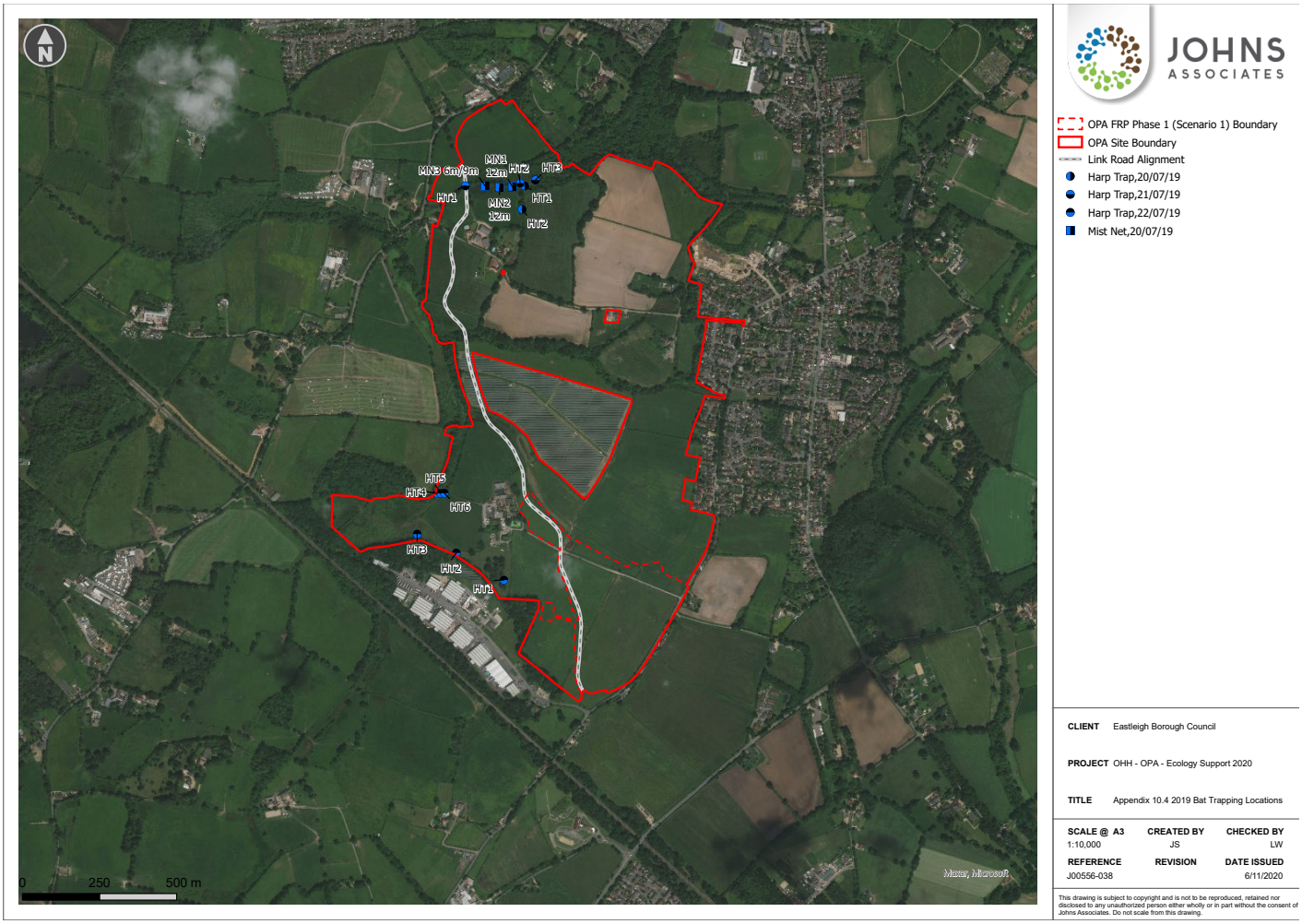
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Figure 9 - Locations of Trapping survey 2018



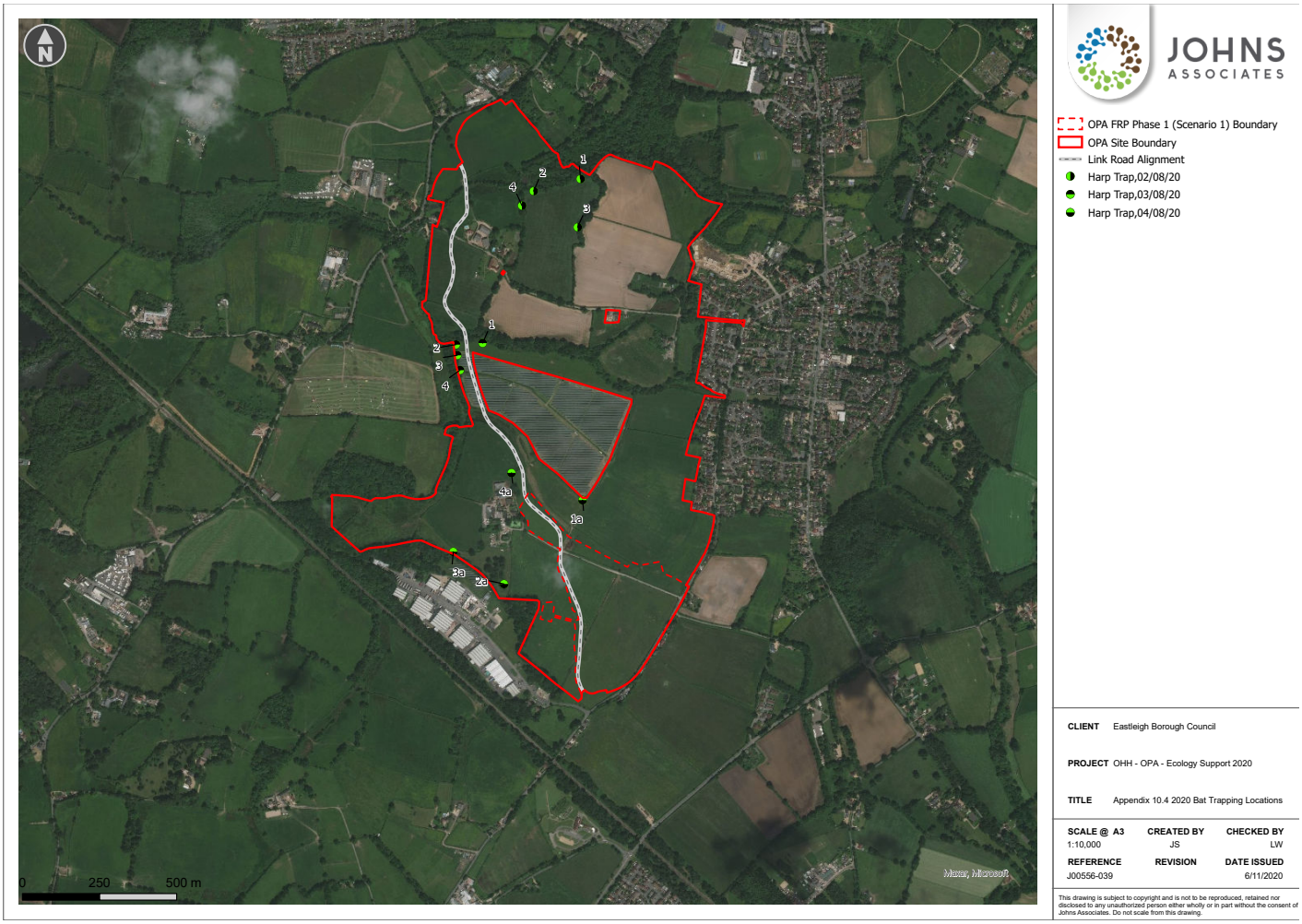
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Figure 10 - Trapping location for Radio Tracking 2019



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Figure 11 - Trapping Locations in 2020



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3.9 RADIO TRACKING SURVEYS

3.9.17 Locations

Three trapping locations were sampled at the locations of the most significant impacts (particularly road severance locations). Indicative locations are included in (see Figure 10) with exact locations within these habitats agreed during a site visit prior to surveys.

The project area is intended to cover the zone of influence of the Proposed Development, considered to be 5km from the centre of the development site or as determined by the range of radiotagged bats.

3.9.18 Catching bats

A combination of harp-traps and mist nets will be used in association with an acoustic lure (The Sussex Autobat) at three locations to catch the following species (see Table 16):

Table 16 Species Selection

Tier	Species	Round 1 (Late July 2019)	Round 2 (Late May – Early June 2020) Cancelled due to COVID-19	Selection Rationale
Tier 1 Bats	*Myotis bechsteinii*	2	2	Prioritise adult females of appropriate weight over adult males and juveniles
	Barbastellus barbastella	2	2	
	Eptesicus serotinus	2	2	
Tier 2 bats	*Plecotus auritus*	2	2	Two bats of these species depending on priorities at trapping site, success of trapping and numbers of tier 1 bats trapped (i.e. to balance numbers of bats being tracked). Prioritise adult females of appropriate weight over adult males and juveniles
	Myotis natteri			
	Myotis daubentonii			
	Myotis mystacinus			
	Myotis brandtii			
Additional Species of Interest	*Rhinolophus ferrumequinum*			To be added to licence in unlikely situation that these species are captured given such low numbers/none or individuals are expected. These individuals would be tagged (where of appropriate weight) as a matter of priority, regardless of age and sex.
	Plecotus austriacus			
	Pipistrellus nathusii			
	Nyctalus Leisleri			

Catching effort will apply to up to three adjacent locations at any one time across the site, with a minimum of two competent field workers at each location. Two of the locations will be manned by the licensee and a Class 4 licence holder. The locations will be at least 250m apart, with the acoustic lure deployed at intervals between the locations throughout catching nights, as recommended by the manufacturers.

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Fitting of radio tags and data collection

A selection of captured bats showing good body condition will be fitted with radio-tags. Body condition will be determined by dividing the weight by the forearm length. This will be compared with published data for the species. Radio-tags will be fitted using Vetbond veterinary surgical glue. Biotrack Pico-pip radio-tags will be fitted. Fixing of radio-tags will be only be undertaken by licensee Eric Palmer.

Radiotracking

A maximum of five bats will be radio-tracked during each of the two sessions in order to gather representative information on foraging areas and roost sites over the summer season. The period mid-June to mid-July will be avoided to reduce the possibility of catching heavily pregnant females or those carrying very young pups.

Equipment used to receive signals from transmitters will comprise of three Australis scanning receivers made by Titley Scientific. These are capable of scanning for all frequencies programmed into their memory banks to enable more than one bat to be tracked at one time.

Focal animal sampling will be used to record the radio-tracked bat's activity every five minutes (whenever contact is established). Triangulation of "Location fixes" will be noted every five minutes whenever more than one surveyor is in contact with a bat. Otherwise, this will be achieved by the surveyor moving relative to the bat. This will result in a series of locations on a map, with note taken of activity (moving or ctorte), as well as apparent habitat use.

Wherever possible, bats will be followed throughout their nightly activity period. Roost sites will be identified by locating radio-tagged bats during daytime and then posting volunteers to watch bats emerging at dusk by appropriate means (e.g. infra-red cameras); these emergence observations will also provide an opportunity to assess population size. Roost sites will be marked and characterised.

Personnel

The project is being managed by Ben Mitchell BSc (Hons) MCIEEM (Project Manager & intended limited accredited agent), supported by Eric Palmer CEnv MCIEEM (Licensee) on behalf of Johns Associates, as appointed by Eastleigh Borough Council (the land owner).

The radio-tracking and capture would be undertaken under a project-specific licence held by Eric Palmer, a current licence holder for radio-tracking Bechstein's and barbastelle in Gloucestershire. The tagging of bats will be carried out by the licensee only. The subsequent radio-tracking will be undertaken by the project manager, assisted by members of the Project team and the Johns Associates ecology team, as required.

Ben Mitchell

Ben is a Principal Ecologist at Johns Associates and manages the ecology team as well as his own portfolio of projects and managed the radiotracking project on this site (Licence Ref: 2019-40848-SCI-SCI). He has worked in the professional consultancy and nature conservation sectors, both within the UK and internationally for over 18 years. Ben has personally delivered a number of large scale, complex projects including a 2300 unit housing development in Eastleigh, creation of 10.2ha of heathland on behalf of HS2 and ecological impact assessments of a number of sensitive and designated sites within South West England. He has also been instrumental in the delivery of the Corsham "Batscapes" element of the Corsham Neighbourhood Plan and the Trowbridge Bat Mitigation Strategy for Wiltshire Council.

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Ben currently holds 2015-11990-CLS-CLS (CL18, Bat Survey (Level 2)) and holds corresponding licenses in Scotland and Wales. He has acted as named ecologist on several active bat mitigation licenses, including licenses permitting impacts to maternity roosts. (2015-11070-EPS-MIT, 2016-25512-EPS-MIT, 2017-31969-EPS-MIT, 2018-33840-EPS-MIT). He has also acted as an assistant/accredited agent on several mitigation licenses (2014-433-EPS_MIT, EPSM2008-280, 2015-13135-EPS-MIT, 2015-10985-EPS-MIT, 2015-7551-EPS-MIT-1, BAT-817-NAW-IND, EPSM2012-24508, EPSM2012-24508, EPSM2014-6994, EPSM2012-4220 & EPSM2013-5434). He is currently training towards his CL20 class license through supporting Gareth Harris (see below) with the Wiltshire Bechstein's Bat & Barbastelle Project (2014-present) run by Gareth Harris and Savernake Forest Bat studies, including hibernation & swarming surveys of the disused railway tunnel in Marlborough run by Lisa Wade and Gareth Harris. He has also attended the BCT 5 day Advanced Bat Licence Techniques course in 2016.

Ben routinely draws on his broad range of experience of managing ecological projects for local authorities, National Park Authorities and the RSPB to compile targeted mitigation strategies for a range of protected species and habitats. He has a strong record of project management from managing high value, complex, nationally important conservation projects, to delivering infrastructure scale ecological surveys for major international engineering companies.

Ben is an experienced tree climber and has inspected over 500 trees for bat roosts for several large infrastructure projects across the UK.

3.10 CONSTRAINTS AND LIMITATIONS

On the second trapping night an adult male Daubenton's bat was trapped on the 21st July at 22:40 which was a sufficient weight to be fitted with a radio tagging equipment. Subsequently after the bat was released the radio-tag could not be located with the equipment and it is thought that the tag was faulty and had failed.

On the night of the 23rd July the weather developed into a thunder storm between 00:00 and 02:00, during this time radio tracking was halted as the weather conditions were unsuitable and unsafe to continue surveying.

On the 24th of July two surveyors went to undertake a tree emergence survey where the brown long eared bat was radio-tracked to in hearts copse woods. The surveyors couldn't pick up a signal from the bat on arrival it was assumed the bat may have moved roost location during the day.

During the tree emergence survey of the 2nd Natterers roost on the 25th July there was power failures of the infer red cameras and night vision video recorders, no bats were recorded leaving the roost during this survey.

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4 RESULTS

4.1 HABITAT SUITABILITY

A formal phase 1 habitat survey of the wider Horton Heath site including the areas due to be affected by construction Phases A1 and A2. The Phase 1 habitat survey was completed on between 25th – 6th August 2018 Jenny Bennett BSc MSc MCIEEM PIEMA and Jasmine Walters BSc (Hons) GradCIEEM from Johns Associates.

The survey categorized the site into high suitability habitat in the north, moderate suitability across the middle and low in the south of the site and current guidance as to the survey effort for each of these habitats was followed in terms of survey effort for transects and automated bat detectors.

4.2 TREE ROOST ASSESSMENT

4.2.1 Emergence Surveys

One active roost was found during the tree emergence surveys. Observation of the behaviour and the time of year leads to the conclusion that T19 is a noctule mating roost, in addition to this survey, surveys in 2018 of Pond Cottages adjacent to T19 observed a noctule lekking from a tree by the pond which is considered likely to be T19.

No other active roost where found during these surveys, this data has been combined with the aerial inspections' surveys see Figure 19

Table 17 - Results of Tree Emergence/ Re-entry Surveys

Tree No.	Date	Survey Start - End	Species Roosting within Tree	Number of bats	Time	PRF used
T1	25/08/20	19:49 – 21:34	None			
	16/09/20	19:02 – 20:47	None			
T2	25/08/20	19:49 – 21:34	None			
	16/09/20	19:02 – 20:47	None			
T3	25/08/20	19:49 – 21:34	None			
	16/09/20	19:02 – 20:47	None			
T5	21/09/20	18:49 – 20:34	None			
T6	26/08/20	04:40 – 06:25	None			
T11	26/08/20	04:40 – 06:25	None			
T12	26/08/20	04:40 – 06:25	None			
T13	21/09/20	18:49 – 20:34	None			
T14	15/09/20	19:03 – 20:48	None			
T15	21/09/20	18:49 – 20:34	None			
T16	23/09/20	18:45 – 20:30	None			
T18	15/09/20	18:45 – 20:49	None			
T19	15/09/20	18:35 – 20:30	Noctule	3	18:40, 18:45, 19:57	Tear out at the top of the tree: two Noctule were flying 40mins before sunset, 1 entered the feature at 18:40 and the two emerged at 18:45 and 19:57.
T20	22/09/20	18:47 – 20:32	None			

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4.2.2 Aerial Inspection Survey

Results of the aerial inspection survey and final assessment and categorization of trees for suitable potential roost features are detailed in Table 18. Seven trees are considered to have high suitability, nine are considered to have moderate suitability, three are considered to have low suitability and three have been confirmed as having negligible suitability at the time of survey.

One confirmed roost was found (T23) during the survey of a brown long-eared roost which was found on the 20th October and re-checked on the 27th October with the maximum count of 2 individuals present on the 20th October.

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Table 18 - Results for Aerial Inspection Survey

Tree ID No	Category	Species	DBH	Height	PRF	Orientation	Height	Ivy Present?	Areal Inspection?	Post Inspection	Comments from tree climber
T1	High	Alder	60cm	19m	Knot Hole	SW	8m	N	Yes	High	High: Old bee hive present
					Knot Hole	SW	7m				High: Extends downwards 35cm
					Knot Hole	S	7m				Low: Cob web and debris present
					Knot Hole	S	5m				Low: Enlarged by squirrel but does not extend up or downwards
					Knot Hole	S	5m				Neg: Does not extend
					Knot Hole	SW	4m				Neg: Does not extend
					Knot Hole	S	3.5m				Low: Dry but does not extend far
					Knot Hole	W	3m				Neg: Cob web and damp present
					Knot Hole	SE	3m				Low: Dry with cob webs present
					Knot Hole	SE	2.5m				High: Small crevice feature which extends 30cm downwards. Old birds nest present at the bottom
T2	High	Alder	50cm	12m	2 x Woodpecker holes	SE	3-4m	N	No (dead)	High	-
					1 x Knot Hole	SE	3.5m				
T3	High	Alder	75cm	14m	11 x Knot Holes	SE, E & S	4 - 7m	N	Yes	Neg	11 x knot hole features do not have cavities.
T4	Low	Oak	30cm	9m	1 x Tear Out	E	8m	N	Yes	Mod	Mod: Tear out feature extends inwards and had good dry cavity for bats and is considered moderate potential
					1 x Wound	S	1.5m				Low: A collection of leaves at the top. Some green, possible dormouse, but no woven structure; likely to be a woodmouse or squirrel (and hole was enlarged further suggests squirrel)
T5	Mod	Oak	50cm	11m	3 x Knot Holes	E	4 -7m	N	No - dead	Mod	-
T6	High	Oak	175cm	>15m	Tear Out	N	10m	Y	Yes	High	High: Cavity extends downwards 1m, dry
					Tear Out	NW	8m				High: Cavity extends downwards, dry
					Tear Out	W	6m				Neg: No cavity
					Tear Out	S	10m				Mod: large but open to the elements and wet at basse
					Wound	S	6m				Low: on upperside of limb, wet
					Wound	N	4m				Mod: on upperside of limb
T7	Mod	Oak	100cm	12m	1 x Transverse Cracks	W	5m	Y	Yes	Mod	Low: quite exposed feature but some suitable crevices present
					Wound	S	5m				Mod: Feature on southern limb with large cavity
T8	Low	Oak	1.5m	12m	Tear Out	SE	7m	N	Yes	High	Neg: No cavity present
					Tear Out	N	7m				High: large cavity which extends up and downwards, has been extended by squirrel
					Dead Limb	E	6m				Low: multiple small cavities
					1 x Compression Fork	E	8m				Neg: No cavity present
T9	Low	Oak	100cm	10m	Knot Hole	SE	4m	N	Yes	Low	Low: exposed, doesn't extend upwards or downwards by much
					Lifting bark	S	3m				Low: open at the top and limited in extend but still suitable.
T10	Low	Alder	30cm (MB)	12m	2 x Knot Holes	E & NE	6 - 7m	N	Yes	Neg	4 x knot holes inspected, none of them have cavities

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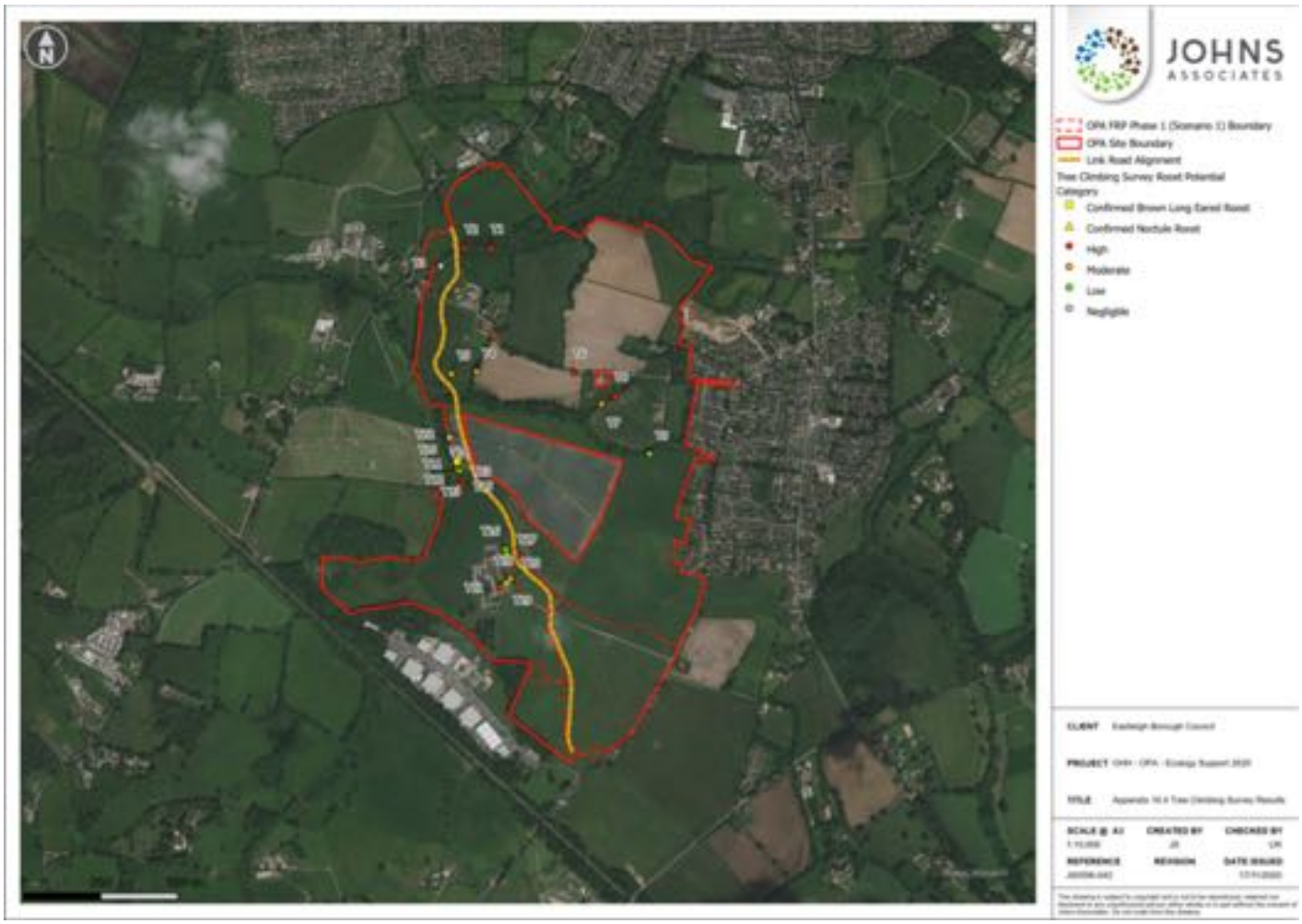
T11	High	Alder	50cm	12m	1 x Woodpecker Hole	E	4.5m	N	Yes	High	Squirrel present in the top of the feature. Squirrel damage to entrance.
T12	Mod	Alder	MB	11m	1 x Squirrel Hole	N	4m	N	Yes	Mod	Mod: cavity does not extend upwards, may extend downwards but could not fully inspect due to H&S
					Tear Out	N	7m				Mod: large cavity extends downwards, dry.
T13	High	Alder	60cm	11m	1 x Woodpecker Hole	E	7m	Y	Yes	Mod	Mod: does not extend far, enlarged by suirrel but dry cavity
					Tear Out	E	15m				Low: does not extend far and is exposed to the elements
					Fluting	E	10m				Low: does not extend far and is exposed to the elements
T14	Low	Ash	45cm	12m	1 x Shearing Crack	W	6m	N	No - ash dieback	Low	-
T15	Mod	Ash	75cm	11m	2 x Knot Holes	SW	4-6m	Y	No - ash dieback	Mod	-
					1 x Tear Out	SW	4-6m				
T16	Mod	Ash	50cm (MB)	12m	4 x Knot Holes	E, E/SE & NW	4-10m	N	No - ash dieback	Mod	-
					2 x Tear Out	S & SW	4-5m				
					1 x Wound	NE	2m				
T17	Mod	Oak	125cm	13m	1 x Knot Hole	S	8m	N	Yes	Low	Neg: no cavity present
					1 x Tear Out	E	6m				feature missing
					1 x But Rott	E	<1m				Low: some crevices present
T18	Mod	Oak	175cm	12m	3 x Tear Out	SE & SW	1.5-7m	N	Yes	Mod	As many features as possible were checked, but the poor weather conditions made it difficult. All features were low to moderate in potential being able to suport low numbers of bats and often being exposed to the weather.
					2 x Transverse Cracks	SE & SW	5m				
T19	High	Ash	75cm	13m	2 x Tear Out	NW	8-9m	N	No - ash dieback	High	Confirmed noctule mating roost though emergence surveys
T20	High	Oak	150cm	14m	Wound	N	11m	Y	Yes	Mod	Mod: dry cavity with space for small numbers of bats
					Wound	N	9m				Mod: dry cavity with space for small numbers of bats
					Tear Out	NE	7m				Low: limited space for 1 bat possible
T21	Low	Willow	50cm	10m	Tear Out	S/SW	6m	Y	Yes	High	Low: No dry cavities present at time of survey, possible suitblity on a dry warm day
					Tear Out	SW	5m				Low: small cavity present suitable for single bat
					Knot Hole	SW	5m				High: large cavity extending upwards by approx. 20cm
T22	Mod	Oak	60cm	14m	1 x Knot Hole	E	8m	Y	Yes	Neg	No cavities suitable for bats recorded.
					4 x Tear Out	E, W & SW	8m				
T23	High	Field Maple	11cm	8m	Wound	SE	1m	N	Yes	Comfirmed	Roost for brown long-eared bat with a maxium of 2 individuls recorded. Likely to be mating roost.

Key

	High
	Moderate
	Low
	Negligible
	Confirmed Roost

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Table 19 - Combined Aerial Inspection and Tree emergence surveys results



4.3 TRANSECT SURVEYS

In total seven species of bat were recorded during the activity surveys (see Table 7). Common pipistrelle was the most frequently recorded species across all three transects, followed by soprano pipistrelle in the high and moderate transects but Nyctalus spp. Was the second most recorded species on the Low transect. The full species assemblage for each transect is shown in Table 20 and broken down per month in Table 22 and Table 23.

The highest number of recordings for the High Transect were in May for common pipistrelle (448) with a drop in total recordings in June and July which is the peak maternity months rising again in August and September (423 and 595 respectively) during the peak juvenile months. Which suggest that this area of the site is not significant for lactating female common pipistrelle but maybe within the core substance zone for juveniles.

Myotis and Plecotus spp. similarly recorded the highest number of recordings in September on this transect as well.

The moderate transect route recorded a similar level of activity with common pipistrelle as the highest recorded species across all survey's dates. All other species were recorded at a rate on less than 20 recordings across all months with May as an exception for soprano pipistrelle.

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Common pipistrelle were recorded at the highest peak in May and July with the lowest recording in August across the Moderate Transect.

Statistical analysis using Mann-Whitney-Wilcoxon test comparing the level of recording per species between the High and Moderate Transects found a significant difference in the number of recordings for Plecotus spp., with a higher volume of Plecotus spp. recordings in the high transect when compared to the moderate transect route (with a $P<0.05$).

All other species were found to have a statistically similar level of activity.

The low transect route was only surveyed three times across the survey season following guidelines. It is therefore difficult to draw comparisons of the data with the other two transect routes due to the level of survey effort. Common pipistrelle and Nyctalus spp. were recorded at the highest peak during August over this route, again suggesting that the site is used by juveniles and post breeding adults.

Table 20 - Transect Survey Results – Total Passes Per Species per habitat suitability

Species	High	Moderate	Low
Common pipistrelle	20.43	23.49	9.20
Soprano pipistrelle	0.47	1.15	1.00
Myotis	0.40	0.15	0.11
Noctule	0.31	0.29	0.73
Nyctalus spp.	0.13	0	3.18
Serotine	0.12	0.10	0.16
Plecotus spp.	0.26	0.13	0

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Table 21 - Median Passes Per Hour Per Species, per month during the high transect surveys.

Species	April	May	June	July	August	September	October
Common pipistrelle	10.5	13.8	54.2	8.9	13	18.3	9.3
Soprano pipistrelle	0.77	1	0.09	0.33	0.18	0.43	1.35
Myotis	0.18	0.06	0.3	0.03	0.4	0.95	0.18
Noctule	0.27	0.18	0.46	0.15	0.09	0.09	0.03
Nyctalus spp.	0	0	0.03	0	0	0	0
Serotine	0.06	0.06	0.89	0.03	0.03	0.27	0.06
Plecotus spp.	0	0.06	0.06	0	0	0.55	0.24

Table 22 - Median Passes Per Hour Per Species, per month during the moderate transect surveys.

Species	April	May	June	July	August	September	October
Common pipistrelle	12.22	24.91	10.57	20.74	74	10.91	11.54
Soprano pipistrelle	0.34	2.85	0.22	0.22	0.91	0.97	0.86
Myotis	0.06	0.06	0.11	0.28	0.46	0.06	0.11
Noctule	0	0	0	0.57	0.17	0.11	0
Nyctalus spp.	0	0	0	0	0	0	0
Serotine	0.17	0	0	0	0.06	0	0.05
Plecotus spp.	0	0.06	0.06	0	0.11	0.06	0.11

Table 23 - Median Passes Per Hour Per Species, per month during the Low Transect Surveys.

Species	April	May	June	July	August	September	October
Common pipistrelle	NS	10.66	NS	NS	11.06	24.46	NS
Soprano pipistrelle	NS	0.13	NS	NS	2.13	2	NS
Myotis	NS	0	NS	NS	0.13	0	NS
Noctule	NS	0	NS	NS	0.13	2	NS
Nyctalus spp.	NS	0	NS	NS	1.46	7.6	NS
Serotine	NS	0	NS	NS	0.26	0.13	NS
Plecotus spp.	NS	0	NS	NS	0	0	NS

The highest level of recordings on the blue route were observed around Quobleigh Wood and the southern stream corridor. Light sensitive Plecotus spp. were most frequently recorded along the hedgerow connecting Victoria Farmhouse (see Figure 13) with Quableigh Woods which are considered likely to indicate an important connecting hedgerow for the brown long-eared maternity roost located within Victoria Farmhouse.

The highest level of recordings on the orange route were observed around the southern edge of the solar park and the parkland south out Chalcroft Farm complex. Light sensitive Myotis spp. were most frequently recorded south of Chalcroft Farm (see Figure 15).

The highest level of recordings on the green route were observed in fields to the east of the Chalcroft Farm complex. Light sensitive Myotis spp. were recorded at very low numbers on this route (see Figure 15). Large bats which are less light sensitive and specialize on feeding of larger prey items in open habitats such as beetles were most frequently recorded on this transect route.

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Figure 12 - All Species Records for All Months on High Habitat Transect Route

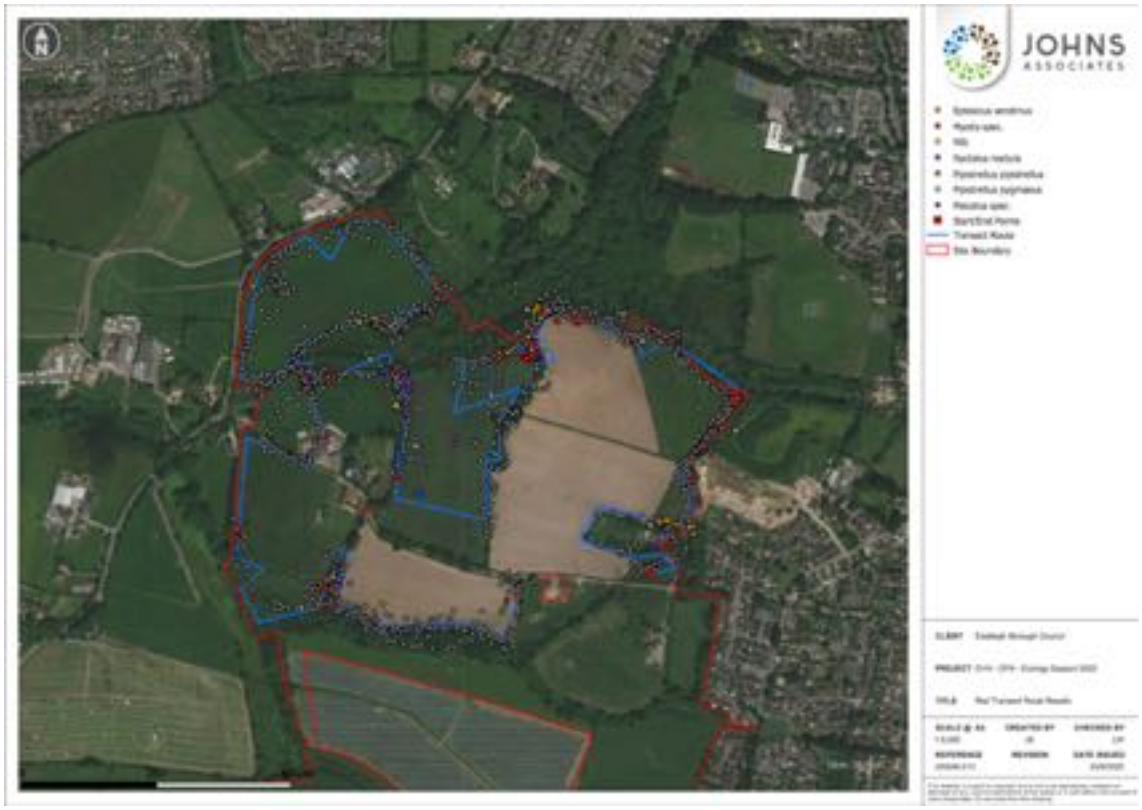


Figure 13 - Light Sensitive Species for all months on High Habitat Transect Route



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Figure 14 - All Species Records for All Months on Moderate Habitat Transect Route



Figure 15 - Light Sensitive Species Records for All Months on Moderate Habitat Transect Route



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Figure 16 - All Species Records for All Months on Low Habitat Transect Route



Figure 17 - Light Sensitive Species Records for All Months on Low Habitat Transect Route



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4.4 AUTOMATED DETECTOR SURVEYS

4.4.3 Total Overall Activity

Nine species and a total of 509,848 recordings were made across the 2018 - 2020 survey period, this is broken down into the following Table 24.

Table 24 - Total Species and Number of Recordings

Species	Total Count No.	Percentage of Total
Common pipistrelle	454154	89.08
Soprano pipistrelle	26082	5.12
Myotis	19927	3.91
Noctule	3927	0.77
Long-eared	2291	0.45
Nyctalus spp.	2001	0.39
Serotine	1372	0.27
Nathusius pipistrelle	51	0.01
Barbastelle	43	0.01

4.4.4 Species Assemblage Analysis

Non-metric multidimensional scaling (NMDS) analysis found that the species composition of the data set between years was not statistically significant at $P<0.05$ which means that data gathered from 2018, 2019 and 2020 had a similar composition of species (see Figure 3, Appendix A).

Cluster Analysis identified a number of automated bat detector locations which were statistically similar in species assemblage found three pairs of automated bat detector locations (ST14 and ST2, ST7 and ST3, ST5 and ST1), two clusters (Group 1: ST16 and ST12, ST15 and ST11 with ST4, Group 2: ST10 and ST9 with ST13 and ST8) where locations were of a similar species assemblage and one location which was entirely dissimilar to all other locations (ST6) (see 3.3, Appendix A).

4.4.5 Common Pipistrelle

Common pipistrelle was the most frequently recorded species during the automated bat detector and transect surveys, accounting for 89.08% of all recordings made during the automated bat detectors surveys (a total of 454,154 recordings were made for this species across all automated bat detector locations).

The majority of records for this species were recorded at ST1, ST5 and ST14 (see Table 7, Section 2.6, Appendix A) with ST5 recording the highest median number of recordings in total. It was found that there was a statistically significant difference between ST1 and seven of the other automated bat detectors ($P<0.04$), ST5 recorded a statistically significant difference with all but two of the other automated bat detectors (ST11 and ST14) to $P< 0.04$ and ST14 recorded a statistically significant difference with eight of the other automated bat detectors to $P<0.02$. This difference has been interpreted here recording a significantly higher levels of activity (see Table 22, Appendix A for full detailed table results).

Common pipistrelle were recording at high levels within the emergence window at every detector location except ST6. They were also recorded at high levels from sunset until the emergence window at every location and in every month. There were a few occasions were the level of pre-emergence window activity was reduced; ST2 in August, ST7 in July, ST8 in April and August, ST9 from June to October, ST13 in May and July, ST15 in May and at ST16 in all months except September.

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Recordings made within the species-specific emergence window (Russ J. , 2012) are considered to give an indication as to the likelihood of a roost being nearby. Therefore, recordings made close to or pre-sunset are likely to give a stronger indication of a roost nearby. More significantly at automated bat detector location ST4 and ST7 recordings were made up to dawn and 15 minutes after dawn for this species in August (10 recordings after dawn) and September (40 recordings after dawn) respectively (see Section 3.8 and 3.10, Appendix A). This is considered to be a strong indication that a significant roost was located nearby for this species in these months.

The median bat passes per hour per month found April, June and July to have the highest activity for common pipistrelle (see Table 9, Section 2.7, Appendix A) with a significant decrease in activity across the site in August, September and October. The pattern of activity levels during the peak maternity season in June and July is a likely indication that the Site may be within the CSZ for a maternity colony of common pipistrelle. The decrease in the number of recordings in August (less than half than the previous month) however, suggests that the Site is not within the CSZ for juveniles of common pipistrelle.

4.4.6 Soprano Pipistrelle

Soprano pipistrelle was the second most frequently recorded species during the automated bat detector and transect surveys, accounting for 5.12% of all recordings made during the automated bat detectors surveys (a total of 26,082 recordings were made for this species across all automated bat detector locations).

The majority of records for this species were recorded at ST1, ST2 and ST4 (see Table 7, Section 2.6, Appendix A) with ST2 recording the highest median number of recordings in total. It was found that there was a statistically significant difference between ST1 and 10 of the other automated bat detectors to $P<0.00$, ST2 recorded a statistically significant difference with nine other automated bat detectors to $P< 0.01$ and ST4 recorded a statistically significant difference with seven of the other automated bat detectors to $P<0.01$. This difference has been interpreted here as recording significantly higher levels of activity (see Table 23, Appendix A for full detailed table results).

Soprano pipistrelle were recorded within the emergence window at every detector location except ST6. The notable locations where a significant proportion of the recordings were prior to the emergence window are at; ST3 in June, Aug and September, ST4 in July and August, ST8 in October and ST14 in October. Recordings made within the species-specific emergence window are considered to give an indication as to the likelihood of a roost being nearby therefore, recordings made prior to the emergence window are considered to be a strong indication of a nearby roost.

The median bat passes per hour per month found April recorded the highest level of recordings with the lowest number of recordings in May and then a similar level of recordings for the remaining months (see Table 9, Section 2.7, Appendix A). This pattern of activity levels suggests the formation of a possible maternity roost close to the site but the drop in activity for the rest of the active season suggest that this site does not fall within the CSZ for a maternity colony of soprano pipistrelle.

4.4.7 Noctule

Noctule accounted for 0.77% of all recordings made during the automated bat detectors surveys (a total of 3927 recordings were made for this species across all automated bat detector locations). Noctule can be difficult to separate from Leisler's in sonogram analysis as there is considerable overlap between the frequency range of these two species, particularly when foraging/in clutter. Where this is the case a precautionary approach was applied and the group of Nyctalus spp. was assigned. It is not considered that the addition of these recordings would make a significant impact to the assessment of this species.

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No Leisler's were caught during trapping surveys (see Section 4.9) or any specific Leisler's records returned form the data search. Therefore, it is very likely that the majority of Nyctalus spp. group is comprised of foraging Noctule calls.

The majority of records for this species were recorded at ST1, ST2, ST3, ST5, ST6 and ST16 (see Table 7, Section 2.6, Appendix A) with ST5 recording the highest median number of recordings in total (1,272). It was found that there was a statistically significant difference between ST2 and eight of the other automated bat detectors to $P<0.04$, ST3 recorded a statistically significant difference with three other automated bat detectors to $P< 0.04$, ST5 recorded a statistically significant difference with four of the other automated bat detectors to $P<0.04$, ST6 recorded a statistically significant difference with two of the other automated bat detectors to $P<0.02$ and ST16 recorded a statistically significant difference with seven of the other automated bat detectors to $P<0.02$. ST1 did not record a statistical significance with any other automated bat detector. This difference has been interpreted here as recording significantly higher levels of activity at these locations (see Table 23, Appendix A for full detailed table results).

Only a small proportion of the recordings made for this species were within the emergence window. Recordings made within the species-specific emergence window are considered to give an indication as to the likelihood of a roost being nearby therefore, recordings made prior to the emergence window are considered to be a strong indication of a nearby roost. Overall ST5 and ST16 recorded the most consistent level of activity during the emergence window for this species. A noctule roost is known to be present within an Ash tree adjacent to the pond north of ST5 so it is considered likely that these recordings relate to this roost.

The median bat passes per hour per month found April and June recorded the highest level of recordings with the lowest number of recordings in August and October with a similar level of recordings for the remaining months (see Table 9, Section 2.7, Appendix A). This pattern of activity levels suggests the formation of a possible maternity roost close to the site but the drop in activity for the rest of the active season suggest that this site does not fall within the CSZ for a maternity colony of noctule. However, the home range of this fast, highflying species is very large and, as such, the site will only constitute a small proportion of the total available area with the CSZ of any maternity roost. In addition, the habitats within the development footprint are of very low value in terms of the diversity and abundance of prey species supported by these habitats.

4.4.8 Serotine

Serotine was accounted for 0.27% of all recordings made during the automated bat detectors surveys (a total of 1,372 recordings were made for this species across all automated bat detector locations).

Serotine were recorded at all locations typically at a low level of 0.13 passes per hour. The highest level of recordings was at ST4 (0.52 passes per hour), ST8 (0.46 passes per hour), ST10 (0.45 passes per hour) and ST15 (0.75 passes per hour). ST4 was the only location to be found to have a statistically significant difference using the Dunn's test to $P<0.04$. This difference has been interpreted here as recording significantly higher levels of activity (see Table 23, Appendix A for full detailed table results).

Only a small proportion of the recordings made for this species were within the emergence window. Recordings made within the species-specific emergence window are considered to give an indication as to the likelihood of a roost being nearby therefore, recordings made prior to the emergence window are considered to be a strong indication of a nearby roost. However, the home range of this fast, highflying species is very large and, as such, the site will only constitute a small proportion of the total available area with the CSZ of any maternity roost. In addition, the habitats within the development footprint are of very low value in terms of the diversity and abundance of prey species supported by these habitats.

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Overall ST5 recorded three recordings between sunset and 10 minutes after sunset in July and September and ST8 recorded 10 recordings prior to the emergence window in September,

The median bat passes per hour per month found a relatively consistent level of recordings across the months with small peaks in May, July and August (see Table 9, Section 2.7, Appendix A). It is difficult to draw any strong conclusion from such a low level of activity however, given the low level of recordings and that only males were caught during trapping surveys it is considered that this site does not fall within the CSZ for a maternity colony of serotine.

4.5 WOODLAND/CLUTTER FORAGING SPECIES

4.5.9 Myotis species

This section includes all species of the *Myotis* genus, owing to the similarity in their call characteristics and difficulty in identifying to species level through call characteristics alone. Of the six Myotis species found in the UK only three of the most common species were recorded to be present within the site during trapping surveys; Daubenton's *Myotis daubentonii*, whiskered *Myotis mystacinus* and Natterer's *Myotis nattereri*.

No Bechstein's bats were caught over the three periods of trapping, despite significant, targeted survey effort. It is considered that this species is very unlikely to be present and there is no indication that this site supports any roosts for this species.

Myotis spp. was the third most frequently recorded species during the automated bat detector surveys, accounting for 3.91% of all recordings made during the automated bat detectors surveys (a total of 19,927recordings were made for this species across all automated bat detector locations).

The high levels of activity for this group were recorded at ST1 and ST4 (see Table 7, Section 2.6, Appendix A) with ST6, ST8 and ST13 recording very low levels of activity. It was found that there was a statistically significant difference between ST1 and 12 of the other automated bat detectors to $P<0.00$, ST4 recorded a statistically significant difference with five other automated bat detectors to $P< 0.02$. This difference has been interpreted here as recording significantly higher levels of activity (see Table 23, Appendix A for full detailed table results).

Myotis were recorded within the emergence window at every detector location with the exception of ST6, with activity recorded in all months throughout the active season.

Recordings made within the species-specific emergence window are considered to give an indication as to the likelihood of a roost being nearby. However, the Myotis emergence window has a large duration (between 30 to 70 minutes after sunset) due to the number of different species included in this group. Therefore, recordings made prior to the emergence window (and therefore closer to sunset) are considered likely to give a stronger indication of the potential presence of a nearby roost. Pre-emergence window recordings were more frequent in the later months (August, September and October) at the majority of locations and most significantly at ST2 where 20 recordings were from sunset to the start of the emergence window in September and ST4 recorded the highest number in April.

At ST4 in August four recordings were made after dawn and 15 minutes after dawn for this species (see Section 3.8 and 3.10, Appendix A). This is considered to be a strong indication that a significant roost was located nearby for this species in this month. However, the species (or multiple species) attributed to this data cannot be accurately allocated. Further surveys, see trapping and radiotracking, added further Myotis species specific data regarding the breeding status of bats using the site to accommodate for this constraint.

The median bat passes per hour per month found a high level of activity across all the month for this species. April and July recorded a similar level of activity (3.95 and 3.48 passes per hour respectively) with a dip in May to 0.87 passes per

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hour but the activity level was tripled in September to 9.04 which was the highest level of activity for any non-pipistrellus species (see Table 9, Section 2.7, Appendix A). This pattern of activity levels suggests the formation of a possible maternity roost close to the site but it is unclear whether the decrease in activity in May would indicate the absence of a natal roost. The increase in activity in September is likely to indicate an influx of juvenile bats which suggests that this site may well fall within the CSZ for a maternity or post breeding colony for a short period of the season. However, any meaningful assessment of the presence of a significant roost is limited by the highly mobile and transient nature of maternity/natal roosts for species within this group.

4.5.10 Plecotus species

This group includes grey long-eared it is considered highly unlikely that grey long-eared are present within the site. No records of grey long-eared bats were returned in the data search and DNA analysis of dropping within the buildings have all returned brown long-eared bats. In addition, no grey long-eared bats were caught during trapping surveys. Therefore, it is considered that this group represent brown long-eared bats within this site and that grey long-eared bat are absent.

Plecotus spp. was the fifth most frequently recorded species during the automated bat detector surveys, accounting for 0.45% of all recordings made during the automated bat detectors surveys (a total of 2,291recordings were made for this species across all automated bat detector locations).

The highest levels of activity for this species were recorded at ST5, ST11, ST12 and ST15 (see Table 7, Section 2.6, Appendix A) with the remaining automated bat detectors recording lower levels of activity. It was found that there was a statistically significant difference between ST1 and 2 of the other automated bat detectors to $P<0.02$, ST12 recorded a statistically significant difference with six other automated bat detectors to $P< 0.01$, ST15 recorded a statistically significant difference with ST7 other automated bat detectors to $P< 0.00$ and ST12 recorded a statistically significant difference with six other automated bat detectors to $P< 0.01$ ST16 recorded a statistically significant difference with ST7 other automated bat detectors to $P< 0.04$, ST5 did not record a statistical difference with any other location. This difference has been interpreted here as recording significantly higher levels of activity (see Table 24, Appendix A for full detailed table results).

Plecotus were recorded at a low level within the emergence window at every detector location except ST6. Activity within the emergence window was recorded in most months at every location.

The highest number of recordings before and within the emergence window for Plecotus was at ST12 in August. This location is north of the known northern brown long-eared maternity roost. It is considered highly likely that these recordings are associated with the maternity roost and suggest in August there is a preference to commute north along the hedgerow to access high quality foraging resource both in and around Quobleigh Woods.

ST11 in September recorded the largest number of recordings for this species 30 minutes prior to sunrise. Given that this species is known to return to the roost early, the presence of a large number of recordings so close to sunrise is significant (see Section 3.8 and 3.10, Appendix A). ST12 recorded a similar level of activity up to 30 minutes before sunrise in July and August. This is considered to be a strongly associated with the known maternity roost in Fir Tree Farmhouse and shows that this roost frequently use the hedgerows extending both north and south of the maternity roost site.

July, August and September recorded the highest median bat passes per hour per month for this species with the remaining months at lower levels of activity (0.82, 0.54 and 0.47 passes per hour respectively) (see Table 9, Section 2.7, Appendix A). This pattern of activity levels is consistent with maternity group with a characteristic activity peak in July and August as a result of increased foraging demand and the appearance of juvenile bats in August. Two maternity

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groups are present within the site (Fir Tree Farmhouse and Chalcroft Farm) therefore this site does fall within the CSZ for two maternity colonies.

4.5.11 Barbastelle

Barbastelle accounted for 0.01% of all recordings made during the automated bat detectors surveys (a total of only 43 recordings were made for this species across all automated bat detector locations).

Barbastelle were recorded at all automated bat detector locations across the site, with the exception of ST2 and ST10. These were typically at a very low activity level of 1 or 2 recordings in total. The highest number of recordings was observed at ST11 with 16 recordings in total (see Table 3, Section 2.3, Appendix A for full detailed table results). No significant statistical difference was returned for Barbastelle due to the small size of the data set for this species.

Nine of the 43 recordings occur prior to or within the emergence window for this species;

- one recording at ST8 in September
- six recordings at ST11 in July, one in August and one in October
- one at ST12 in August
- one at ST13 at 15 minutes after sunset in October.

Recordings made within the species-specific emergence window are considered to give an indication as to the likelihood of a roost being nearby therefore, recordings made prior to the emergence window are considered to be a strong indication of a nearby roost. Overall ST5 recorded three recordings between sunset and 10 minutes after sunset in July and September and ST8 recorded 10 recordings prior to the emergence window in September,

June, July and October returned the highest number of recordings for this species (see Table 5, Section 2.4, Appendix A). There is no indication that the site supports a roost of conservation significance for this species due to the low level of recordings observed and the absence of this species during trapping surveys.

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4.6 POTENTIAL ROOST ASSESSMENT

Table 25 - Summary of results of Internal and external building inspections

Building No.	Brief Building Description	Evidence of bat roosting	Potential Roost Features (PRFs) Present	Assessment of Building for bat roosting	Further Surveys?	Photo
A1	A derelict 2 storey building with brick walls and hipped roof and 4 capped chimneys present. Vegetation has overgrown this building on all elevations.	No Internal Access	Numerous slipped and missing roof tiles, open windows and doors with significant vegetation growth on all elevations which could screen further suitable features.	High	Yes	
A7	A derelict raised barn with timber frame and wooden cladding walled structure and tiled roof. Vegetation has overgrown this building on the eastern southern and western elevations.	No Internal Access	Numerous slipped and missing roof tiles, open windows and doors with significant vegetation growth on all elevations which could screen further suitable features.	Confirmed roost – identified as brown-long eared roost in 2014 Building A7 is considered to have an historic non-active long-eared roost within it due to 50+ droppings being found within the building in 2014. However, no bats were recorded emerging or re-entering this building during 2014 and surveys in 2018 only identified a common pipistrelle roost to be active within the building.	Yes	

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A9	A 2-storey terraced residential building. Brick cavity walls with wooden fascia in poor condition. One capped chimney present in the centre of the roof. 2 roof voids present which is separated by a brick wall, with bitumen felt, wooden beams and loft insulation all present and in good condition. Numerous gaps along the internal separating wall and light ingress at the eaves and at the gable walls.	50+ brown long-eared droppings of various ages (fresh to old) within both roof voids.	Gaps between the gable walls and the fascia boards on the eastern and western gables. Gaps by broken down pipe on the western gable.	Confirmed roost - Identified as a brown-long-eared maternity roost in 2014.	Yes	
A6 & A6b	Single storey stables constructed from a timber frame with a slate roof and ridge tiles with numerous gaps and open windows and doors present on the eastern elevation. A wall separates the northern workshop section which is comprised of wooden walls and a corrugated metal roof.	6 scattered brown long-eared droppings found throughout the building.	Open windows and doors on the eastern elevation numerous slipped and missing tiles especially on the south-eastern corner of the building. Suitable roosting between the timber beams and potential along the wall head dividing the stables and the workshop.	High	Yes	
A8	Pole barn of single skin corrugated metal roof and open sided.	None	None	Negligible	No	
A2 & A2b6	Large L-shaped Dutch barn with a dirt floor, walls are constructed from half brick or breeze block and wood. The roof is constructed of asbestos or metal sheeting with very old ill-fitting wooden beams throughout. Open	6 scattered droppings found throughout the building	Large open doorway on the western elevation, numerous missing sheets on the northern and southern elevations as well as gaps along the ridge line.	High	Yes	

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A3	Small shed structure used as a signage workshop. Constructed from wooden walls and roof with felt roof tiles.	None	Gaps between the wooden slatted walls and behind the signs.	Moderate	Yes	
A4	Main butcher's single storey building and shop. The front section is constructed of brick walls with a pitched L-shaped roof and a small void present.	None	Loose and missing tiles throughout with various gaps at the ridge line. Two open vents into the void and large gaps at the eaves around the shop section and behind the signs.	Moderate	Yes	
8	Flat roofed extension to the original L-shaped main building (A4).	None	None	Negligible	No	
A10	Pole barn construction with corrugated metal walls and flat roof.	None	None	Negligible	No	

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A11	Open sided barn with asbestos and corrugated sheet roofing and metal beams.	None	None	Negligible	No	
B13	Open sided pole barn with a corrugated metal pitched roof and metal joists.	None	None	Negligible	No	
A5	A storage barn constructed of single skinned corrugated walls and roof with wooden beams throughout.	None	Open doors and windows on the eastern and western elevations. Suitable roosting between wooden beam joints.	Moderate	Yes	
A14	Open sided pole barn with a corrugated metal pitched roof and metal joists.	None	None	Negligible	No	

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A15	Small breeze block shed with a corrugated metal flat roof.	None	None	Negligible	No	
A16	Large open sided pole barn with corrugated metal roof and metal beams	None	None	Negligible	No	
B17	Large brick built barn and slate pitched roof on an east-west axis. Vegetation has overgrown the western southern and eastern elevations.	None	Open windows and doors, numerous slipped and missing roof tiles and gaps between the wall and the fascia on the northern elevation.	Moderate	Yes	
B18	Large brick walled 2 storey barn with an asbestos sheet roof and skylights. Open to the apex with metal roof beams.	Occasional scattered (+2) droppings found internally	Various gaps around wooden window and door frames.	High	Yes	

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B19	Brick walled single storey barn which is open sided on the western elevation with metal sheet roof and earth floor. Old crafted joints but no visible crevices.	None	None	Negligible	No	
B20	A large derelict 2 storey building with a Victorian extension on the northern elevation. The roof is comprised of pan clay tiles and ridge tiles with 4 capped chimneys present. Bitumen roof felt and original wooden rafters throughout.	30+ old brown long-eared droppings	Numerous slipped and missing roof tiles, gaps beneath lead flashing, and gaps at the eaves between the walls and the timber rafters.	Confirmed roost	Yes	
B21	Cavity walled grain store with pitched, slate tiled roof. Currently in use as a garage/store. Numerous access points throughout but loft space appears well lit and drafty limiting suitability as a maternity roost (particularly for long eared bats). Roof bitumen felt lined.	None *no access to upper floor	Multiple gaps/cracks on all elevations.	High	Yes - carried out 2020 to inform this strategy	
B22	Small shed style construction with timber clad walls and bitumen felt roof. Small roof void present with chipboard which is tightly sealed and in good condition.	None	Numerous gaps between the wooden cladding on all elevations.	Moderate	Yes	

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B23	Single brick stable block with corrugated metal roof.	None	None	Negligible	No	
B24	Dilapidated automated bat detector caravan with flat roof used as kennel.	None	Access to hollow walls; however, internal walls missing/chewed leaving no suitable crevices.	Negligible	No	
B25	Large U-shaped 2-storey residential building. The walls are constructed with brick with wooden cladding. The roof has numerous dormer windows, and small extensions creating valleys and junctions. The roof void is comprised of wooden beams with bitumen felt in good condition. Light ingress was observed at the eaves on the western elevation and on the SW corner.	50+ brown long-eared droppings throughout the building along the ridge of various (fresh to old) ages.	Slipped and missing roof tiles, crack roof tile on the roof junction on the SW corner.	Confirmed roost – identified as a low status brown long eared roost in 2015	Yes	

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B26	Large barn with metal beams, corrugated metal walls and slightly pitched roof with large metal doors across the building.	None	None	Negligible	No	
B27	A large double ridged open barn with metal beams, corrugated metal half walls and a corrugated roof.	None	None	Negligible	No	
B28	A large corrugated metal wall barn with a corrugated metal flat roof and metal beams.	None	None	Negligible	No	
B29	L-shaped brick built single skin 2-storey residential building with a single storey garage extension on the eastern elevation with clay roof and ridge tiles. The roof void is comprised of bitumen roofing felt with trussed rafters.	Scattered droppings throughout and a small aggregation on the southern gable end.	Numerous light ingress observed around the eaves within the roof void with slipped and missing roof tiles.	Confirmed roost – identified as low status common pipistrelle roost in 2015	Yes	

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4.6.12 Results of DNA

During the internal building inspections where possible, droppings found within the building were collected in order to confirm species through DNA analysis (see Table 28). This was only possible were sufficient droppings were present therefore the 6 scattered droppings recorded within A2 and A2a were not enough to obtain DNA results from.

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Table 26 - DNA Analysis results

Building No.	Location of sample	Result
A9	The eastern roof void	Brown long-eared
	The western roof void	Brown long-eared
A6	Scattered droppings collected within the stables	Brown long-eared
B25	From along the ridge within the roof void	Brown long-eared
B29	Within the roof void	Brown long-eared

4.7 BUILDING EMERGENCE/ RE-ENTRY SURVEYS

Those buildings identified as having low, moderate or high suitability for bat roosting or were confirmed as a bat roost through the presence of bat droppings were taken forward for bat activity surveys the results of which are summaries in Table 27.

Table 27 - Summary of bat activity surveys carried out in 2018

Building No.	Date	Survey Start – End Time	Species roosting within building	Number of bats	Time	Building PRF used	Additional species recorded during the survey
A1	19/07/18	03:43 – 05:58	None	0	-	None	5 Common pipistrelle passes 2 Soprano pipistrelle passes long eared pass 1 Noctule passes
	30/07/18	20:39 – 22:24	None	0	-	None	80 Common pipistrelle passes 7 long eared passes 4 soprano pipistrelle passes 20 noctule passes
	23/08/18	04:15 – 06:00	Common pipistrelle	1	05:40	Returned to roost into the vegetation on the SE corner of the Building	69 Common pipistrelle passes 9 long eared passes 4 soprano pipistrelle passes 2 noctule passes Myotis pass
A7	19/07/18	21:00 – 22:33	Common pipistrelle	1	20:20	Emerged from vegetation on the NW corner of the building	87 common pipistrelle passes 1 Soprano pipistrelle pass 3 Serotine passes 8 Noctule passes 1 long-eared pass
				1	21:51	Emerged from open window on the northern elevation	

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	16/08/18	03:55 – 05:56	None	0	-	None	28 Common pipistrelle passes 26 long-eared passes 1 soprano pipistrelle pass 2 Noctule passes 2 Myotis passes
	30/08/18	19:40 – 21:25	None	0	-	None	57 Common pipistrelle passes 9 Soprano pipistrelle passes 14 Noctule passes 5 long-eared passes 2 Myotis passes
A9	18/07/18	20:56 – 22:42	Common pipistrelle	2	21:36 – 21:41	Emerged from under the fascia on the SW junction	68 Common pipistrelle passes 1 Soprano pipistrelle pass 1 Myotis Pass 4 long-eared passes
	31/07/18	03:59 – 05:29	Common pipistrelle	1	05:05	Entered under fascia board on the on the SW junction	445 Common pipistrelle passes 16 Noctule passes 18 long-eared passes 4 Myotis passes
	21/08/18	20:04 – 21:50	Common pipistrelle	2	20:37	Emerged from beneath the western gable barge board.	1130 Common pipistrelle passes 20 Soprano pipistrelle passes 4 Noctule passes 4 Serotine passes 4 Myotis passes 9 long eared passes **A noctule was recorded lekking on large tree next to the pond.** **A hedgehog recorded in the garden**
A6 & A6a	19/07/18	21:00 – 22:33	Brown long-eared	5	21:49 – 22:08	Emerged via the open stable door on the eastern elevation	61 Common pipistrelle passes 6 Soprano pipistrelle passes 8 Noctule passes 2 Serotine passes

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							2 Myotis passes
	16/08/18	03:55 – 05:56	Brown long-eared	5	04:22 – 05:22	Re-entered via the open stable door on the eastern elevation	13 Common pipistrelle passes 20 long-eared passes 2 Noctule passes 1 Serotine pass
	30/08/18	19:40 – 21:25	Common pipistrelle	2	20:08 – 20:13	Emerged via the open stable door on the eastern elevation	23 Common pipistrelle passes 16 Noctule passes 3 long-eared passes 1 Soprano pipistrelle pass
A2, A2a & A3	25/07/18	03:21 – 05:21	Non-echolocating bat – assumed to be brown long-eared	1	03:58	Entered the building via the large open doorway on the western elevation	18 Common pipistrelle passes 2 Soprano pipistrelle passes 1 Serotine pass
			Common pipistrelle	1	04:26	Entered the building via the large open doorway on the western elevation	
			Soprano pipistrelle	1	04:49	Entered the building via the large open doorway on the western elevation	
	16/08/18	20:10 – 21:55	None	0	-	None	32 Common pipistrelle passes 7 Noctule passes 2 myotis passes 1 Serotine pass 1 long-eared pass
	30/08/18	04:30 – 06:15	Common pipistrelle	0	-	None	13 Common pipistrelle passes 8 Noctule passes 1 Myotis pass
A4	20/07/18	03:30 – 05:15	None	0	-	None	106 Common pipistrelle passes 2 Soprano pipistrelle passes 2 Noctule passes 2 Myotis passes **A common pipistrelle roosted behind the sign on the southern**

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							elevation of B7 at 05:55
	15/08/18	20:30 – 22:00	Common pipistrelle	2	20:52 – 20:54	Emerged from the eaves of the farm shop on the SE corner of the building	195 Common pipistrelle passes 3 Soprano pipistrelle passes 7 Noctule passes 3 Serotine passes
	06/09/18	19:26 – 21:11	None	0	-	None	31 Common pipistrelle passes 14 Noctule passes 2 Soprano pipistrelle passes 2 Serotine passes **Barn owl recorded at 20:28 to the south of the building.**
A5	24/07/18	20:25 – 22:25	Soprano pipistrelle	1	21:17	Entered building under corrugated roof on the western elevation	671 Common pipistrelle passes 10 Soprano pipistrelle passes
			Common pipistrelle	1	21:30	Emerged from the ridge on the eastern elevation	
			Brown long-eared	1	21:30	Emerged from building via open doorway on the western elevation	
	17/08/18	04:25 – 06:10	None	0	-	None	1 Common pipistrelle pass 21 Noctule passes
	31/08/18	04:45 – 06:30	None	0	-	None	4 Common pipistrelle passes
B17	09/08/18	04:12 – 05:57	None	0	-	None	42 Common pipistrelle passes 1 Soprano pipistrelle pass
	22/08/18	20:15 – 21:45	Common pipistrelle	5		Emerged from under fascia board above the doorway on the northern elevation	570 Common pipistrelle passes 2 Soprano pipistrelle passes 54 Noctule passes 22 Serotine passes 7 Myotis passes
			Common pipistrelle	1	20:32	Emerged from open window in the eastern elevation	
	13/09/18	19:10 – 20:55	Common pipistrelle	1	19:39	Emerged from western gable end from behind ivy	101 Common pipistrelle passes 2 Soprano pipistrelle passes 3 Noctule passes
			Non-echolocating	1	20:12	Emerged from western gable	

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			bat – assumed to be brown long-eared			end from behind ivy	1 long eared pass 7 Myotis passes
B18	09/08/18	04:12 – 05:57	Common pipistrelle	1	05:40	Entered on the SE corner of the building	42 Common pipistrelle passes 1 Soprano pipistrelle pass
	22/08/18	20:15 – 21:45	Common pipistrelle	1	20:30	Emerged from vegetation on the northern gable end	572 Common pipistrelle passes 2 Soprano pipistrelle passes 56 Noctule passes 22 Serotine passes 7 Myotis passes 1 long-eared pass
			Common pipistrelle	1	20:47	Emerged from vegetation on the northern gable end	
			Natterers	1	20:52	Emerged from vegetation on the northern gable end	
	13/09/18	19:10 – 20:55	Common pipistrelle	1	19:57	Emerged from vegetation on the northern gable end	101 Common pipistrelle passes 2 Soprano pipistrelle passes 3 Noctule passes 1 long eared pass 7 Myotis passes
B20	08/08/18	20:25 – 22:10	Common pipistrelle	1		Emerged from the NW corner of the building	36 Common pipistrelle passes 2 Soprano pipistrelle passes 2 Myotis passes
	05/09/18	19:14 – 19:15	None	0	-	None	207 Common pipistrelle passes 2 Soprano pipistrelle passes 38 Myotis passes 2 Noctule passes
	11/09/18	19:15 – 21:00	None	0	-	None	26 Common pipistrelle passes 4 Myotis passes 1 Serotine pass
B21	16/07/20	20:55 – 22:45	None	0	-	None	226 common pipistrelle passes 3 long-eared passes 1 serotine pass 1 soprano pipistrelle pass
	27/07/20	20:43 – 22:30	None	0	-	None	56 Common pipistrelle passes

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							3 long-eared passes
	13/08/20	04:09 – 06:05	Brown long-eared	3	04:49	Re-entered via the S/W corner of the building	24 long-eared passes 19 Common pipistrelle passes 2 Soprano pipistrelle passes 1 noctule pass 1 Myotis spp. pass
B22	01/08/18	20:37 – 22:22	Common pipistrelle	3		Emerged from the external wooden cladding on the eastern elevation	24 Common pipistrelle passes
	21/08/18	20:05 – 21:45 -	None	0	-	None	26 Common pipistrelle passes 4 long-eared passes 1 Noctule pass
	07/09/18	04:57 – 06:42	None	0	-	None	2 Soprano pipistrelle passes
B25	30/07/18	20:40 – 22:25	Common pipistrelle	1	21:16	Emerged from the northern corner of the building on the gable end under the hip tile.	76 Common pipistrelle passes 3 Soprano pipistrelle passes 4 long-eared passes 6 Noctule passes 3 Serotine passes
B29	26/07/18	20:45 – 22:30	Common pipistrelle	1	21:44	Emerged at the base of the chimney into the soffit box on the southern elevation	40 Common pipistrelle passes 4 Soprano pipistrelle passes 14 Noctule passes 3 Serotine passes 1 Myotis pass
	22/08/18	04:08 – 05:57	Common pipistrelle	1	05:36	Entered at the base of the chimney into the soffit box on the southern elevation.	14 Common pipistrelle passes 1 Soprano pipistrelle passes 3 Myotis passes 1 Noctule pass 1 long-eared pass
	06/09/18	05:00 – 06:24	Brown long-eared	1		Emerged from the roof apex on the NW gable end	No bats heard only 1 emerged from building.
B29 (2020 Update)	08/07/20	21:04 – 22:49	Common pipistrelle	1	21:46	Emerged at the base of the chimney into the soffit box on the southern elevation	447 common pipistrelle passes 5 soprano pipistrelle passes 5 serotine passes

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			Soprano Pipistrelle	1	22:14	Emerged from eastern Dorma valley on the southern elevation.	3 noctule passes 1 myotis pass 1 long-eared pass

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4.7.13 Results of DNA

During the internal building inspections where possible, droppings found within the building were collected in order to confirm species through DNA analysis (see Table 28). This was only possible were sufficient droppings were present therefore the 6 scattered droppings recorded within A2 and B18 were not enough to obtain DNA results from.

Table 28 - DNA Analysis results

Building No.	Location of sample	Result
A9	The eastern roof void	Brown long-eared
	The western roof void	Brown long-eared
A6	Scattered droppings collected within the stables	Brown long-eared
B20	Within the roof void	Brown long-eared
B25	From along the ridge within the roof void	Brown long-eared
B29	Within the roof void	Brown long-eared

4.8 ROAD CROSSING POINT SURVEYS

These surveys recorded generally similar levels of crossing events at locations 1 to 3 with crossing points 3 and 4 lower than the northern crossing points (Table 15).

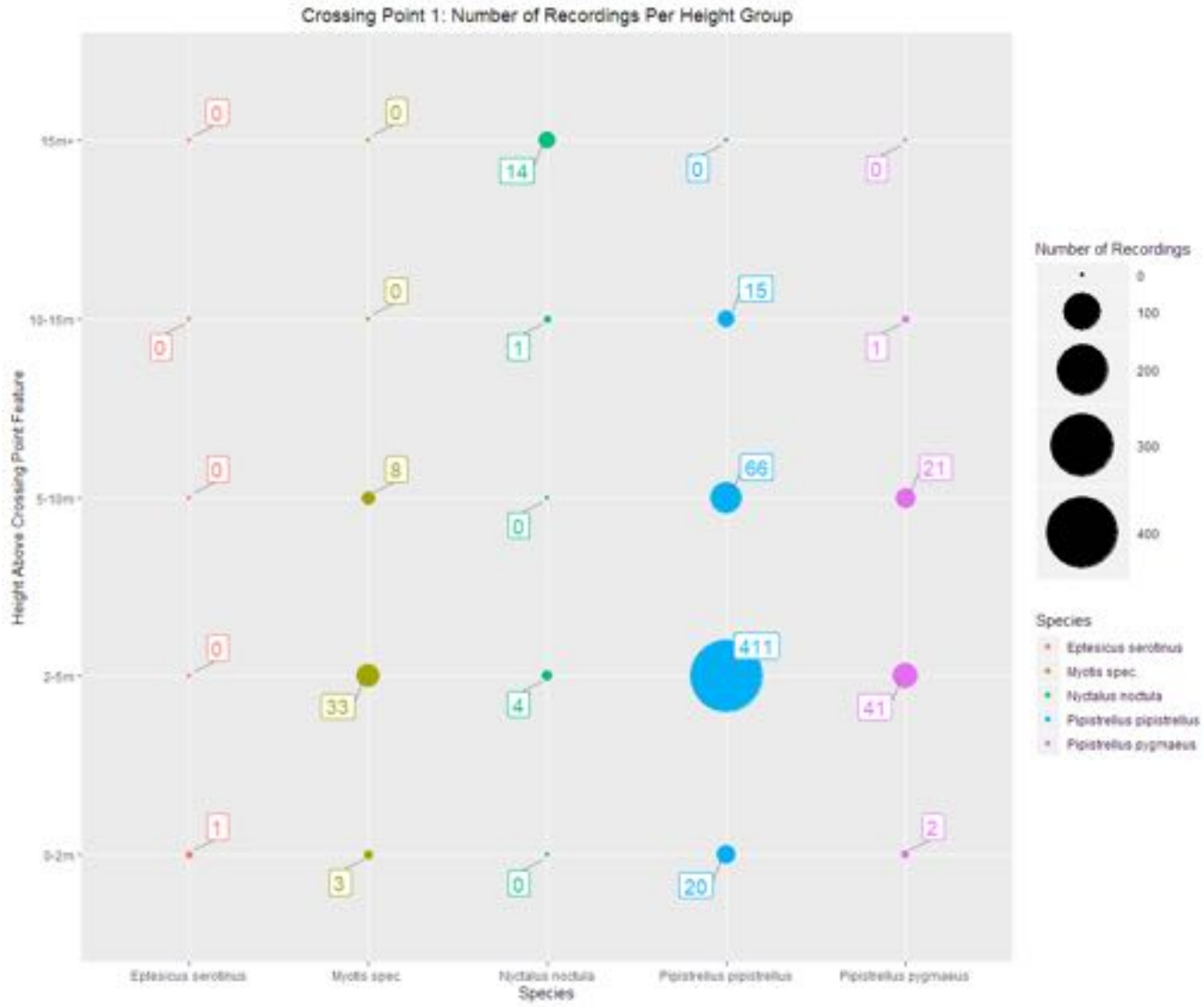
Detailed assessment of the height range for each species is shown in Figure 18 to Figure 22 with a particular focus on the number of crossings within the estimated road collision impact height range of 0 to 5m.

Table 15 Comparison of crossing events

Crossing Point	Number of Crossing Events (all species)
CP1	641
CP2	565
CP3	649
CP4	265
CP5	386

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Figure 18 - Summary of observed bat crossings at CP1



A total of 1,197 recordings were recorded at CP1 during the course of the surveys of these 641 crossings were observed the breakdown of which is in detailed in Figure 18. This equates to 51.2% of bat recordings resulting in a crossing at this location.

The majority of these crossings were by common pipistrelle between 2-5m height (411 crossings) with Myotis spp. and soprano pipistrelle also recording the highest number of crossing events for these species at this height (33 crossings and 41 crossings respectively).

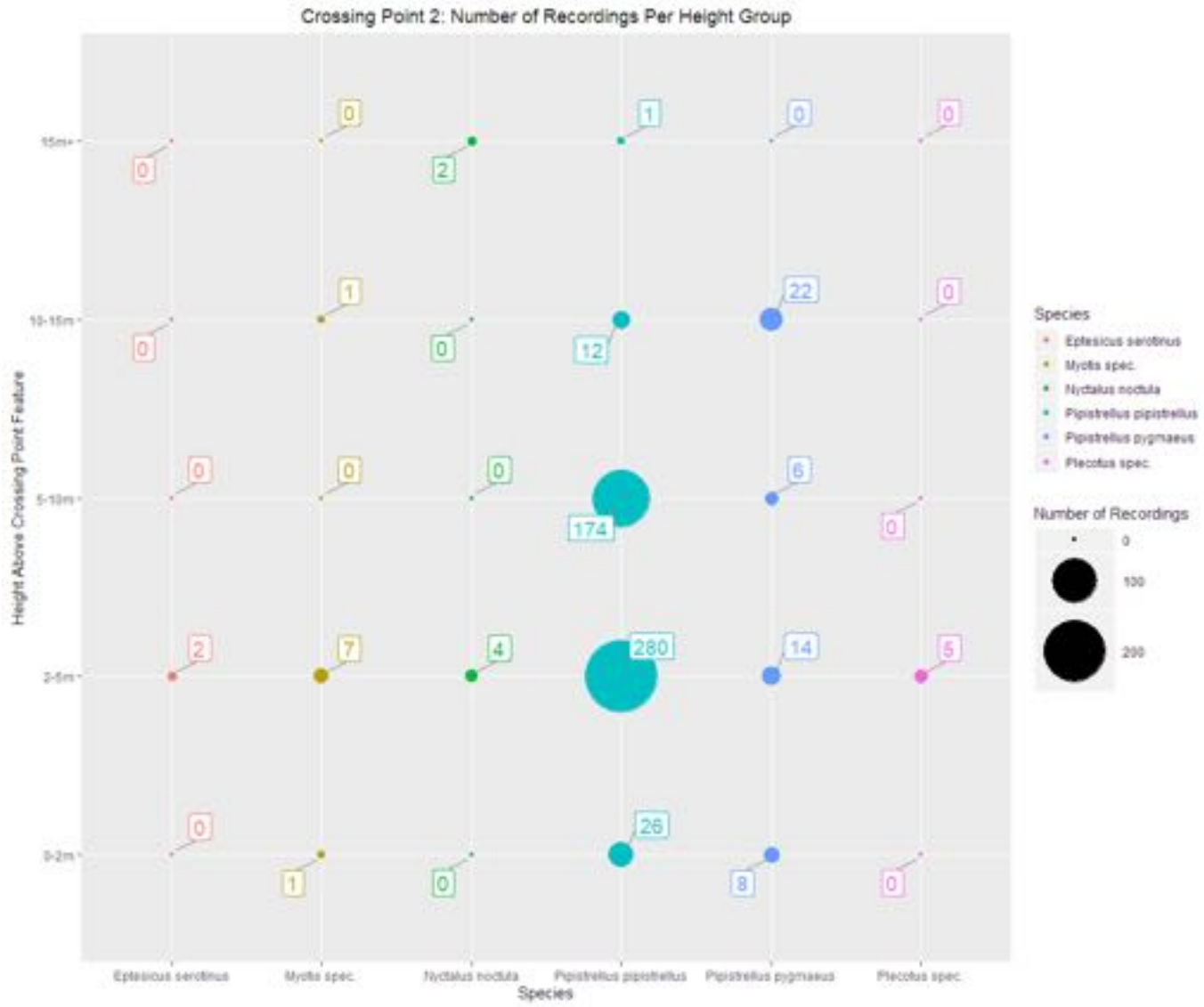
Observations of the behaviour before and after the crossing events at this crossing point showed that the crossings were associated with a potential commuting route (east to west) along the southern aspect of the hedgerow from Quobleigh Woods and were generally considered to be a high number of individual bats. In addition, a number of these crossings (263 in total over all surveys) occurred before or in the upper part of the emergence window for common pipistrelle which would suggest that this location is used by a large/number of smaller roosts and this is a valuable commuting route. The overall activity for common pipistrelle increased in August at this location along with the number of pre emergence window recordings which would also suggest that this location is used frequently by juvenile bats.

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Myotis spp., common and soprano pipistrelle were the only species to be recorded crossing within the lowest height band 0-2m.

Species within highest collision risk band (0-2m height) are common and soprano pipistrelle, serotine and Myotis spp. at location CP1.

Figure 19 Summary of observed bat crossings at CP2



A total of 565 crossings were observed at CP1 (see Figure 19).

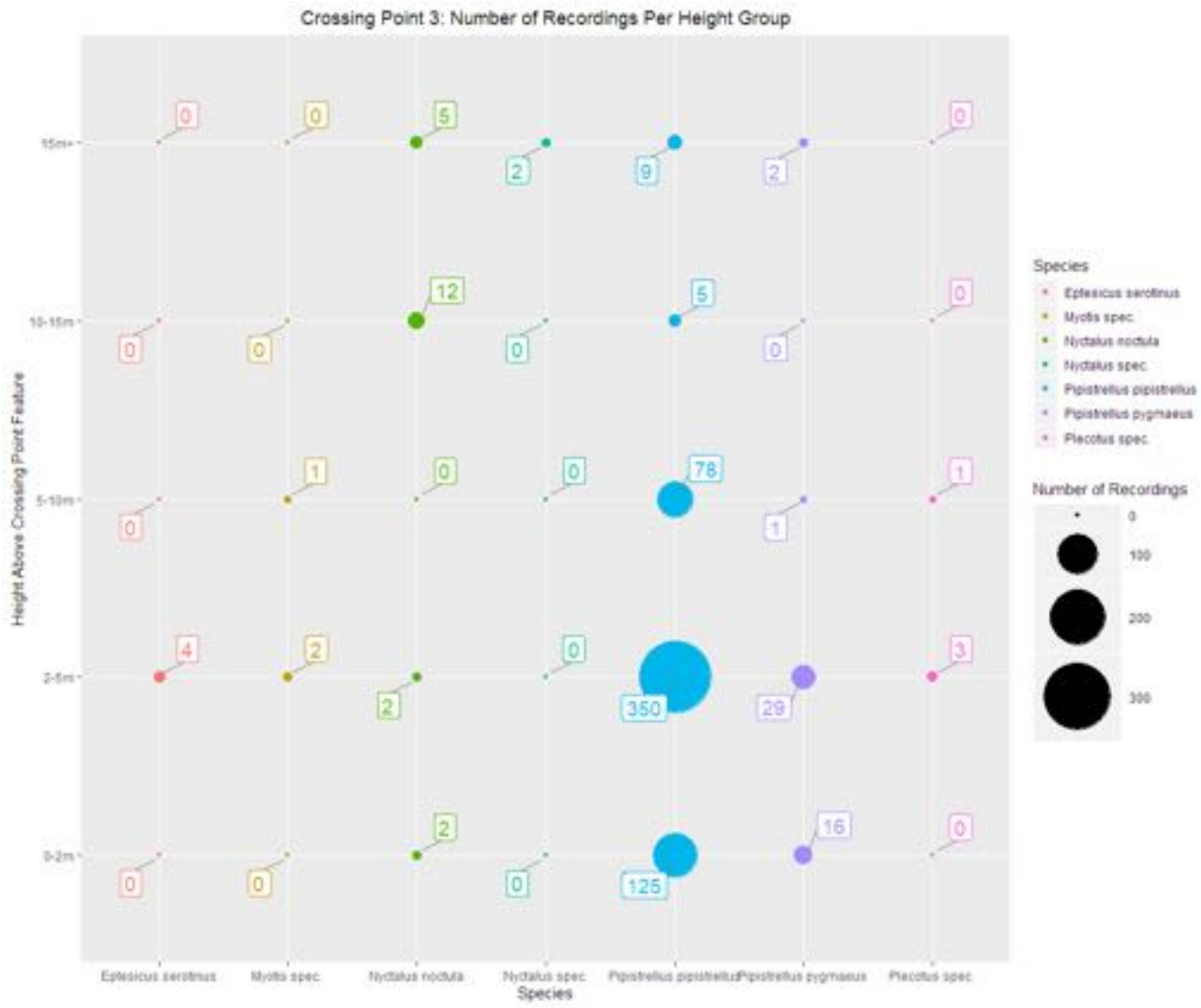
The majority of these crossings were by common pipistrelle between 2-5m height (280 crossings).

Myotis spp., common and soprano pipistrelle were the only species to be recorded crossing within the lowest height band 0-2m.

Species within highest collision risk band (0-2m height); common pipistrelle, soprano pipistrelle and Myotis spp. at location CP2.

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Figure 20 - Summary of observed bat crossings at CP3

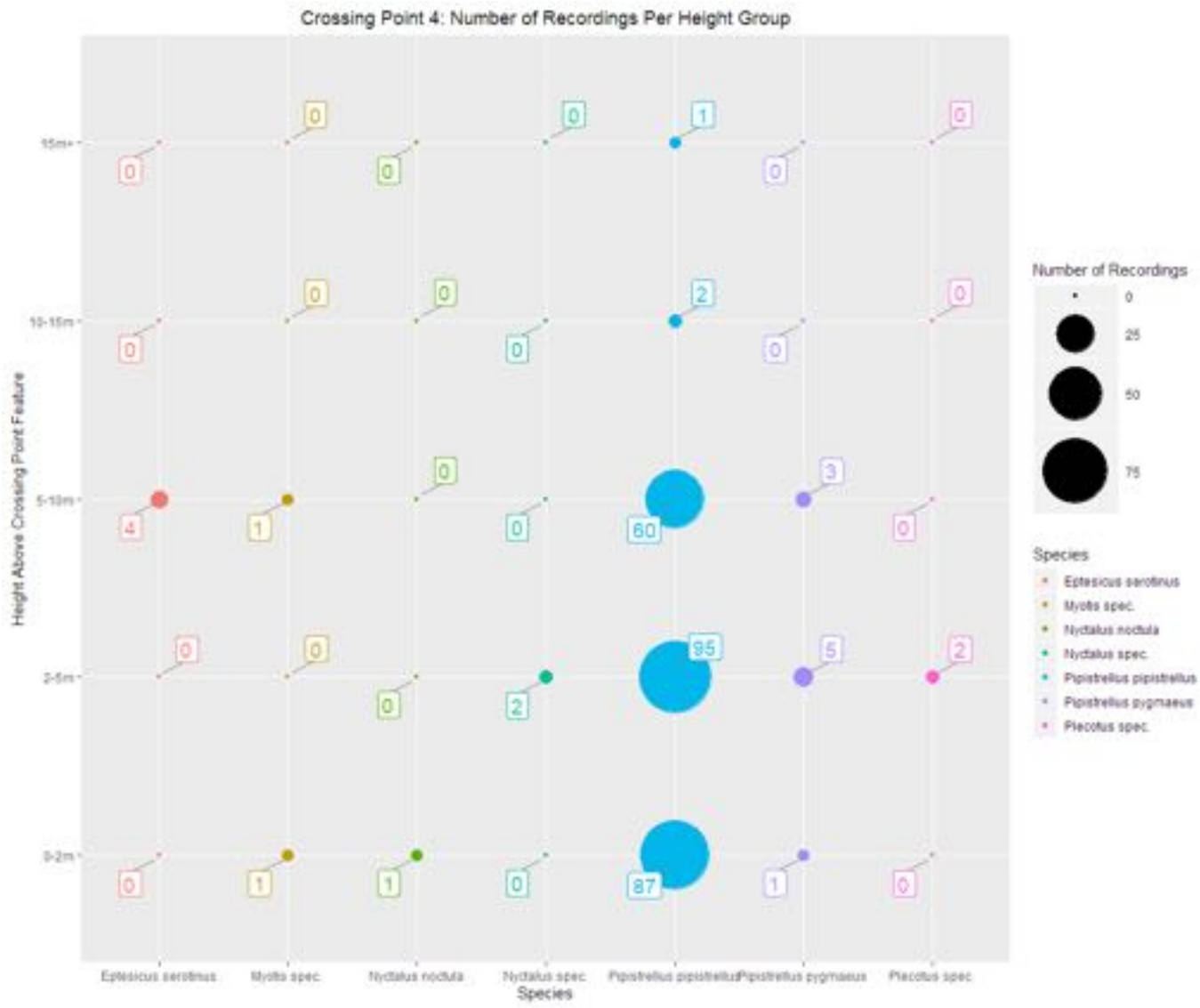


A total of 718 recordings were recorded at CP3 during the course of the surveys of these 649 crossings were observed (see Figure 20) with 74.2% of the total recorded below 5m.

Species within highest collision risk band (0-2m height); common pipistrelle, soprano pipistrelle and noctule at location CP3.

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Figure 21 - Summary of observed bat crossings at CP4



265 crossings were observed at CP4 (see Figure 21).

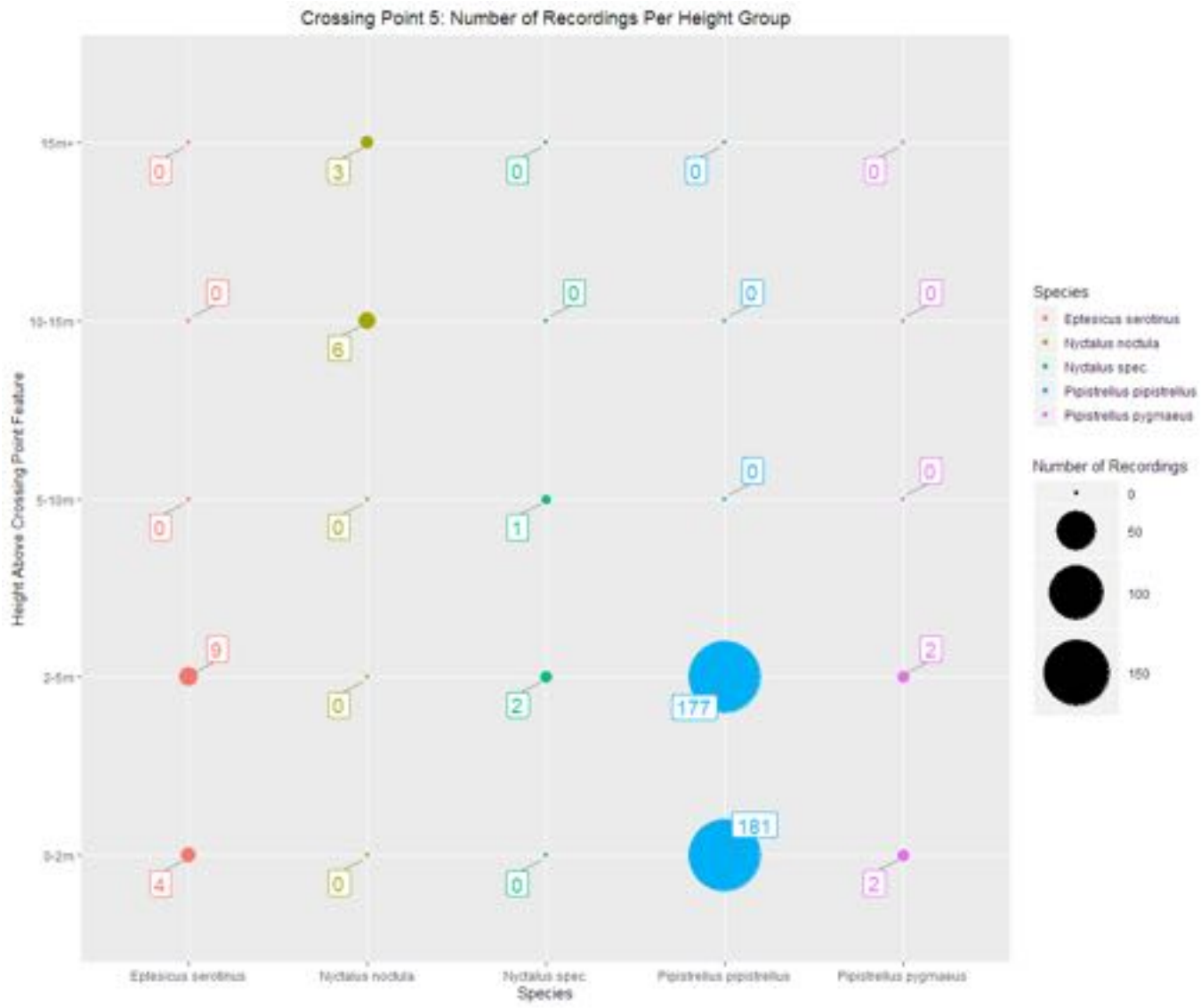
The majority of these crossings were by common pipistrelle between 2-5m height (95 crossings) with a similar number of crossings (87) were observed in the 0-2m height band for this species. Only 1 crossing was observed for Myotis spp., noctule and soprano pipistrelle at the lowest height band at this location.

Observations of the behaviour before and after the crossing events at this crossing point showed that the crossings were associated with general foraging behaviour rather than commuting per se with a low number of individual bats observed foraging underneath an oak tree at the northern corner of the location adjacent to the northern hedgerow.

Species within highest collision risk band (0-2m height); common pipistrelle, soprano pipistrelle, Myotis spp. and noctule at location CP4.

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Figure 22 - Summary of observed bat crossings at CP5



386 crossings were observed at CP5 (see Figure 21).

The majority of these crossings were by common pipistrelle between 0-2m height (181 crossings) but a similar number of crossings (177) were observed in the 2-5m height band for this species. Serotine and soprano pipistrelle were also recorded crossing at 0-2m and 2-5m.

In comparison with the other locations the majority of activity for all bat species was outside of the emergence windows which may relate to the distance from a roost site. This location also recorded the highest number of crossings at the lowest height which is likely to be due to bats flying close to the darker base of hedgerows in this exposed location.

Species within highest collision risk band (0-2m height); common pipistrelle, soprano pipistrelle and serotine at location CP5.

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4.9 TRAPPING SURVEYS

2018

Quobleigh Woods – West

Bat activity was considered low, given weather conditions and habitat quality, with only regular passes of common pipistrelle bat noted, and 1-2 passes of serotine, Myotis sp. and soprano pipistrelle bat noted throughout the night. Given the located of traps overlooking the pond and adjacent to a well-vegetated watercourse, the low bat activity was unexpected. Gusty conditions outside of the copse limited opportunities for captures and was considered a limitation to this survey. The low activity levels were in line with observations made during recent bat activity transect surveys (Johns Associates, 2018). No bats were trapped at this location.

Chalcroft Farm - Parkland

Bat activity was notably higher at this location, despite the bright lighting within the adjacent distribution centre, with bats known to be emerging from nearby farm buildings (noted during recent emergence/re-entry surveys) and bat activity transect surveys (Johns Associates 2018).

Weather conditions were ideal for bat trapping surveys with negligible wind, warm conditions at dusk and some cloud cover. The crescent moon was obscured by trees for much of the survey. Two hours after sunset temperatures declined and by 23:25 it was only 9C and bat activity levels were similarly reduced. Bats were trapped between 21:00 and 22:40.

Mist nets (4 and 5; see Figure 23) were placed on this hedgerow, targeting bats emerging from the farm buildings and commuting along these hedgerows, resulting in 2 brown long-eared bat and 1 common pipistrelle.

Harp trap 1 (with lure) was placed within the parkland (situated between a mature tree and a standing dead trunk) to target bats foraging within the parkland trees. This trap resulted in four bats including the Noctule, Serotine, a Soprano pipistrelle and a brown long-eared bat.

A harp trap (with lure) and mist net were placed at positions 2 and 3 to target bats foraging/commuting along the boundary woodland, resulting in a Daubenton's bat, a Soprano pipistrelle and a Soprano pipistrelle bat.

A total of 10 bats were trapped of 6 species (see Table 29). All bats trapped were adult. The three female bats were all post-lactating or parous (indicating breeding previously). Of the 7 male bats caught, 5 were in breeding condition (with swollen testes and/or epididymis) whilst 2 were not yet in breeding condition. The absence of trapped juveniles is unexpected.

Of note is that a high proportion of bats trapped were adult males. This may be an artefact of using acoustic lures to trap bats (males often vigorously respond to lures), but it is understood that female Bechstein's and Brown Long-eared bats also vigorously respond to lures in the maternity period.

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Table 29 - Results of Bats Caught at Chalcroft Farm Parkland

Time	Species	Sex	Age	Breeding Status	Trap
21:00	*Plecotus auritus*	Male	Adult	Non-breeding	3
21:00	*Myotis daubentonii*	Male	Adult	Swollen testes	2
21:15	*Plecotus auritus*	Male	Adult	Swollen testes	5
21:20	*Pipistrellus pipistrellus*	Male	Adult	Swollen testes	4
21:20	*Plecotus auritus*	Female	Adult	Post-lactating	4
21:45	*Nyctalus noctula*	Female	Adult	Post-lactating	1
21:50	*Pipistrellus pygmaeus*	Male	Adult	Swollen testes, swollen epididymis	3
22:00	*Eptesicus serotinus*	Male	Adult	Swollen testes	1
22:15	*Plecotus auritus*	Male	Adult	Non-breeding	1
22:40	*Pipistrellus pygmaeus*	Female	Adult	Parous	1

Figure 23 - Location of nets & traps at Chalcroft Farm Parkland 2018



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Trapping - 2019

Trapping was carried out in Quableigh Wood and Chalcroft Farm Parkland (see Figure 24) under licence for three nights with an aim to trap individuals bats of target species that would be suitable for radio tracking (see Table 16), primarily Bechstein's and Barbastelle bats. Three bats were tagged (Natterer's, Daubenton's and brown long-eared) however, the radio tag failed shortly after being attached to the Daubenton's and no viable data was gathered for this bat.

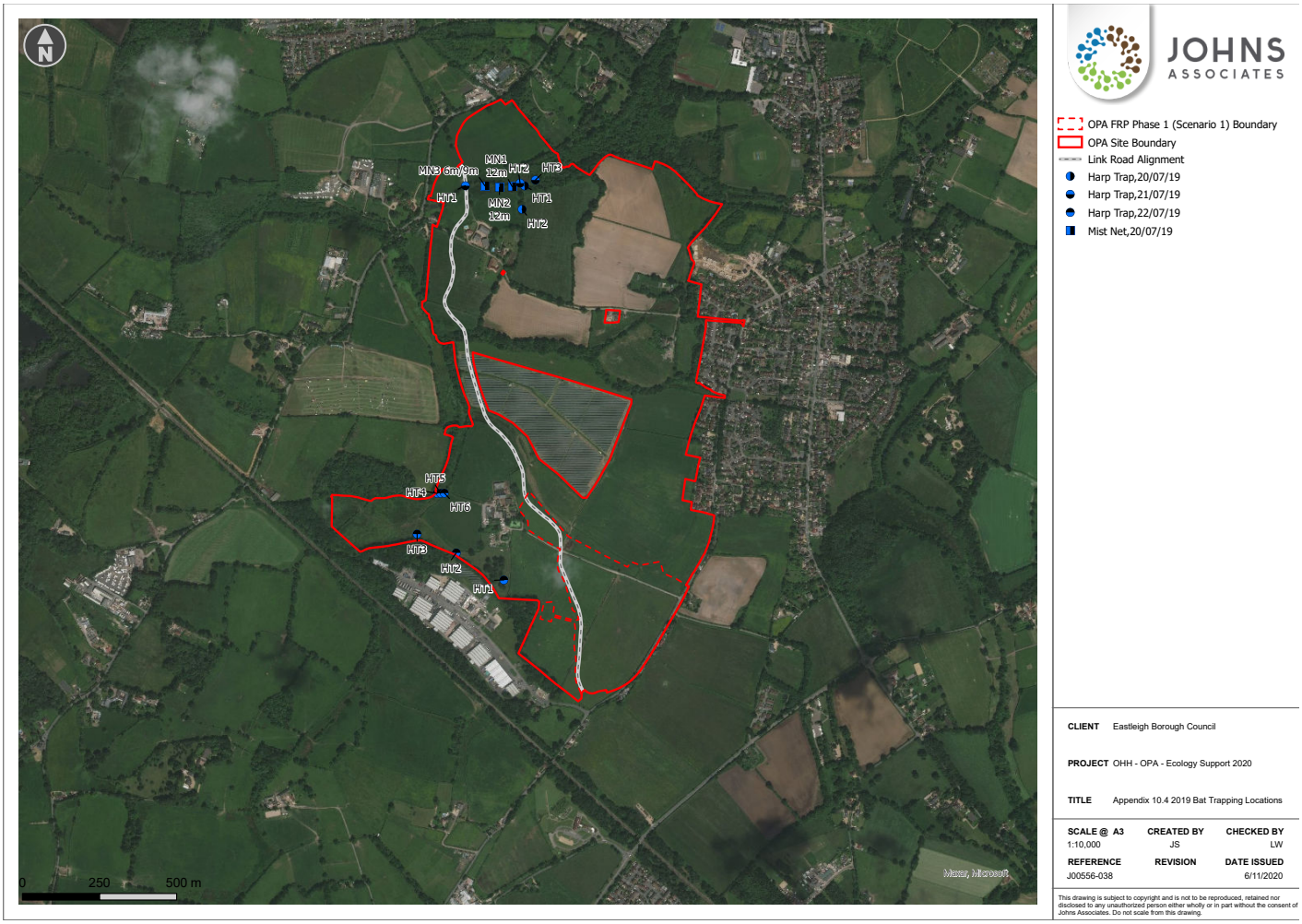
Details of all bats caught during this trapping period are detailed below in Table 30.

Table 30 - Results of Trapping 2019

Date	Time	Species	Sex	Age	Breeding Status	Trap
20/07/19	00:15	Myotis mystacinus	Male	Adult		N/R
21/07/19	22:00	Myotis mystacinus	Male	Adult		1
	22:40	Pipistrellus pipistrellus	Female	Adult	Post lactating	2
		Myotis daubentonii	Male	Adult		2
		Myotis daubentonii	Male	Adult		2
		Pipistrellus pipistrellus	Male	Adult		2
	23:35	Pipistrellus pipistrellus	Male	Adult		1
		Myotis mystacinus	Male	Adult		1
		Pipistrellus pipistrellus	Male	Adult		1
		Myotis nattereri	Male	Adult		3
	02:55	Pipistrellus pygmaeus	Male	Adult		1
22/07/19	22:00	Nyctalus noctula	Male	Adult		1
	00:20	Pipistrellus pipistrellus	Male	Adult		1
		Pipistrellus pipistrellus	Female	Adult	Post Lactating	3
		Plecotus auritus	Female	Adult	Parous	1
	03:00	Pipistrellus pygmaeus	Male	Adult		2

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Figure 24 - Trapping Locations in 2019



Trapping - 2020

Two trapping teams were present on site for three nights on 2nd, 3rd and 4th August 2020. Each team was in a different location on each night (see Figure 25). Team A was run by Daniel Whitby and the results of all the bats caught over the three nights can be found in Table 31. Team B was run by Eric Palmer and the results of all the bats caught over the three nights can be found in Table 31.

Table 31 - Team A Results

Date	Time	Species	Sex	Age	Breeding Status	Trap
02/08/20	21:30	Myotis daubentonii	Male	Adult		D
		Myotis mystacinus	Female	Adult	Non-breeding	B
		Pipistrellus pipistrellus	Male	Adult		C
		Pipistrellus pipistrellus	Male	Adult		C
	22:00	Plecotus auritus	Female	Adult	Non-breeding	A
		Myotis nattereri	Male	Juvenile		A
		Pipistrellus pipistrellus	Male	Juvenile		C
		Pipistrellus pygmaeus	Male	Juvenile		D
		Pipistrellus pipistrellus	Male	Juvenile		E

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		Myotis nattereri	Male	Adult		B
		Pipistrellus pygmaeus	Female	Juvenile		C
		Myotis daubentonii	Female	Adult		A
		Myotis daubentonii	Female	Juvenile		A
		Pipistrellus pipistrellus	Female	Juvenile		E
	23:00	Pipistrellus pipistrellus	Male	Juvenile		C
		Myotis nattereri	Female	Adult	Lactating	C
		Myotis daubentonii	Male	Juvenile		B
		Plecotus auritus	Female	Adult	Lactating	A
		Plecotus auritus	Male	Juvenile		A
		Myotis daubentonii	Male	Juvenile		A
		Myotis nattereri	Male	Adult		C
		Myotis daubentonii	Male	Juvenile		D
		Pipistrellus pygmaeus	Male	Juvenile		C
	00:00	Myotis daubentonii	Male	Juvenile		D
		Plecotus auritus	Female	Adult	Lactating	A
		Myotis daubentonii	Female	Adult		A
		Myotis mystacinus	Female	Adult	Non-breeding	D
		Pipistrellus pipistrellus	Female	Juvenile		D
		Myotis daubentonii	Female	Juvenile		A
		Myotis daubentonii	Female	Adult		A
		Myotis daubentonii	Female	Adult		A
	01:00	Pipistrellus pipistrellus	Male	Juvenile		C
		Pipistrellus pygmaeus	Male	Adult		C
		Myotis nattereri	Male	Adult		D
		Pipistrellus pipistrellus	Female	Adult	Post Lactating	E
		Pipistrellus pipistrellus	Male	Juvenile		A
		Myotis daubentonii	Male	Juvenile		B
	02:00	Plecotus auritus	Female	Adult	Lactating	C
		Plecotus auritus	Male	Adult		A
		Plecotus auritus	Male	Juvenile		A
		Plecotus auritus	Female	Juvenile		A
		Plecotus auritus	Female	Adult	Lactating	A
		Myotis daubentonii	Male	Juvenile		A
		Myotis daubentonii	Male	Juvenile		D
03/08/20	21:30	Pipistrellus pipistrellus	Female	Juvenile		C
		Pipistrellus pipistrellus	Female	Juvenile		C
		Pipistrellus pygmaeus	Male	Adult		E
		Pipistrellus pygmaeus	Male	Juvenile		E
		Pipistrellus pygmaeus	Female	Adult	Non-breeding	D
		Pipistrellus pipistrellus	Female	Adult		F
		Myotis nattereri	Male	Juvenile		F
		Pipistrellus pipistrellus	Male	Juvenile		A
	22:00	Plecotus auritus	Male	Adult		B
		Pipistrellus pygmaeus	Male	Adult		C
		Pipistrellus pipistrellus	Female	Adult		C
		Myotis mystacinus	Female	Adult	Lactating	E
		Myotis mystacinus	Male	Juvenile		E
		Myotis nattereri	Female	Adult	Lactating	F
		Myotis mystacinus	Male	Adult		D

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		Myotis daubentonii	Female	Adult		C
		Pipistrellus pygmaeus	Male	Adult		A
	00:00	Myotis nattereri	Male	Adult		B
	01:00	Plecotus auritus	Female	Adult	Lactating	C
	02:00	Myotis daubentonii	Male	Adult		A
04/08/20	21:30	Myotis nattereri	Male	Adult		B
		Pipistrellus pipistrellus	Female	Adult		D
		Pipistrellus pipistrellus	Female	Juvenile		D
		Nyctalus noctula	Male	Adult		E
		Pipistrellus pipistrellus	Male	Adult		A
		Pipistrellus pygmaeus	Male	Adult		B
		Myotis mystacinus	Female	Adult		D
		Pipistrellus pipistrellus	Male	Adult		E
		Pipistrellus pygmaeus	Male	Adult		E
	22:00	Plecotus auritus	Male	Adult		A
		Pipistrellus pipistrellus	Male	Juvenile		A
		Eptesicus serotinus	Male	Adult		B
		Pipistrellus pygmaeus	Male	Adult		E
		Myotis daubentonii	Female	Juvenile		E
		Pipistrellus pipistrellus	Male	Juvenile		E
		Pipistrellus pipistrellus	Male	Juvenile		D
		Myotis nattereri	Female	Adult	Post Lactating	C
	23:00	Myotis daubentonii	Female	Juvenile		A
		Myotis daubentonii	Male	Juvenile		B
		Pipistrellus pipistrellus	Male	Juvenile		E
		Myotis mystacinus	Female	Adult	Post lactating	C
	00:00	Myotis daubentonii	Male	Juvenile		E
		Pipistrellus pipistrellus	Female	Adult		E
		Myotis daubentonii	Male	Juvenile		E
		Myotis daubentonii	Male	Juvenile		E
	01:00	Nyctalus noctula	Female	Adult	Post Lactating	E

Table 32 - Team B Results

Date	Time	Species	Sex	Age	Breeding Status	Trap
02/08/20	01:15	Myotis nattereri	Male	Adult		N/R
	02:25	Myotis nattereri	Female	Adult	Post lactating	N/R
	22:00	Myotis nattereri	Female	Adult		N/R
03/08/20	22:00	Myotis mystacinus	Female	Adult	Post Lactating	1
	22:50	Myotis nattereri	Female	Juvenile		2
	23:40	Myotis nattereri	Female	Adult		1
	01:10	Myotis nattereri	Female	Adult		1
	01:10	Myotis nattereri	Male	Juvenile	Lactating	1
04/08/20	21:45	Pipistrellus pipistrellus	Female	Adult		3
		Pipistrellus pipistrellus	Female	Adult		3
	22:15	Pipistrellus pipistrellus	Female	Adult	Post Lactating	1
		Pipistrellus pipistrellus	Male	Adult		1
		Pipistrellus pygmaeus	Female	Adult		1
	22:30	Pipistrellus pipistrellus	Female	Adult		3
		Pipistrellus pipistrellus	Female	Adult		3
	23:00	Myotis nattereri	Female	Adult	Post Lactating	2

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		Pipistrellus pipistrellus	Male	Adult		3
		Pipistrellus pygmaeus	Male	Adult		3
	23:30	Pipistrellus pipistrellus	Male	Adult		3
	00:50	Pipistrellus pipistrellus	Female	Juvenile		3
	01:30	Myotis daubentonii	Male	Adult		3
	04:00	Myotis daubentonii	Male	Juvenile		3

Figure 25 - Trapping locations of both teams in 2020 over 3 nights in Aug



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4.9.14 Overall Trapping Results

Over the three trapping periods carried out in 2018, 2019 and 2020 in total 138 bats were caught across the site with eight species confirmed to be present (see Table 33).

Table 33 - Summary of All bats Caught from 2018, 2019 & 2020

Common Name	Latin Name	Total Caught	Female	Male	Juveniles	Lactating/post lactating females present on site?	Location Trapped	Radiotracked?
Common pipistrelle	*Pipistrellus pipistrellus*	40	18	22	14	Yes	Chalcroft Parkland	No
Daubenton's	*Myotis daubentonii*	27	9	18	16	No*		No - tag failure
Natterers	*Myotis nattereri*	19	9	10	4	Yes	Central woodland belt, Hearts Copse & Quobleigh Wood	Yes * lactating female trapped on site radiotracked to breeding colony east of Horton Heath
Soprano pipistrelle	*Pipistrellus pygmaeus*	18	4	14	4	No		No
Brown Long-eared	*Plecotus auritus*	17	9	8	3	Yes	Chalcroft parkland,	Yes – lactating female trapped on site tracked to tree roost in Hearts Copse.
Whiskered	*Myotis mystacinus*	11	6	5	1	Yes	Hearts Copse	No
Noctule	*Nyctalus noctula*	4	2	2	0	Yes	Hearts Copse (edge)	No
Serotine	*Eptesicus serotinus*	2	0	2	0	No - males only		No

Overall the gender observed was 58.7% male and 41.3% female. This may be an artefact of using acoustic lures to trap bats (males often vigorously respond to lures), but it is understood that female Bechstein's and Brown Long-eared bats also vigorously respond to lures in the maternity period too (pers. Comm. Gareth Harris, 2018).

Overall 21 post lactating, lactating or parous females were caught which indicates that the site is used by breeding female bats (see Table 33)

In total 42 juveniles were caught over the three trapping period (2018 - 2020) equating to 30.4% of the overall catch. Only two species did not record any juveniles; noctule and serotine. However, the catch for both these species was low as trapping either of these species is challenging. However, this does confirm that the site is used by juvenile bats.

Of the six Myotis species found in the UK only three of the most common species were recorded to be present within the site; Daubenton's *Myotis daubentonii*, whiskered *Myotis mystacinus* and Natterer's *Myotis nattereri*. In total over the whole period Myotis accounted for 41.3% of all caught bats and of that Daubenton's was the most frequently

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encountered species (27 individuals equating to 47.3% of Myotis caught) with Natterer's second (19 individuals equating to 33.3% of Myotis caught) and whiskered making up the remaining (11 individuals equating to 19.3% of Myotis caught).

The absence of female Daubenton's bats with confirmed breeding status is notable despite the high number of individuals captured. However, COVID-19 measures employed to manage the transmission risk to bats during 2020 resulted in the decision to avoid unnecessary processing of bats. Daubenton's bats have dense fur and the identification of breeding status of female bats requires close inspection that was not deemed appropriate. This constraint reduces the confidence in the assessment that the site does not support breeding female Daubenton's bats. A precautionary approach has been taken to the assessment of the likely effects of the development on this species including the potential presence of a breeding roost nearby for this species.

No Bechstein's were caught over the three period of trapping and therefore due to the extended survey effort it is considered that this site is unlikely to form a critical part of a maternity CSZ and the Myotis Spp. recorded on detector surveys are most likely to be a combination of the above common Myotis species.

No Barbastelle were caught so it was not possible to confirm the sex or breeding status of this species on site. The absence of bats despite a significant, targeted suite of trapping surveys does, however, support the assessment that the site is not important for this species.

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4.10 RADIO TRACKING SURVEYS

4.10.1 Brown Long Eared bat

An adult female brown long-eared bat was trapped and tagged on the 22nd July at 00:20.

After release the Brown long-eared bat was tracked foraging along various points along Fir Tree Lane. It was last observed foraging along a hedgerow adjacent to fir tree lane at 04:47 when the signal was lost, no further fix was picked up that evening.

On the 23rd July the bat was first tracked commuting along the woodland belt north of Chalcroft solar park at 21:15, the bat travelled to the east into Horton Heath and was observed foraging within various gardens throughout the housing estate until 23:45 when the signal was lost. At this point the weather deteriorated into a thunderstorm and survey work ceased until the weather cleared. At 02:17 the signal was tracked to the west of Chalcroft Farm, the bat appeared to be foraging within Hearts Copse. It was assumed the bat returned to roost during the thunderstorm and that it was likely the roost was located in Hearts Copse. The bat spent the majority of the rest of the evening foraging between gardens within southern Horton Heath and foraging around the Chalcroft Farm complex. These activity loci are displayed in Figure 26.

24th July

Day tracking identified the bat to an alder tree *Alnus glutinosa* within hearts copse adjacent to the western Site boundary, (see roost location Figure 27 – Activity Heat Map - Natterer's Bat

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Figure 28). The tree had multiple potential roost features present including woodpecker holes and rot holes throughout the main trunk see Plate 1. On the evening of 24th July an emergence survey of the tree was due to be carried out, however, on arrival the surveyors could not pick up the radio tag signal, surveyors instead positioned themselves on the edge of hearts copse woods to locate the bat and track its movements. The brown long-eared bat was detected in the woodland from 21:15 and the bat left the woods at 22:00 traveling towards the direction of the solar farm. The bat was next picked up at 22:22 foraging around gardens in Horton Heath, the foraging patterns of the bat were similar to the previous evening. The bat spent time foraging between gardens in Horton heath, around Chalcroft Farm and Hearts Copse, the bat appeared to quickly commute between these main foraging areas. These three main foraging hotspots correspond with the heat map shown in Figure 26. The brown long-eared bat was radio tracked back to Hearts Copse where the signal remained static for an hour and was assumed to have returned to roost at 05:20.

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Figure 26 – Activity Heat Map - Brown long-eared bat



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Plate 1: Brown long-eared roost in alder tree.



On the 25th July an emergence survey following BCT survey guidelines with additional infrared (IF) lighting and IF cameras was carried out on the alder tree roost. A signal from the radio-tag was identified from the tree at the start of the survey but no emergence was observed and the signal from the bat was not present at the end of the survey. After the emergence survey the bat was radio-tracked into Horton Heath where the bat remained for the majority of the night foraging within residential gardens until returning to the roost site in Hearts Copse at 04:33.

4.10.2 Natterers

An adult female Natterers bat was trapped in the central woodland belt and tagged on the 21st July at 23:35 and was radio-tracked the following evening.

On the 22nd July the Natterers bat was first tracked to the west of the Site south of Victoria House around 22:45 where it foraging up and down the hedgerows in this field and the hedgerow adjacent to Fir Tree Lane until 00:30 when the bat was recorded commuting east along the northern side of the central woodland belt solar farm into Horton Heath at 01:28, this density of activity is shown on Figure 27. The bat was then observed foraging along unlit public footpaths between residential houses, at 04:35 the bat was located to the east of the B3354 (Botley road) and was observed flying down a dark footpath within the housing estate, the bat was tracked through the estate to the very edge of the Huntington gardens housing estate. The bat was tracked to a tree roost located on the edge of a wooded stream at 05:00, the roost was located in a north-west facing knothole within an ash tree *Fraxinus excelsior* located at SU 49821 16916. This roost location is described as the 1st Natterer's roost and can be seen in Figure 28 and a picture of the roost is shown in Plate 2.

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The daytime radiotracking team confirmed the location of the Natterer's bat within the tree on the 23rd July and that evening conducted an emergence survey of the 1st Natterers roost. The Natterer's bat wasn't observed emerging from the tree however it was picked up leaving the roost using the radiotracking equipment at 22:10 and tracked west towards the Site. Signal on the bat was lost until after the thunderstorm had passed, the bat was observed foraging up and down a hedgerow adjacent to Fir Tree Lane at 02:20 until 02:30 when the bat was observed flying south west towards the solar park. The bat was observed foraging between the solar panels, the bat remained foraging around the solar park until 04:20 when it was recorded commuting east along the woodland belt north of the solar farm. Radio-tag signal was lost and the bat did not return to the 1st Natterers roost.

Plate 2: 1st Natterers Roost within an ash tree.



24th July

the Natterer's bat was tracked to a second tree roost offsite to the east of Horton Heath (see Figure 28). The roost was located in a tear out on a mature beech tree, within a woodland adjacent to an un-named minor road near a small group of residential properties see Plate 3. The same evening an emergence survey was conducted on this tree roost following BCT surveying guidelines using standard survey equipment, infrared cameras and IF video cameras. A total of nine Natterers bats were observed emerging from the roost between 21:33 and 22:09. The radio-tagged Natterer's bat was observed emerging from the tree roost at 21:50 and travelled in a south easterly direction along the un-named minor road.

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Plate 3: 2nd Natterers roost located in a beech tree.



An emergence survey was also conducted on the 1st Natterers roost on the 24th July, no bats were observed emerging from this roost.

The radiotracking team observed the bat to be more transient throughout this evening, however the main foraging areas observed throughout the night were over the solar farm, through Horton Heath and within a woodland block east of Botley road. The natterers bat was radio tracked back to the 2nd Natterers roost at 05:09.

On the evening of the 25th July a second emergence survey of the 2nd Natterers roost was conducted. No bats were observed to emerge from the tree. The radio tracking team observed the bat frequently moving throughout the evening between two foraging locations, Chalcroft solar park and the woodland block to the east of Botley road. At 04:26 the bat was tracked back to the 1st Natterers roost, however the bat appeared to commute along the water course to the south west, the bat was tracked to the 2nd Natterers roost at 04:40 where the bat remained static until 05:00 when the survey concluded.

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Figure 27 – Activity Heat Map - Natterer's Bat



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Figure 28 - Locations of roost and activity points combined for both species



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5 SUMMARY

Ten species have been confirmed to be present on Site:

Barbastelle:

A very low levels of activity was recorded through automated bat detector surveys however; this species was recorded at all detector locations and in all months with the exception of May. Maximum of 16 passes recorded (median 0.15 passes per night of recording effort).

Serotine:

No roosts identified on site. Two adult males recorded during trapping. Low activity levels observed (maximum 1.03 median passes per night in August) despite high detectability and distinctive call structure. Few records (28 passes recorded within emergence window over 1133 recording nights) indicating potential presence of low status non-breeding roost within ZOI. 20 total passes within potential impact height recorded at all crossing point locations.

Brown long-eared:

Two maternity roosts present on site (Fir Tree Farmhouse and Chalcroft Farm). Fir Tree Farmhouse (Northern Colony) – automated bat detector data indicates that these bats are using the two main connective habitats leading both north and south across Fir Tree Lane from the Farmhouse, presumably to the highly suitable foraging habitats in Quobleigh Wood and the central/western stream corridor respectively (ST11 and ST12). Two Post lactating female BLE and one adult male were caught in Quobleigh Wood in August 2020. Chalcroft Farm (Southern Colony) – Maternity roost present in Pond Cottages to the north of Chalcroft pond. Additional satellite roosts identified in tree in Hearts Copse and within the stables building (A6). Key supporting habitats are considered to be Hearts Copse (offsite) with the marshy grassland and riparian corridor of the southwest and western areas of the site. Trapping in the vicinity of Hearts Copse in 2020 caught 4 lactating female bats, two adult males and two juvenile bats (male and female). Key connective corridors are the hedgerows to the south and the riparian corridor to the north and west of Chalcroft Farm. Radiotracking in 2019 recorded a female adult post lactating female from this colony roosting in Round Copse and foraging repeatedly in the central and eastern woodland utilising the central hedgerow east of the solar park and the western riparian corridor. One confirmed tree roost was found (T23) during the survey of a brown long-eared roost which was found on the 20th October and re-checked on the 27th October with the maximum count of 2 individuals present on the 20th October. 10 crossing events were recorded within the collision risk height band (locations CP2 – 5, CP3 – 3 & CP4-2). No crossing events were recorded for this species at CP1 or CP5.

Natterer's:

One roost record on site in B18 in 2018. This building has subsequently been demolished under licence. Automated bat detector surveys are limited to providing additional information at genus level. This genus is represented at all locations sampled. Radiotracking surveys tracked a post lactating female to two maternity roosts to the east of Horton Heath (both tree roosts, colony size 20-30). This bat foraged along the central woodland belt and within a young woodland within the existing housing estate each night of the survey. Trapping surveys recorded a total of 19 Natterers bats with female lactating bats captured in Quobleigh Wood, Hearts Copse and the Central Woodland. Males and juveniles were also present in these areas. Crossing point data recorded 45 crossing events by this genus within the predicted road traffic collision height range with 33 of these at location CP1 (Quobleigh Stream Crossing). This value is likely to be comprised of a high proportion of Daubenton's bats given the riparian habitats present at this location.

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Daubenton's:

No known roosts present on site. Anecdotal observation of two Daubenton's bats entering oak tree in parkland south of Chalcroft during trapping surveys. 1 male was captured in Chalcroft Farm Parkland in 2018. 8 female (4 adults and 4 juveniles) were caught in Hearts Copse, 14 males (2 adult and 12 juveniles caught in Hearts copse and Chalcroft Farm Parkland. 1 adult female and 3 adult male was caught in Quobleigh Woods. These were predominantly males (18 in total) and juveniles. No evidence of the use of the site of lactating females was recorded. One adult male bat caught in Quobleigh Woods on the 22nd Aug 2019, was radiotagged but the tag failed within minutes of application. Key locations are considered to be the riparian corridors, particularly the western site boundary connecting Quobleigh Wood and the habitats south of the site to the River Itchen and to Itchen Valley Country Park. Crossing point data recorded 45 crossing events by this genus within the predicted road traffic collision height range with 33 of these at location CP1 (Quobleigh Stream Crossing). This value is likely to be comprised of a high proportion of Daubenton's bats given the riparian habitats present at this location.

Nathusius Pipistrelle:

51 passes over 1133 recording nights, 26 of which at location ST16. 41 of these were recorded in October 2020. No records in July or August. Not recorded during crossing point surveys.

Noctule:

The majority of records for this species were recorded at ST1, ST2, ST3, ST5, ST6 and ST16 with ST5 recording the highest median number of recordings in total. Tree 19 (an Ash next to the pond at Chalcroft Farm) has been confirmed as a meting roost. Noctule were heard calling from the tree in 2018 and emergence surveys on the tree in September 2020 confirm 3 noctules emerging from a tear out at the top of the tree. In total 4 adult noctules were caught (2 post-lactating females and 2 males) all in Chalcroft Parkland. 55 crossing were recorded in total across all the crossing point locations by noctule. Of those only 1 at CP4 and 2 at CP3 were within the highest collision risk category.

Common pipistrelle:

Common pipistrelle were recorded at high levels at all automated bat detector locations. The majority of records for this species were recorded at ST1, ST5 and ST14. The median bat passes per hour per month found April, June and July to have the highest activity for common pipistrelle which is within the peak maternity period for this species. ST14 recorded the highest number of pre-sunset recordings with 100 recordings, Recordings made within the species-specific emergence window (Russ J. , 2012) are considered to give an indication as to the likelihood of a roost being nearby. Therefore, recordings made close to or pre-sunset are likely to give a stronger indication of a roost nearby. 40 common pipistrelle were captured during the trapping surveys; 18 females (4 post lactating and 6 juveniles) and 22 males (12 adults and 10 juveniles). They were caught in all years and at all locations. Crossing point surveys recorded; 20 at CP1, 26 at CP2, 125 at CP3, 87 at CP4 and 181 at CP5 at the highest collision risk category for this species. CP1, 3 and 4 are considered to be on commuting routes while CP2 and 5 recorded more foraging activity.

Soprano pipistrelle:

The majority of automated bat detector records for this species were recorded at ST1, ST2 and ST4 with ST2 recording the highest median number of recordings in total. The median bat passes per hour per month found April recorded the highest level of recordings with the lowest number of recordings in May and then a similarly low level of recordings for the remaining months. 18 soprano pipistrelle were captured during the trapping surveys; 5 females (2 parous and 1

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juveniles) and 13 males (10 adults and 3 juveniles). They were caught in all years and at all locations. Crossing point surveys recorded; 2 at CP1, 8 at CP2, 16 at CP3, 1 at CP4 and 2 at CP5 at the highest collision risk category for this species. CP1, 3 and 4 are considered to be on commuting routes while CP2 and 5 recorded more foraging activity.

5.2 BAT ROOSTS – ON SITE

16 of the 26 buildings within the site were identified during the building emergence/ re-entry surveys has having bat roosts for 4 species with 7 of the buildings having roosts of multiple species which have been summarized in Table 34.

Table 34 - Summary of Confirmed bat roosts

Building No.	Species Present	Max Count	DNA analysis results	Roost type	Roost location
A1	Common Pipistrelle	1	N/A	Low status non-breeding	Behind vegetation on SE corner
A7	Common pipistrelle	2	N/A	Low status non-breeding	At the eaves on the northern elevation
A9	Brown long-eared	Unknown	Brown long eared	Maternity roost	Roof void
	Common pipistrelle	2	N/A	Low status non-breeding	Barge board on western gable end
A6	Brown long-eared	5	Brown long-eared	Satellite roost	Unknown – likely to be the wall head between the stables and the workshop
A2	Common pipistrelle	2	N/A	Low status non-breeding	Unknown – likely to be single roosting between the wooden beam joints
	Soprano pipistrelle	1	N/A	Low status non-breeding	Unknown – likely to be single roosting between the wooden beam joints
	Brown long-eared	1	N/A	Low status non-breeding	Unknown – likely to be single roosting between the wooden beam joints
A3	Common pipistrelle	1	N/A	Low status non-breeding	Behind external sign on the southern elevation
A4	Common pipistrelle	2	N/A	Low status non-breeding	The eaves of the farm shop on the SE corner
	Soprano pipistrelle	1	N/A	Low status non-breeding	Entered building under corrugated roof on the western elevation
	Common pipistrelle	1	N/A	Low status non-breeding	Emerged from the ridge on the eastern elevation
B17	Common pipistrelle	5	N/A	Mating roost	Behind fascia board on the NW corner of the building
B18	Common pipistrelle	2	N/A	Low status non-breeding	Behind vegetation on the northern elevation
	Natterers	1	N/A	Low status non-breeding	Behind vegetation on the northern elevation
B20	Brown long-eared	Unknown	Brown long-	Likely abandoned	Roof void

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			eared	roost	
	Common pipistrelle	1	N/A	Low status non-breeding	NW corner of the building
B21	Brown long-eared	3	N/A	Low status non-breeding	Between roof tiles and roofing membrane on the SW corner
B22	Common pipistrelle	3	N/A	Mating roost	Between wooden cladding and wall on the eastern elevation
B25	Common pipistrelle	1	N/A	Low status non-breeding	Northern corner of the building on the gable end under the hip tile.
	Brown long-eared	Unknown	Brown long-eared	Low status non-breeding	Roof void
B29	Brown long-eared	1	Brown long-eared	Low status non-breeding	Roof void
	Common pipistrelle	1	N/A	Low status non-breeding	Soffit box beneath the SE chimney

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APPENDIX A – R REPORT OF BAT DATA

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Appendix A

Automated Bat Detector Survey

Data Analysis and Visualisation

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1 INTRODUCTION

1.1 General Information on Bat Species Observed

Below is a general introduction to the species observed on the survey. Further information can be found on the Bat Conservation Trust website https://www.bats.org.uk/about-bats/what-are-bats/uk-bats.

Barbastelle *Barbastella barbastellus*
The barbastelle is a distinctive looking medium-sized bat. It has a pug-shaped nose and broad ears which join across the top of the head, and its fur is very dark with "frosted" tips. It prefers woodland, roosting in trees and hunting both beneath the canopy and over tree-tops but can also be found over rough meadows, ponds and streams.

Common Pipistrelle *Pipistrellus pipistrellus*
Common pipistrelles are the most common and widespread of all British bat species. They are found in lots of places, including towns and cities, as well as in the countryside. They are small, and their flight is fast and jerky as they pursue small insects which they catch and eat whilst flying. A single pipistrelle can consume up to 3,000 insects in one night!

Leisler's or Noctule
These two bats belong to the same family, and are fairly large for a British bat. The noctule is generally one of the first bats to be seen of an evening, and they like to hunt over open ground, particularly pasture. Leisler's are more likely to be found in woodland, but they can also be found in the same places as noctules-making them hard to tell apart!

Myotis Species
The Myotis are a group of bats which includes Alcathoe, Bechstein's, Brandt's, Daubenton's, Natterer's and Whiskered bats. They all make very similar sounds which mean that sometimes it is very hard to tell them apart from their recordings alone.

Nathusius' Pipistrelle *Pipistrellus nathusii*
This bat is quite rare in the UK, though records have increased in recent years. It is migratory (with one bat recorded travelling between Bristol and Holland!) and is most commonly found in autumn, although there are now records of colonies remaining all year and breeding in the UK. It is similar in appearance to, but slightly larger than the common and soprano pipistrelles and the fur on its back is longer, sometimes giving a shaggy appearance. The Nathusius' is strongly associated with water and woodlands.

Serotine *Eptesicus serotinus* The serotine is one of Britain's largest bat species and usually one of the first to appear in the evening, often emerging in good light. It flies at about tree-top height (to about 10 m) often close to vegetation, and will sometimes flop, wings outstretched, on to the foliage to catch large insects. The serotine will feed around street lamps and even catch prey from the ground.

Serotines roost mainly in buildings with high gables and cavity walls. They can be found in much older buildings and churches, but are less often found in modern buildings.

Soprano Pipistrelle *Pipistrellus pygmaeus*
The soprano pipistrelle was discovered as a different species to the common pipistrelle in the 1990s - they are very similar but they use slightly different echolocation calls and there are subtle differences in how they look. They also tend to roost and hunt in slightly different places, with the soprano pipistrelle favouring river habitat and wetland areas.

Soprano Pipistrelle *Pipistrellus pygmaeus*
The soprano pipistrelle was discovered as a different species to the common pipistrelle in the 1990s - they are very similar but they use slightly different echolocation calls and there are subtle differences in how they look. They also tend to roost and hunt in slightly different places, with the soprano pipistrelle favouring river habitat and wetland areas.

2 TABLES

2.1 Table of Suntimes

Bats are nocturnal, active at night rather than day; therefore the surveys are reported relative to the *night* which runs from the date at sunset to dawn the following day.

Table 1 gives the survey *night*, time of sunset, time of sunrise and the length in hours of each night

Table 1: Horton Heath Suntimes for each Survey Night

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
27 July 2018	21:01	05:26	8.4
28 July 2018	20:59	05:27	8.5
29 July 2018	20:58	05:29	8.5
30 July 2018	20:56	05:30	8.6
31 July 2018	20:55	05:32	8.6
01 August 2018	20:53	05:33	8.7
02 August 2018	20:51	05:35	8.7
03 August 2018	20:50	05:36	8.8
04 August 2018	20:48	05:38	8.8
09 August 2018	20:40	05:45	9.1
10 August 2018	20:38	05:47	9.1
11 August 2018	20:36	05:48	9.2
12 August 2018	20:34	05:50	9.3
13 August 2018	20:32	05:51	9.3
14 August 2018	20:30	05:53	9.4
15 August 2018	20:28	05:54	9.4
16 August 2018	20:27	05:56	9.5
17 August 2018	20:25	05:58	9.6
18 August 2018	20:23	05:59	9.6
19 August 2018	20:21	06:01	9.7
20 August 2018	20:19	06:02	9.7
21 August 2018	20:17	06:04	9.8
22 August 2018	20:15	06:05	9.8
23 August 2018	20:12	06:07	9.9
24 August 2018	20:10	06:09	10.0
25 August 2018	20:08	06:10	10.0
26 August 2018	20:06	06:12	10.1
27 August 2018	20:04	06:13	10.2
28 August 2018	20:02	06:15	10.2
29 August 2018	20:00	06:16	10.3
30 August 2018	19:58	06:18	10.3
31 August 2018	19:55	06:19	10.4
01 September 2018	19:53	06:21	10.5
02 September 2018	19:51	06:23	10.5
03 September 2018	19:49	06:24	10.6
04 September 2018	19:47	06:26	10.6
05 September 2018	19:44	06:27	10.7
06 September 2018	19:42	06:29	10.8
07 September 2018	19:40	06:30	10.8
08 September 2018	19:38	06:32	10.9
09 September 2018	19:35	06:33	11.0
10 September 2018	19:33	06:35	11.0
11 September 2018	19:31	06:36	11.1

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
12 September 2018	19:29	06:38	11.2
13 September 2018	19:26	06:39	11.2
14 September 2018	19:24	06:41	11.3
15 September 2018	19:22	06:43	11.3
16 September 2018	19:20	06:44	11.4
17 September 2018	19:17	06:46	11.5
18 September 2018	19:15	06:47	11.5
19 September 2018	19:13	06:49	11.6
20 September 2018	19:10	06:50	11.7
21 September 2018	19:08	06:52	11.7
22 September 2018	19:06	06:53	11.8
23 September 2018	19:04	06:55	11.9
24 September 2018	19:01	06:57	11.9
25 September 2018	18:59	06:58	12.0
26 September 2018	18:57	07:00	12.0
27 September 2018	18:54	07:01	12.1
28 September 2018	18:52	07:03	12.2
29 September 2018	18:50	07:04	12.2
30 September 2018	18:48	07:06	12.3
01 October 2018	18:45	07:08	12.4
02 October 2018	18:43	07:09	12.4
03 October 2018	18:41	07:11	12.5
04 October 2018	18:39	07:12	12.6
05 October 2018	18:36	07:14	12.6
06 October 2018	18:34	07:16	12.7
07 October 2018	18:32	07:17	12.8
08 October 2018	18:30	07:19	12.8
11 October 2018	18:23	07:24	13.0
12 October 2018	18:21	07:25	13.1
13 October 2018	18:19	07:27	13.1
14 October 2018	18:17	07:29	13.2
15 October 2018	18:15	07:30	13.3
16 October 2018	18:13	07:32	13.3
17 October 2018	18:11	07:34	13.4
18 October 2018	18:08	07:35	13.4
19 October 2018	18:06	07:37	13.5
24 October 2018	17:56	07:46	13.8
25 October 2018	17:54	07:47	13.9
26 October 2018	17:53	07:49	13.9
27 October 2018	17:51	06:51	14.0
28 October 2018	16:49	06:52	14.1
29 October 2018	16:47	06:54	14.1
30 October 2018	16:45	06:56	14.2
31 October 2018	16:43	06:58	14.2
15 April 2019	20:00	06:10	10.2
16 April 2019	20:01	06:08	10.1
17 April 2019	20:03	06:06	10.0
18 April 2019	20:05	06:04	10.0
19 April 2019	20:06	06:02	9.9

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
20 April 2019	20:08	06:00	9.9
21 April 2019	20:10	05:58	9.8
22 April 2019	20:11	05:56	9.7
23 April 2019	20:13	05:54	9.7
24 April 2019	20:15	05:52	9.6
25 April 2019	20:16	05:50	9.6
26 April 2019	20:18	05:48	9.5
27 April 2019	20:19	05:46	9.4
28 April 2019	20:21	05:44	9.4
29 April 2019	20:23	05:42	9.3
30 April 2019	20:24	05:40	9.3
01 May 2019	20:26	05:38	9.2
02 May 2019	20:28	05:37	9.2
03 May 2019	20:29	05:35	9.1
04 May 2019	20:31	05:33	9.0
05 May 2019	20:32	05:31	9.0
06 May 2019	20:34	05:30	8.9
07 May 2019	20:36	05:28	8.9
08 May 2019	20:37	05:26	8.8
09 May 2019	20:39	05:25	8.8
10 May 2019	20:40	05:23	8.7
11 May 2019	20:42	05:22	8.7
12 May 2019	20:43	05:20	8.6
13 May 2019	20:45	05:19	8.6
14 May 2019	20:46	05:17	8.5
15 May 2019	20:48	05:16	8.5
16 May 2019	20:49	05:14	8.4
17 May 2019	20:51	05:13	8.4
18 May 2019	20:52	05:12	8.3
19 May 2019	20:54	05:10	8.3
20 May 2019	20:55	05:09	8.2
21 May 2019	20:56	05:08	8.2
22 May 2019	20:58	05:07	8.1
23 May 2019	20:59	05:05	8.1
24 May 2019	21:01	05:04	8.1
25 May 2019	21:02	05:03	8.0
26 May 2019	21:03	05:02	8.0
27 May 2019	21:04	05:01	7.9
28 May 2019	21:06	05:00	7.9
29 May 2019	21:07	04:59	7.9
30 May 2019	21:08	04:59	7.8
31 May 2019	21:09	04:58	7.8
01 June 2019	21:10	04:57	7.8
02 June 2019	21:11	04:56	7.8
03 June 2019	21:12	04:56	7.7
04 June 2019	21:13	04:55	7.7
05 June 2019	21:14	04:54	7.7
06 June 2019	21:15	04:54	7.6
07 June 2019	21:16	04:53	7.6

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
08 June 2019	21:17	04:53	7.6
09 June 2019	21:18	04:53	7.6
10 June 2019	21:18	04:52	7.6
11 June 2019	21:19	04:52	7.5
12 June 2019	21:20	04:52	7.5
13 June 2019	21:20	04:52	7.5
14 June 2019	21:21	04:51	7.5
15 June 2019	21:22	04:51	7.5
16 June 2019	21:22	04:51	7.5
17 June 2019	21:23	04:51	7.5
18 June 2019	21:23	04:51	7.5
19 June 2019	21:23	04:51	7.5
20 June 2019	21:24	04:52	7.5
21 June 2019	21:24	04:52	7.5
22 June 2019	21:24	04:52	7.5
23 June 2019	21:24	04:52	7.5
24 June 2019	21:24	04:53	7.5
25 June 2019	21:24	04:53	7.5
26 June 2019	21:24	04:54	7.5
27 June 2019	21:24	04:54	7.5
28 June 2019	21:24	04:55	7.5
29 June 2019	21:24	04:55	7.5
30 June 2019	21:24	04:56	7.5
02 July 2019	21:23	04:57	7.6
03 July 2019	21:23	04:58	7.6
04 July 2019	21:23	04:59	7.6
05 July 2019	21:22	04:59	7.6
06 July 2019	21:22	05:00	7.6
07 July 2019	21:21	05:01	7.7
08 July 2019	21:20	05:02	7.7
09 July 2019	21:20	05:03	7.7
10 July 2019	21:19	05:04	7.7
11 July 2019	21:18	05:05	7.8
12 July 2019	21:18	05:06	7.8
13 July 2019	21:17	05:07	7.8
14 July 2019	21:16	05:08	7.9
15 July 2019	21:15	05:10	7.9
16 July 2019	21:14	05:11	7.9
17 July 2019	21:13	05:12	8.0
18 July 2019	21:12	05:13	8.0
19 July 2019	21:11	05:15	8.1
20 July 2019	21:10	05:16	8.1
21 July 2019	21:09	05:17	8.1
22 July 2019	21:07	05:18	8.2
23 July 2019	21:06	05:20	8.2
24 July 2019	21:05	05:21	8.3
25 July 2019	21:04	05:23	8.3
26 July 2019	21:02	05:24	8.4
27 July 2019	21:01	05:25	8.4

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
28 July 2019	20:59	05:27	8.5
29 July 2019	20:58	05:28	8.5
30 July 2019	20:57	05:30	8.6
31 July 2019	20:55	05:31	8.6
01 August 2019	20:53	05:33	8.7
02 August 2019	20:52	05:34	8.7
03 August 2019	20:50	05:36	8.8
04 August 2019	20:49	05:37	8.8
05 August 2019	20:47	05:39	8.9
06 August 2019	20:45	05:40	8.9
07 August 2019	20:44	05:42	9.0
08 August 2019	20:42	05:43	9.0
09 August 2019	20:40	05:45	9.1
10 August 2019	20:38	05:46	9.1
11 August 2019	20:36	05:48	9.2
12 August 2019	20:35	05:49	9.2
13 August 2019	20:33	05:51	9.3
14 August 2019	20:31	05:53	9.4
15 August 2019	20:29	05:54	9.4
21 August 2019	20:17	06:03	9.8
22 August 2019	20:15	06:05	9.8
23 August 2019	20:13	06:07	9.9
24 August 2019	20:11	06:08	10.0
25 August 2019	20:09	06:10	10.0
26 August 2019	20:07	06:11	10.1
27 August 2019	20:05	06:13	10.1
28 August 2019	20:02	06:14	10.2
29 August 2019	20:00	06:16	10.3
30 August 2019	19:58	06:17	10.3
31 August 2019	19:56	06:19	10.4
01 September 2019	19:54	06:21	10.4
02 September 2019	19:52	06:22	10.5
03 September 2019	19:49	06:24	10.6
04 September 2019	19:47	06:25	10.6
05 September 2019	19:45	06:27	10.7
06 September 2019	19:43	06:28	10.8
11 September 2019	19:32	06:36	11.1
12 September 2019	19:29	06:38	11.1
13 September 2019	19:27	06:39	11.2
14 September 2019	19:25	06:41	11.3
15 September 2019	19:22	06:42	11.3
16 September 2019	19:20	06:44	11.4
17 September 2019	19:18	06:45	11.5
18 September 2019	19:16	06:47	11.5
19 September 2019	19:13	06:48	11.6
20 September 2019	19:11	06:50	11.6
21 September 2019	19:09	06:51	11.7
22 September 2019	19:06	06:53	11.8
23 September 2019	19:04	06:55	11.8

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
24 September 2019	19:02	06:56	11.9
25 September 2019	19:00	06:58	12.0
26 September 2019	18:57	06:59	12.0
27 September 2019	18:55	07:01	12.1
28 September 2019	18:53	07:02	12.2
29 September 2019	18:51	07:04	12.2
30 September 2019	18:48	07:06	12.3
01 October 2019	18:46	07:07	12.4
02 October 2019	18:44	07:09	12.4
03 October 2019	18:42	07:10	12.5
04 October 2019	18:39	07:12	12.5
05 October 2019	18:37	07:14	12.6
06 October 2019	18:35	07:15	12.7
07 October 2019	18:33	07:17	12.7
08 October 2019	18:30	07:18	12.8
09 October 2019	18:28	07:20	12.9
10 October 2019	18:26	07:22	12.9
17 October 2019	18:11	07:33	13.4
18 October 2019	18:09	07:35	13.4
19 October 2019	18:07	07:37	13.5
20 October 2019	18:05	07:38	13.6
21 October 2019	18:03	07:40	13.6
22 October 2019	18:01	07:42	13.7
23 October 2019	17:59	07:43	13.7
24 October 2019	17:57	07:45	13.8
25 October 2019	17:55	07:47	13.9
28 April 2020	20:22	05:43	9.3
29 April 2020	20:24	05:41	9.3
30 April 2020	20:26	05:39	9.2
01 May 2020	20:27	05:37	9.2
02 May 2020	20:29	05:35	9.1
03 May 2020	20:30	05:34	9.1
04 May 2020	20:32	05:32	9.0
05 May 2020	20:34	05:30	8.9
06 May 2020	20:35	05:28	8.9
07 May 2020	20:37	05:27	8.8
08 May 2020	20:38	05:25	8.8
09 May 2020	20:40	05:24	8.7
15 May 2020	20:49	05:15	8.4
16 May 2020	20:50	05:13	8.4
17 May 2020	20:52	05:12	8.3
18 May 2020	20:53	05:11	8.3
19 May 2020	20:55	05:09	8.2
20 May 2020	20:56	05:08	8.2
21 May 2020	20:58	05:07	8.2
22 May 2020	20:59	05:06	8.1
23 May 2020	21:00	05:05	8.1
24 May 2020	21:01	05:04	8.0
25 May 2020	21:03	05:03	8.0

Table 1: Horton Heath Suntimes for each Survey Night *(continued)*

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
26 May 2020	21:04	05:02	8.0
22 June 2020	21:24	04:52	7.5
23 June 2020	21:24	04:53	7.5
24 June 2020	21:24	04:53	7.5
25 June 2020	21:24	04:53	7.5
26 June 2020	21:24	04:54	7.5
27 June 2020	21:24	04:54	7.5
28 June 2020	21:24	04:55	7.5
29 June 2020	21:24	04:56	7.5
30 June 2020	21:24	04:56	7.5
01 July 2020	21:23	04:57	7.6
02 July 2020	21:23	04:58	7.6
03 July 2020	21:23	04:58	7.6
04 July 2020	21:22	04:59	7.6
08 July 2020	21:20	05:03	7.7
09 July 2020	21:19	05:04	7.7
10 July 2020	21:19	05:05	7.8
11 July 2020	21:18	05:06	7.8
12 July 2020	21:17	05:07	7.8
13 July 2020	21:16	05:08	7.9
14 July 2020	21:15	05:09	7.9
15 July 2020	21:14	05:10	7.9
26 August 2020	20:05	06:12	10.1
27 August 2020	20:03	06:14	10.2
28 August 2020	20:01	06:15	10.2
29 August 2020	19:59	06:17	10.3
30 August 2020	19:57	06:19	10.4
31 August 2020	19:54	06:20	10.4
01 September 2020	19:52	06:22	10.5
02 September 2020	19:50	06:23	10.6
09 September 2020	19:34	06:34	11.0
10 September 2020	19:32	06:36	11.1
11 September 2020	19:30	06:37	11.1
12 September 2020	19:28	06:39	11.2
13 September 2020	19:25	06:40	11.2
14 September 2020	19:23	06:42	11.3
05 October 2020	18:35	07:15	12.7
06 October 2020	18:33	07:16	12.7
07 October 2020	18:31	07:18	12.8
08 October 2020	18:29	07:20	12.8
09 October 2020	18:27	07:21	12.9
10 October 2020	18:24	07:23	13.0
11 October 2020	18:22	07:24	13.0

2.2 Bat Passes per Species

Table 2 shows total number of passes recorded for each species across all of the detectors. A total of 509,848 passes were recorded.

Table 2: Horton Heath Species and Number of Bat Passes

Scientific Name	Common Name	Count (No)	Percentage of total (%)
Pipistrellus pipistrellus	**Common pipistrelle**	454154	89.08
Pipistrellus pygmaeus	**Soprano pipistrelle**	26082	5.12
Myotis spp.	**Myotis**	19927	3.91
Nyctalus noctula	**Noctule**	3927	0.77
Plecotus spp.	**Long-eared**	2291	0.45
Nyctalus spp.	**Noctule or Leisler's**	2001	0.39
Eptesicus serotinus	**Serotine**	1372	0.27
Pipistrellus nathusii	**Nathusius pipistrelle**	51	0.01
Barbastella barbastellus	**Barbastelle**	43	0.01

2.3 Location and Number of Bat Passes

Table 3 shows the location and number of bat passes

Table 3: Number of Bat Passes and Location - part 1 of 2

Species	ST01	ST02	ST03	ST04	ST05	ST06	ST07	ST08
Barbastella barbastellus	2		5	4	2	1	2	2
Eptesicus serotinus	23	31	75	109	56	22	32	331
Myotis spp.	2,279	730	1,880	1,736	1,746	49	1,017	105
Nyctalus noctula	264	557	367	89	1,272	34	109	295
Nyctalus spp.	80	21	24	216	146	1	56	250
Pipistrellus nathusii			2	4			2	
Pipistrellus pipistrellus	50,013	34,941	40,377	31,747	80,233	710	36,431	10,875
Pipistrellus pygmaeus	1,934	3,184	966	8,764	1,715	47	1,041	565
Plecotus spp.	70	68	81	35	182	9	38	50

Table 4: Number of Bat Passes and Location - part 2 of 2

Species	ST09	ST10	ST11	ST12	ST13	ST14	ST15	ST16
Barbastella barbastellus	1		16	1	2		1	4
Eptesicus serotinus	42	37	281	54	21	17	129	112
Myotis spp.	475	303	1,111	2,327	36	808	4,445	880
Nyctalus noctula	67	110	111	197	53	34	78	290
Nyctalus spp.	50	45	56	334	38	21	106	557
Pipistrellus nathusii			7	5		1	1	29
Pipistrellus pipistrellus	10,042	7,273	32,361	18,132	12,016	42,720	23,664	22,619
Pipistrellus pygmaeus	435	265	493	1,867	230	2,218	668	1,690
Plecotus spp.	79	43	663	529	4	104	185	151

2.4 Month and Number of Bat Passes

Table 5 shows the month and number of bat passes

Table 5: Number of Bat Passes and Month

Species	Apr	May	Jun	Jul	Aug	Sep	Oct
Barbastella barbastellus	4		9	8	5	7	10
Eptesicus serotinus	30	131	55	350	655	133	18
Myotis spp.	669	967	847	2,879	1,994	8,519	4,052
Nyctalus noctula	420	1,125	574	513	300	647	348
Nyctalus spp.	12	164	199	375	402	477	372
Pipistrellus nathusii	2	3	2			3	41
Pipistrellus pipistrellus	45,497	56,130	68,876	89,508	59,653	93,873	40,617
Pipistrellus pygmaeus	7,210	2,300	1,480	3,152	2,556	4,686	4,698
Plecotus spp.	37	113	54	477	684	757	169

2.5 Month/Location and Number of Bat Passes

Table 6 shows the location, month and number of bat passes

Table 6: Number of Bat Passes, Month and Location

Month	*Location*	*Barbastella barbastellus*	*Eptesicus serotinus*	*Myotis spp.*	*Nyctalus noctula*	*Nyctalus spp.*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus spp.*
	ST01		2	87	3	1		1,912	133	1
	ST02		10	22	355	6		4,888	458	10
	ST03			11				4,321	30	1
	ST04	1		356	4			7,024	5,654	4
	ST05	2	1	91	16	1		13,051	624	4
	ST06	1	8	10	19			109	5	9
April	**ST07**		2	15	2		2	4,864	18	3
	ST08		4	4	9			4,183	144	
	ST09		1	31				1,080	46	
	ST10			25	2	2		867	17	5
	ST13		2	10	9	2		2,934	73	
	ST15			3	1			152	3	
	ST16			4				112	5	
	ST01		3	356	53	19		6,689	300	17
	ST02		4	29	49			5,841	247	20
	ST03		56	82	109	3	2	5,996	92	24
	ST04			122	1			1,484	349	1
	ST05		8	4	829	16		15,880	114	2
May	**ST09**		2	102	11	19		2,105	49	26
	ST10		6	57	4	12		956	15	11
	ST11		47	53	27	20		3,642	15	6
	ST12		3	35	4	18		389	898	3
	ST13							1,999	6	
	ST15		2	35	22	30		4,420	85	
	ST16			92	16	27	1	6,729	130	3
	ST01		1	109	23	7		5,462	70	
	ST03	4	2	82	195			8,333	238	8
	ST04		5	29	12	34		1,816	78	1
	ST05		1	19	145	5		9,171	51	2
	ST07	2	16	102	40	34		16,914	402	16
	ST09			11	2			1,549	7	
June	**ST10**			100	58	8		729	11	
	ST11		9	72	24	23		4,856	15	
	ST12			15	51	17	2	2,383	215	5
	ST13			4	8			3,032	22	1
	ST15		16	210	3	36		10,321	280	6
	ST16	3	5	94	13	35		4,310	91	15
	ST01		6	490	127	33		13,414	360	26
	ST02		12	178	133	3		17,147	1,463	19
	ST03		3	11	2	1		1,826	19	
	ST04		60	134	19	171		5,940	485	14

Table 6: Number of Bat Passes, Month and Location *(continued)*

Month	*Location*	*Barbastella barbastellus*	*Eptesicus serotinus*	*Myotis spp.*	*Nyctalus noctula*	*Nyctalus spp.*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus spp.*
	ST05		15	75	99	36		11,515	162	47
	ST06		3	7	4	1		182	8	
	ST07		2		1			112	1	1
July	**ST09**		19	47	14	11		2,115	64	11
	ST10		1	29	13	6		1,680	30	3
	ST11	7	162	47	17	12		9,672	103	59
	ST12		28	130	41	54		3,873	155	84
	ST13		19	16	6	21		2,760	51	2
	ST14		8	58		7		12,063	154	7
	ST15			1,234	5	1		2,856	40	130
	ST16	1	12	423	32	18		4,353	57	74
	ST01	2	10	582	8	11		8,969	509	4
	ST02		4	88		6		1,132	72	4
	ST03		12	103	12	7		5,023	163	11
	ST04		43	309	4			3,978	579	5
	ST05		13	98	50	22		9,787	183	19
	ST06		8	9				213	13	
	ST07		9	151	11			3,286	93	3
August	**ST08**		269	32	86	135		2,933	97	11
	ST09		16	80	8	9		2,057	94	8
	ST10		29	28	6	10		960	58	1
	ST11	1	53	122	24			3,313	72	159
	ST12	1	13	109	11	28		3,151	249	372
	ST14		5	188	12	13		13,175	242	7
	ST15	1	110	53	31	37		824	62	39
	ST16		61	42	37	124		852	70	41
	ST01		1	538	34	6		11,131	477	19
	ST02			361	8	3		3,236	689	8
	ST03	1	2	1,048	27	10		8,243	195	15
	ST04	1	1	692	43	9	2	6,223	1,532	8
	ST05		17	829	88	33		15,355	333	74
	ST06		3	18	2			173	18	
	ST07		3	651	46	15		10,193	392	14
September	**ST08**	2	57	58	153	113		2,417	113	34
	ST09	1	4	153	27	11		994	157	20
	ST10			37	22	5		530	67	20
	ST11	2	8	695	13	1	1	7,956	190	423
	ST12		9	1,857	73	208		6,434	168	43
	ST14		4	340	20			14,880	300	62
	ST15		1	1,160	11			2,015	38	7
	ST16		23	82	80	63		4,093	17	10
	ST01			117	16	3		2,436	85	3
	ST02		1	52	12	3		2,697	255	7
	ST03			543	22	3		6,635	229	22
	ST04	2		94	6	2	2	5,282	87	2

Table 6: Number of Bat Passes, Month and Location *(continued)*

Month	*Location*	*Barbastella barbastellus*	*Eptesicus serotinus*	*Myotis spp.*	*Nyctalus noctula*	*Nyctalus spp.*	*Pipistrellus nathusii*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus spp.*
October	**ST05**		1	630	45	33		5,474	248	34
	ST06			5	9			33	3	
	ST07			98	9	7		1,062	135	1
	ST08		1	11	47	2		1,342	211	5
	ST09			51	5			142	18	14
	ST10		1	27	5	2		1,551	67	3
	ST11	6	2	122	6		6	2,922	98	16
	ST12		1	181	17	9	3	1,902	182	22
	ST13	2		6	30	15		1,291	78	1
	ST14			222	2	1	1	2,602	1,522	28
	ST15			1,750	5	2	1	3,076	160	3
	ST16		11	143	112	290	28	2,170	1,320	8

2.6 Median Bat Passes per Hour by Location

Table 7 shows the median *nightly pass rate* (bat passes per hour, per night) of each species.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean.

Table 7: Number of Bat Passes and Location - part 1 of 2

Species	ST01	ST02	ST03	ST04	ST05	ST06	ST07	ST08
Barbastella barbastellus	0.10		0.26	0.10	0.10	0.10	0.27	0.09
Eptesicus serotinus	0.12	0.12	0.13	0.52	0.17	0.15	0.11	0.46
Myotis spp.	2.29	0.62	0.69	1.29	0.69	0.19	0.50	0.18
Nyctalus noctula	0.28	0.60	0.14	0.19	0.43	0.20	0.18	0.29
Nyctalus spp.	0.13	0.10	0.12	0.27	0.21	0.12	0.25	0.45
Pipistrellus nathusii			0.12	0.08			0.21	
Pipistrellus pipistrellus	39.88	28.95	25.17	34.92	66.92	1.19	18.09	11.66
Pipistrellus pygmaeus	2.15	2.46	0.46	2.03	1.10	0.21	0.87	0.36
Plecotus spp.	0.17	0.15	0.13	0.12	0.22	0.10	0.10	0.17

Table 8: Number of Bat Passes and Location - part 2 of 2

Species	ST09	ST10	ST11	ST12	ST13	ST14	ST15	ST16
Barbastella barbastellus	0.09		0.13	0.11	0.15		0.10	0.13
Eptesicus serotinus	0.12	0.45	0.34	0.12	0.12	0.13	0.75	0.27
Myotis spp.	0.51	0.89	0.60	0.59	0.15	0.49	0.90	0.55
Nyctalus noctula	0.22	0.23	0.17	0.36	0.20	0.11	0.19	0.50
Nyctalus spp.	0.24	0.23	0.26	0.24	0.36	0.13	0.24	0.39
Pipistrellus nathusii			0.08	0.13		0.07	0.08	0.30
Pipistrellus pipistrellus	9.62	12.01	27.30	21.05	17.85	56.71	15.61	25.98
Pipistrellus pygmaeus	0.48	0.51	0.36	1.10	0.59	1.00	0.70	0.67
Plecotus spp.	0.12	0.14	0.25	0.38	0.12	0.15	0.27	0.19

2.7 Median Bat Passes per Hour by Month

Table 9 shows the median Nightly Pass Rate (bat passes per hour, per night) of each species.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean.

Table 9: Median Bat Passes per Hour by Month

Species	Apr	May	Jun	Jul	Aug	Sep	Oct
Barbastella barbastellus	0.20		0.27	0.24	0.10	0.09	0.11
Eptesicus serotinus	0.31	0.50	0.20	0.67	1.03	0.18	0.08
Myotis spp.	3.95	0.87	2.00	3.48	2.34	9.04	2.55
Nyctalus noctula	1.45	0.60	0.94	1.03	0.38	0.78	0.38
Nyctalus spp.	0.10	0.48	0.52	0.79	0.33	0.35	0.31
Pipistrellus nathusii	0.21	0.12	0.13			0.09	0.15
Pipistrellus pipistrellus	217.59	81.36	212.18	198.74	66.62	87.57	31.41
Pipistrellus pygmaeus	19.31	1.11	3.27	3.49	2.52	3.36	2.63
Plecotus spp.	0.20	0.37	0.27	0.82	0.54	0.47	0.23

2.8 Summary Statistics: Bat Passes per Hour grouped by Species/Location

Table 10 shows the summary statistics of the *bat passes per hour* grouped by *species* and *location*

Table 10: Summary Statistics: Bat Pass Rate (per hour)

Species	Location	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Barbastella barbastellus	ST01	0.10	0.10	0.10	0.10	0.11	0.11	0.00
	ST03	0.09	0.18	0.21	0.26	0.26	0.27	0.10
	ST04	0.08	0.09	0.11	0.10	0.13	0.15	0.03
	ST05	0.10	0.10	0.10	0.10	0.10	0.10	0.00
	ST06	0.10	0.10	0.10	0.10	0.10	0.10	NA
	ST07	0.27	0.27	0.27	0.27	0.27	0.27	NA
	ST08	0.08	0.09	0.09	0.09	0.09	0.09	0.01
	ST09	0.09	0.09	0.09	0.09	0.09	0.09	NA
	ST11	0.07	0.08	0.20	0.13	0.24	0.59	0.18
	ST12	0.11	0.11	0.11	0.11	0.11	0.11	NA
	ST13	0.15	0.15	0.15	0.15	0.15	0.15	NA
	ST15	0.10	0.10	0.10	0.10	0.10	0.10	NA
	ST16	0.13	0.13	0.18	0.13	0.20	0.27	0.08
Eptesicus serotinus	ST01	0.10	0.11	0.14	0.12	0.13	0.34	0.07
	ST02	0.08	0.10	0.16	0.12	0.20	0.52	0.10
	ST03	0.09	0.11	0.39	0.13	0.29	2.23	0.59
	ST04	0.09	0.18	0.93	0.52	1.23	3.76	1.05
	ST05	0.08	0.11	0.21	0.17	0.25	0.53	0.13
	ST06	0.09	0.10	0.19	0.15	0.24	0.43	0.12
	ST07	0.09	0.10	0.26	0.11	0.26	1.07	0.27
	ST08	0.08	0.11	1.00	0.46	1.36	5.22	1.20
	ST09	0.09	0.11	0.24	0.12	0.25	1.20	0.26
	ST10	0.08	0.25	0.41	0.45	0.56	0.70	0.22
	ST11	0.08	0.13	0.77	0.34	0.47	5.71	1.36
	ST12	0.08	0.09	0.28	0.12	0.25	2.07	0.43
	ST13	0.10	0.11	0.41	0.12	0.65	1.19	0.48
	ST14	0.09	0.10	0.16	0.13	0.19	0.39	0.09
	ST15	0.09	0.21	1.32	0.75	1.78	4.55	1.46
	ST16	0.08	0.13	0.45	0.27	0.54	2.57	0.58
Myotis spp.	ST01	0.10	1.51	2.67	2.29	3.29	17.47	2.17
	ST02	0.07	0.27	1.28	0.62	1.50	8.53	1.71
	ST03	0.07	0.24	1.59	0.69	1.62	9.81	2.24
	ST04	0.07	0.63	2.06	1.29	2.83	11.85	2.14
	ST05	0.07	0.30	1.78	0.69	2.06	15.16	2.76
	ST06	0.08	0.11	0.21	0.19	0.26	0.66	0.15
	ST07	0.07	0.24	1.54	0.50	1.24	14.36	2.73
	ST08	0.07	0.10	0.24	0.18	0.30	0.78	0.18
	ST09	0.12	0.30	0.65	0.51	0.74	2.51	0.51
	ST10	0.07	0.34	1.09	0.89	1.25	7.56	1.37
	ST11	0.07	0.32	1.39	0.60	1.07	14.37	2.84
	ST12	0.07	0.25	3.65	0.59	1.72	52.49	9.44
	ST13	0.10	0.13	0.21	0.15	0.27	0.48	0.11
	ST14	0.08	0.26	1.27	0.49	1.57	5.77	1.55
	ST15	0.11	0.36	10.72	0.90	6.95	87.89	21.36
	ST16	0.11	0.27	1.66	0.55	0.98	24.82	4.20
	ST01	0.08	0.13	0.64	0.28	0.66	4.59	0.92
	ST02	0.08	0.35	1.63	0.60	1.67	11.45	2.58
	ST03	0.07	0.11	0.92	0.14	0.42	10.84	1.97

Table 10: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Species	Location	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Nyctalus noctula	ST04	0.08	0.11	0.27	0.19	0.27	0.94	0.23
	ST05	0.07	0.17	2.13	0.43	1.03	37.49	6.04
	ST06	0.07	0.10	0.20	0.20	0.31	0.40	0.11
	ST07	0.08	0.10	0.30	0.18	0.36	1.31	0.29
	ST08	0.08	0.10	0.65	0.29	0.78	3.94	0.84
	ST09	0.07	0.12	0.25	0.22	0.33	0.72	0.16
	ST10	0.07	0.11	0.67	0.23	0.41	3.79	1.12
	ST11	0.07	0.12	0.28	0.17	0.28	1.20	0.29
	ST12	0.08	0.14	0.54	0.36	0.64	2.24	0.57
	ST13	0.07	0.13	0.27	0.20	0.26	1.70	0.36
	ST14	0.08	0.10	0.16	0.11	0.20	0.35	0.09
	ST15	0.08	0.13	0.28	0.19	0.26	1.16	0.25
	ST16	0.10	0.26	0.76	0.50	0.99	3.87	0.77
Nyctalus spp.	ST01	0.08	0.11	0.25	0.13	0.26	1.18	0.24
	ST02	0.08	0.09	0.15	0.10	0.19	0.46	0.10
	ST03	0.08	0.09	0.15	0.12	0.18	0.34	0.07
	ST04	0.08	0.10	1.26	0.27	2.49	5.10	1.55
	ST05	0.07	0.10	0.28	0.21	0.35	1.28	0.25
	ST06	0.12	0.12	0.12	0.12	0.12	0.12	NA
	ST07	0.08	0.09	0.32	0.25	0.29	1.60	0.36
	ST08	0.08	0.14	0.99	0.45	1.54	3.82	1.18
	ST09	0.08	0.11	0.22	0.24	0.35	0.47	0.13
	ST10	0.08	0.11	0.26	0.23	0.39	0.52	0.15
	ST11	0.09	0.23	0.29	0.26	0.36	0.80	0.16
	ST12	0.07	0.12	0.64	0.24	0.39	5.76	1.29
	ST13	0.10	0.17	0.35	0.36	0.36	0.95	0.24
	ST14	0.08	0.12	0.16	0.13	0.20	0.30	0.06
	ST15	0.11	0.13	0.53	0.24	0.53	4.01	0.83
	ST16	0.09	0.24	1.13	0.39	1.47	6.68	1.54
Pipistrellus nathusii	ST03	0.12	0.12	0.12	0.12	0.12	0.12	0.00
	ST04	0.07	0.08	0.08	0.08	0.09	0.09	0.01
	ST07	0.21	0.21	0.21	0.21	0.21	0.21	NA
	ST11	0.07	0.07	0.11	0.08	0.09	0.23	0.07
	ST12	0.07	0.12	0.12	0.13	0.13	0.15	0.03
	ST14	0.07	0.07	0.07	0.07	0.07	0.07	NA
	ST15	0.08	0.08	0.08	0.08	0.08	0.08	NA
	ST16	0.08	0.11	0.58	0.30	0.77	1.66	0.74
	ST01	1.27	20.83	58.73	39.88	76.61	229.37	53.73
	ST02	0.07	7.80	52.89	28.95	71.52	226.89	58.10
	ST03	0.07	12.15	36.96	25.17	46.79	220.03	39.05
	ST04	0.07	17.95	37.94	34.92	51.20	128.46	26.67
	ST05	0.07	25.06	89.81	66.92	113.65	470.61	92.79
	ST06	0.10	0.45	2.56	1.19	3.40	14.96	3.36
	ST07	0.07	10.60	53.37	18.09	50.91	376.88	76.79
	ST08	0.08	2.30	16.29	11.66	24.88	125.89	20.87
	ST09	0.13	5.28	13.70	9.62	15.68	106.62	16.91
	ST10	0.13	4.60	21.88	12.01	24.37	112.85	26.38
	ST11	1.32	16.22	45.99	27.30	74.36	148.06	39.72
	ST12	0.37	7.30	30.50	21.05	42.93	174.67	32.28
	ST13	0.74	9.19	26.98	17.85	33.08	142.38	27.58
	ST14	0.08	31.32	64.34	56.71	80.74	227.61	46.21
	ST15	0.33	5.93	55.81	15.61	58.26	441.60	95.66

Table 10: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Species	Location	Minimum	Q1	Mean	Median	Q3	Maximum	SD
	ST16	0.21	9.65	40.27	25.98	61.48	157.77	39.29
Pipistrellus pygmaeus	ST01	0.10	1.26	2.20	2.15	2.77	8.98	1.40
	ST02	0.10	1.21	5.01	2.46	4.85	37.82	7.29
	ST03	0.07	0.30	0.98	0.46	1.03	10.45	1.49
	ST04	0.07	0.53	11.21	2.03	9.85	131.44	22.85
	ST05	0.07	0.46	1.87	1.10	2.18	14.17	2.33
	ST06	0.07	0.10	0.25	0.21	0.33	0.65	0.18
	ST07	0.07	0.33	1.72	0.87	2.05	10.98	2.37
	ST08	0.09	0.17	1.10	0.36	0.94	11.11	2.10
	ST09	0.07	0.23	0.63	0.48	0.78	2.66	0.59
	ST10	0.08	0.31	0.86	0.51	1.00	4.13	0.98
	ST11	0.07	0.15	0.68	0.36	0.92	5.82	0.88
	ST12	0.11	0.51	3.51	1.10	1.94	35.73	6.61
	ST13	0.07	0.20	0.70	0.59	0.84	2.88	0.66
	ST14	0.11	0.66	2.99	1.00	1.95	82.98	10.39
	ST15	0.09	0.14	1.97	0.70	2.68	20.08	3.53
	ST16	0.09	0.26	2.59	0.67	1.20	79.49	10.60
Plecotus spp.	ST01	0.08	0.11	0.22	0.17	0.28	0.65	0.15
	ST02	0.08	0.11	0.20	0.15	0.26	0.40	0.10
	ST03	0.07	0.09	0.21	0.13	0.27	0.62	0.16
	ST04	0.07	0.09	0.17	0.12	0.23	0.39	0.10
	ST05	0.07	0.11	0.27	0.22	0.35	1.05	0.20
	ST06	0.10	0.10	0.13	0.10	0.15	0.21	0.05
	ST07	0.08	0.09	0.17	0.10	0.12	0.80	0.20
	ST08	0.08	0.09	0.16	0.17	0.18	0.34	0.08
	ST09	0.07	0.11	0.22	0.12	0.25	1.28	0.23
	ST10	0.08	0.11	0.23	0.14	0.29	0.58	0.17
	ST11	0.07	0.12	1.30	0.25	0.99	10.68	2.39
	ST12	0.07	0.16	1.30	0.38	1.36	24.49	3.65
	ST13	0.07	0.11	0.11	0.12	0.12	0.13	0.03
	ST14	0.08	0.10	0.29	0.15	0.30	1.05	0.29
	ST15	0.08	0.20	1.31	0.27	0.67	10.98	2.79
	ST16	0.08	0.13	0.53	0.19	0.59	2.59	0.67

2.9 Summary Statistics: Bat Passes per Hour grouped by Species/Month

Table 11 shows the summary statistics of the *bat passes per hour* grouped by *species* and *month*

Table 11: Summary Statistics: Bat Pass Rate (per hour)

Species	Month	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Barbastella barbastellus	Apr	0.20	0.20	0.20	0.20	0.21	0.21	0.20
	Jun	0.13	0.26	0.24	0.27	0.27	0.27	0.13
	Jul	0.13	0.18	0.32	0.24	0.42	0.59	0.13
	Aug	0.10	0.10	0.10	0.10	0.11	0.11	0.10
	Sep	0.08	0.08	0.12	0.09	0.17	0.19	0.08
	Oct	0.07	0.08	0.13	0.11	0.15	0.24	0.07
Eptesicus serotinus	Apr	0.10	0.10	0.25	0.31	0.40	0.42	0.10
	May	0.11	0.35	0.71	0.50	0.97	2.23	0.11
	Jun	0.13	0.13	0.61	0.20	0.94	2.01	0.13
	Jul	0.13	0.25	1.26	0.67	1.37	7.78	0.13
	Aug	0.10	0.22	1.55	1.03	2.38	7.11	0.10
	Sep	0.08	0.09	0.32	0.18	0.42	1.71	0.08
	Oct	0.08	0.08	0.13	0.08	0.16	0.31	0.08
Myotis spp.	Apr	0.32	0.87	3.79	3.95	6.62	7.51	0.32
	May	0.11	0.46	2.32	0.87	2.50	18.93	0.11
	Jun	0.13	0.53	3.50	2.00	5.95	21.65	0.13
	Jul	0.26	1.27	7.77	3.48	6.92	109.93	0.26
	Aug	0.11	0.82	3.55	2.34	6.16	14.72	0.11
	Sep	0.17	2.73	12.10	9.04	19.23	52.49	0.17
	Oct	0.08	0.94	6.40	2.55	6.58	76.89	0.08
Nyctalus noctula	Apr	0.11	0.21	3.00	1.45	3.31	11.85	0.11
	May	0.11	0.32	3.84	0.60	3.34	37.61	0.11
	Jun	0.13	0.27	3.00	0.94	4.66	13.24	0.13
	Jul	0.13	0.51	1.62	1.03	2.08	7.63	0.13
	Aug	0.10	0.20	0.70	0.38	0.92	2.85	0.10
	Sep	0.08	0.28	1.01	0.78	1.46	4.03	0.08
	Oct	0.07	0.16	0.79	0.38	1.09	4.03	0.07
Nyctalus spp.	Apr	0.10	0.10	0.15	0.10	0.20	0.30	0.10
	May	0.11	0.25	0.53	0.48	0.70	1.52	0.11
	Jun	0.13	0.27	1.10	0.52	1.23	5.48	0.13
	Jul	0.12	0.26	1.28	0.79	1.32	6.15	0.12
	Aug	0.10	0.20	0.92	0.33	1.12	4.05	0.10
	Sep	0.08	0.17	0.91	0.35	0.64	6.15	0.08
	Oct	0.07	0.12	1.07	0.31	0.99	6.68	0.07
Pipistrellus nathusii	Apr	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	May	0.12	0.12	0.12	0.12	0.12	0.13	0.12
	Jun	0.13	0.13	0.13	0.13	0.13	0.13	0.13
	Sep	0.08	0.09	0.09	0.09	0.09	0.09	0.08
	Oct	0.07	0.08	0.32	0.15	0.23	1.66	0.07
Pipistrellus pipistrellus	Apr	0.21	68.98	245.59	217.59	302.94	794.58	0.21
	May	1.44	31.43	129.46	81.36	169.86	555.53	1.44
	Jun	6.93	38.40	268.35	212.18	433.23	961.32	6.93
	Jul	15.18	96.03	236.47	198.74	341.31	637.19	15.18
	Aug	2.43	31.41	106.83	66.62	159.34	370.06	2.43
	Sep	0.08	37.58	130.57	87.57	188.56	440.89	0.08
	Oct	0.14	10.00	61.08	31.41	83.49	337.30	0.14

Table 11: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Species	Month	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Pipistrellus pygmaeus	Apr	0.11	0.86	38.65	19.31	70.75	171.49	0.11
	May	0.11	0.38	5.57	1.11	5.54	41.35	0.11
	Jun	0.13	0.40	6.12	3.27	8.70	36.49	0.13
	Jul	0.13	1.39	8.47	3.49	12.94	40.59	0.13
	Aug	0.11	1.36	4.66	2.52	5.37	26.38	0.11
	Sep	0.09	1.41	6.71	3.36	6.98	55.45	0.09
	Oct	0.07	1.10	7.81	2.63	7.79	87.11	0.07
Plecotus spp.	Apr	0.10	0.11	0.27	0.20	0.42	0.51	0.10
	May	0.11	0.21	0.56	0.37	0.72	2.22	0.11
	Jun	0.13	0.13	0.42	0.27	0.52	1.20	0.13
	Jul	0.13	0.57	1.50	0.82	1.33	13.30	0.13
	Aug	0.10	0.22	1.69	0.54	1.69	25.28	0.10
	Sep	0.08	0.19	1.20	0.47	0.83	12.30	0.08
	Oct	0.07	0.15	0.32	0.23	0.37	1.67	0.07

2.10 Summary Statistics: Bat Passes per Hour grouped by Location

Table 12 shows the summary statistics of the *bat passes per hour* by *location*

Table 12: Summary Statistics: Bat Pass Rate (per hour)

Location	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
ST01	*Barbastella barbastellus*	0.10	0.10	0.10	0.10	0.11	0.11	0.10
	Eptesicus serotinus	0.10	0.11	0.14	0.12	0.13	0.34	0.10
	Myotis spp.	0.10	1.51	2.67	2.29	3.29	17.47	0.10
	Nyctalus noctula	0.08	0.13	0.64	0.28	0.66	4.59	0.08
	Nyctalus spp.	0.08	0.11	0.25	0.13	0.26	1.18	0.08
	Pipistrellus pipistrellus	1.27	20.83	58.73	39.88	76.61	229.37	1.27
	Pipistrellus pygmaeus	0.10	1.26	2.20	2.15	2.77	8.98	0.10
	Plecotus spp.	0.08	0.11	0.22	0.17	0.28	0.65	0.08
ST02	*Eptesicus serotinus*	0.08	0.10	0.16	0.12	0.20	0.52	0.08
	Myotis spp.	0.07	0.27	1.28	0.62	1.50	8.53	0.07
	Nyctalus noctula	0.08	0.35	1.63	0.60	1.67	11.45	0.08
	Nyctalus spp.	0.08	0.09	0.15	0.10	0.19	0.46	0.08
	Pipistrellus pipistrellus	0.07	7.80	52.89	28.95	71.52	226.89	0.07
	Pipistrellus pygmaeus	0.10	1.21	5.01	2.46	4.85	37.82	0.10
	Plecotus spp.	0.08	0.11	0.20	0.15	0.26	0.40	0.08
ST03	*Barbastella barbastellus*	0.09	0.18	0.21	0.26	0.26	0.27	0.09
	Eptesicus serotinus	0.09	0.11	0.39	0.13	0.29	2.23	0.09
	Myotis spp.	0.07	0.24	1.59	0.69	1.62	9.81	0.07
	Nyctalus noctula	0.07	0.11	0.92	0.14	0.42	10.84	0.07
	Nyctalus spp.	0.08	0.09	0.15	0.12	0.18	0.34	0.08
	Pipistrellus nathusii	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Pipistrellus pipistrellus	0.07	12.15	36.96	25.17	46.79	220.03	0.07
	Pipistrellus pygmaeus	0.07	0.30	0.98	0.46	1.03	10.45	0.07
	Plecotus spp.	0.07	0.09	0.21	0.13	0.27	0.62	0.07
ST04	*Barbastella barbastellus*	0.08	0.09	0.11	0.10	0.13	0.15	0.08
	Eptesicus serotinus	0.09	0.18	0.93	0.52	1.23	3.76	0.09
	Myotis spp.	0.07	0.63	2.06	1.29	2.83	11.85	0.07
	Nyctalus noctula	0.08	0.11	0.27	0.19	0.27	0.94	0.08
	Nyctalus spp.	0.08	0.10	1.26	0.27	2.49	5.10	0.08
	Pipistrellus nathusii	0.07	0.08	0.08	0.08	0.09	0.09	0.07
	Pipistrellus pipistrellus	0.07	17.95	37.94	34.92	51.20	128.46	0.07
	Pipistrellus pygmaeus	0.07	0.53	11.21	2.03	9.85	131.44	0.07
	Plecotus spp.	0.07	0.09	0.17	0.12	0.23	0.39	0.07
ST05	*Barbastella barbastellus*	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Eptesicus serotinus	0.08	0.11	0.21	0.17	0.25	0.53	0.08
	Myotis spp.	0.07	0.30	1.78	0.69	2.06	15.16	0.07
	Nyctalus noctula	0.07	0.17	2.13	0.43	1.03	37.49	0.07
	Nyctalus spp.	0.07	0.10	0.28	0.21	0.35	1.28	0.07
	Pipistrellus pipistrellus	0.07	25.06	89.81	66.92	113.65	470.61	0.07
	Pipistrellus pygmaeus	0.07	0.46	1.87	1.10	2.18	14.17	0.07
	Plecotus spp.	0.07	0.11	0.27	0.22	0.35	1.05	0.07
	Barbastella barbastellus	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Eptesicus serotinus	0.09	0.10	0.19	0.15	0.24	0.43	0.09
	Myotis spp.	0.08	0.11	0.21	0.19	0.26	0.66	0.08
	Nyctalus noctula	0.07	0.10	0.20	0.20	0.31	0.40	0.07
	Nyctalus spp.	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Pipistrellus pipistrellus	0.10	0.45	2.56	1.19	3.40	14.96	0.10

Table 12: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Location	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
ST06								
	Pipistrellus pygmaeus	0.07	0.10	0.25	0.21	0.33	0.65	0.07
	Plecotus spp.	0.10	0.10	0.13	0.10	0.15	0.21	0.10
ST07	*Barbastella barbastellus*	0.27	0.27	0.27	0.27	0.27	0.27	0.27
	Eptesicus serotinus	0.09	0.10	0.26	0.11	0.26	1.07	0.09
	Myotis spp.	0.07	0.24	1.54	0.50	1.24	14.36	0.07
	Nyctalus noctula	0.08	0.10	0.30	0.18	0.36	1.31	0.08
	Nyctalus spp.	0.08	0.09	0.32	0.25	0.29	1.60	0.08
	Pipistrellus nathusii	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	Pipistrellus pipistrellus	0.07	10.60	53.37	18.09	50.91	376.88	0.07
	Pipistrellus pygmaeus	0.07	0.33	1.72	0.87	2.05	10.98	0.07
	Plecotus spp.	0.08	0.09	0.17	0.10	0.12	0.80	0.08
ST08	*Barbastella barbastellus*	0.08	0.09	0.09	0.09	0.09	0.09	0.08
	Eptesicus serotinus	0.08	0.11	1.00	0.46	1.36	5.22	0.08
	Myotis spp.	0.07	0.10	0.24	0.18	0.30	0.78	0.07
	Nyctalus noctula	0.08	0.10	0.65	0.29	0.78	3.94	0.08
	Nyctalus spp.	0.08	0.14	0.99	0.45	1.54	3.82	0.08
	Pipistrellus pipistrellus	0.08	2.30	16.29	11.66	24.88	125.89	0.08
	Pipistrellus pygmaeus	0.09	0.17	1.10	0.36	0.94	11.11	0.09
	Plecotus spp.	0.08	0.09	0.16	0.17	0.18	0.34	0.08
ST09	*Barbastella barbastellus*	0.09	0.09	0.09	0.09	0.09	0.09	0.09
	Eptesicus serotinus	0.09	0.11	0.24	0.12	0.25	1.20	0.09
	Myotis spp.	0.12	0.30	0.65	0.51	0.74	2.51	0.12
	Nyctalus noctula	0.07	0.12	0.25	0.22	0.33	0.72	0.07
	Nyctalus spp.	0.08	0.11	0.22	0.24	0.35	0.47	0.08
	Pipistrellus pipistrellus	0.13	5.28	13.70	9.62	15.68	106.62	0.13
	Pipistrellus pygmaeus	0.07	0.23	0.63	0.48	0.78	2.66	0.07
	Plecotus spp.	0.07	0.11	0.22	0.12	0.25	1.28	0.07
ST10	*Eptesicus serotinus*	0.08	0.25	0.41	0.45	0.56	0.70	0.08
	Myotis spp.	0.07	0.34	1.09	0.89	1.25	7.56	0.07
	Nyctalus noctula	0.07	0.11	0.67	0.23	0.41	3.79	0.07
	Nyctalus spp.	0.08	0.11	0.26	0.23	0.39	0.52	0.08
	Pipistrellus pipistrellus	0.13	4.60	21.88	12.01	24.37	112.85	0.13
	Pipistrellus pygmaeus	0.08	0.31	0.86	0.51	1.00	4.13	0.08
	Plecotus spp.	0.08	0.11	0.23	0.14	0.29	0.58	0.08
ST11	*Barbastella barbastellus*	0.07	0.08	0.20	0.13	0.24	0.59	0.07
	Eptesicus serotinus	0.08	0.13	0.77	0.34	0.47	5.71	0.08
	Myotis spp.	0.07	0.32	1.39	0.60	1.07	14.37	0.07
	Nyctalus noctula	0.07	0.12	0.28	0.17	0.28	1.20	0.07
	Nyctalus spp.	0.09	0.23	0.29	0.26	0.36	0.80	0.09
	Pipistrellus nathusii	0.07	0.07	0.11	0.08	0.09	0.23	0.07
	Pipistrellus pipistrellus	1.32	16.22	45.99	27.30	74.36	148.06	1.32
	Pipistrellus pygmaeus	0.07	0.15	0.68	0.36	0.92	5.82	0.07
	Plecotus spp.	0.07	0.12	1.30	0.25	0.99	10.68	0.07
	Barbastella barbastellus	0.11	0.11	0.11	0.11	0.11	0.11	0.11
	Eptesicus serotinus	0.08	0.09	0.28	0.12	0.25	2.07	0.08
	Myotis spp.	0.07	0.25	3.65	0.59	1.72	52.49	0.07
	Nyctalus noctula	0.08	0.14	0.54	0.36	0.64	2.24	0.08
	Nyctalus spp.	0.07	0.12	0.64	0.24	0.39	5.76	0.07
	Pipistrellus nathusii	0.07	0.12	0.12	0.13	0.13	0.15	0.07
	Pipistrellus pipistrellus	0.37	7.30	30.50	21.05	42.93	174.67	0.37

Table 12: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Location	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
ST12	*Pipistrellus pygmaeus*	0.11	0.51	3.51	1.10	1.94	35.73	0.11
	Plecotus spp.	0.07	0.16	1.30	0.38	1.36	24.49	0.07
ST13	*Barbastella barbastellus*	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	Eptesicus serotinus	0.10	0.11	0.41	0.12	0.65	1.19	0.10
	Myotis spp.	0.10	0.13	0.21	0.15	0.27	0.48	0.10
	Nyctalus noctula	0.07	0.13	0.27	0.20	0.26	1.70	0.07
	Nyctalus spp.	0.10	0.17	0.35	0.36	0.36	0.95	0.10
	Pipistrellus pipistrellus	0.74	9.19	26.98	17.85	33.08	142.38	0.74
	Pipistrellus pygmaeus	0.07	0.20	0.70	0.59	0.84	2.88	0.07
	Plecotus spp.	0.07	0.11	0.11	0.12	0.12	0.13	0.07
ST14	*Eptesicus serotinus*	0.09	0.10	0.16	0.13	0.19	0.39	0.09
	Myotis spp.	0.08	0.26	1.27	0.49	1.57	5.77	0.08
	Nyctalus noctula	0.08	0.10	0.16	0.11	0.20	0.35	0.08
	Nyctalus spp.	0.08	0.12	0.16	0.13	0.20	0.30	0.08
	Pipistrellus nathusii	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	Pipistrellus pipistrellus	0.08	31.32	64.34	56.71	80.74	227.61	0.08
	Pipistrellus pygmaeus	0.11	0.66	2.99	1.00	1.95	82.98	0.11
	Plecotus spp.	0.08	0.10	0.29	0.15	0.30	1.05	0.08
ST15	*Barbastella barbastellus*	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Eptesicus serotinus	0.09	0.21	1.32	0.75	1.78	4.55	0.09
	Myotis spp.	0.11	0.36	10.72	0.90	6.95	87.89	0.11
	Nyctalus noctula	0.08	0.13	0.28	0.19	0.26	1.16	0.08
	Nyctalus spp.	0.11	0.13	0.53	0.24	0.53	4.01	0.11
	Pipistrellus nathusii	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	Pipistrellus pipistrellus	0.33	5.93	55.81	15.61	58.26	441.60	0.33
	Pipistrellus pygmaeus	0.09	0.14	1.97	0.70	2.68	20.08	0.09
	Plecotus spp.	0.08	0.20	1.31	0.27	0.67	10.98	0.08
ST16	*Barbastella barbastellus*	0.13	0.13	0.18	0.13	0.20	0.27	0.13
	Eptesicus serotinus	0.08	0.13	0.45	0.27	0.54	2.57	0.08
	Myotis spp.	0.11	0.27	1.66	0.55	0.98	24.82	0.11
	Nyctalus noctula	0.10	0.26	0.76	0.50	0.99	3.87	0.10
	Nyctalus spp.	0.09	0.24	1.13	0.39	1.47	6.68	0.09
	Pipistrellus nathusii	0.08	0.11	0.58	0.30	0.77	1.66	0.08
	Pipistrellus pipistrellus	0.21	9.65	40.27	25.98	61.48	157.77	0.21
	Pipistrellus pygmaeus	0.09	0.26	2.59	0.67	1.20	79.49	0.09
	Plecotus spp.	0.08	0.13	0.53	0.19	0.59	2.59	0.08

2.11 Summary Statistics: Bat Passes per Hour grouped by Month

Table 13 shows the summary statistics of the *bat passes per hour* by *month*

Table 13: Summary Statistics: Bat Pass Rate (per hour)

Month	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Apr	*Barbastella barbastellus*	0.20	0.20	0.20	0.20	0.21	0.21	0.20
	Eptesicus serotinus	0.10	0.10	0.25	0.31	0.40	0.42	0.10
	Myotis spp.	0.32	0.87	3.79	3.95	6.62	7.51	0.32
	Nyctalus noctula	0.11	0.21	3.00	1.45	3.31	11.85	0.11
	Nyctalus spp.	0.10	0.10	0.15	0.10	0.20	0.30	0.10
	Pipistrellus nathusii	0.21	0.21	0.21	0.21	0.21	0.21	0.21
	Pipistrellus pipistrellus	0.21	68.98	245.59	217.59	302.94	794.58	0.21
	Pipistrellus pygmaeus	0.11	0.86	38.65	19.31	70.75	171.49	0.11
	Plecotus spp.	0.10	0.11	0.27	0.20	0.42	0.51	0.10
May	*Eptesicus serotinus*	0.11	0.35	0.71	0.50	0.97	2.23	0.11
	Myotis spp.	0.11	0.46	2.32	0.87	2.50	18.93	0.11
	Nyctalus noctula	0.11	0.32	3.84	0.60	3.34	37.61	0.11
	Nyctalus spp.	0.11	0.25	0.53	0.48	0.70	1.52	0.11
	Pipistrellus nathusii	0.12	0.12	0.12	0.12	0.12	0.13	0.12
	Pipistrellus pipistrellus	1.44	31.43	129.46	81.36	169.86	555.53	1.44
	Pipistrellus pygmaeus	0.11	0.38	5.57	1.11	5.54	41.35	0.11
	Plecotus spp.	0.11	0.21	0.56	0.37	0.72	2.22	0.11
Jun	*Barbastella barbastellus*	0.13	0.26	0.24	0.27	0.27	0.27	0.13
	Eptesicus serotinus	0.13	0.13	0.61	0.20	0.94	2.01	0.13
	Myotis spp.	0.13	0.53	3.50	2.00	5.95	21.65	0.13
	Nyctalus noctula	0.13	0.27	3.00	0.94	4.66	13.24	0.13
	Nyctalus spp.	0.13	0.27	1.10	0.52	1.23	5.48	0.13
	Pipistrellus nathusii	0.13	0.13	0.13	0.13	0.13	0.13	0.13
	Pipistrellus pipistrellus	6.93	38.40	268.35	212.18	433.23	961.32	6.93
	Pipistrellus pygmaeus	0.13	0.40	6.12	3.27	8.70	36.49	0.13
	Plecotus spp.	0.13	0.13	0.42	0.27	0.52	1.20	0.13
Jul	*Barbastella barbastellus*	0.13	0.18	0.32	0.24	0.42	0.59	0.13
	Eptesicus serotinus	0.13	0.25	1.26	0.67	1.37	7.78	0.13
	Myotis spp.	0.26	1.27	7.77	3.48	6.92	109.93	0.26
	Nyctalus noctula	0.13	0.51	1.62	1.03	2.08	7.63	0.13
	Nyctalus spp.	0.12	0.26	1.28	0.79	1.32	6.15	0.12
	Pipistrellus pipistrellus	15.18	96.03	236.47	198.74	341.31	637.19	15.18
	Pipistrellus pygmaeus	0.13	1.39	8.47	3.49	12.94	40.59	0.13
	Plecotus spp.	0.13	0.57	1.50	0.82	1.33	13.30	0.13
Aug	*Barbastella barbastellus*	0.10	0.10	0.10	0.10	0.11	0.11	0.10
	Eptesicus serotinus	0.10	0.22	1.55	1.03	2.38	7.11	0.10
	Myotis spp.	0.11	0.82	3.55	2.34	6.16	14.72	0.11
	Nyctalus noctula	0.10	0.20	0.70	0.38	0.92	2.85	0.10
	Nyctalus spp.	0.10	0.20	0.92	0.33	1.12	4.05	0.10
	Pipistrellus pipistrellus	2.43	31.41	106.83	66.62	159.34	370.06	2.43
	Pipistrellus pygmaeus	0.11	1.36	4.66	2.52	5.37	26.38	0.11
	Plecotus spp.	0.10	0.22	1.69	0.54	1.69	25.28	0.10
	Barbastella barbastellus	0.08	0.08	0.12	0.09	0.17	0.19	0.08
	Eptesicus serotinus	0.08	0.09	0.32	0.18	0.42	1.71	0.08
	Myotis spp.	0.17	2.73	12.10	9.04	19.23	52.49	0.17
	Nyctalus noctula	0.08	0.28	1.01	0.78	1.46	4.03	0.08
	Nyctalus spp.	0.08	0.17	0.91	0.35	0.64	6.15	0.08

Table 13: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Month	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Sep	*Pipistrellus nathusii*	0.08	0.09	0.09	0.09	0.09	0.09	0.08
	Pipistrellus pipistrellus	0.08	37.58	130.57	87.57	188.56	440.89	0.08
	Pipistrellus pygmaeus	0.09	1.41	6.71	3.36	6.98	55.45	0.09
	Plecotus spp.	0.08	0.19	1.20	0.47	0.83	12.30	0.08
Oct	*Barbastella barbastellus*	0.07	0.08	0.13	0.11	0.15	0.24	0.07
	Eptesicus serotinus	0.08	0.08	0.13	0.08	0.16	0.31	0.08
	Myotis spp.	0.08	0.94	6.40	2.55	6.58	76.89	0.08
	Nyctalus noctula	0.07	0.16	0.79	0.38	1.09	4.03	0.07
	Nyctalus spp.	0.07	0.12	1.07	0.31	0.99	6.68	0.07
	Pipistrellus nathusii	0.07	0.08	0.32	0.15	0.23	1.66	0.07
	Pipistrellus pipistrellus	0.14	10.00	61.08	31.41	83.49	337.30	0.14
	Pipistrellus pygmaeus	0.07	1.10	7.81	2.63	7.79	87.11	0.07
	Plecotus spp.	0.07	0.15	0.32	0.23	0.37	1.67	0.07

2.12 Locations Near a Bat Roost

Table 14 presents the bat observations, within the estimated emergence time, for a species to exit the roost; indicating that a roost for that species is nearby. The roost emergence times for the bat species is based on the work of (Russ 2012); the calculation has used the upper roost emergence time as the threshold to be included in the list of bats potentially near a roost.

Table 14: Locations Near a Bat Roost

Location	*Bat Species*	Bat Passes Near Roost
ST01	*Myotis spp.*	1006
	Nyctalus noctula	20
	Pipistrellus pipistrellus	3653
	Pipistrellus pygmaeus	655
	Plecotus spp.	7
ST02	*Myotis spp.*	214
	Nyctalus noctula	1
	Nyctalus spp.	1
	Pipistrellus pipistrellus	3544
	Pipistrellus pygmaeus	335
	Plecotus spp.	20
ST03	*Barbastella barbastellus*	2
	Myotis spp.	205
	Nyctalus noctula	20
	Nyctalus spp.	1
	Pipistrellus pipistrellus	6036
	Pipistrellus pygmaeus	281
	Plecotus spp.	29
ST04	*Myotis spp.*	458
	Nyctalus noctula	5
	Pipistrellus pipistrellus	4180
	Pipistrellus pygmaeus	472
	Plecotus spp.	10
ST05	*Eptesicus serotinus*	4
	Myotis spp.	85
	Nyctalus noctula	39
	Nyctalus spp.	11
	Pipistrellus pipistrellus	5618
	Pipistrellus pygmaeus	115
	Plecotus spp.	32
ST06	*Myotis spp.*	2
	Nyctalus noctula	3
ST07	*Myotis spp.*	155
	Nyctalus noctula	1
	Nyctalus spp.	4
	Pipistrellus pipistrellus	4999
	Pipistrellus pygmaeus	347
	Plecotus spp.	6
	Barbastella barbastellus	1
	Eptesicus serotinus	12
	Myotis spp.	21
	Nyctalus noctula	5
	Nyctalus spp.	16
	Pipistrellus pipistrellus	1292

Table 14: Locations Near a Bat Roost *(continued)*

Location	*Bat Species*	Bat Passes Near Roost
ST08		
	Pipistrellus pygmaeus	110
	Plecotus spp.	20
ST09	*Myotis spp.*	95
	Nyctalus noctula	3
	Nyctalus spp.	5
	Pipistrellus pipistrellus	1265
	Pipistrellus pygmaeus	45
	Plecotus spp.	20
ST10	*Eptesicus serotinus*	3
	Myotis spp.	33
	Nyctalus noctula	7
	Nyctalus spp.	4
	Pipistrellus pipistrellus	1150
	Pipistrellus pygmaeus	30
	Plecotus spp.	12
ST11	*Barbastella barbastellus*	6
	Myotis spp.	100
	Nyctalus noctula	10
	Pipistrellus nathusii	3
	Pipistrellus pipistrellus	3692
	Pipistrellus pygmaeus	43
	Plecotus spp.	29
ST12	*Barbastella barbastellus*	1
	Eptesicus serotinus	4
	Myotis spp.	202
	Nyctalus noctula	17
	Nyctalus spp.	34
	Pipistrellus nathusii	2
	Pipistrellus pipistrellus	1274
	Pipistrellus pygmaeus	115
	Plecotus spp.	224
ST13	*Barbastella barbastellus*	1
	Myotis spp.	9
	Nyctalus noctula	2
	Nyctalus spp.	2
	Pipistrellus pipistrellus	535
	Pipistrellus pygmaeus	48
ST14	*Myotis spp.*	78
	Nyctalus noctula	5
	Pipistrellus pipistrellus	3481
	Pipistrellus pygmaeus	410
	Plecotus spp.	4
ST15	*Myotis spp.*	748
	Nyctalus noctula	5
	Pipistrellus pipistrellus	2588
	Pipistrellus pygmaeus	50
	Plecotus spp.	21
	Eptesicus serotinus	5
	Myotis spp.	106
	Nyctalus noctula	88

Table 14: Locations Near a Bat Roost *(continued)*

Location	*Bat Species*	Bat Passes Near Roost
ST16	*Nyctalus spp.*	36
	Pipistrellus pipistrellus	2133
	Pipistrellus pygmaeus	26
	Plecotus spp.	64

Table 15 details the roost emergence time range (Russ 2012) for the bat species recorded at the site. The lower and upper columns show the roost emergence time range (Russ 2012), in minutes, for the bat species relative to sunset; in practice the calculation for the table above only used the upper limit, listing bats recored before this time; any observation nearer or before sunset is likely to be a stronger indication that a roost is nearby.

Table 15: Roost Emergence Times for Bats Observed

Species	lower	upper
Pipistrellus pipistrellus	22	32
Pipistrellus pygmaeus	22	28
Myotis spp.	30	70
Plecotus spp.	40	60
Nyctalus noctula	5	9
Nyctalus spp.	5	18
Barbastella barbastellus	25	60
Eptesicus serotinus	20	25
Pipistrellus nathusii	18	28

2.13 Date Location and Roost Emergence

Table 16 details the date location and potential roost emergence for each species of bat

Table 16: Locations, Survey Date and Roost Emergence

Location	Night	*Bat Species*	Passes Near Roost (No.)
	27 July 2018	*Myotis spp.*	17
	27 July 2018	*Pipistrellus pipistrellus*	16
	27 July 2018	*Pipistrellus pygmaeus*	6
	28 July 2018	*Myotis spp.*	9
	28 July 2018	*Pipistrellus pipistrellus*	9
	28 July 2018	*Pipistrellus pygmaeus*	4
	29 July 2018	*Myotis spp.*	9
	29 July 2018	*Pipistrellus pipistrellus*	20
	29 July 2018	*Pipistrellus pygmaeus*	4
	30 July 2018	*Myotis spp.*	6
	30 July 2018	*Pipistrellus pipistrellus*	12
	30 July 2018	*Pipistrellus pygmaeus*	2
	31 July 2018	*Myotis spp.*	8
	31 July 2018	*Pipistrellus pipistrellus*	9
	01 August 2018	*Myotis spp.*	8
	01 August 2018	*Pipistrellus pipistrellus*	9
	01 August 2018	*Pipistrellus pygmaeus*	2
	02 August 2018	*Myotis spp.*	6
	02 August 2018	*Pipistrellus pipistrellus*	6
	02 August 2018	*Pipistrellus pygmaeus*	2
	02 August 2018	*Plecotus spp.*	1
	03 August 2018	*Myotis spp.*	9
	03 August 2018	*Pipistrellus pipistrellus*	6
	03 August 2018	*Pipistrellus pygmaeus*	1
	09 August 2018	*Myotis spp.*	19
	09 August 2018	*Pipistrellus pipistrellus*	13
	09 August 2018	*Pipistrellus pygmaeus*	3
	10 August 2018	*Myotis spp.*	54
	10 August 2018	*Pipistrellus pipistrellus*	16
	10 August 2018	*Pipistrellus pygmaeus*	10
	11 August 2018	*Myotis spp.*	15
	11 August 2018	*Pipistrellus pipistrellus*	27
	11 August 2018	*Pipistrellus pygmaeus*	14
	12 August 2018	*Myotis spp.*	2
	12 August 2018	*Pipistrellus pipistrellus*	42
	12 August 2018	*Pipistrellus pygmaeus*	16
	13 August 2018	*Myotis spp.*	7
	13 August 2018	*Pipistrellus pipistrellus*	22
	13 August 2018	*Pipistrellus pygmaeus*	8
	14 August 2018	*Myotis spp.*	13
	14 August 2018	*Pipistrellus pipistrellus*	8
	14 August 2018	*Pipistrellus pygmaeus*	9
	15 August 2018	*Myotis spp.*	8
	15 August 2018	*Pipistrellus pipistrellus*	10
	15 August 2018	*Pipistrellus pygmaeus*	11
	16 August 2018	*Myotis spp.*	4
	16 August 2018	*Pipistrellus pipistrellus*	15
	16 August 2018	*Pipistrellus pygmaeus*	8
	17 August 2018	*Myotis spp.*	16

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	17 August 2018	*Pipistrellus pipistrellus*	14
	17 August 2018	*Pipistrellus pygmaeus*	8
	18 August 2018	*Myotis spp.*	18
	18 August 2018	*Pipistrellus pipistrellus*	23
	18 August 2018	*Pipistrellus pygmaeus*	13
	19 August 2018	*Myotis spp.*	8
	19 August 2018	*Pipistrellus pipistrellus*	10
	19 August 2018	*Pipistrellus pygmaeus*	8
	20 August 2018	*Myotis spp.*	15
	20 August 2018	*Pipistrellus pipistrellus*	11
	20 August 2018	*Pipistrellus pygmaeus*	5
	21 August 2018	*Myotis spp.*	18
	21 August 2018	*Pipistrellus pipistrellus*	16
	21 August 2018	*Pipistrellus pygmaeus*	8
	22 August 2018	*Myotis spp.*	20
	22 August 2018	*Pipistrellus pipistrellus*	20
	22 August 2018	*Pipistrellus pygmaeus*	13
	22 August 2018	*Plecotus spp.*	1
	23 August 2018	*Myotis spp.*	19
	23 August 2018	*Pipistrellus pipistrellus*	31
	23 August 2018	*Pipistrellus pygmaeus*	12
	24 August 2018	*Myotis spp.*	4
	24 August 2018	*Pipistrellus pipistrellus*	57
	24 August 2018	*Pipistrellus pygmaeus*	9
	30 August 2018	*Myotis spp.*	18
	30 August 2018	*Pipistrellus pipistrellus*	37
	30 August 2018	*Pipistrellus pygmaeus*	10
	31 August 2018	*Myotis spp.*	22
	31 August 2018	*Pipistrellus pipistrellus*	41
	31 August 2018	*Pipistrellus pygmaeus*	9
	01 September 2018	*Myotis spp.*	26
	01 September 2018	*Pipistrellus pipistrellus*	27
	01 September 2018	*Pipistrellus pygmaeus*	7
	02 September 2018	*Myotis spp.*	16
	02 September 2018	*Pipistrellus pipistrellus*	19
	02 September 2018	*Pipistrellus pygmaeus*	11
	03 September 2018	*Myotis spp.*	22
	03 September 2018	*Pipistrellus pipistrellus*	19
	03 September 2018	*Pipistrellus pygmaeus*	12
	04 September 2018	*Myotis spp.*	20
	04 September 2018	*Pipistrellus pipistrellus*	8
	04 September 2018	*Pipistrellus pygmaeus*	5
	05 September 2018	*Myotis spp.*	19
	05 September 2018	*Pipistrellus pipistrellus*	17
	05 September 2018	*Pipistrellus pygmaeus*	5
	06 September 2018	*Myotis spp.*	45
	06 September 2018	*Pipistrellus pipistrellus*	72
	06 September 2018	*Pipistrellus pygmaeus*	15
	07 September 2018	*Myotis spp.*	9
	07 September 2018	*Pipistrellus pipistrellus*	44
	07 September 2018	*Pipistrellus pygmaeus*	14
	08 September 2018	*Myotis spp.*	15
	08 September 2018	*Nyctalus noctula*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	08 September 2018	*Pipistrellus pipistrellus*	66
	08 September 2018	*Pipistrellus pygmaeus*	16
	09 September 2018	*Myotis spp.*	35
	09 September 2018	*Nyctalus noctula*	1
	09 September 2018	*Pipistrellus pipistrellus*	20
	09 September 2018	*Pipistrellus pygmaeus*	9
	10 September 2018	*Myotis spp.*	4
	10 September 2018	*Nyctalus noctula*	1
	10 September 2018	*Pipistrellus pipistrellus*	31
	10 September 2018	*Pipistrellus pygmaeus*	12
	11 September 2018	*Myotis spp.*	4
	11 September 2018	*Pipistrellus pipistrellus*	40
	11 September 2018	*Pipistrellus pygmaeus*	21
	12 September 2018	*Myotis spp.*	7
	12 September 2018	*Pipistrellus pipistrellus*	18
	12 September 2018	*Pipistrellus pygmaeus*	9
	13 September 2018	*Myotis spp.*	8
	13 September 2018	*Pipistrellus pipistrellus*	34
	13 September 2018	*Pipistrellus pygmaeus*	7
	14 September 2018	*Myotis spp.*	5
	14 September 2018	*Pipistrellus pipistrellus*	24
	14 September 2018	*Pipistrellus pygmaeus*	8
	20 September 2018	*Myotis spp.*	8
	20 September 2018	*Pipistrellus pipistrellus*	12
	20 September 2018	*Pipistrellus pygmaeus*	13
	21 September 2018	*Myotis spp.*	5
	21 September 2018	*Pipistrellus pipistrellus*	15
	23 September 2018	*Myotis spp.*	2
	23 September 2018	*Pipistrellus pipistrellus*	9
	24 September 2018	*Myotis spp.*	4
	24 September 2018	*Pipistrellus pipistrellus*	9
	24 September 2018	*Pipistrellus pygmaeus*	3
	25 September 2018	*Myotis spp.*	4
	25 September 2018	*Pipistrellus pipistrellus*	9
	25 September 2018	*Pipistrellus pygmaeus*	3
	26 September 2018	*Myotis spp.*	18
	26 September 2018	*Pipistrellus pipistrellus*	33
	26 September 2018	*Pipistrellus pygmaeus*	4
	27 September 2018	*Myotis spp.*	7
	27 September 2018	*Nyctalus noctula*	2
	27 September 2018	*Pipistrellus pipistrellus*	30
	27 September 2018	*Pipistrellus pygmaeus*	11
	28 September 2018	*Myotis spp.*	4
	28 September 2018	*Pipistrellus pipistrellus*	32
	28 September 2018	*Pipistrellus pygmaeus*	5
	29 September 2018	*Myotis spp.*	4
	29 September 2018	*Pipistrellus pipistrellus*	18
	29 September 2018	*Pipistrellus pygmaeus*	10
	30 September 2018	*Myotis spp.*	8
	30 September 2018	*Pipistrellus pipistrellus*	5
	30 September 2018	*Pipistrellus pygmaeus*	5
	01 October 2018	*Myotis spp.*	5
	01 October 2018	*Pipistrellus pipistrellus*	17

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	01 October 2018	*Pipistrellus pygmaeus*	7
	02 October 2018	*Myotis spp.*	7
	02 October 2018	*Pipistrellus pipistrellus*	55
	02 October 2018	*Pipistrellus pygmaeus*	12
	03 October 2018	*Myotis spp.*	10
	03 October 2018	*Pipistrellus pipistrellus*	27
	03 October 2018	*Pipistrellus pygmaeus*	10
	04 October 2018	*Myotis spp.*	5
	04 October 2018	*Nyctalus noctula*	1
	04 October 2018	*Pipistrellus pipistrellus*	66
	04 October 2018	*Pipistrellus pygmaeus*	5
	05 October 2018	*Myotis spp.*	8
	05 October 2018	*Pipistrellus pipistrellus*	62
	05 October 2018	*Pipistrellus pygmaeus*	4
	15 April 2019	*Pipistrellus pipistrellus*	3
	15 April 2019	*Pipistrellus pygmaeus*	1
	16 April 2019	*Myotis spp.*	3
	16 April 2019	*Pipistrellus pipistrellus*	78
	16 April 2019	*Pipistrellus pygmaeus*	10
	17 April 2019	*Myotis spp.*	10
	17 April 2019	*Pipistrellus pipistrellus*	68
	17 April 2019	*Pipistrellus pygmaeus*	13
	18 April 2019	*Myotis spp.*	12
	18 April 2019	*Pipistrellus pipistrellus*	87
	18 April 2019	*Pipistrellus pygmaeus*	11
	22 April 2019	*Myotis spp.*	1
	22 April 2019	*Pipistrellus pipistrellus*	97
	22 April 2019	*Pipistrellus pygmaeus*	8
	25 April 2019	*Myotis spp.*	2
	25 April 2019	*Pipistrellus pipistrellus*	89
	25 April 2019	*Pipistrellus pygmaeus*	8
	25 April 2019	*Plecotus spp.*	1
	07 May 2019	*Myotis spp.*	6
	07 May 2019	*Pipistrellus pipistrellus*	133
	07 May 2019	*Pipistrellus pygmaeus*	7
	08 May 2019	*Myotis spp.*	3
	08 May 2019	*Pipistrellus pipistrellus*	25
	08 May 2019	*Pipistrellus pygmaeus*	20
	09 May 2019	*Myotis spp.*	8
	09 May 2019	*Pipistrellus pipistrellus*	58
	09 May 2019	*Pipistrellus pygmaeus*	7
	10 May 2019	*Myotis spp.*	8
	10 May 2019	*Pipistrellus pipistrellus*	53
	10 May 2019	*Pipistrellus pygmaeus*	11
	11 May 2019	*Myotis spp.*	12
	11 May 2019	*Pipistrellus pipistrellus*	58
	11 May 2019	*Pipistrellus pygmaeus*	11
	12 May 2019	*Myotis spp.*	10
	12 May 2019	*Pipistrellus pipistrellus*	58
	12 May 2019	*Pipistrellus pygmaeus*	11
	13 May 2019	*Myotis spp.*	10
	13 May 2019	*Pipistrellus pipistrellus*	89
	13 May 2019	*Pipistrellus pygmaeus*	12

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	15 May 2019	*Pipistrellus pipistrellus*	52
	15 May 2019	*Pipistrellus pygmaeus*	16
	17 May 2019	*Myotis spp.*	11
	17 May 2019	*Pipistrellus pipistrellus*	79
	17 May 2019	*Pipistrellus pygmaeus*	13
	18 May 2019	*Myotis spp.*	8
	18 May 2019	*Pipistrellus pipistrellus*	67
	18 May 2019	*Pipistrellus pygmaeus*	9
	19 May 2019	*Myotis spp.*	2
	19 May 2019	*Nyctalus noctula*	13
	19 May 2019	*Pipistrellus pipistrellus*	91
	19 May 2019	*Pipistrellus pygmaeus*	10
	04 June 2019	*Pipistrellus pipistrellus*	76
	04 June 2019	*Pipistrellus pygmaeus*	1
	05 June 2019	*Myotis spp.*	12
	05 June 2019	*Pipistrellus pipistrellus*	93
	05 June 2019	*Pipistrellus pygmaeus*	3
	06 June 2019	*Myotis spp.*	13
	06 June 2019	*Pipistrellus pipistrellus*	63
	06 June 2019	*Pipistrellus pygmaeus*	1
	07 June 2019	*Myotis spp.*	1
	07 June 2019	*Nyctalus noctula*	1
	07 June 2019	*Pipistrellus pipistrellus*	68
	07 June 2019	*Pipistrellus pygmaeus*	2
	08 June 2019	*Myotis spp.*	5
	08 June 2019	*Pipistrellus pipistrellus*	79
	08 June 2019	*Pipistrellus pygmaeus*	3
	09 June 2019	*Myotis spp.*	6
	09 June 2019	*Pipistrellus pipistrellus*	72
	09 June 2019	*Pipistrellus pygmaeus*	1
	10 June 2019	*Pipistrellus pipistrellus*	98
	11 June 2019	*Myotis spp.*	5
	11 June 2019	*Pipistrellus pipistrellus*	108
	11 June 2019	*Pipistrellus pygmaeus*	8
	02 July 2019	*Myotis spp.*	13
	02 July 2019	*Pipistrellus pipistrellus*	32
	02 July 2019	*Pipistrellus pygmaeus*	1
	03 July 2019	*Myotis spp.*	8
	03 July 2019	*Pipistrellus pipistrellus*	53
	03 July 2019	*Pipistrellus pygmaeus*	1
	04 July 2019	*Myotis spp.*	20
	04 July 2019	*Pipistrellus pipistrellus*	46
	04 July 2019	*Pipistrellus pygmaeus*	1
	04 July 2019	*Plecotus spp.*	1
	05 July 2019	*Myotis spp.*	20
	05 July 2019	*Pipistrellus pipistrellus*	45
	06 July 2019	*Myotis spp.*	20
	06 July 2019	*Pipistrellus pipistrellus*	32
	06 July 2019	*Pipistrellus pygmaeus*	3
	06 July 2019	*Plecotus spp.*	1
	07 July 2019	*Myotis spp.*	20
	07 July 2019	*Pipistrellus pipistrellus*	43
	07 July 2019	*Pipistrellus pygmaeus*	5

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	07 July 2019	*Plecotus spp.*	1
	08 July 2019	*Myotis spp.*	11
	08 July 2019	*Pipistrellus pipistrellus*	71
	08 July 2019	*Pipistrellus pygmaeus*	2
	08 July 2019	*Plecotus spp.*	1
	09 July 2019	*Myotis spp.*	23
	09 July 2019	*Pipistrellus pipistrellus*	41
	09 July 2019	*Pipistrellus pygmaeus*	2
	10 July 2019	*Myotis spp.*	14
	10 July 2019	*Pipistrellus pipistrellus*	36
	10 July 2019	*Pipistrellus pygmaeus*	3
	11 July 2019	*Myotis spp.*	17
	11 July 2019	*Pipistrellus pipistrellus*	46
	11 July 2019	*Pipistrellus pygmaeus*	1
	12 July 2019	*Myotis spp.*	6
	12 July 2019	*Pipistrellus pipistrellus*	28
	12 July 2019	*Pipistrellus pygmaeus*	1
	27 July 2018	*Myotis spp.*	21
	27 July 2018	*Pipistrellus pipistrellus*	16
	27 July 2018	*Pipistrellus pygmaeus*	6
	28 July 2018	*Myotis spp.*	11
	28 July 2018	*Pipistrellus pipistrellus*	9
	28 July 2018	*Pipistrellus pygmaeus*	4
	29 July 2018	*Myotis spp.*	7
	29 July 2018	*Pipistrellus pipistrellus*	20
	29 July 2018	*Pipistrellus pygmaeus*	4
	30 July 2018	*Myotis spp.*	8
	30 July 2018	*Pipistrellus pipistrellus*	12
	30 July 2018	*Pipistrellus pygmaeus*	2
	31 July 2018	*Myotis spp.*	11
	31 July 2018	*Pipistrellus pipistrellus*	9
	01 August 2018	*Myotis spp.*	11
	01 August 2018	*Pipistrellus pipistrellus*	9
	01 August 2018	*Pipistrellus pygmaeus*	2
	02 August 2018	*Myotis spp.*	8
	02 August 2018	*Pipistrellus pipistrellus*	6
	02 August 2018	*Pipistrellus pygmaeus*	2
	02 August 2018	*Plecotus spp.*	2
	03 August 2018	*Myotis spp.*	10
	03 August 2018	*Pipistrellus pipistrellus*	6
	03 August 2018	*Pipistrellus pygmaeus*	1
	30 August 2018	*Myotis spp.*	1
	30 August 2018	*Pipistrellus pipistrellus*	9
	31 August 2018	*Pipistrellus pipistrellus*	7
	01 September 2018	*Myotis spp.*	2
	01 September 2018	*Pipistrellus pipistrellus*	13
	02 September 2018	*Pipistrellus pipistrellus*	11
	03 September 2018	*Myotis spp.*	1
	03 September 2018	*Pipistrellus pipistrellus*	25
	04 September 2018	*Pipistrellus pipistrellus*	13
	04 September 2018	*Pipistrellus pygmaeus*	1
	05 September 2018	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	05 September 2018	*Pipistrellus pipistrellus*	13
	20 September 2018	*Myotis spp.*	57
	20 September 2018	*Pipistrellus pipistrellus*	109
	20 September 2018	*Pipistrellus pygmaeus*	59
	21 September 2018	*Myotis spp.*	10
	21 September 2018	*Pipistrellus pipistrellus*	153
	21 September 2018	*Pipistrellus pygmaeus*	63
	21 September 2018	*Plecotus spp.*	1
	23 September 2018	*Myotis spp.*	6
	23 September 2018	*Pipistrellus pipistrellus*	31
	23 September 2018	*Pipistrellus pygmaeus*	25
	24 September 2018	*Myotis spp.*	8
	25 September 2018	*Myotis spp.*	7
	25 September 2018	*Pipistrellus pipistrellus*	14
	25 September 2018	*Pipistrellus pygmaeus*	2
	26 September 2018	*Myotis spp.*	4
	26 September 2018	*Pipistrellus pipistrellus*	72
	26 September 2018	*Pipistrellus pygmaeus*	36
	27 September 2018	*Myotis spp.*	3
	27 September 2018	*Pipistrellus pipistrellus*	6
	28 September 2018	*Myotis spp.*	11
	28 September 2018	*Nyctalus noctula*	1
	28 September 2018	*Pipistrellus pipistrellus*	29
	28 September 2018	*Pipistrellus pygmaeus*	29
	29 September 2018	*Myotis spp.*	3
	29 September 2018	*Pipistrellus pipistrellus*	43
	29 September 2018	*Pipistrellus pygmaeus*	34
	29 September 2018	*Plecotus spp.*	1
	30 September 2018	*Pipistrellus pipistrellus*	212
	30 September 2018	*Pipistrellus pygmaeus*	4
	01 October 2018	*Myotis spp.*	1
	01 October 2018	*Pipistrellus pipistrellus*	238
	01 October 2018	*Pipistrellus pygmaeus*	6
	01 October 2018	*Plecotus spp.*	1
	11 October 2018	*Nyctalus spp.*	1
	11 October 2018	*Pipistrellus pipistrellus*	44
	11 October 2018	*Pipistrellus pygmaeus*	5
	12 October 2018	*Pipistrellus pipistrellus*	12
	13 October 2018	*Pipistrellus pipistrellus*	125
	13 October 2018	*Pipistrellus pygmaeus*	5
	14 October 2018	*Pipistrellus pipistrellus*	2
	14 October 2018	*Pipistrellus pygmaeus*	3
	15 October 2018	*Myotis spp.*	2
	15 October 2018	*Pipistrellus pipistrellus*	7
	15 October 2018	*Pipistrellus pygmaeus*	8
	16 October 2018	*Pipistrellus pipistrellus*	72
	24 October 2018	*Myotis spp.*	1
	24 October 2018	*Pipistrellus pipistrellus*	30
	24 October 2018	*Pipistrellus pygmaeus*	7
	25 October 2018	*Myotis spp.*	2
	25 October 2018	*Pipistrellus pipistrellus*	3
	15 April 2019	*Myotis spp.*	1
	15 April 2019	*Pipistrellus pipistrellus*	11

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	15 April 2019	*Pipistrellus pygmaeus*	1
	16 April 2019	*Pipistrellus pipistrellus*	22
	16 April 2019	*Pipistrellus pygmaeus*	7
	17 April 2019	*Pipistrellus pipistrellus*	23
	17 April 2019	*Pipistrellus pygmaeus*	3
	18 April 2019	*Pipistrellus pipistrellus*	20
	18 April 2019	*Plecotus spp.*	2
	19 April 2019	*Myotis spp.*	1
	19 April 2019	*Pipistrellus pipistrellus*	16
	19 April 2019	*Pipistrellus pygmaeus*	1
	19 April 2019	*Plecotus spp.*	1
	20 April 2019	*Myotis spp.*	1
	20 April 2019	*Pipistrellus pipistrellus*	28
	20 April 2019	*Pipistrellus pygmaeus*	1
	20 April 2019	*Plecotus spp.*	2
	21 April 2019	*Pipistrellus pipistrellus*	33
	21 April 2019	*Pipistrellus pygmaeus*	1
	22 April 2019	*Pipistrellus pipistrellus*	19
	23 April 2019	*Pipistrellus pipistrellus*	35
	23 April 2019	*Pipistrellus pygmaeus*	2
	24 April 2019	*Pipistrellus pipistrellus*	49
	25 April 2019	*Pipistrellus pipistrellus*	7
	26 April 2019	*Pipistrellus pipistrellus*	1
	26 April 2019	*Pipistrellus pygmaeus*	1
	28 April 2019	*Myotis spp.*	1
	28 April 2019	*Pipistrellus pipistrellus*	21
	28 April 2019	*Pipistrellus pygmaeus*	1
	28 April 2019	*Plecotus spp.*	1
	29 April 2019	*Pipistrellus pipistrellus*	20
	29 April 2019	*Plecotus spp.*	1
	30 April 2019	*Pipistrellus pipistrellus*	44
	07 May 2019	*Myotis spp.*	1
	07 May 2019	*Pipistrellus pipistrellus*	170
	07 May 2019	*Plecotus spp.*	1
	08 May 2019	*Pipistrellus pipistrellus*	36
	09 May 2019	*Pipistrellus pipistrellus*	39
	09 May 2019	*Plecotus spp.*	1
	10 May 2019	*Pipistrellus pipistrellus*	63
	11 May 2019	*Myotis spp.*	1
	11 May 2019	*Pipistrellus pipistrellus*	51
	13 May 2019	*Myotis spp.*	1
	13 May 2019	*Pipistrellus pipistrellus*	146
	13 May 2019	*Pipistrellus pygmaeus*	1
	13 May 2019	*Plecotus spp.*	2
	14 May 2019	*Pipistrellus pipistrellus*	67
	14 May 2019	*Pipistrellus pygmaeus*	1
	15 May 2019	*Pipistrellus pipistrellus*	103
	16 May 2019	*Pipistrellus pipistrellus*	61
	16 May 2019	*Pipistrellus pygmaeus*	1
	17 May 2019	*Pipistrellus pipistrellus*	84
	17 May 2019	*Plecotus spp.*	1
	18 May 2019	*Pipistrellus pipistrellus*	88
	19 May 2019	*Pipistrellus pipistrellus*	146

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	19 May 2019	*Plecotus spp.*	1
	02 July 2019	*Pipistrellus pipistrellus*	29
	03 July 2019	*Pipistrellus pipistrellus*	52
	04 July 2019	*Pipistrellus pipistrellus*	71
	05 July 2019	*Pipistrellus pipistrellus*	68
	05 July 2019	*Pipistrellus pygmaeus*	1
	06 July 2019	*Pipistrellus pipistrellus*	81
	06 July 2019	*Pipistrellus pygmaeus*	2
	07 July 2019	*Pipistrellus pipistrellus*	70
	08 July 2019	*Pipistrellus pipistrellus*	127
	08 July 2019	*Pipistrellus pygmaeus*	1
	09 July 2019	*Pipistrellus pipistrellus*	111
	09 July 2019	*Plecotus spp.*	1
	10 July 2019	*Pipistrellus pipistrellus*	91
	10 July 2019	*Plecotus spp.*	1
	11 July 2019	*Pipistrellus pipistrellus*	61
	11 July 2019	*Pipistrellus pygmaeus*	2
	27 July 2018	*Myotis spp.*	1
	27 July 2018	*Pipistrellus pipistrellus*	138
	28 July 2018	*Myotis spp.*	1
	28 July 2018	*Pipistrellus pipistrellus*	16
	29 July 2018	*Pipistrellus pipistrellus*	30
	30 July 2018	*Pipistrellus pipistrellus*	74
	30 July 2018	*Pipistrellus pygmaeus*	8
	31 July 2018	*Myotis spp.*	1
	31 July 2018	*Pipistrellus pipistrellus*	83
	31 July 2018	*Pipistrellus pygmaeus*	2
	01 August 2018	*Myotis spp.*	2
	01 August 2018	*Pipistrellus pipistrellus*	42
	01 August 2018	*Pipistrellus pygmaeus*	3
	02 August 2018	*Myotis spp.*	1
	02 August 2018	*Pipistrellus pipistrellus*	58
	02 August 2018	*Pipistrellus pygmaeus*	1
	03 August 2018	*Pipistrellus pipistrellus*	28
	04 August 2018	*Pipistrellus pipistrellus*	23
	04 August 2018	*Pipistrellus pygmaeus*	2
	09 August 2018	*Myotis spp.*	4
	09 August 2018	*Pipistrellus pipistrellus*	130
	10 August 2018	*Pipistrellus pipistrellus*	84
	10 August 2018	*Pipistrellus pygmaeus*	12
	11 August 2018	*Pipistrellus pipistrellus*	107
	11 August 2018	*Pipistrellus pygmaeus*	1
	12 August 2018	*Myotis spp.*	2
	12 August 2018	*Pipistrellus pipistrellus*	106
	13 August 2018	*Myotis spp.*	1
	13 August 2018	*Pipistrellus pipistrellus*	50
	13 August 2018	*Pipistrellus pygmaeus*	10
	14 August 2018	*Myotis spp.*	3
	14 August 2018	*Pipistrellus pipistrellus*	53
	15 August 2018	*Pipistrellus pipistrellus*	13
	22 August 2018	*Myotis spp.*	1
	22 August 2018	*Pipistrellus pipistrellus*	26

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	22 August 2018	*Pipistrellus pygmaeus*	4
	23 August 2018	*Myotis spp.*	1
	23 August 2018	*Pipistrellus pipistrellus*	29
	23 August 2018	*Pipistrellus pygmaeus*	2
	24 August 2018	*Myotis spp.*	1
	24 August 2018	*Pipistrellus pipistrellus*	8
	25 August 2018	*Pipistrellus pipistrellus*	38
	25 August 2018	*Pipistrellus pygmaeus*	2
	26 August 2018	*Pipistrellus pipistrellus*	39
	30 August 2018	*Pipistrellus pipistrellus*	142
	30 August 2018	*Pipistrellus pygmaeus*	6
	31 August 2018	*Myotis spp.*	1
	31 August 2018	*Pipistrellus pipistrellus*	185
	31 August 2018	*Pipistrellus pygmaeus*	39
	31 August 2018	*Plecotus spp.*	1
	01 September 2018	*Myotis spp.*	2
	01 September 2018	*Pipistrellus pipistrellus*	115
	01 September 2018	*Pipistrellus pygmaeus*	17
	02 September 2018	*Pipistrellus pipistrellus*	88
	03 September 2018	*Myotis spp.*	1
	03 September 2018	*Nyctalus noctula*	1
	03 September 2018	*Pipistrellus pipistrellus*	62
	04 September 2018	*Pipistrellus pipistrellus*	86
	06 September 2018	*Myotis spp.*	1
	06 September 2018	*Nyctalus noctula*	1
	06 September 2018	*Pipistrellus pipistrellus*	26
	07 September 2018	*Myotis spp.*	3
	07 September 2018	*Pipistrellus pipistrellus*	62
	07 September 2018	*Pipistrellus pygmaeus*	3
	08 September 2018	*Myotis spp.*	2
	08 September 2018	*Pipistrellus pipistrellus*	70
	08 September 2018	*Pipistrellus pygmaeus*	4
	08 September 2018	*Plecotus spp.*	1
	09 September 2018	*Pipistrellus pipistrellus*	53
	13 September 2018	*Myotis spp.*	19
	13 September 2018	*Nyctalus spp.*	1
	13 September 2018	*Pipistrellus pipistrellus*	37
	14 September 2018	*Myotis spp.*	7
	14 September 2018	*Pipistrellus pipistrellus*	30
	14 September 2018	*Plecotus spp.*	1
	15 September 2018	*Myotis spp.*	6
	15 September 2018	*Nyctalus noctula*	1
	15 September 2018	*Pipistrellus pipistrellus*	53
	15 September 2018	*Pipistrellus pygmaeus*	15
	15 September 2018	*Plecotus spp.*	1
	16 September 2018	*Myotis spp.*	10
	16 September 2018	*Pipistrellus pipistrellus*	27
	16 September 2018	*Plecotus spp.*	1
	17 September 2018	*Myotis spp.*	2
	17 September 2018	*Pipistrellus pipistrellus*	77
	18 September 2018	*Pipistrellus pipistrellus*	4
	19 September 2018	*Myotis spp.*	6
	19 September 2018	*Pipistrellus pipistrellus*	3

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	20 September 2018	*Myotis spp.*	1
	20 September 2018	*Pipistrellus pipistrellus*	1
	20 September 2018	*Pipistrellus pygmaeus*	2
	21 September 2018	*Myotis spp.*	2
	21 September 2018	*Pipistrellus pipistrellus*	6
	21 September 2018	*Plecotus spp.*	3
	22 September 2018	*Myotis spp.*	3
	23 September 2018	*Myotis spp.*	2
	23 September 2018	*Pipistrellus pipistrellus*	2
	23 September 2018	*Pipistrellus pygmaeus*	1
	24 September 2018	*Myotis spp.*	4
	24 September 2018	*Pipistrellus pipistrellus*	7
	24 September 2018	*Pipistrellus pygmaeus*	12
	25 September 2018	*Myotis spp.*	10
	25 September 2018	*Pipistrellus pipistrellus*	65
	25 September 2018	*Pipistrellus pygmaeus*	11
	26 September 2018	*Myotis spp.*	5
	26 September 2018	*Nyctalus noctula*	1
	26 September 2018	*Pipistrellus pipistrellus*	99
	26 September 2018	*Pipistrellus pygmaeus*	24
	27 September 2018	*Myotis spp.*	10
	27 September 2018	*Pipistrellus pipistrellus*	33
	28 September 2018	*Myotis spp.*	8
	28 September 2018	*Pipistrellus pipistrellus*	22
	29 September 2018	*Myotis spp.*	2
	29 September 2018	*Pipistrellus pipistrellus*	89
	29 September 2018	*Pipistrellus pygmaeus*	1
	30 September 2018	*Myotis spp.*	1
	30 September 2018	*Pipistrellus pipistrellus*	53
	30 September 2018	*Pipistrellus pygmaeus*	2
	01 October 2018	*Myotis spp.*	5
	01 October 2018	*Pipistrellus pipistrellus*	48
	01 October 2018	*Pipistrellus pygmaeus*	5
	02 October 2018	*Myotis spp.*	6
	02 October 2018	*Pipistrellus pipistrellus*	47
	03 October 2018	*Myotis spp.*	8
	03 October 2018	*Pipistrellus pipistrellus*	37
	03 October 2018	*Pipistrellus pygmaeus*	1
	04 October 2018	*Myotis spp.*	8
	04 October 2018	*Pipistrellus pipistrellus*	35
	04 October 2018	*Pipistrellus pygmaeus*	5
	05 October 2018	*Myotis spp.*	3
	05 October 2018	*Pipistrellus pipistrellus*	76
	05 October 2018	*Plecotus spp.*	1
	06 October 2018	*Pipistrellus pipistrellus*	2
	07 October 2018	*Myotis spp.*	1
	07 October 2018	*Pipistrellus pipistrellus*	7
	08 October 2018	*Myotis spp.*	2
	08 October 2018	*Nyctalus noctula*	4
	08 October 2018	*Pipistrellus pipistrellus*	47
	11 October 2018	*Pipistrellus pipistrellus*	16
	12 October 2018	*Myotis spp.*	2
	13 October 2018	*Myotis spp.*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	13 October 2018	*Pipistrellus pipistrellus*	10
	14 October 2018	*Myotis spp.*	1
	14 October 2018	*Pipistrellus pipistrellus*	2
	15 October 2018	*Myotis spp.*	6
	15 October 2018	*Nyctalus noctula*	1
	15 October 2018	*Pipistrellus pipistrellus*	24
	15 October 2018	*Pipistrellus pygmaeus*	1
	16 October 2018	*Myotis spp.*	2
	16 October 2018	*Pipistrellus pipistrellus*	34
	17 October 2018	*Pipistrellus pipistrellus*	2
	18 October 2018	*Pipistrellus pipistrellus*	5
	19 October 2018	*Pipistrellus pipistrellus*	11
	24 October 2018	*Myotis spp.*	1
	24 October 2018	*Pipistrellus pipistrellus*	1
	25 October 2018	*Plecotus spp.*	1
	16 April 2019	*Myotis spp.*	1
	16 April 2019	*Pipistrellus pipistrellus*	29
	17 April 2019	*Pipistrellus pipistrellus*	56
	17 April 2019	*Plecotus spp.*	1
	18 April 2019	*Pipistrellus pipistrellus*	57
	19 April 2019	*Pipistrellus pipistrellus*	57
	20 April 2019	*Pipistrellus pipistrellus*	64
	21 April 2019	*Pipistrellus pipistrellus*	34
	22 April 2019	*Pipistrellus pipistrellus*	32
	23 April 2019	*Pipistrellus pipistrellus*	41
	24 April 2019	*Pipistrellus pipistrellus*	15
	25 April 2019	*Pipistrellus pipistrellus*	6
	26 April 2019	*Pipistrellus pipistrellus*	5
	07 May 2019	*Myotis spp.*	1
	07 May 2019	*Pipistrellus pipistrellus*	31
	07 May 2019	*Pipistrellus pygmaeus*	3
	07 May 2019	*Plecotus spp.*	1
	08 May 2019	*Myotis spp.*	1
	08 May 2019	*Pipistrellus pipistrellus*	8
	08 May 2019	*Pipistrellus pygmaeus*	1
	09 May 2019	*Myotis spp.*	1
	09 May 2019	*Pipistrellus pipistrellus*	8
	09 May 2019	*Plecotus spp.*	2
	10 May 2019	*Pipistrellus pipistrellus*	25
	10 May 2019	*Pipistrellus pygmaeus*	1
	10 May 2019	*Plecotus spp.*	1
	11 May 2019	*Myotis spp.*	1
	11 May 2019	*Pipistrellus pipistrellus*	30
	11 May 2019	*Plecotus spp.*	2
	12 May 2019	*Pipistrellus pipistrellus*	32
	22 May 2019	*Pipistrellus pipistrellus*	70
	23 May 2019	*Myotis spp.*	2
	23 May 2019	*Pipistrellus pipistrellus*	99
	24 May 2019	*Nyctalus noctula*	8
	24 May 2019	*Pipistrellus pipistrellus*	94
	25 May 2019	*Myotis spp.*	1
	25 May 2019	*Pipistrellus pipistrellus*	69
	26 May 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	26 May 2019	*Pipistrellus pipistrellus*	41
	26 May 2019	*Plecotus spp.*	1
	27 May 2019	*Myotis spp.*	3
	27 May 2019	*Pipistrellus pipistrellus*	109
	27 May 2019	*Pipistrellus pygmaeus*	3
	28 May 2019	*Myotis spp.*	3
	28 May 2019	*Pipistrellus pipistrellus*	121
	28 May 2019	*Plecotus spp.*	2
	01 June 2019	*Pipistrellus pipistrellus*	222
	02 June 2019	*Nyctalus noctula*	2
	02 June 2019	*Pipistrellus pipistrellus*	186
	02 June 2019	*Pipistrellus pygmaeus*	67
	03 June 2019	*Myotis spp.*	1
	03 June 2019	*Pipistrellus pipistrellus*	123
	04 June 2019	*Myotis spp.*	3
	04 June 2019	*Pipistrellus pipistrellus*	151
	04 June 2019	*Pipistrellus pygmaeus*	7
	05 June 2019	*Pipistrellus pipistrellus*	108
	06 June 2019	*Myotis spp.*	3
	06 June 2019	*Pipistrellus pipistrellus*	288
	07 June 2019	*Myotis spp.*	2
	07 June 2019	*Nyctalus noctula*	1
	07 June 2019	*Pipistrellus pipistrellus*	40
	08 June 2019	*Pipistrellus pipistrellus*	63
	09 June 2019	*Pipistrellus pipistrellus*	132
	10 June 2019	*Pipistrellus pipistrellus*	33
	11 June 2019	*Barbastella barbastellus*	2
	11 June 2019	*Pipistrellus pipistrellus*	133
	01 August 2019	*Myotis spp.*	1
	01 August 2019	*Pipistrellus pipistrellus*	70
	01 August 2019	*Pipistrellus pygmaeus*	2
	02 August 2019	*Myotis spp.*	1
	02 August 2019	*Pipistrellus pipistrellus*	44
	02 August 2019	*Plecotus spp.*	1
	03 August 2019	*Pipistrellus pipistrellus*	34
	03 August 2019	*Pipistrellus pygmaeus*	1
	04 August 2019	*Pipistrellus pipistrellus*	14
	05 August 2019	*Myotis spp.*	1
	05 August 2019	*Pipistrellus pipistrellus*	24
	05 August 2019	*Plecotus spp.*	5
	06 August 2019	*Pipistrellus pipistrellus*	31
	07 August 2019	*Myotis spp.*	2
	07 August 2019	*Pipistrellus pipistrellus*	74
	07 August 2019	*Plecotus spp.*	1
	08 August 2019	*Myotis spp.*	2
	08 August 2019	*Pipistrellus pipistrellus*	51
	08 August 2019	*Plecotus spp.*	2
	09 August 2019	*Pipistrellus pipistrellus*	6
	27 July 2018	*Myotis spp.*	3
	27 July 2018	*Pipistrellus pipistrellus*	43
	27 July 2018	*Pipistrellus pygmaeus*	1
	28 July 2018	*Myotis spp.*	3

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	28 July 2018	*Pipistrellus pipistrellus*	36
	28 July 2018	*Pipistrellus pygmaeus*	1
	29 July 2018	*Myotis spp.*	5
	29 July 2018	*Pipistrellus pipistrellus*	42
	29 July 2018	*Pipistrellus pygmaeus*	1
	30 July 2018	*Myotis spp.*	2
	30 July 2018	*Pipistrellus pipistrellus*	29
	31 July 2018	*Myotis spp.*	5
	31 July 2018	*Pipistrellus pipistrellus*	13
	01 August 2018	*Myotis spp.*	5
	01 August 2018	*Pipistrellus pipistrellus*	23
	01 August 2018	*Pipistrellus pygmaeus*	5
	02 August 2018	*Myotis spp.*	1
	02 August 2018	*Pipistrellus pipistrellus*	15
	03 August 2018	*Myotis spp.*	1
	03 August 2018	*Pipistrellus pipistrellus*	16
	09 August 2018	*Myotis spp.*	2
	09 August 2018	*Pipistrellus pipistrellus*	52
	09 August 2018	*Pipistrellus pygmaeus*	15
	10 August 2018	*Myotis spp.*	1
	10 August 2018	*Pipistrellus pipistrellus*	59
	10 August 2018	*Pipistrellus pygmaeus*	3
	11 August 2018	*Myotis spp.*	4
	11 August 2018	*Pipistrellus pipistrellus*	46
	11 August 2018	*Pipistrellus pygmaeus*	2
	12 August 2018	*Myotis spp.*	2
	12 August 2018	*Pipistrellus pipistrellus*	51
	12 August 2018	*Pipistrellus pygmaeus*	12
	13 August 2018	*Pipistrellus pipistrellus*	22
	13 August 2018	*Pipistrellus pygmaeus*	4
	14 August 2018	*Myotis spp.*	3
	14 August 2018	*Pipistrellus pipistrellus*	20
	15 August 2018	*Myotis spp.*	5
	15 August 2018	*Pipistrellus pipistrellus*	24
	15 August 2018	*Pipistrellus pygmaeus*	2
	16 August 2018	*Myotis spp.*	4
	16 August 2018	*Pipistrellus pipistrellus*	35
	16 August 2018	*Pipistrellus pygmaeus*	2
	06 September 2018	*Myotis spp.*	12
	06 September 2018	*Pipistrellus pipistrellus*	84
	06 September 2018	*Pipistrellus pygmaeus*	29
	07 September 2018	*Myotis spp.*	32
	07 September 2018	*Pipistrellus pipistrellus*	106
	07 September 2018	*Pipistrellus pygmaeus*	10
	08 September 2018	*Myotis spp.*	6
	08 September 2018	*Nyctalus noctula*	2
	08 September 2018	*Pipistrellus pipistrellus*	73
	08 September 2018	*Pipistrellus pygmaeus*	14
	09 September 2018	*Myotis spp.*	6
	09 September 2018	*Pipistrellus pipistrellus*	64
	09 September 2018	*Pipistrellus pygmaeus*	31
	10 September 2018	*Myotis spp.*	4
	10 September 2018	*Pipistrellus pipistrellus*	75

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	10 September 2018	*Pipistrellus pygmaeus*	17
	11 September 2018	*Myotis spp.*	6
	11 September 2018	*Pipistrellus pipistrellus*	77
	11 September 2018	*Pipistrellus pygmaeus*	15
	12 September 2018	*Myotis spp.*	4
	12 September 2018	*Pipistrellus pipistrellus*	52
	12 September 2018	*Pipistrellus pygmaeus*	45
	13 September 2018	*Myotis spp.*	6
	13 September 2018	*Pipistrellus pipistrellus*	114
	14 September 2018	*Myotis spp.*	5
	14 September 2018	*Pipistrellus pipistrellus*	100
	14 September 2018	*Pipistrellus pygmaeus*	1
	15 September 2018	*Nyctalus noctula*	1
	20 September 2018	*Pipistrellus pipistrellus*	4
	21 September 2018	*Myotis spp.*	3
	21 September 2018	*Pipistrellus pipistrellus*	70
	23 September 2018	*Myotis spp.*	1
	23 September 2018	*Pipistrellus pipistrellus*	10
	24 September 2018	*Myotis spp.*	1
	24 September 2018	*Pipistrellus pipistrellus*	39
	25 September 2018	*Myotis spp.*	2
	25 September 2018	*Pipistrellus pipistrellus*	69
	26 September 2018	*Myotis spp.*	4
	26 September 2018	*Pipistrellus pipistrellus*	106
	27 September 2018	*Myotis spp.*	6
	27 September 2018	*Nyctalus noctula*	2
	27 September 2018	*Pipistrellus pipistrellus*	86
	27 September 2018	*Pipistrellus pygmaeus*	1
	28 September 2018	*Myotis spp.*	1
	28 September 2018	*Pipistrellus pipistrellus*	67
	11 October 2018	*Myotis spp.*	2
	11 October 2018	*Pipistrellus pipistrellus*	75
	12 October 2018	*Pipistrellus pipistrellus*	2
	13 October 2018	*Pipistrellus pipistrellus*	35
	14 October 2018	*Pipistrellus pipistrellus*	30
	14 October 2018	*Pipistrellus pygmaeus*	1
	15 October 2018	*Myotis spp.*	2
	15 October 2018	*Pipistrellus pipistrellus*	20
	16 October 2018	*Myotis spp.*	2
	16 October 2018	*Pipistrellus pipistrellus*	49
	18 October 2018	*Pipistrellus pipistrellus*	9
	24 October 2018	*Pipistrellus pipistrellus*	12
	25 October 2018	*Myotis spp.*	2
	25 October 2018	*Pipistrellus pipistrellus*	6
	15 April 2019	*Pipistrellus pipistrellus*	106
	15 April 2019	*Pipistrellus pygmaeus*	1
	16 April 2019	*Myotis spp.*	2
	16 April 2019	*Pipistrellus pipistrellus*	118
	16 April 2019	*Pipistrellus pygmaeus*	1
	17 April 2019	*Myotis spp.*	3
	17 April 2019	*Pipistrellus pipistrellus*	100
	17 April 2019	*Pipistrellus pygmaeus*	5
	18 April 2019	*Myotis spp.*	17

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	18 April 2019	*Pipistrellus pipistrellus*	66
	18 April 2019	*Pipistrellus pygmaeus*	12
	19 April 2019	*Myotis spp.*	26
	19 April 2019	*Pipistrellus pipistrellus*	81
	19 April 2019	*Pipistrellus pygmaeus*	6
	20 April 2019	*Myotis spp.*	33
	20 April 2019	*Pipistrellus pipistrellus*	111
	20 April 2019	*Pipistrellus pygmaeus*	5
	20 April 2019	*Plecotus spp.*	1
	21 April 2019	*Myotis spp.*	50
	21 April 2019	*Pipistrellus pipistrellus*	62
	21 April 2019	*Pipistrellus pygmaeus*	5
	22 April 2019	*Myotis spp.*	10
	22 April 2019	*Pipistrellus pipistrellus*	97
	22 April 2019	*Pipistrellus pygmaeus*	33
	23 April 2019	*Myotis spp.*	24
	23 April 2019	*Pipistrellus pipistrellus*	87
	23 April 2019	*Pipistrellus pygmaeus*	29
	24 April 2019	*Myotis spp.*	1
	24 April 2019	*Pipistrellus pipistrellus*	99
	24 April 2019	*Pipistrellus pygmaeus*	6
	25 April 2019	*Myotis spp.*	1
	25 April 2019	*Pipistrellus pipistrellus*	63
	26 April 2019	*Myotis spp.*	1
	26 April 2019	*Pipistrellus pipistrellus*	86
	27 April 2019	*Pipistrellus pipistrellus*	36
	28 April 2019	*Myotis spp.*	27
	28 April 2019	*Pipistrellus pipistrellus*	114
	28 April 2019	*Plecotus spp.*	3
	21 May 2019	*Myotis spp.*	71
	21 May 2019	*Pipistrellus pipistrellus*	66
	22 May 2019	*Myotis spp.*	20
	22 May 2019	*Pipistrellus pipistrellus*	43
	22 May 2019	*Pipistrellus pygmaeus*	58
	22 May 2019	*Plecotus spp.*	1
	17 June 2019	*Pipistrellus pipistrellus*	29
	17 June 2019	*Pipistrellus pygmaeus*	1
	18 June 2019	*Myotis spp.*	1
	18 June 2019	*Pipistrellus pipistrellus*	104
	19 June 2019	*Myotis spp.*	1
	19 June 2019	*Pipistrellus pipistrellus*	3
	20 June 2019	*Pipistrellus pipistrellus*	18
	21 June 2019	*Myotis spp.*	3
	21 June 2019	*Pipistrellus pipistrellus*	16
	21 June 2019	*Pipistrellus pygmaeus*	1
	22 June 2019	*Myotis spp.*	1
	22 June 2019	*Pipistrellus pipistrellus*	43
	22 June 2019	*Pipistrellus pygmaeus*	3
	23 June 2019	*Myotis spp.*	2
	23 June 2019	*Pipistrellus pipistrellus*	70
	23 June 2019	*Pipistrellus pygmaeus*	5
	24 June 2019	*Myotis spp.*	1
	24 June 2019	*Pipistrellus pipistrellus*	102

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	24 June 2019	*Pipistrellus pygmaeus*	4
	25 June 2019	*Myotis spp.*	1
	25 June 2019	*Pipistrellus pipistrellus*	22
	25 June 2019	*Pipistrellus pygmaeus*	1
	02 July 2019	*Myotis spp.*	1
	02 July 2019	*Pipistrellus pipistrellus*	9
	03 July 2019	*Myotis spp.*	2
	03 July 2019	*Pipistrellus pipistrellus*	29
	04 July 2019	*Myotis spp.*	2
	04 July 2019	*Pipistrellus pipistrellus*	13
	05 July 2019	*Myotis spp.*	2
	05 July 2019	*Pipistrellus pipistrellus*	19
	05 July 2019	*Pipistrellus pygmaeus*	1
	06 July 2019	*Pipistrellus pipistrellus*	21
	07 July 2019	*Pipistrellus pipistrellus*	33
	07 July 2019	*Pipistrellus pygmaeus*	8
	08 July 2019	*Myotis spp.*	2
	08 July 2019	*Pipistrellus pipistrellus*	141
	08 July 2019	*Pipistrellus pygmaeus*	32
	09 July 2019	*Pipistrellus pipistrellus*	103
	09 July 2019	*Plecotus spp.*	2
	10 July 2019	*Pipistrellus pipistrellus*	75
	10 July 2019	*Pipistrellus pygmaeus*	1
	10 July 2019	*Plecotus spp.*	1
	11 July 2019	*Pipistrellus pipistrellus*	35
	11 July 2019	*Pipistrellus pygmaeus*	42
	11 July 2019	*Plecotus spp.*	2
	27 July 2018	*Nyctalus noctula*	1
	27 July 2018	*Pipistrellus pipistrellus*	124
	27 July 2018	*Pipistrellus pygmaeus*	4
	28 July 2018	*Eptesicus serotinus*	1
	28 July 2018	*Pipistrellus pipistrellus*	165
	29 July 2018	*Myotis spp.*	1
	29 July 2018	*Nyctalus noctula*	1
	29 July 2018	*Pipistrellus pipistrellus*	106
	29 July 2018	*Pipistrellus pygmaeus*	2
	30 July 2018	*Myotis spp.*	1
	30 July 2018	*Pipistrellus pipistrellus*	58
	30 July 2018	*Pipistrellus pygmaeus*	2
	31 July 2018	*Myotis spp.*	2
	31 July 2018	*Pipistrellus pipistrellus*	83
	31 July 2018	*Pipistrellus pygmaeus*	3
	31 July 2018	*Plecotus spp.*	1
	01 August 2018	*Myotis spp.*	1
	01 August 2018	*Nyctalus spp.*	1
	01 August 2018	*Pipistrellus pipistrellus*	112
	02 August 2018	*Pipistrellus pipistrellus*	121
	02 August 2018	*Pipistrellus pygmaeus*	1
	03 August 2018	*Myotis spp.*	2
	03 August 2018	*Nyctalus spp.*	2
	03 August 2018	*Pipistrellus pipistrellus*	106
	03 August 2018	*Pipistrellus pygmaeus*	4

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	03 August 2018	*Plecotus spp.*	1
	04 August 2018	*Myotis spp.*	2
	04 August 2018	*Nyctalus spp.*	2
	04 August 2018	*Pipistrellus pipistrellus*	91
	04 August 2018	*Pipistrellus pygmaeus*	1
	09 August 2018	*Myotis spp.*	1
	09 August 2018	*Pipistrellus pipistrellus*	110
	10 August 2018	*Myotis spp.*	1
	10 August 2018	*Pipistrellus pipistrellus*	87
	10 August 2018	*Plecotus spp.*	1
	11 August 2018	*Eptesicus serotinus*	1
	11 August 2018	*Myotis spp.*	1
	11 August 2018	*Nyctalus spp.*	1
	11 August 2018	*Pipistrellus pipistrellus*	48
	11 August 2018	*Pipistrellus pygmaeus*	5
	12 August 2018	*Pipistrellus pipistrellus*	5
	13 August 2018	*Myotis spp.*	1
	13 August 2018	*Nyctalus noctula*	2
	13 August 2018	*Pipistrellus pipistrellus*	132
	13 August 2018	*Pipistrellus pygmaeus*	1
	13 August 2018	*Plecotus spp.*	1
	14 August 2018	*Myotis spp.*	2
	14 August 2018	*Pipistrellus pipistrellus*	110
	14 August 2018	*Pipistrellus pygmaeus*	1
	15 August 2018	*Pipistrellus pipistrellus*	78
	22 August 2018	*Pipistrellus pipistrellus*	108
	22 August 2018	*Pipistrellus pygmaeus*	1
	22 August 2018	*Plecotus spp.*	1
	23 August 2018	*Myotis spp.*	3
	23 August 2018	*Pipistrellus pipistrellus*	128
	30 August 2018	*Myotis spp.*	4
	30 August 2018	*Nyctalus noctula*	2
	30 August 2018	*Pipistrellus pipistrellus*	86
	31 August 2018	*Pipistrellus pipistrellus*	112
	01 September 2018	*Myotis spp.*	2
	01 September 2018	*Pipistrellus pipistrellus*	147
	01 September 2018	*Pipistrellus pygmaeus*	2
	02 September 2018	*Myotis spp.*	3
	02 September 2018	*Nyctalus noctula*	1
	02 September 2018	*Pipistrellus pipistrellus*	152
	02 September 2018	*Pipistrellus pygmaeus*	3
	03 September 2018	*Nyctalus noctula*	1
	03 September 2018	*Pipistrellus pipistrellus*	71
	03 September 2018	*Pipistrellus pygmaeus*	1
	03 September 2018	*Plecotus spp.*	1
	04 September 2018	*Pipistrellus pipistrellus*	15
	05 September 2018	*Pipistrellus pipistrellus*	38
	06 September 2018	*Pipistrellus pipistrellus*	94
	06 September 2018	*Pipistrellus pygmaeus*	1
	06 September 2018	*Plecotus spp.*	2
	07 September 2018	*Eptesicus serotinus*	1
	07 September 2018	*Myotis spp.*	2
	07 September 2018	*Pipistrellus pipistrellus*	60

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	07 September 2018	*Pipistrellus pygmaeus*	1
	08 September 2018	*Pipistrellus pipistrellus*	103
	09 September 2018	*Myotis spp.*	3
	09 September 2018	*Pipistrellus pipistrellus*	136
	09 September 2018	*Pipistrellus pygmaeus*	1
	09 September 2018	*Plecotus spp.*	1
	10 September 2018	*Pipistrellus pipistrellus*	144
	11 September 2018	*Eptesicus serotinus*	1
	11 September 2018	*Pipistrellus pipistrellus*	56
	12 September 2018	*Myotis spp.*	3
	12 September 2018	*Pipistrellus pipistrellus*	11
	13 September 2018	*Myotis spp.*	5
	13 September 2018	*Pipistrellus pipistrellus*	55
	14 September 2018	*Myotis spp.*	4
	14 September 2018	*Pipistrellus pipistrellus*	12
	14 September 2018	*Pipistrellus pygmaeus*	1
	14 September 2018	*Plecotus spp.*	1
	15 September 2018	*Myotis spp.*	3
	15 September 2018	*Nyctalus spp.*	1
	15 September 2018	*Pipistrellus pipistrellus*	95
	15 September 2018	*Plecotus spp.*	1
	16 September 2018	*Myotis spp.*	6
	16 September 2018	*Pipistrellus pipistrellus*	164
	16 September 2018	*Pipistrellus pygmaeus*	4
	17 September 2018	*Pipistrellus pipistrellus*	53
	17 September 2018	*Pipistrellus pygmaeus*	4
	18 September 2018	*Pipistrellus pipistrellus*	120
	18 September 2018	*Plecotus spp.*	1
	20 September 2018	*Pipistrellus pipistrellus*	20
	21 September 2018	*Nyctalus noctula*	1
	23 September 2018	*Plecotus spp.*	2
	24 September 2018	*Plecotus spp.*	1
	25 September 2018	*Myotis spp.*	1
	25 September 2018	*Pipistrellus pipistrellus*	1
	26 September 2018	*Nyctalus noctula*	1
	26 September 2018	*Pipistrellus pipistrellus*	6
	26 September 2018	*Pipistrellus pygmaeus*	2
	27 September 2018	*Myotis spp.*	1
	27 September 2018	*Nyctalus noctula*	3
	27 September 2018	*Pipistrellus pipistrellus*	3
	27 September 2018	*Plecotus spp.*	1
	28 September 2018	*Pipistrellus pipistrellus*	18
	29 September 2018	*Pipistrellus pipistrellus*	7
	30 September 2018	*Myotis spp.*	1
	30 September 2018	*Pipistrellus pipistrellus*	5
	30 September 2018	*Pipistrellus pygmaeus*	2
	30 September 2018	*Plecotus spp.*	2
	01 October 2018	*Pipistrellus pipistrellus*	2
	11 October 2018	*Pipistrellus pipistrellus*	39
	11 October 2018	*Pipistrellus pygmaeus*	11
	11 October 2018	*Plecotus spp.*	1
	12 October 2018	*Pipistrellus pipistrellus*	2
	12 October 2018	*Pipistrellus pygmaeus*	18

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	13 October 2018	*Pipistrellus pipistrellus*	46
	13 October 2018	*Plecotus spp.*	1
	14 October 2018	*Pipistrellus pipistrellus*	1
	15 October 2018	*Myotis spp.*	5
	15 October 2018	*Pipistrellus pipistrellus*	2
	15 October 2018	*Plecotus spp.*	3
	16 October 2018	*Pipistrellus pipistrellus*	9
	16 October 2018	*Pipistrellus pygmaeus*	3
	16 October 2018	*Plecotus spp.*	1
	17 October 2018	*Myotis spp.*	6
	17 October 2018	*Plecotus spp.*	1
	18 October 2018	*Pipistrellus pipistrellus*	2
	24 October 2018	*Pipistrellus pipistrellus*	6
	24 October 2018	*Plecotus spp.*	1
	25 October 2018	*Pipistrellus pygmaeus*	1
	25 October 2018	*Plecotus spp.*	1
	26 October 2018	*Plecotus spp.*	1
	16 April 2019	*Nyctalus noctula*	1
	16 April 2019	*Pipistrellus pipistrellus*	294
	16 April 2019	*Pipistrellus pygmaeus*	8
	17 April 2019	*Pipistrellus pipistrellus*	85
	17 April 2019	*Pipistrellus pygmaeus*	7
	17 April 2019	*Plecotus spp.*	1
	18 April 2019	*Pipistrellus pipistrellus*	70
	18 April 2019	*Pipistrellus pygmaeus*	4
	18 April 2019	*Plecotus spp.*	1
	19 April 2019	*Nyctalus noctula*	1
	19 April 2019	*Pipistrellus pipistrellus*	294
	19 April 2019	*Pipistrellus pygmaeus*	2
	20 April 2019	*Myotis spp.*	2
	20 April 2019	*Pipistrellus pipistrellus*	109
	21 April 2019	*Pipistrellus pipistrellus*	104
	21 April 2019	*Pipistrellus pygmaeus*	5
	22 April 2019	*Pipistrellus pipistrellus*	130
	22 April 2019	*Pipistrellus pygmaeus*	6
	23 April 2019	*Pipistrellus pipistrellus*	103
	24 April 2019	*Myotis spp.*	7
	24 April 2019	*Nyctalus noctula*	4
	24 April 2019	*Pipistrellus pipistrellus*	27
	24 April 2019	*Pipistrellus pygmaeus*	1
	25 April 2019	*Pipistrellus pipistrellus*	27
	26 April 2019	*Pipistrellus pipistrellus*	10
	20 May 2019	*Pipistrellus pipistrellus*	69
	20 May 2019	*Pipistrellus pygmaeus*	2
	21 May 2019	*Pipistrellus pipistrellus*	3
	22 May 2019	*Nyctalus noctula*	2
	22 May 2019	*Nyctalus spp.*	4
	22 May 2019	*Pipistrellus pipistrellus*	4
	23 May 2019	*Pipistrellus pipistrellus*	6
	29 May 2019	*Pipistrellus pipistrellus*	69
	30 May 2019	*Nyctalus noctula*	2
	30 May 2019	*Pipistrellus pipistrellus*	10
	31 May 2019	*Pipistrellus pipistrellus*	8

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	01 June 2019	*Nyctalus noctula*	8
	01 June 2019	*Pipistrellus pipistrellus*	18
	02 June 2019	*Pipistrellus pipistrellus*	41
	17 June 2019	*Pipistrellus pipistrellus*	19
	18 June 2019	*Pipistrellus pipistrellus*	79
	19 June 2019	*Myotis spp.*	1
	19 June 2019	*Pipistrellus pipistrellus*	37
	20 June 2019	*Pipistrellus pipistrellus*	9
	21 June 2019	*Pipistrellus pipistrellus*	25
	22 June 2019	*Pipistrellus pipistrellus*	20
	23 June 2019	*Myotis spp.*	1
	23 June 2019	*Pipistrellus pipistrellus*	66
	24 June 2019	*Myotis spp.*	2
	24 June 2019	*Nyctalus noctula*	3
	24 June 2019	*Pipistrellus pipistrellus*	47
	25 June 2019	*Pipistrellus pipistrellus*	24
	24 July 2019	*Pipistrellus pipistrellus*	2
	25 July 2019	*Myotis spp.*	1
	26 July 2019	*Myotis spp.*	2
	26 July 2019	*Pipistrellus pipistrellus*	9
	27 July 2019	*Myotis spp.*	1
	27 July 2019	*Pipistrellus pipistrellus*	64
	28 July 2019	*Pipistrellus pipistrellus*	4
	29 July 2019	*Pipistrellus pipistrellus*	7
	29 July 2019	*Plecotus spp.*	2
	30 July 2019	*Pipistrellus pipistrellus*	3
	31 July 2019	*Myotis spp.*	1
	31 July 2019	*Pipistrellus pipistrellus*	1
	01 August 2019	*Nyctalus noctula*	5
	01 August 2019	*Pipistrellus pipistrellus*	56
ST06	09 August 2018	*Myotis spp.*	2
	16 October 2018	*Nyctalus noctula*	3
	06 September 2018	*Myotis spp.*	37
	06 September 2018	*Nyctalus noctula*	1
	06 September 2018	*Pipistrellus pipistrellus*	229
	06 September 2018	*Pipistrellus pygmaeus*	18
	07 September 2018	*Pipistrellus pipistrellus*	92
	07 September 2018	*Pipistrellus pygmaeus*	68
	08 September 2018	*Myotis spp.*	33
	08 September 2018	*Pipistrellus pipistrellus*	158
	08 September 2018	*Pipistrellus pygmaeus*	30
	08 September 2018	*Plecotus spp.*	1
	09 September 2018	*Myotis spp.*	12
	09 September 2018	*Pipistrellus pipistrellus*	173
	09 September 2018	*Pipistrellus pygmaeus*	12
	10 September 2018	*Myotis spp.*	12
	10 September 2018	*Pipistrellus pipistrellus*	129
	10 September 2018	*Pipistrellus pygmaeus*	3
	11 September 2018	*Myotis spp.*	1
	11 September 2018	*Pipistrellus pipistrellus*	133
	12 September 2018	*Pipistrellus pipistrellus*	37
	12 September 2018	*Pipistrellus pygmaeus*	42

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	13 September 2018	*Myotis spp.*	1
	13 September 2018	*Pipistrellus pipistrellus*	169
	13 September 2018	*Pipistrellus pygmaeus*	3
	13 September 2018	*Plecotus spp.*	1
	14 September 2018	*Myotis spp.*	1
	14 September 2018	*Pipistrellus pipistrellus*	103
	14 September 2018	*Pipistrellus pygmaeus*	9
	15 September 2018	*Myotis spp.*	3
	15 September 2018	*Pipistrellus pipistrellus*	146
	15 September 2018	*Pipistrellus pygmaeus*	14
	16 September 2018	*Pipistrellus pipistrellus*	178
	16 September 2018	*Pipistrellus pygmaeus*	8
	17 September 2018	*Myotis spp.*	2
	17 September 2018	*Pipistrellus pipistrellus*	66
	17 September 2018	*Pipistrellus pygmaeus*	21
	18 September 2018	*Pipistrellus pipistrellus*	25
	18 September 2018	*Pipistrellus pygmaeus*	20
	19 September 2018	*Pipistrellus pipistrellus*	71
	20 September 2018	*Pipistrellus pipistrellus*	9
	20 September 2018	*Pipistrellus pygmaeus*	1
	21 September 2018	*Myotis spp.*	1
	21 September 2018	*Pipistrellus pipistrellus*	6
	21 September 2018	*Pipistrellus pygmaeus*	11
	23 September 2018	*Pipistrellus pipistrellus*	2
	24 September 2018	*Pipistrellus pipistrellus*	6
	25 September 2018	*Myotis spp.*	1
	25 September 2018	*Pipistrellus pipistrellus*	2
	26 September 2018	*Pipistrellus pipistrellus*	50
	26 September 2018	*Pipistrellus pygmaeus*	1
	27 September 2018	*Myotis spp.*	1
	27 September 2018	*Pipistrellus pipistrellus*	89
	28 September 2018	*Pipistrellus pipistrellus*	17
	28 September 2018	*Pipistrellus pygmaeus*	3
	29 September 2018	*Pipistrellus pipistrellus*	14
	29 September 2018	*Pipistrellus pygmaeus*	1
	30 September 2018	*Myotis spp.*	1
	30 September 2018	*Pipistrellus pipistrellus*	73
	30 September 2018	*Pipistrellus pygmaeus*	22
	01 October 2018	*Pipistrellus pipistrellus*	3
	01 October 2018	*Pipistrellus pygmaeus*	9
	12 October 2018	*Pipistrellus pipistrellus*	3
	13 October 2018	*Pipistrellus pipistrellus*	17
	14 October 2018	*Pipistrellus pipistrellus*	23
	14 October 2018	*Pipistrellus pygmaeus*	3
	15 October 2018	*Myotis spp.*	3
	15 October 2018	*Pipistrellus pipistrellus*	4
	15 October 2018	*Pipistrellus pygmaeus*	1
	16 October 2018	*Pipistrellus pipistrellus*	10
	16 October 2018	*Pipistrellus pygmaeus*	2
	24 October 2018	*Pipistrellus pipistrellus*	11
	24 October 2018	*Pipistrellus pygmaeus*	1
	25 October 2018	*Myotis spp.*	9
	23 April 2019	*Pipistrellus pipistrellus*	94

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	24 April 2019	*Pipistrellus pipistrellus*	48
	25 April 2019	*Pipistrellus pipistrellus*	25
	26 April 2019	*Pipistrellus pipistrellus*	4
	27 April 2019	*Pipistrellus pipistrellus*	6
	28 April 2019	*Pipistrellus pipistrellus*	46
	29 April 2019	*Pipistrellus pipistrellus*	27
	30 April 2019	*Pipistrellus pipistrellus*	18
	03 June 2019	*Pipistrellus pipistrellus*	110
	04 June 2019	*Pipistrellus pipistrellus*	68
	04 June 2019	*Plecotus spp.*	2
	05 June 2019	*Pipistrellus pipistrellus*	56
	06 June 2019	*Myotis spp.*	6
	06 June 2019	*Pipistrellus pipistrellus*	92
	06 June 2019	*Pipistrellus pygmaeus*	14
	07 June 2019	*Pipistrellus pipistrellus*	216
	08 June 2019	*Pipistrellus pipistrellus*	56
	09 June 2019	*Myotis spp.*	6
	09 June 2019	*Pipistrellus pipistrellus*	98
	09 June 2019	*Pipistrellus pygmaeus*	14
	10 June 2019	*Pipistrellus pipistrellus*	132
	11 June 2019	*Pipistrellus pipistrellus*	158
	11 June 2019	*Pipistrellus pygmaeus*	14
	12 June 2019	*Nyctalus spp.*	4
	12 June 2019	*Pipistrellus pipistrellus*	54
	12 June 2019	*Pipistrellus pygmaeus*	2
	17 June 2019	*Pipistrellus pipistrellus*	130
	18 June 2019	*Myotis spp.*	4
	18 June 2019	*Pipistrellus pipistrellus*	182
	18 June 2019	*Plecotus spp.*	2
	19 June 2019	*Myotis spp.*	2
	19 June 2019	*Pipistrellus pipistrellus*	204
	20 June 2019	*Pipistrellus pipistrellus*	150
	21 June 2019	*Pipistrellus pipistrellus*	58
	22 June 2019	*Myotis spp.*	2
	22 June 2019	*Pipistrellus pipistrellus*	164
	23 June 2019	*Pipistrellus pipistrellus*	188
	24 June 2019	*Myotis spp.*	4
	24 June 2019	*Pipistrellus pipistrellus*	236
	25 June 2019	*Myotis spp.*	2
	25 June 2019	*Pipistrellus pipistrellus*	208
	15 July 2019	*Pipistrellus pipistrellus*	25
	05 August 2019	*Myotis spp.*	2
	05 August 2019	*Pipistrellus pipistrellus*	6
	06 August 2019	*Myotis spp.*	3
	06 August 2019	*Pipistrellus pipistrellus*	16
	07 August 2019	*Pipistrellus pipistrellus*	23
	08 August 2019	*Myotis spp.*	2
	08 August 2019	*Pipistrellus pipistrellus*	18
	09 August 2019	*Myotis spp.*	1
	10 August 2019	*Pipistrellus pipistrellus*	18
	11 August 2019	*Myotis spp.*	1
	11 August 2019	*Pipistrellus pipistrellus*	2
	12 August 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	12 August 2019	*Pipistrellus pipistrellus*	6
	13 August 2019	*Myotis spp.*	1
	13 August 2019	*Pipistrellus pipistrellus*	9
	23 August 2018	*Pipistrellus pipistrellus*	1
	24 August 2018	*Pipistrellus pipistrellus*	26
	24 August 2018	*Pipistrellus pygmaeus*	5
	24 August 2018	*Plecotus spp.*	1
	26 August 2018	*Myotis spp.*	1
	26 August 2018	*Pipistrellus pipistrellus*	3
	27 August 2018	*Myotis spp.*	1
	27 August 2018	*Pipistrellus pipistrellus*	15
	27 August 2018	*Plecotus spp.*	3
	28 August 2018	*Myotis spp.*	1
	28 August 2018	*Pipistrellus pipistrellus*	56
	29 August 2018	*Myotis spp.*	1
	29 August 2018	*Pipistrellus pipistrellus*	31
	29 August 2018	*Plecotus spp.*	1
	30 August 2018	*Myotis spp.*	1
	30 August 2018	*Pipistrellus pipistrellus*	48
	30 August 2018	*Plecotus spp.*	2
	31 August 2018	*Pipistrellus pipistrellus*	29
	01 September 2018	*Pipistrellus pipistrellus*	16
	02 September 2018	*Pipistrellus pipistrellus*	13
	03 September 2018	*Myotis spp.*	1
	03 September 2018	*Pipistrellus pipistrellus*	39
	03 September 2018	*Pipistrellus pygmaeus*	3
	04 September 2018	*Pipistrellus pipistrellus*	11
	04 September 2018	*Pipistrellus pygmaeus*	1
	04 September 2018	*Plecotus spp.*	1
	05 September 2018	*Pipistrellus pipistrellus*	1
	05 September 2018	*Pipistrellus pygmaeus*	2
	05 September 2018	*Plecotus spp.*	1
	06 September 2018	*Barbastella barbastellus*	1
	06 September 2018	*Eptesicus serotinus*	2
	06 September 2018	*Pipistrellus pipistrellus*	67
	06 September 2018	*Plecotus spp.*	2
	07 September 2018	*Plecotus spp.*	1
	08 September 2018	*Eptesicus serotinus*	1
	08 September 2018	*Myotis spp.*	1
	08 September 2018	*Pipistrellus pipistrellus*	69
	08 September 2018	*Plecotus spp.*	2
	09 September 2018	*Pipistrellus pipistrellus*	18
	09 September 2018	*Plecotus spp.*	2
	10 September 2018	*Eptesicus serotinus*	1
	10 September 2018	*Myotis spp.*	1
	10 September 2018	*Pipistrellus pipistrellus*	25
	11 September 2018	*Pipistrellus pipistrellus*	28
	12 September 2018	*Pipistrellus pipistrellus*	11
	12 September 2018	*Pipistrellus pygmaeus*	2
	14 September 2018	*Eptesicus serotinus*	1
	14 September 2018	*Nyctalus spp.*	1
	14 September 2018	*Pipistrellus pipistrellus*	29

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	14 September 2018	*Pipistrellus pygmaeus*	2
	14 September 2018	*Plecotus spp.*	1
	15 September 2018	*Eptesicus serotinus*	2
	15 September 2018	*Pipistrellus pipistrellus*	56
	15 September 2018	*Plecotus spp.*	2
	16 September 2018	*Pipistrellus pipistrellus*	17
	17 September 2018	*Myotis spp.*	2
	17 September 2018	*Pipistrellus pipistrellus*	107
	17 September 2018	*Pipistrellus pygmaeus*	1
	18 September 2018	*Myotis spp.*	2
	18 September 2018	*Pipistrellus pipistrellus*	33
	18 September 2018	*Pipistrellus pygmaeus*	2
	19 September 2018	*Pipistrellus pipistrellus*	51
	20 September 2018	*Eptesicus serotinus*	2
	20 September 2018	*Nyctalus noctula*	4
	20 September 2018	*Nyctalus spp.*	3
	20 September 2018	*Pipistrellus pipistrellus*	14
	21 September 2018	*Nyctalus spp.*	1
	21 September 2018	*Pipistrellus pipistrellus*	1
	23 September 2018	*Pipistrellus pipistrellus*	1
	24 September 2018	*Myotis spp.*	1
	25 September 2018	*Myotis spp.*	1
	26 September 2018	*Eptesicus serotinus*	2
	26 September 2018	*Myotis spp.*	1
	26 September 2018	*Nyctalus spp.*	3
	26 September 2018	*Pipistrellus pipistrellus*	4
	26 September 2018	*Pipistrellus pygmaeus*	2
	27 September 2018	*Nyctalus spp.*	8
	27 September 2018	*Pipistrellus pipistrellus*	49
	28 September 2018	*Pipistrellus pipistrellus*	33
	29 September 2018	*Pipistrellus pipistrellus*	1
	30 September 2018	*Eptesicus serotinus*	1
	30 September 2018	*Pipistrellus pipistrellus*	16
	01 October 2018	*Pipistrellus pipistrellus*	3
	01 October 2018	*Plecotus spp.*	1
	11 October 2018	*Pipistrellus pipistrellus*	97
	11 October 2018	*Pipistrellus pygmaeus*	23
	13 October 2018	*Myotis spp.*	1
	13 October 2018	*Pipistrellus pipistrellus*	9
	14 October 2018	*Pipistrellus pipistrellus*	1
	15 October 2018	*Myotis spp.*	2
	15 October 2018	*Pipistrellus pipistrellus*	49
	16 October 2018	*Myotis spp.*	3
	16 October 2018	*Pipistrellus pipistrellus*	86
	16 October 2018	*Pipistrellus pygmaeus*	67
	24 October 2018	*Pipistrellus pipistrellus*	5
	25 October 2018	*Pipistrellus pipistrellus*	25
	16 April 2019	*Pipistrellus pipistrellus*	41
	17 April 2019	*Pipistrellus pipistrellus*	59
	18 April 2019	*Pipistrellus pipistrellus*	4
	19 April 2019	*Pipistrellus pipistrellus*	4
	21 April 2019	*Nyctalus noctula*	1
	21 April 2019	*Pipistrellus pipistrellus*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	22 April 2019	*Pipistrellus pipistrellus*	31
	23 April 2019	*Pipistrellus pipistrellus*	41
	24 April 2019	*Pipistrellus pipistrellus*	16
	15 April 2019	*Myotis spp.*	1
	15 April 2019	*Pipistrellus pipistrellus*	22
	16 April 2019	*Myotis spp.*	3
	16 April 2019	*Pipistrellus pipistrellus*	36
	16 April 2019	*Pipistrellus pygmaeus*	3
	17 April 2019	*Myotis spp.*	1
	17 April 2019	*Pipistrellus pipistrellus*	37
	17 April 2019	*Pipistrellus pygmaeus*	1
	18 April 2019	*Pipistrellus pipistrellus*	47
	19 April 2019	*Myotis spp.*	1
	19 April 2019	*Pipistrellus pipistrellus*	29
	23 April 2019	*Pipistrellus pipistrellus*	43
	23 April 2019	*Pipistrellus pygmaeus*	2
	29 April 2019	*Myotis spp.*	2
	29 April 2019	*Pipistrellus pipistrellus*	40
	30 April 2019	*Myotis spp.*	3
	30 April 2019	*Pipistrellus pipistrellus*	50
	30 April 2019	*Pipistrellus pygmaeus*	1
	01 May 2019	*Myotis spp.*	2
	01 May 2019	*Pipistrellus pipistrellus*	54
	01 May 2019	*Pipistrellus pygmaeus*	1
	02 May 2019	*Myotis spp.*	1
	02 May 2019	*Pipistrellus pipistrellus*	40
	02 May 2019	*Plecotus spp.*	1
	03 May 2019	*Myotis spp.*	1
	03 May 2019	*Pipistrellus pipistrellus*	50
	03 May 2019	*Pipistrellus pygmaeus*	1
	04 May 2019	*Myotis spp.*	1
	04 May 2019	*Pipistrellus pipistrellus*	7
	05 May 2019	*Myotis spp.*	1
	05 May 2019	*Pipistrellus pipistrellus*	39
	06 May 2019	*Myotis spp.*	2
	06 May 2019	*Pipistrellus pipistrellus*	40
	06 May 2019	*Pipistrellus pygmaeus*	2
	07 May 2019	*Myotis spp.*	2
	07 May 2019	*Pipistrellus pipistrellus*	31
	08 May 2019	*Pipistrellus pipistrellus*	39
	09 May 2019	*Myotis spp.*	2
	09 May 2019	*Pipistrellus pipistrellus*	25
	10 May 2019	*Pipistrellus pipistrellus*	45
	11 May 2019	*Pipistrellus pipistrellus*	23
	12 May 2019	*Myotis spp.*	2
	12 May 2019	*Pipistrellus pipistrellus*	31
	13 May 2019	*Myotis spp.*	1
	13 May 2019	*Nyctalus spp.*	2
	13 May 2019	*Pipistrellus pipistrellus*	34
	13 May 2019	*Plecotus spp.*	5
	14 May 2019	*Myotis spp.*	1
	14 May 2019	*Pipistrellus pipistrellus*	111

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	14 May 2019	*Pipistrellus pygmaeus*	3
	14 May 2019	*Plecotus spp.*	3
	15 May 2019	*Myotis spp.*	2
	15 May 2019	*Pipistrellus pipistrellus*	18
	16 May 2019	*Myotis spp.*	1
	16 May 2019	*Nyctalus spp.*	2
	16 May 2019	*Pipistrellus pipistrellus*	56
	16 May 2019	*Pipistrellus pygmaeus*	1
	16 May 2019	*Plecotus spp.*	2
	17 May 2019	*Myotis spp.*	3
	18 May 2019	*Myotis spp.*	2
	18 May 2019	*Pipistrellus pipistrellus*	9
	18 May 2019	*Pipistrellus pygmaeus*	1
	19 May 2019	*Myotis spp.*	1
	19 May 2019	*Nyctalus spp.*	1
	19 May 2019	*Pipistrellus pipistrellus*	4
	03 June 2019	*Pipistrellus pipistrellus*	4
	04 June 2019	*Pipistrellus pipistrellus*	4
	05 June 2019	*Pipistrellus pipistrellus*	8
	06 June 2019	*Myotis spp.*	1
	06 June 2019	*Pipistrellus pipistrellus*	11
	08 June 2019	*Pipistrellus pipistrellus*	3
	09 June 2019	*Pipistrellus pipistrellus*	2
	13 June 2019	*Pipistrellus pipistrellus*	3
	13 June 2019	*Pipistrellus pygmaeus*	1
	15 June 2019	*Pipistrellus pipistrellus*	4
	16 June 2019	*Pipistrellus pipistrellus*	8
	15 July 2019	*Myotis spp.*	2
	15 July 2019	*Pipistrellus pipistrellus*	6
	16 July 2019	*Myotis spp.*	2
	16 July 2019	*Pipistrellus pipistrellus*	2
	17 July 2019	*Pipistrellus pipistrellus*	10
	18 July 2019	*Pipistrellus pipistrellus*	3
	19 July 2019	*Myotis spp.*	2
	19 July 2019	*Pipistrellus pipistrellus*	20
	26 July 2019	*Myotis spp.*	1
	26 July 2019	*Pipistrellus pipistrellus*	18
	26 July 2019	*Pipistrellus pygmaeus*	3
	27 July 2019	*Pipistrellus pipistrellus*	3
	27 July 2019	*Pipistrellus pygmaeus*	2
	28 July 2019	*Myotis spp.*	1
	28 July 2019	*Pipistrellus pipistrellus*	6
	29 July 2019	*Pipistrellus pipistrellus*	6
	29 July 2019	*Pipistrellus pygmaeus*	1
	29 July 2019	*Plecotus spp.*	1
	30 July 2019	*Myotis spp.*	1
	30 July 2019	*Pipistrellus pipistrellus*	9
	30 July 2019	*Pipistrellus pygmaeus*	1
	31 July 2019	*Myotis spp.*	1
	31 July 2019	*Pipistrellus pipistrellus*	1
	31 July 2019	*Pipistrellus pygmaeus*	1
	01 August 2019	*Nyctalus noctula*	1
	01 August 2019	*Pipistrellus pipistrellus*	13

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	05 August 2019	*Myotis spp.*	1
	05 August 2019	*Pipistrellus pipistrellus*	3
	05 August 2019	*Pipistrellus pygmaeus*	1
	06 August 2019	*Myotis spp.*	2
	06 August 2019	*Pipistrellus pipistrellus*	3
	07 August 2019	*Pipistrellus pipistrellus*	1
	07 August 2019	*Pipistrellus pygmaeus*	1
	08 August 2019	*Myotis spp.*	3
	08 August 2019	*Pipistrellus pipistrellus*	12
	09 August 2019	*Myotis spp.*	1
	09 August 2019	*Pipistrellus pipistrellus*	7
	09 August 2019	*Pipistrellus pygmaeus*	2
	10 August 2019	*Pipistrellus pipistrellus*	3
	11 August 2019	*Myotis spp.*	1
	11 August 2019	*Pipistrellus pipistrellus*	1
	11 August 2019	*Plecotus spp.*	1
	12 August 2019	*Myotis spp.*	1
	12 August 2019	*Pipistrellus pipistrellus*	1
	13 August 2019	*Myotis spp.*	5
	13 August 2019	*Pipistrellus pipistrellus*	3
	14 August 2019	*Myotis spp.*	1
	14 August 2019	*Pipistrellus pipistrellus*	5
	14 August 2019	*Pipistrellus pygmaeus*	1
	15 August 2019	*Myotis spp.*	2
	15 August 2019	*Pipistrellus pipistrellus*	3
	15 August 2019	*Pipistrellus pygmaeus*	1
	01 September 2019	*Myotis spp.*	4
	01 September 2019	*Pipistrellus pipistrellus*	3
	01 September 2019	*Pipistrellus pygmaeus*	1
	02 September 2019	*Myotis spp.*	1
	02 September 2019	*Pipistrellus pipistrellus*	19
	02 September 2019	*Pipistrellus pygmaeus*	1
	03 September 2019	*Myotis spp.*	3
	03 September 2019	*Pipistrellus pipistrellus*	10
	03 September 2019	*Pipistrellus pygmaeus*	2
	04 September 2019	*Pipistrellus pipistrellus*	2
	05 September 2019	*Myotis spp.*	1
	05 September 2019	*Nyctalus noctula*	1
	05 September 2019	*Pipistrellus pipistrellus*	9
	06 September 2019	*Pipistrellus pipistrellus*	14
	11 September 2019	*Myotis spp.*	3
	11 September 2019	*Pipistrellus pipistrellus*	7
	12 September 2019	*Myotis spp.*	3
	12 September 2019	*Pipistrellus pipistrellus*	8
	12 September 2019	*Pipistrellus pygmaeus*	4
	13 September 2019	*Myotis spp.*	2
	13 September 2019	*Pipistrellus pipistrellus*	8
	13 September 2019	*Pipistrellus pygmaeus*	1
	26 September 2019	*Myotis spp.*	2
	26 September 2019	*Pipistrellus pipistrellus*	3
	27 September 2019	*Myotis spp.*	1
	27 September 2019	*Pipistrellus pipistrellus*	1
	27 September 2019	*Pipistrellus pygmaeus*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	28 September 2019	*Myotis spp.*	5
	28 September 2019	*Pipistrellus pipistrellus*	7
	28 September 2019	*Pipistrellus pygmaeus*	3
	29 September 2019	*Nyctalus noctula*	1
	29 September 2019	*Pipistrellus pipistrellus*	2
	17 October 2019	*Myotis spp.*	1
	17 October 2019	*Pipistrellus pygmaeus*	1
	17 October 2019	*Plecotus spp.*	1
	18 October 2019	*Pipistrellus pipistrellus*	5
	19 October 2019	*Pipistrellus pipistrellus*	7
	19 October 2019	*Plecotus spp.*	1
	20 October 2019	*Pipistrellus pipistrellus*	2
	21 October 2019	*Pipistrellus pipistrellus*	2
	21 October 2019	*Plecotus spp.*	1
	22 October 2019	*Myotis spp.*	1
	22 October 2019	*Pipistrellus pipistrellus*	4
	23 October 2019	*Myotis spp.*	2
	23 October 2019	*Pipistrellus pipistrellus*	5
	23 October 2019	*Plecotus spp.*	4
	24 October 2019	*Myotis spp.*	2
	24 October 2019	*Pipistrellus pipistrellus*	1
	16 April 2019	*Myotis spp.*	5
	16 April 2019	*Pipistrellus pipistrellus*	11
	16 April 2019	*Pipistrellus pygmaeus*	1
	16 April 2019	*Plecotus spp.*	1
	17 April 2019	*Pipistrellus pipistrellus*	34
	18 April 2019	*Pipistrellus pipistrellus*	128
	18 April 2019	*Pipistrellus pygmaeus*	1
	19 April 2019	*Myotis spp.*	4
	19 April 2019	*Pipistrellus pipistrellus*	121
	19 April 2019	*Pipistrellus pygmaeus*	2
	19 April 2019	*Plecotus spp.*	3
	07 May 2019	*Myotis spp.*	1
	07 May 2019	*Nyctalus spp.*	1
	07 May 2019	*Pipistrellus pipistrellus*	184
	08 May 2019	*Pipistrellus pipistrellus*	63
	08 May 2019	*Pipistrellus pygmaeus*	3
	08 May 2019	*Plecotus spp.*	2
	09 May 2019	*Pipistrellus pipistrellus*	3
	09 May 2019	*Plecotus spp.*	1
	10 May 2019	*Myotis spp.*	2
	10 May 2019	*Nyctalus spp.*	2
	10 May 2019	*Pipistrellus pipistrellus*	25
	11 May 2019	*Myotis spp.*	1
	11 May 2019	*Pipistrellus pipistrellus*	16
	11 May 2019	*Plecotus spp.*	2
	12 May 2019	*Eptesicus serotinus*	3
	12 May 2019	*Myotis spp.*	1
	12 May 2019	*Nyctalus spp.*	1
	12 May 2019	*Pipistrellus pipistrellus*	39
	12 May 2019	*Plecotus spp.*	2
	03 June 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	03 June 2019	*Pipistrellus pipistrellus*	32
	04 June 2019	*Myotis spp.*	3
	04 June 2019	*Pipistrellus pipistrellus*	36
	05 June 2019	*Myotis spp.*	1
	05 June 2019	*Pipistrellus pipistrellus*	18
	06 June 2019	*Myotis spp.*	1
	06 June 2019	*Pipistrellus pipistrellus*	35
	26 July 2019	*Pipistrellus pipistrellus*	44
ST10	27 July 2019	*Myotis spp.*	2
	27 July 2019	*Pipistrellus pipistrellus*	39
	27 July 2019	*Pipistrellus pygmaeus*	1
	28 July 2019	*Pipistrellus pipistrellus*	24
	05 August 2019	*Pipistrellus pipistrellus*	10
	06 August 2019	*Pipistrellus pipistrellus*	9
	07 August 2019	*Myotis spp.*	1
	07 August 2019	*Pipistrellus pipistrellus*	31
	07 August 2019	*Pipistrellus pygmaeus*	1
	08 August 2019	*Myotis spp.*	2
	08 August 2019	*Pipistrellus pipistrellus*	80
	08 August 2019	*Pipistrellus pygmaeus*	10
	09 August 2019	*Pipistrellus pipistrellus*	2
	10 August 2019	*Pipistrellus pipistrellus*	18
	10 August 2019	*Pipistrellus pygmaeus*	1
	11 August 2019	*Myotis spp.*	1
	11 August 2019	*Pipistrellus pipistrellus*	17
	11 August 2019	*Pipistrellus pygmaeus*	1
	26 September 2019	*Myotis spp.*	1
	26 September 2019	*Pipistrellus pipistrellus*	4
	27 September 2019	*Myotis spp.*	1
	28 September 2019	*Pipistrellus pipistrellus*	4
	29 September 2019	*Myotis spp.*	3
	29 September 2019	*Nyctalus noctula*	5
	29 September 2019	*Pipistrellus pipistrellus*	30
	29 September 2019	*Pipistrellus pygmaeus*	3
	29 September 2019	*Plecotus spp.*	1
	01 October 2019	*Myotis spp.*	1
	01 October 2019	*Nyctalus noctula*	1
	01 October 2019	*Pipistrellus pipistrellus*	29
	01 October 2019	*Pipistrellus pygmaeus*	1
	02 October 2019	*Myotis spp.*	1
	02 October 2019	*Pipistrellus pipistrellus*	7
	02 October 2019	*Pipistrellus pygmaeus*	1
	17 October 2019	*Pipistrellus pipistrellus*	14
	18 October 2019	*Pipistrellus pipistrellus*	3
	18 October 2019	*Pipistrellus pygmaeus*	1
	19 October 2019	*Nyctalus noctula*	1
	19 October 2019	*Pipistrellus pipistrellus*	40
	19 October 2019	*Pipistrellus pygmaeus*	3
	07 May 2019	*Myotis spp.*	3
	07 May 2019	*Pipistrellus pipistrellus*	40
	08 May 2019	*Myotis spp.*	1
	08 May 2019	*Pipistrellus pipistrellus*	21

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	09 May 2019	*Myotis spp.*	1
	09 May 2019	*Pipistrellus pipistrellus*	50
	10 May 2019	*Myotis spp.*	1
	10 May 2019	*Pipistrellus pipistrellus*	23
	11 May 2019	*Myotis spp.*	1
	11 May 2019	*Pipistrellus pipistrellus*	49
	12 May 2019	*Pipistrellus pipistrellus*	51
	13 May 2019	*Pipistrellus pipistrellus*	98
	13 May 2019	*Plecotus spp.*	1
	14 May 2019	*Pipistrellus pipistrellus*	63
	15 May 2019	*Myotis spp.*	1
	15 May 2019	*Pipistrellus pipistrellus*	79
	16 May 2019	*Pipistrellus pipistrellus*	100
	17 May 2019	*Myotis spp.*	1
	17 May 2019	*Pipistrellus pipistrellus*	35
	17 May 2019	*Plecotus spp.*	1
	18 May 2019	*Myotis spp.*	1
	18 May 2019	*Pipistrellus pipistrellus*	65
	19 May 2019	*Myotis spp.*	2
	19 May 2019	*Pipistrellus pipistrellus*	115
	03 June 2019	*Myotis spp.*	1
	03 June 2019	*Pipistrellus pipistrellus*	47
	04 June 2019	*Myotis spp.*	1
	04 June 2019	*Pipistrellus pipistrellus*	93
	17 June 2019	*Myotis spp.*	4
	17 June 2019	*Pipistrellus pipistrellus*	47
	18 June 2019	*Myotis spp.*	1
	18 June 2019	*Nyctalus noctula*	7
	18 June 2019	*Pipistrellus pipistrellus*	44
	20 June 2019	*Pipistrellus pipistrellus*	17
	21 June 2019	*Myotis spp.*	6
	21 June 2019	*Pipistrellus pipistrellus*	17
	21 June 2019	*Pipistrellus pygmaeus*	1
	22 June 2019	*Pipistrellus pipistrellus*	63
	23 June 2019	*Myotis spp.*	3
	23 June 2019	*Pipistrellus pipistrellus*	90
	24 June 2019	*Myotis spp.*	2
	24 June 2019	*Pipistrellus pipistrellus*	117
	25 June 2019	*Pipistrellus pipistrellus*	60
	26 June 2019	*Myotis spp.*	1
	26 June 2019	*Pipistrellus pipistrellus*	38
	27 June 2019	*Myotis spp.*	2
	27 June 2019	*Pipistrellus pipistrellus*	23
	28 June 2019	*Myotis spp.*	1
	28 June 2019	*Pipistrellus pipistrellus*	48
	15 July 2019	*Myotis spp.*	2
	15 July 2019	*Pipistrellus pipistrellus*	52
	16 July 2019	*Myotis spp.*	1
	16 July 2019	*Pipistrellus pipistrellus*	81
	16 July 2019	*Pipistrellus pygmaeus*	1
	17 July 2019	*Myotis spp.*	1
	17 July 2019	*Pipistrellus pipistrellus*	91
	18 July 2019	*Pipistrellus pipistrellus*	29

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	18 July 2019	*Plecotus spp.*	2
	19 July 2019	*Myotis spp.*	1
	19 July 2019	*Pipistrellus pipistrellus*	23
	19 July 2019	*Pipistrellus pygmaeus*	1
	20 July 2019	*Pipistrellus pipistrellus*	80
	21 July 2019	*Myotis spp.*	2
	21 July 2019	*Pipistrellus pipistrellus*	60
	21 July 2019	*Pipistrellus pygmaeus*	1
	22 July 2019	*Myotis spp.*	1
	22 July 2019	*Pipistrellus pipistrellus*	42
	23 July 2019	*Myotis spp.*	1
	23 July 2019	*Pipistrellus pipistrellus*	76
	24 July 2019	*Myotis spp.*	1
	24 July 2019	*Pipistrellus pipistrellus*	23
	25 July 2019	*Pipistrellus pipistrellus*	24
	26 July 2019	*Myotis spp.*	1
	26 July 2019	*Pipistrellus pipistrellus*	43
	26 July 2019	*Pipistrellus pygmaeus*	2
	27 July 2019	*Barbastella barbastellus*	3
	27 July 2019	*Pipistrellus pipistrellus*	55
	28 July 2019	*Pipistrellus pipistrellus*	37
	29 July 2019	*Pipistrellus pipistrellus*	38
	30 July 2019	*Pipistrellus pipistrellus*	42
	30 July 2019	*Pipistrellus pygmaeus*	11
	30 July 2019	*Plecotus spp.*	1
	21 August 2019	*Myotis spp.*	8
	21 August 2019	*Pipistrellus pipistrellus*	88
	21 August 2019	*Pipistrellus pygmaeus*	1
	21 August 2019	*Plecotus spp.*	2
	22 August 2019	*Barbastella barbastellus*	1
	22 August 2019	*Myotis spp.*	2
	22 August 2019	*Nyctalus noctula*	2
	22 August 2019	*Pipistrellus pipistrellus*	61
	23 August 2019	*Pipistrellus pipistrellus*	102
	24 August 2019	*Myotis spp.*	6
	24 August 2019	*Pipistrellus pipistrellus*	42
	25 August 2019	*Myotis spp.*	1
	25 August 2019	*Pipistrellus pipistrellus*	32
	26 August 2019	*Pipistrellus pipistrellus*	41
	27 August 2019	*Myotis spp.*	1
	27 August 2019	*Pipistrellus pipistrellus*	26
	27 August 2019	*Pipistrellus pygmaeus*	2
	28 August 2019	*Myotis spp.*	1
	28 August 2019	*Pipistrellus pipistrellus*	49
	29 August 2019	*Pipistrellus pipistrellus*	39
	29 August 2019	*Plecotus spp.*	3
	30 August 2019	*Myotis spp.*	1
	30 August 2019	*Pipistrellus pipistrellus*	15
	30 August 2019	*Plecotus spp.*	4
	31 August 2019	*Myotis spp.*	1
	31 August 2019	*Pipistrellus pipistrellus*	70
	31 August 2019	*Plecotus spp.*	1
	01 September 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	01 September 2019	*Pipistrellus pipistrellus*	59
	01 September 2019	*Plecotus spp.*	2
	02 September 2019	*Myotis spp.*	2
	02 September 2019	*Pipistrellus pipistrellus*	39
	11 September 2019	*Myotis spp.*	7
	11 September 2019	*Nyctalus noctula*	1
	11 September 2019	*Pipistrellus pipistrellus*	74
	11 September 2019	*Pipistrellus pygmaeus*	2
	12 September 2019	*Myotis spp.*	2
	12 September 2019	*Pipistrellus pipistrellus*	38
	12 September 2019	*Plecotus spp.*	1
	13 September 2019	*Myotis spp.*	1
	13 September 2019	*Pipistrellus pipistrellus*	42
	13 September 2019	*Plecotus spp.*	1
	14 September 2019	*Myotis spp.*	4
	14 September 2019	*Pipistrellus pipistrellus*	29
	14 September 2019	*Pipistrellus pygmaeus*	1
	14 September 2019	*Plecotus spp.*	2
	15 September 2019	*Pipistrellus pipistrellus*	59
	15 September 2019	*Plecotus spp.*	3
	16 September 2019	*Pipistrellus pipistrellus*	64
	17 September 2019	*Myotis spp.*	1
	17 September 2019	*Pipistrellus pipistrellus*	19
	26 September 2019	*Barbastella barbastellus*	1
	26 September 2019	*Pipistrellus pipistrellus*	12
	27 September 2019	*Myotis spp.*	1
	27 September 2019	*Pipistrellus pipistrellus*	31
	27 September 2019	*Plecotus spp.*	1
	28 September 2019	*Myotis spp.*	3
	28 September 2019	*Pipistrellus pipistrellus*	13
	28 September 2019	*Pipistrellus pygmaeus*	7
	03 October 2019	*Barbastella barbastellus*	1
	03 October 2019	*Pipistrellus pipistrellus*	49
	03 October 2019	*Pipistrellus pygmaeus*	2
	04 October 2019	*Myotis spp.*	3
	04 October 2019	*Pipistrellus pipistrellus*	26
	04 October 2019	*Pipistrellus pygmaeus*	1
	05 October 2019	*Pipistrellus pipistrellus*	43
	05 October 2019	*Pipistrellus pygmaeus*	1
	05 October 2019	*Plecotus spp.*	1
	06 October 2019	*Myotis spp.*	1
	06 October 2019	*Pipistrellus pipistrellus*	29
	06 October 2019	*Pipistrellus pygmaeus*	1
	07 October 2019	*Myotis spp.*	2
	07 October 2019	*Pipistrellus pipistrellus*	9
	07 October 2019	*Pipistrellus pygmaeus*	1
	07 October 2019	*Plecotus spp.*	1
	08 October 2019	*Myotis spp.*	3
	08 October 2019	*Pipistrellus pipistrellus*	19
	08 October 2019	*Pipistrellus pygmaeus*	3
	08 October 2019	*Plecotus spp.*	1
	09 October 2019	*Myotis spp.*	2
	09 October 2019	*Pipistrellus nathusii*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	09 October 2019	*Pipistrellus pipistrellus*	18
	09 October 2019	*Pipistrellus pygmaeus*	1
	17 October 2019	*Myotis spp.*	1
	17 October 2019	*Pipistrellus pipistrellus*	1
	18 October 2019	*Pipistrellus pipistrellus*	3
	18 October 2019	*Pipistrellus pygmaeus*	2
	19 October 2019	*Pipistrellus nathusii*	1
	19 October 2019	*Pipistrellus pipistrellus*	18
	20 October 2019	*Pipistrellus pipistrellus*	16
	20 October 2019	*Plecotus spp.*	1
	21 October 2019	*Pipistrellus pipistrellus*	49
	21 October 2019	*Pipistrellus pygmaeus*	1
	22 October 2019	*Pipistrellus pipistrellus*	65
	23 October 2019	*Pipistrellus pipistrellus*	14
	13 May 2019	*Pipistrellus pipistrellus*	28
	13 May 2019	*Pipistrellus pygmaeus*	8
	14 May 2019	*Pipistrellus pipistrellus*	7
	14 May 2019	*Pipistrellus pygmaeus*	9
	15 May 2019	*Pipistrellus pipistrellus*	13
	15 May 2019	*Pipistrellus pygmaeus*	8
	16 May 2019	*Pipistrellus pipistrellus*	16
	16 May 2019	*Pipistrellus pygmaeus*	12
	16 May 2019	*Plecotus spp.*	1
	17 May 2019	*Myotis spp.*	2
	17 May 2019	*Pipistrellus pipistrellus*	15
	17 May 2019	*Pipistrellus pygmaeus*	9
	18 May 2019	*Pipistrellus pipistrellus*	11
	18 May 2019	*Pipistrellus pygmaeus*	9
	19 May 2019	*Pipistrellus pipistrellus*	14
	19 May 2019	*Pipistrellus pygmaeus*	9
	03 June 2019	*Pipistrellus nathusii*	1
	03 June 2019	*Pipistrellus pipistrellus*	17
	03 June 2019	*Plecotus spp.*	1
	04 June 2019	*Myotis spp.*	1
	04 June 2019	*Pipistrellus pipistrellus*	26
	04 June 2019	*Pipistrellus pygmaeus*	1
	05 June 2019	*Pipistrellus nathusii*	1
	05 June 2019	*Pipistrellus pipistrellus*	14
	06 June 2019	*Pipistrellus pipistrellus*	31
	06 June 2019	*Pipistrellus pygmaeus*	1
	07 June 2019	*Nyctalus noctula*	5
	07 June 2019	*Pipistrellus pipistrellus*	17
	07 June 2019	*Pipistrellus pygmaeus*	2
	08 June 2019	*Pipistrellus pipistrellus*	19
	09 June 2019	*Pipistrellus pipistrellus*	18
	09 June 2019	*Pipistrellus pygmaeus*	1
	10 June 2019	*Pipistrellus pipistrellus*	12
	17 June 2019	*Pipistrellus pipistrellus*	10
	18 June 2019	*Pipistrellus pipistrellus*	32
	18 June 2019	*Plecotus spp.*	1
	19 June 2019	*Myotis spp.*	1
	19 June 2019	*Pipistrellus pipistrellus*	14

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	19 June 2019	*Pipistrellus pygmaeus*	3
	19 June 2019	*Plecotus spp.*	1
	15 July 2019	*Myotis spp.*	1
	15 July 2019	*Pipistrellus pipistrellus*	15
	15 July 2019	*Pipistrellus pygmaeus*	1
	16 July 2019	*Myotis spp.*	2
	16 July 2019	*Pipistrellus pipistrellus*	14
	16 July 2019	*Plecotus spp.*	1
	17 July 2019	*Myotis spp.*	2
	17 July 2019	*Pipistrellus pipistrellus*	16
	17 July 2019	*Plecotus spp.*	1
	18 July 2019	*Pipistrellus pipistrellus*	12
	19 July 2019	*Myotis spp.*	2
	19 July 2019	*Pipistrellus pipistrellus*	18
	19 July 2019	*Pipistrellus pygmaeus*	2
	20 July 2019	*Pipistrellus pipistrellus*	13
	20 July 2019	*Plecotus spp.*	1
	21 July 2019	*Myotis spp.*	3
	21 July 2019	*Pipistrellus pipistrellus*	12
	21 July 2019	*Pipistrellus pygmaeus*	1
	21 July 2019	*Plecotus spp.*	1
	22 July 2019	*Pipistrellus pipistrellus*	27
	23 July 2019	*Pipistrellus pipistrellus*	49
	23 July 2019	*Pipistrellus pygmaeus*	1
	23 July 2019	*Plecotus spp.*	3
	05 August 2019	*Barbastella barbastellus*	1
	05 August 2019	*Myotis spp.*	8
	05 August 2019	*Pipistrellus pipistrellus*	22
	05 August 2019	*Pipistrellus pygmaeus*	1
	05 August 2019	*Plecotus spp.*	115
	06 August 2019	*Myotis spp.*	1
	06 August 2019	*Pipistrellus pipistrellus*	8
	06 August 2019	*Plecotus spp.*	22
	07 August 2019	*Myotis spp.*	8
	07 August 2019	*Pipistrellus pipistrellus*	25
	07 August 2019	*Pipistrellus pygmaeus*	1
	07 August 2019	*Plecotus spp.*	21
	08 August 2019	*Eptesicus serotinus*	1
	08 August 2019	*Myotis spp.*	10
	08 August 2019	*Pipistrellus pipistrellus*	68
	08 August 2019	*Pipistrellus pygmaeus*	2
	08 August 2019	*Plecotus spp.*	8
	09 August 2019	*Eptesicus serotinus*	1
	09 August 2019	*Myotis spp.*	1
	09 August 2019	*Pipistrellus pipistrellus*	9
	09 August 2019	*Plecotus spp.*	7
	10 August 2019	*Myotis spp.*	1
	10 August 2019	*Pipistrellus pipistrellus*	7
	10 August 2019	*Plecotus spp.*	6
	11 August 2019	*Myotis spp.*	1
	11 August 2019	*Pipistrellus pipistrellus*	6
	11 August 2019	*Plecotus spp.*	7
	12 August 2019	*Pipistrellus pipistrellus*	22

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	12 August 2019	*Plecotus spp.*	3
	13 August 2019	*Myotis spp.*	2
	13 August 2019	*Pipistrellus pipistrellus*	42
	13 August 2019	*Pipistrellus pygmaeus*	1
	13 August 2019	*Plecotus spp.*	4
	11 September 2019	*Myotis spp.*	2
	11 September 2019	*Pipistrellus pipistrellus*	84
	11 September 2019	*Plecotus spp.*	1
	12 September 2019	*Myotis spp.*	1
	12 September 2019	*Pipistrellus pipistrellus*	26
	12 September 2019	*Pipistrellus pygmaeus*	2
	12 September 2019	*Plecotus spp.*	4
	13 September 2019	*Myotis spp.*	29
	13 September 2019	*Pipistrellus pipistrellus*	31
	13 September 2019	*Pipistrellus pygmaeus*	1
	13 September 2019	*Plecotus spp.*	1
	14 September 2019	*Eptesicus serotinus*	1
	14 September 2019	*Myotis spp.*	2
	14 September 2019	*Pipistrellus pipistrellus*	29
	14 September 2019	*Pipistrellus pygmaeus*	2
	15 September 2019	*Myotis spp.*	31
	15 September 2019	*Pipistrellus pipistrellus*	26
	15 September 2019	*Pipistrellus pygmaeus*	3
	15 September 2019	*Plecotus spp.*	2
	16 September 2019	*Myotis spp.*	1
	16 September 2019	*Pipistrellus pipistrellus*	73
	16 September 2019	*Pipistrellus pygmaeus*	1
	16 September 2019	*Plecotus spp.*	2
	17 September 2019	*Eptesicus serotinus*	1
	17 September 2019	*Myotis spp.*	1
	17 September 2019	*Pipistrellus pipistrellus*	31
	17 September 2019	*Pipistrellus pygmaeus*	1
	26 September 2019	*Myotis spp.*	1
	26 September 2019	*Nyctalus spp.*	1
	26 September 2019	*Pipistrellus pipistrellus*	5
	26 September 2019	*Plecotus spp.*	3
	27 September 2019	*Myotis spp.*	33
	27 September 2019	*Nyctalus spp.*	4
	28 September 2019	*Nyctalus noctula*	7
	28 September 2019	*Nyctalus spp.*	28
	28 September 2019	*Pipistrellus pipistrellus*	26
	28 September 2019	*Pipistrellus pygmaeus*	3
	29 September 2019	*Myotis spp.*	1
	29 September 2019	*Nyctalus noctula*	1
	29 September 2019	*Nyctalus spp.*	1
	29 September 2019	*Pipistrellus pipistrellus*	10
	29 September 2019	*Pipistrellus pygmaeus*	2
	03 October 2019	*Myotis spp.*	14
	03 October 2019	*Nyctalus noctula*	2
	03 October 2019	*Pipistrellus pipistrellus*	78
	03 October 2019	*Pipistrellus pygmaeus*	6
	04 October 2019	*Myotis spp.*	7
	04 October 2019	*Nyctalus noctula*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	04 October 2019	*Pipistrellus pipistrellus*	6
	04 October 2019	*Plecotus spp.*	2
	05 October 2019	*Myotis spp.*	28
	05 October 2019	*Pipistrellus pipistrellus*	36
	06 October 2019	*Myotis spp.*	1
	06 October 2019	*Pipistrellus pipistrellus*	6
	08 October 2019	*Pipistrellus pipistrellus*	15
	08 October 2019	*Plecotus spp.*	2
	09 October 2019	*Pipistrellus pipistrellus*	11
	17 October 2019	*Pipistrellus pipistrellus*	5
	17 October 2019	*Pipistrellus pygmaeus*	2
	18 October 2019	*Pipistrellus pipistrellus*	1
	18 October 2019	*Plecotus spp.*	1
	19 October 2019	*Myotis spp.*	1
	19 October 2019	*Pipistrellus pipistrellus*	14
	19 October 2019	*Pipistrellus pygmaeus*	7
	20 October 2019	*Myotis spp.*	2
	20 October 2019	*Pipistrellus pipistrellus*	12
	21 October 2019	*Nyctalus noctula*	1
	21 October 2019	*Pipistrellus pipistrellus*	7
	21 October 2019	*Pipistrellus pygmaeus*	1
	22 October 2019	*Pipistrellus pipistrellus*	34
	22 October 2019	*Pipistrellus pygmaeus*	2
	22 October 2019	*Plecotus spp.*	1
	23 October 2019	*Myotis spp.*	1
	23 October 2019	*Pipistrellus pipistrellus*	9
	23 October 2019	*Plecotus spp.*	1
	15 April 2019	*Pipistrellus pipistrellus*	35
	16 April 2019	*Pipistrellus pipistrellus*	44
	17 April 2019	*Pipistrellus pipistrellus*	15
	17 April 2019	*Pipistrellus pygmaeus*	1
	18 April 2019	*Pipistrellus pipistrellus*	31
	18 April 2019	*Pipistrellus pygmaeus*	2
	19 April 2019	*Pipistrellus pipistrellus*	14
	20 April 2019	*Pipistrellus pipistrellus*	14
	21 April 2019	*Pipistrellus pipistrellus*	9
	22 April 2019	*Pipistrellus pipistrellus*	31
	23 April 2019	*Pipistrellus pipistrellus*	20
	24 April 2019	*Pipistrellus pipistrellus*	10
	25 April 2019	*Pipistrellus pipistrellus*	3
	26 April 2019	*Pipistrellus pipistrellus*	1
	28 April 2019	*Pipistrellus pipistrellus*	12
	24 May 2019	*Pipistrellus pipistrellus*	6
	27 May 2019	*Pipistrellus pipistrellus*	1
	28 May 2019	*Pipistrellus pipistrellus*	5
	18 June 2019	*Pipistrellus pipistrellus*	18
	19 June 2019	*Pipistrellus pipistrellus*	15
	23 June 2019	*Pipistrellus pipistrellus*	4
	24 June 2019	*Pipistrellus pipistrellus*	6
	25 June 2019	*Pipistrellus pipistrellus*	9
	26 June 2019	*Pipistrellus pipistrellus*	4
	27 June 2019	*Pipistrellus pipistrellus*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	28 June 2019	*Pipistrellus pipistrellus*	2
	29 June 2019	*Pipistrellus pipistrellus*	2
	30 June 2019	*Pipistrellus pipistrellus*	2
ST13	24 July 2019	*Pipistrellus pipistrellus*	5
	25 July 2019	*Myotis spp.*	1
	25 July 2019	*Pipistrellus pipistrellus*	3
	26 July 2019	*Myotis spp.*	2
	26 July 2019	*Pipistrellus pipistrellus*	8
	27 July 2019	*Myotis spp.*	3
	27 July 2019	*Pipistrellus pipistrellus*	6
	28 July 2019	*Myotis spp.*	1
	28 July 2019	*Pipistrellus pipistrellus*	3
	29 July 2019	*Myotis spp.*	1
	29 July 2019	*Pipistrellus pipistrellus*	4
	17 October 2019	*Pipistrellus pipistrellus*	22
	17 October 2019	*Pipistrellus pygmaeus*	5
	18 October 2019	*Pipistrellus pipistrellus*	2
	18 October 2019	*Pipistrellus pygmaeus*	1
	19 October 2019	*Pipistrellus pipistrellus*	20
	19 October 2019	*Pipistrellus pygmaeus*	1
	20 October 2019	*Barbastella barbastellus*	1
	20 October 2019	*Pipistrellus pipistrellus*	9
	20 October 2019	*Pipistrellus pygmaeus*	3
	21 October 2019	*Pipistrellus pipistrellus*	41
	21 October 2019	*Pipistrellus pygmaeus*	6
	22 October 2019	*Nyctalus spp.*	2
	22 October 2019	*Pipistrellus pipistrellus*	62
	22 October 2019	*Pipistrellus pygmaeus*	17
	23 October 2019	*Myotis spp.*	1
	23 October 2019	*Nyctalus noctula*	2
	23 October 2019	*Pipistrellus pipistrellus*	35
	23 October 2019	*Pipistrellus pygmaeus*	12
	02 July 2019	*Pipistrellus pipistrellus*	17
	03 July 2019	*Myotis spp.*	1
	03 July 2019	*Pipistrellus pipistrellus*	44
	04 July 2019	*Pipistrellus pipistrellus*	36
	04 July 2019	*Pipistrellus pygmaeus*	1
	05 July 2019	*Pipistrellus pipistrellus*	14
	06 July 2019	*Pipistrellus pipistrellus*	41
	07 July 2019	*Pipistrellus pipistrellus*	59
	08 July 2019	*Pipistrellus pipistrellus*	137
	09 July 2019	*Myotis spp.*	1
	09 July 2019	*Pipistrellus pipistrellus*	122
	10 July 2019	*Pipistrellus pipistrellus*	88
	10 July 2019	*Pipistrellus pygmaeus*	1
	11 July 2019	*Pipistrellus pipistrellus*	51
	11 July 2019	*Pipistrellus pygmaeus*	1
	12 July 2019	*Pipistrellus pipistrellus*	20
	13 July 2019	*Myotis spp.*	1
	13 July 2019	*Pipistrellus pipistrellus*	23
	14 July 2019	*Pipistrellus pipistrellus*	15
	15 July 2019	*Pipistrellus pipistrellus*	8

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	16 July 2019	*Pipistrellus pipistrellus*	39
	17 July 2019	*Pipistrellus pipistrellus*	42
	17 July 2019	*Pipistrellus pygmaeus*	3
	18 July 2019	*Pipistrellus pipistrellus*	27
	19 July 2019	*Pipistrellus pipistrellus*	19
	20 July 2019	*Pipistrellus pipistrellus*	28
	21 July 2019	*Pipistrellus pipistrellus*	15
	22 July 2019	*Myotis spp.*	1
	22 July 2019	*Pipistrellus pipistrellus*	14
	23 July 2019	*Pipistrellus pipistrellus*	16
	23 July 2019	*Pipistrellus pygmaeus*	7
	05 August 2019	*Myotis spp.*	1
	05 August 2019	*Pipistrellus pipistrellus*	39
	06 August 2019	*Pipistrellus pipistrellus*	34
	07 August 2019	*Myotis spp.*	1
	07 August 2019	*Pipistrellus pipistrellus*	63
	07 August 2019	*Pipistrellus pygmaeus*	2
	09 August 2019	*Myotis spp.*	1
	09 August 2019	*Pipistrellus pipistrellus*	8
	10 August 2019	*Myotis spp.*	1
	10 August 2019	*Pipistrellus pipistrellus*	23
	21 August 2019	*Nyctalus noctula*	1
	21 August 2019	*Pipistrellus pipistrellus*	97
	21 August 2019	*Pipistrellus pygmaeus*	1
	22 August 2019	*Pipistrellus pipistrellus*	67
	23 August 2019	*Myotis spp.*	4
	23 August 2019	*Pipistrellus pipistrellus*	62
	24 August 2019	*Myotis spp.*	2
	24 August 2019	*Pipistrellus pipistrellus*	33
	24 August 2019	*Pipistrellus pygmaeus*	2
	24 August 2019	*Plecotus spp.*	1
	25 August 2019	*Myotis spp.*	10
	25 August 2019	*Pipistrellus pipistrellus*	48
	25 August 2019	*Pipistrellus pygmaeus*	2
	26 August 2019	*Myotis spp.*	2
	26 August 2019	*Pipistrellus pipistrellus*	46
	26 August 2019	*Pipistrellus pygmaeus*	2
	27 August 2019	*Myotis spp.*	2
	27 August 2019	*Pipistrellus pipistrellus*	65
	27 August 2019	*Pipistrellus pygmaeus*	4
	28 August 2019	*Pipistrellus pipistrellus*	149
	28 August 2019	*Pipistrellus pygmaeus*	1
	29 August 2019	*Myotis spp.*	2
	29 August 2019	*Pipistrellus pipistrellus*	76
	29 August 2019	*Plecotus spp.*	1
	30 August 2019	*Myotis spp.*	1
	30 August 2019	*Pipistrellus pipistrellus*	82
	31 August 2019	*Myotis spp.*	4
	31 August 2019	*Pipistrellus pipistrellus*	64
	31 August 2019	*Pipistrellus pygmaeus*	1
	01 September 2019	*Myotis spp.*	1
	01 September 2019	*Pipistrellus pipistrellus*	44
	02 September 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	02 September 2019	*Pipistrellus pipistrellus*	43
	03 September 2019	*Myotis spp.*	1
	03 September 2019	*Pipistrellus pipistrellus*	53
	04 September 2019	*Myotis spp.*	1
	04 September 2019	*Pipistrellus pipistrellus*	101
	04 September 2019	*Pipistrellus pygmaeus*	4
	05 September 2019	*Myotis spp.*	1
	05 September 2019	*Pipistrellus pipistrellus*	63
	05 September 2019	*Pipistrellus pygmaeus*	2
	06 September 2019	*Myotis spp.*	1
	06 September 2019	*Pipistrellus pipistrellus*	72
	11 September 2019	*Pipistrellus pipistrellus*	67
	11 September 2019	*Pipistrellus pygmaeus*	2
	12 September 2019	*Pipistrellus pipistrellus*	71
	13 September 2019	*Myotis spp.*	1
	13 September 2019	*Pipistrellus pipistrellus*	47
	14 September 2019	*Pipistrellus pipistrellus*	39
	15 September 2019	*Myotis spp.*	2
	15 September 2019	*Pipistrellus pipistrellus*	79
	16 September 2019	*Myotis spp.*	1
	16 September 2019	*Nyctalus noctula*	1
	16 September 2019	*Pipistrellus pipistrellus*	56
	16 September 2019	*Pipistrellus pygmaeus*	1
	17 September 2019	*Myotis spp.*	24
	17 September 2019	*Pipistrellus pipistrellus*	65
	17 September 2019	*Plecotus spp.*	2
	18 September 2019	*Myotis spp.*	1
	18 September 2019	*Pipistrellus pipistrellus*	86
	19 September 2019	*Nyctalus noctula*	2
	19 September 2019	*Pipistrellus pipistrellus*	95
	19 September 2019	*Pipistrellus pygmaeus*	3
	20 September 2019	*Myotis spp.*	1
	20 September 2019	*Pipistrellus pipistrellus*	22
	20 September 2019	*Pipistrellus pygmaeus*	2
	21 September 2019	*Myotis spp.*	1
	21 September 2019	*Pipistrellus pipistrellus*	46
	21 September 2019	*Pipistrellus pygmaeus*	9
	22 September 2019	*Pipistrellus pipistrellus*	39
	22 September 2019	*Pipistrellus pygmaeus*	1
	24 September 2019	*Nyctalus noctula*	1
	24 September 2019	*Pipistrellus pipistrellus*	40
	24 September 2019	*Pipistrellus pygmaeus*	7
	25 September 2019	*Myotis spp.*	1
	25 September 2019	*Pipistrellus pipistrellus*	58
	25 September 2019	*Pipistrellus pygmaeus*	2
	01 October 2019	*Pipistrellus pipistrellus*	37
	01 October 2019	*Pipistrellus pygmaeus*	66
	02 October 2019	*Myotis spp.*	3
	02 October 2019	*Pipistrellus pipistrellus*	17
	02 October 2019	*Pipistrellus pygmaeus*	1
	03 October 2019	*Pipistrellus pipistrellus*	27
	03 October 2019	*Pipistrellus pygmaeus*	22
	04 October 2019	*Myotis spp.*	1

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	04 October 2019	*Pipistrellus pipistrellus*	24
	04 October 2019	*Pipistrellus pygmaeus*	85
	06 October 2019	*Pipistrellus pipistrellus*	8
	06 October 2019	*Pipistrellus pygmaeus*	92
	10 October 2019	*Pipistrellus pipistrellus*	131
	10 October 2019	*Pipistrellus pygmaeus*	5
	22 October 2019	*Pipistrellus pipistrellus*	107
	22 October 2019	*Pipistrellus pygmaeus*	9
	23 October 2019	*Myotis spp.*	1
	23 October 2019	*Pipistrellus pipistrellus*	113
	23 October 2019	*Pipistrellus pygmaeus*	69
	03 May 2020	*Pipistrellus pipistrellus*	6
	07 May 2020	*Pipistrellus pipistrellus*	1
	15 May 2020	*Pipistrellus pipistrellus*	1
	21 May 2020	*Pipistrellus pipistrellus*	8
	22 May 2020	*Pipistrellus pipistrellus*	7
	22 June 2020	*Pipistrellus pipistrellus*	1262
	22 June 2020	*Pipistrellus pygmaeus*	26
	23 June 2020	*Myotis spp.*	1
	23 June 2020	*Pipistrellus pipistrellus*	177
	24 June 2020	*Myotis spp.*	1
	24 June 2020	*Pipistrellus pipistrellus*	33
	24 June 2020	*Pipistrellus pygmaeus*	2
	25 June 2020	*Myotis spp.*	3
	25 June 2020	*Pipistrellus pipistrellus*	15
	25 June 2020	*Pipistrellus pygmaeus*	1
	08 July 2020	*Myotis spp.*	17
	08 July 2020	*Pipistrellus pipistrellus*	47
	09 July 2020	*Myotis spp.*	82
	09 July 2020	*Pipistrellus pipistrellus*	98
	09 July 2020	*Plecotus spp.*	11
	10 July 2020	*Myotis spp.*	2
	10 July 2020	*Pipistrellus pipistrellus*	40
	10 July 2020	*Pipistrellus pygmaeus*	1
	10 July 2020	*Plecotus spp.*	1
	11 July 2020	*Nyctalus noctula*	1
	11 July 2020	*Pipistrellus pipistrellus*	38
	12 July 2020	*Pipistrellus pipistrellus*	45
	13 July 2020	*Myotis spp.*	23
	13 July 2020	*Pipistrellus pipistrellus*	78
	26 August 2020	*Myotis spp.*	7
	26 August 2020	*Pipistrellus pipistrellus*	50
	26 August 2020	*Plecotus spp.*	2
	27 August 2020	*Myotis spp.*	3
	27 August 2020	*Pipistrellus pipistrellus*	66
	27 August 2020	*Pipistrellus pygmaeus*	1
	27 August 2020	*Plecotus spp.*	1
	28 August 2020	*Pipistrellus pipistrellus*	53
	29 August 2020	*Myotis spp.*	1
	29 August 2020	*Pipistrellus pipistrellus*	7
	29 August 2020	*Plecotus spp.*	2
	30 August 2020	*Myotis spp.*	9

ST15

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	30 August 2020	*Pipistrellus pipistrellus*	80
	30 August 2020	*Plecotus spp.*	3
	31 August 2020	*Myotis spp.*	1
	31 August 2020	*Pipistrellus pipistrellus*	71
	31 August 2020	*Plecotus spp.*	1
	09 September 2020	*Myotis spp.*	5
	09 September 2020	*Pipistrellus pipistrellus*	43
	09 September 2020	*Pipistrellus pygmaeus*	6
	10 September 2020	*Myotis spp.*	187
	10 September 2020	*Pipistrellus pipistrellus*	40
	11 September 2020	*Myotis spp.*	88
	11 September 2020	*Pipistrellus pipistrellus*	74
	12 September 2020	*Myotis spp.*	50
	12 September 2020	*Pipistrellus pipistrellus*	58
	13 September 2020	*Pipistrellus pipistrellus*	43
	05 October 2020	*Myotis spp.*	17
	05 October 2020	*Nyctalus noctula*	1
	05 October 2020	*Pipistrellus pipistrellus*	50
	06 October 2020	*Myotis spp.*	35
	06 October 2020	*Pipistrellus pipistrellus*	32
	07 October 2020	*Myotis spp.*	21
	07 October 2020	*Nyctalus noctula*	1
	07 October 2020	*Pipistrellus pipistrellus*	23
	07 October 2020	*Pipistrellus pygmaeus*	1
	08 October 2020	*Myotis spp.*	67
	08 October 2020	*Nyctalus noctula*	2
	08 October 2020	*Pipistrellus pipistrellus*	26
	09 October 2020	*Myotis spp.*	56
	09 October 2020	*Pipistrellus pygmaeus*	12
	10 October 2020	*Myotis spp.*	72
	10 October 2020	*Pipistrellus pipistrellus*	16
	28 April 2020	*Pipistrellus pipistrellus*	2
	28 April 2020	*Pipistrellus pygmaeus*	1
	29 April 2020	*Myotis spp.*	1
	29 April 2020	*Pipistrellus pipistrellus*	6
	30 April 2020	*Myotis spp.*	1
	01 May 2020	*Myotis spp.*	1
	01 May 2020	*Pipistrellus pipistrellus*	3
	02 May 2020	*Pipistrellus pipistrellus*	4
	03 May 2020	*Pipistrellus pipistrellus*	40
	03 May 2020	*Pipistrellus pygmaeus*	2
	04 May 2020	*Pipistrellus pipistrellus*	1
	06 May 2020	*Pipistrellus pipistrellus*	1
	07 May 2020	*Myotis spp.*	1
	07 May 2020	*Pipistrellus pipistrellus*	1
	08 May 2020	*Pipistrellus pipistrellus*	1
	15 May 2020	*Pipistrellus pipistrellus*	2
	16 May 2020	*Pipistrellus pipistrellus*	1
	17 May 2020	*Myotis spp.*	1
	17 May 2020	*Pipistrellus pipistrellus*	2
	18 May 2020	*Myotis spp.*	2
	18 May 2020	*Pipistrellus pipistrellus*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	19 May 2020	*Pipistrellus pipistrellus*	3
	20 May 2020	*Pipistrellus pipistrellus*	1
	21 May 2020	*Myotis spp.*	1
	21 May 2020	*Pipistrellus pipistrellus*	1
	22 May 2020	*Myotis spp.*	1
	22 May 2020	*Pipistrellus pipistrellus*	1
	23 May 2020	*Myotis spp.*	1
	24 May 2020	*Pipistrellus pipistrellus*	3
	25 May 2020	*Myotis spp.*	1
	25 May 2020	*Pipistrellus pipistrellus*	1
	26 May 2020	*Myotis spp.*	1
	26 May 2020	*Pipistrellus pipistrellus*	1
	23 June 2020	*Myotis spp.*	1
	23 June 2020	*Pipistrellus pipistrellus*	1
	24 June 2020	*Pipistrellus pipistrellus*	1
	25 June 2020	*Pipistrellus pipistrellus*	2
	26 June 2020	*Myotis spp.*	1
	26 June 2020	*Pipistrellus pipistrellus*	1
	27 June 2020	*Myotis spp.*	1
	27 June 2020	*Pipistrellus pipistrellus*	2
	28 June 2020	*Pipistrellus pipistrellus*	6
	29 June 2020	*Myotis spp.*	1
	29 June 2020	*Pipistrellus pipistrellus*	2
	30 June 2020	*Myotis spp.*	1
	30 June 2020	*Pipistrellus pipistrellus*	39
	01 July 2020	*Myotis spp.*	1
	01 July 2020	*Pipistrellus pipistrellus*	11
	02 July 2020	*Myotis spp.*	2
	02 July 2020	*Pipistrellus pipistrellus*	2
	03 July 2020	*Pipistrellus pipistrellus*	17
	04 July 2020	*Myotis spp.*	2
	04 July 2020	*Pipistrellus pipistrellus*	76
	04 July 2020	*Pipistrellus pygmaeus*	1
	04 July 2020	*Plecotus spp.*	6
	08 July 2020	*Pipistrellus pipistrellus*	44
	08 July 2020	*Plecotus spp.*	9
	09 July 2020	*Myotis spp.*	1
	09 July 2020	*Pipistrellus pipistrellus*	76
	09 July 2020	*Pipistrellus pygmaeus*	1
	09 July 2020	*Plecotus spp.*	13
	10 July 2020	*Pipistrellus pipistrellus*	3
	11 July 2020	*Pipistrellus pipistrellus*	3
	12 July 2020	*Pipistrellus pipistrellus*	1
	13 July 2020	*Pipistrellus pipistrellus*	29
	13 July 2020	*Pipistrellus pygmaeus*	1
	14 July 2020	*Myotis spp.*	3
	14 July 2020	*Pipistrellus pipistrellus*	2
	14 July 2020	*Plecotus spp.*	8
	15 July 2020	*Myotis spp.*	21
	15 July 2020	*Pipistrellus pipistrellus*	9
	15 July 2020	*Plecotus spp.*	7
	26 August 2020	*Myotis spp.*	2
	26 August 2020	*Pipistrellus pipistrellus*	50

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	26 August 2020	*Plecotus spp.*	3
	27 August 2020	*Myotis spp.*	3
	27 August 2020	*Pipistrellus pipistrellus*	66
	27 August 2020	*Pipistrellus pygmaeus*	1
	27 August 2020	*Plecotus spp.*	1
	28 August 2020	*Pipistrellus pipistrellus*	53
	29 August 2020	*Myotis spp.*	1
	29 August 2020	*Pipistrellus pipistrellus*	7
	29 August 2020	*Plecotus spp.*	2
	30 August 2020	*Pipistrellus pipistrellus*	81
	30 August 2020	*Plecotus spp.*	4
	31 August 2020	*Myotis spp.*	2
	31 August 2020	*Pipistrellus pipistrellus*	73
	01 September 2020	*Myotis spp.*	15
	01 September 2020	*Pipistrellus pipistrellus*	67
	01 September 2020	*Pipistrellus pygmaeus*	1
	01 September 2020	*Plecotus spp.*	1
	02 September 2020	*Pipistrellus pipistrellus*	116
	02 September 2020	*Pipistrellus pygmaeus*	4
	09 September 2020	*Nyctalus noctula*	29
	09 September 2020	*Pipistrellus pipistrellus*	168
	10 September 2020	*Eptesicus serotinus*	4
	10 September 2020	*Myotis spp.*	1
	10 September 2020	*Nyctalus noctula*	11
	10 September 2020	*Nyctalus spp.*	4
	10 September 2020	*Pipistrellus pipistrellus*	92
	10 September 2020	*Pipistrellus pygmaeus*	1
	10 September 2020	*Plecotus spp.*	2
	11 September 2020	*Myotis spp.*	1
	11 September 2020	*Nyctalus noctula*	9
	11 September 2020	*Nyctalus spp.*	3
	11 September 2020	*Pipistrellus pipistrellus*	365
	12 September 2020	*Myotis spp.*	2
	12 September 2020	*Nyctalus noctula*	5
	12 September 2020	*Nyctalus spp.*	8
	12 September 2020	*Pipistrellus pipistrellus*	261
	13 September 2020	*Myotis spp.*	1
	13 September 2020	*Nyctalus noctula*	8
	13 September 2020	*Nyctalus spp.*	1
	13 September 2020	*Pipistrellus pipistrellus*	150
	13 September 2020	*Plecotus spp.*	3
	14 September 2020	*Eptesicus serotinus*	1
	14 September 2020	*Nyctalus noctula*	7
	14 September 2020	*Pipistrellus pipistrellus*	109
	05 October 2020	*Myotis spp.*	8
	05 October 2020	*Nyctalus noctula*	7
	05 October 2020	*Nyctalus spp.*	8
	05 October 2020	*Pipistrellus pipistrellus*	22
	05 October 2020	*Pipistrellus pygmaeus*	4
	06 October 2020	*Myotis spp.*	1
	06 October 2020	*Nyctalus noctula*	1
	06 October 2020	*Nyctalus spp.*	6
	06 October 2020	*Pipistrellus pipistrellus*	2

Table 16: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	*Bat Species*	Passes Near Roost (No.)
	07 October 2020	*Myotis spp.*	15
	07 October 2020	*Nyctalus noctula*	9
	07 October 2020	*Nyctalus spp.*	6
	07 October 2020	*Pipistrellus pipistrellus*	31
	07 October 2020	*Pipistrellus pygmaeus*	9
	07 October 2020	*Plecotus spp.*	1
	08 October 2020	*Myotis spp.*	2
	08 October 2020	*Nyctalus noctula*	2
	08 October 2020	*Pipistrellus pipistrellus*	16
	08 October 2020	*Plecotus spp.*	2
	09 October 2020	*Myotis spp.*	3
	09 October 2020	*Plecotus spp.*	2
	10 October 2020	*Myotis spp.*	2

2.14 Bat Passes each Hour after Sunset by Location

Table 17 give the number of bat passes each hour after sunset by location

Table 17: Bat Passes Each Hour after Sunset

Location	*Species*	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ST01	*Barbastella barbastellus*							1		1							
	Eptesicus serotinus			9	2	6	2	4									
	Myotis spp.		285	817	241	206	127	104	166	123	96	59	40	12	3		
	Nyctalus noctula		94	84	10	3	3	2	16	40	6	1	1		4		
	Nyctalus spp.		2	38	12	9	1	2	6	7	1	1	1				
	Pipistrellus pipistrellus	8	3,111	13,752	7,739	5,884	4,802	4,256	3,680	3,704	1,692	648	502	172	63		
	Pipistrellus pygmaeus		746	487	123	94	114	79	52	89	71	28	26	19	6		
	Plecotus spp.			10	8	8	12	8	10	6	2	3	2		1		
ST02	*Eptesicus serotinus*			19	6	5		1									
	Myotis spp.		43	188	58	54	45	67	62	118	81	14					
	Nyctalus noctula		60	448	16	10	3	2	6	4	7		1				
	Nyctalus spp.		1	7	2	2	1	1	3	3	1						
	Pipistrellus pipistrellus		3,173	7,544	5,274	4,159	3,410	3,347	3,547	2,707	994	496	149	118	23		
	Pipistrellus pygmaeus		363	565	622	397	348	422	207	81	38	36	70	27	8		
	Plecotus spp.		6	20	13	5	4	5	3	6	5			1			
ST03	*Barbastella barbastellus*			4				1									
	Eptesicus serotinus		1	41	21	6	2	2		1	1						
	Myotis spp.		38	247	196	178	195	153	177	197	174	155	102	31	32	5	
	Nyctalus noctula		216	107	5	2	3	2	3	19	4	2		3	1		
	Nyctalus spp.	1	2	11	1	5	1		1	1			1				
	Pipistrellus nathusii				1	1											
	Pipistrellus pipistrellus		5,504	8,118	6,029	4,815	3,593	2,452	2,701	3,394	1,316	1,174	690	383	152	35	21
	Pipistrellus pygmaeus		289	128	135	69	55	36	37	73	12	34	44	40	9	4	1
	Plecotus spp.		8	33	12	11	5	1		3	1	2	3	2			
ST04	*Barbastella barbastellus*					1		3									
	Eptesicus serotinus		1	54	43	8	2	1									
	Myotis spp.		116	408	210	125	136	138	137	170	115	126	45	3	6	1	
	Nyctalus noctula		37	36	7		2	2	1	2					2		
	Nyctalus spp.		2	156	51	4	3										
	Pipistrellus nathusii			1			1		1				1				
	Pipistrellus pipistrellus	1	3,742	8,255	4,967	3,108	2,174	1,768	1,912	2,233	1,167	934	680	445	333	27	1
	Pipistrellus pygmaeus		584	2,288	1,648	1,517	772	535	272	312	509	154	152	15	5	1	
	Plecotus spp.		2	12	6	5	2	3		3		1	1				
ST05	*Barbastella barbastellus*					1			1								
	Eptesicus serotinus		5	25	9	4	3	9	1								
	Myotis spp.		16	147	273	264	227	188	257	189	68	64	16	25	11	1	
	Nyctalus noctula		829	247	37	7	10	10	10	39	68	2	10	2	1		
	Nyctalus spp.		29	55	12	8	11	9	6	4	5	2	1	4			
	Pipistrellus pipistrellus		5,134	15,377	13,259	10,511	9,144	8,117	6,546	5,681	3,062	2,097	641	405	230	29	
	Pipistrellus pygmaeus		128	380	259	200	161	167	140	148	57	46	9	9	10	1	
	Plecotus spp.		7	39	15	12	11	19	21	17	15	14	6	6			
ST06	*Barbastella barbastellus*						1										
	Eptesicus serotinus			3	2	2	10	2	2	1							
	Myotis spp.			4	9	4	10	4	6	6	3	3					
	Nyctalus noctula		8	2	1	1	20	2									
	Nyctalus spp.						1										
	Pipistrellus pipistrellus			173	182	111	192	25	10	3	6	8					
	Pipistrellus pygmaeus			17	9	4	12	3					1		1		
	Plecotus spp.						9										
ST07	*Barbastella barbastellus*						2										
	Eptesicus serotinus		1	19	8	1			1	2							
	Myotis spp.		20	171	164	95	78	175	128	88	56	22	13	5	2		
	Nyctalus noctula		37	53	6	2	3	4	4								
	Nyctalus spp.		9	23	17	1	3			3							
	Pipistrellus nathusii							2									
	Pipistrellus pipistrellus	1	4,524	9,773	6,026	3,755	3,415	2,601	1,970	2,455	854	325	472	243	9	8	
	Pipistrellus pygmaeus		358	195	98	64	50	77	27	124	22	14	5	4	3		
	Plecotus spp.			13	5	9	2	1	2	1	1	2	1	1			
	Barbastella barbastellus		1					1									
	Eptesicus serotinus		12	202	11	58	12	8	10	12	6						
	Myotis spp.		9	22	13	9	11	6	9	11	7	5	1	2			
	Nyctalus noctula		58	57	3	42	2	2		2	2	14	67	1	45		
	Nyctalus spp.		35	201	1			1	1			1	10				

Table 17: Bat Passes Each Hour after Sunset *(continued)*

Station	Species	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Pipistrellus pipistrellus		1,202	5,358	1,449	1,226	452	368	227	134	161	163	122	9	4		
	Pipistrellus pygmaeus		116	135	157	55	29	19	15	21	2	10	5	1			
	Plecotus spp.		6	16	2	4	5	4	2	5	5	1					
ST09	*Barbastella barbastellus*								1								
	Eptesicus serotinus		2	29	5	1		1	2		2						
	Myotis spp.		13	106	67	65	46	68	37	28	27	11	5	2			
	Nyctalus noctula		17	28	2	1	3	5	5	5	1						
	Nyctalus spp.		6	19	15	2		3	3		2						
	Pipistrellus pipistrellus		1,128	3,375	1,577	883	606	608	623	686	333	131	42	46	3	1	
	Pipistrellus pygmaeus		53	161	43	26	27	24	22	22	28	7	7	15			
	Plecotus spp.		8	22	11	2	9	4	2	7	5	2	5	2			
ST10	*Eptesicus serotinus*		5	25	1	3			1	2							
	Myotis spp.		2	46	42	19	18	67	62	21	12	4	6	4			
	Nyctalus noctula		22	79	1	2			1		2		1	2			
	Nyctalus spp.		4	20	10	6	2	1		2							
	Pipistrellus pipistrellus		1,055	1,981	1,100	674	577	594	414	328	415	43	36	50	6		
	Pipistrellus pygmaeus		32	106	36	14	16	8	7	15	12	13	2	4			
	Plecotus spp.		6	10	11		3	5	2	3	3						
ST11	*Barbastella barbastellus*		1	5	1	1	1	1		5	1						
	Eptesicus serotinus		5	122	95	23	19	12	2	3							
	Myotis spp.		23	115	83	85	104	109	120	77	97	63	194	38	3		
	Nyctalus noctula		26	44	6	6	6	2	7	4	9			1			
	Nyctalus spp.			29	11	6	3	2	2	3							
	Pipistrellus nathusii		3	2				1							1		
	Pipistrellus pipistrellus		3,120	8,337	5,003	3,543	2,683	2,329	2,270	2,505	1,029	731	588	189	31	3	
	Pipistrellus pygmaeus		50	125	69	32	45	28	30	16	43	11	30	12	2		
	Plecotus spp.		9	59	43	140	163	100	53	20	14	9	43	9	1		
ST12	*Barbastella barbastellus*			1													
	Eptesicus serotinus		11	26	8	4	2	1		2							
	Myotis spp.		23	218	137	136	62	48	110	564	523	362	119	25			
	Nyctalus noctula		66	88	3	6	6	8	2	11	4		2	1			
	Nyctalus spp.		92	145	31	20	17	9	8	6	4	1		1			
	Pipistrellus nathusii		2	2		1											
	Pipistrellus pipistrellus		1,077	4,209	2,710	2,267	1,503	1,261	1,262	1,718	891	542	468	219	4	1	
	Pipistrellus pygmaeus		136	305	414	425	188	79	100	133	57	13	5	11	1		
	Plecotus spp.		12	286	24	45	29	24	21	45	31	5	2	4	1		
ST13	*Barbastella barbastellus*		1			1											
	Eptesicus serotinus			15	5	1											
	Myotis spp.			10	6	6	4	3	3	2		1		1			
	Nyctalus noctula		34	12	1	1		1		3				1			
	Nyctalus spp.		7	27	1	2			1								
	Pipistrellus pipistrellus		436	3,663	2,380	1,549	1,161	800	762	1,004	172	68	7	7	6	1	
	Pipistrellus pygmaeus		51	94	33	25	10	4	3	5	5						
	Plecotus spp.			1	2	1											
ST14	*Eptesicus serotinus*		2	6	6	1		1		1							
	Myotis spp.		8	86	54	89	160	54	66	113	79	53	38	8			
	Nyctalus noctula		12	8	3	3	1	1	2	1	2		1				
	Nyctalus spp.			8	4	5			2	1	1						
	Pipistrellus nathusii									1							
	Pipistrellus pipistrellus		3,017	10,747	6,695	5,551	4,223	3,296	2,814	2,451	1,050	1,648	989	194	40	5	
	Pipistrellus pygmaeus		435	213	129	85	175	342	301	312	94	70	33	27	2		
	Plecotus spp.			18	18	15	17	2	3	13	9	2	3	4			
ST15	*Barbastella barbastellus*				1												
	Eptesicus serotinus			95	17	8	9										
	Myotis spp.		12	1,168	965	774	331	384	471	193	42	75	26	4			
	Nyctalus noctula		26	25	6	3	3	1	3	1		8	1	1			
	Nyctalus spp.		1	51	17	23	7	2	5								
	Pipistrellus nathusii						1										
	Pipistrellus pipistrellus		2,119	7,716	2,687	1,444	2,637	2,951	1,230	1,447	276	390	391	266	110		
	Pipistrellus pygmaeus		65	175	80	66	110	54	28	17	11	4	27	24	7		
	Plecotus spp.			48	41	16	6	8	45	18		2	1				
	Barbastella barbastellus				1	3											
	Eptesicus serotinus		10	85	11	1	5										
	Myotis spp.	1	5	195	126	192	174	87	54	24	7	5	4	5	1		
	Nyctalus noctula	26	181	45	10	3		1		3	1	19	1				
	Nyctalus spp.	3	153	334	25	9	14	2	2	4	1	2		1	7		
	Pipistrellus nathusii			6				11	5	7							
	Pipistrellus pipistrellus	102	1,839	7,126	3,399	2,216	1,614	1,598	2,251	1,526	108	281	297	208	54		

Table 17: Bat Passes Each Hour after Sunset *(continued)*

ST16

Location	*Species*	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Pipistrellus pygmaeus	1	39	402	351	196	233	132	85	29	4	56	75	46	41		
	Plecotus spp.		5	97	27	6	6	5	1	2		2					

3 GRAPHS

3.1 Bat Colours

Figure 1 show the colour assigned to each species of bat used for the the figures in this report

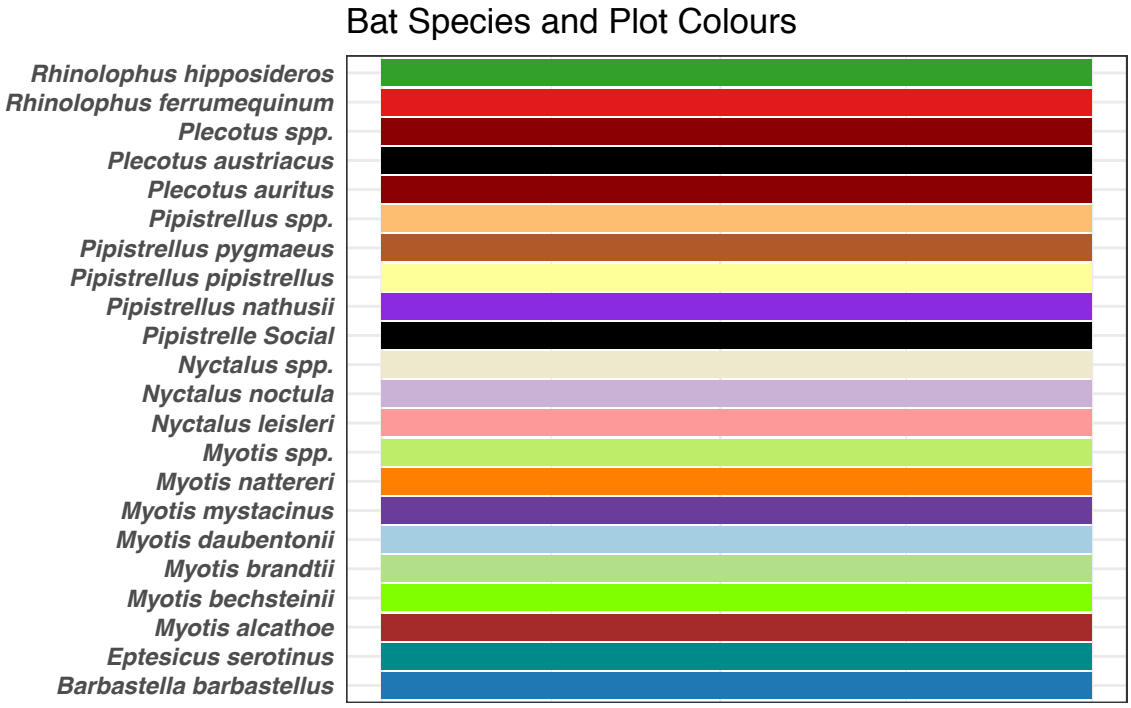


Figure 1: Bat Colours

3.2 Roost Emergence Times After Sunset

Figure 2 illustrates the potential roost emergence times for each species of bat relative to the sunset time; the times are based on the work of (Russ 2012)

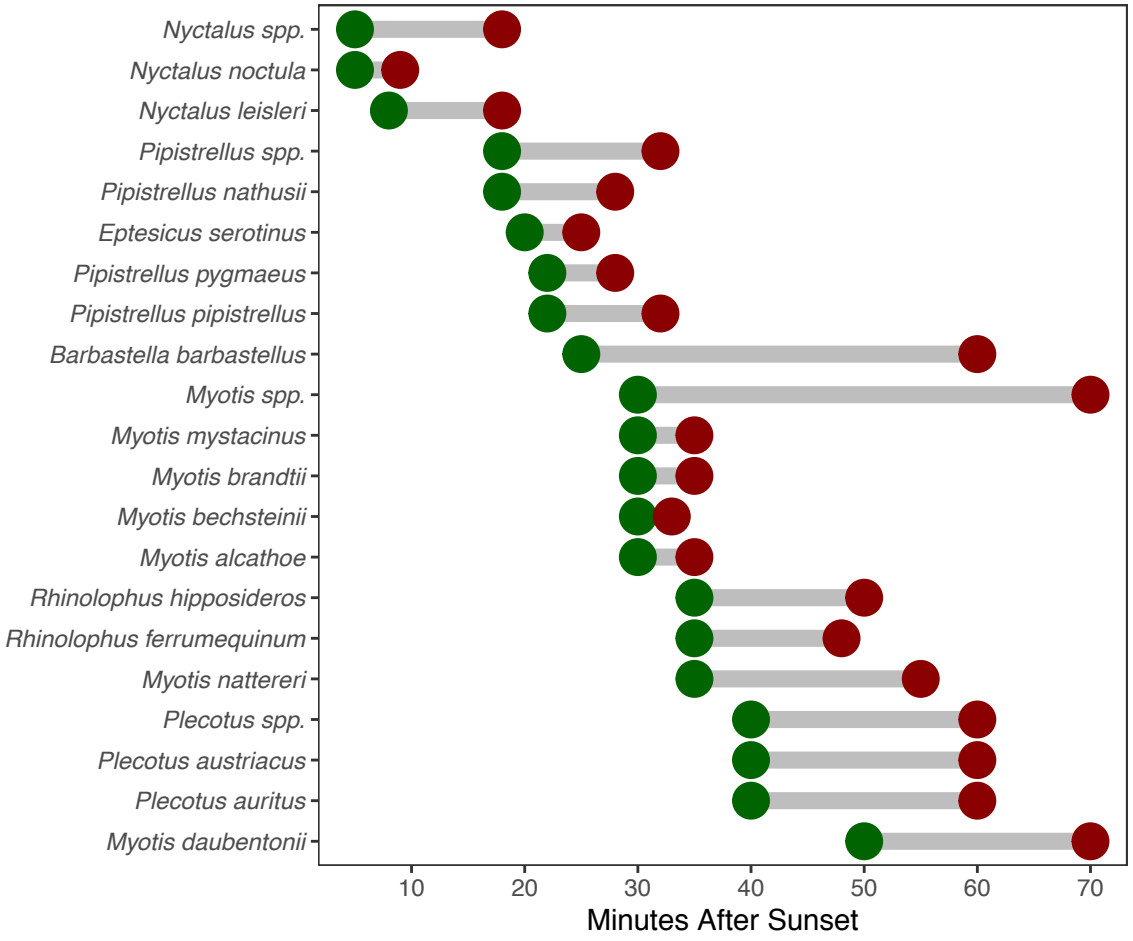


Figure 2: Roost Emergence Times After Sunset

3.3 Period Detector Recorded Bats

Figure 3 shows the period the detector was placed in the field recording bats

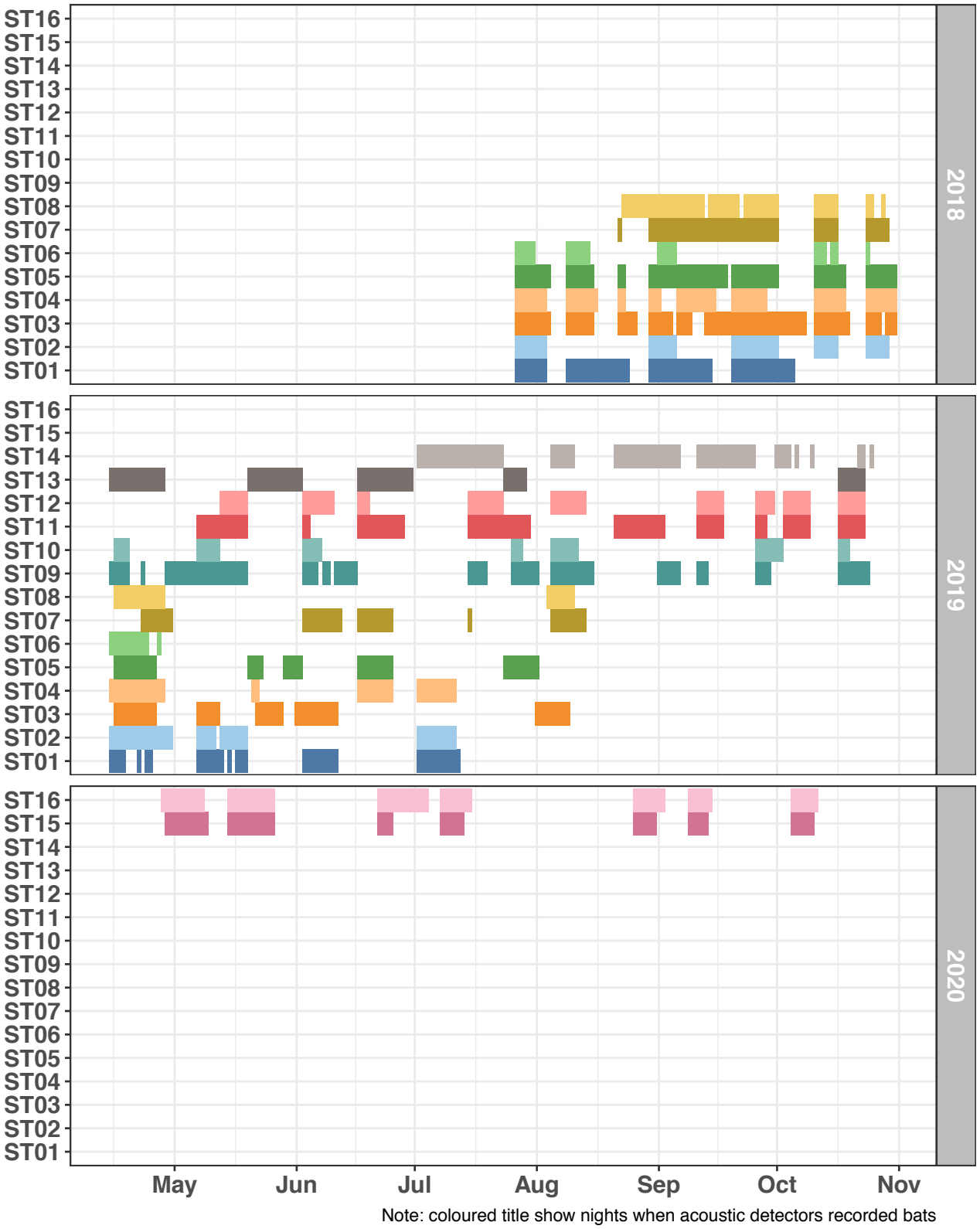


Figure 3: Period Detector Recorded Bats

3.4 Dot Chart: Count of All Species Observations

Figure 4 shows the count of all the species observations as a dot chart

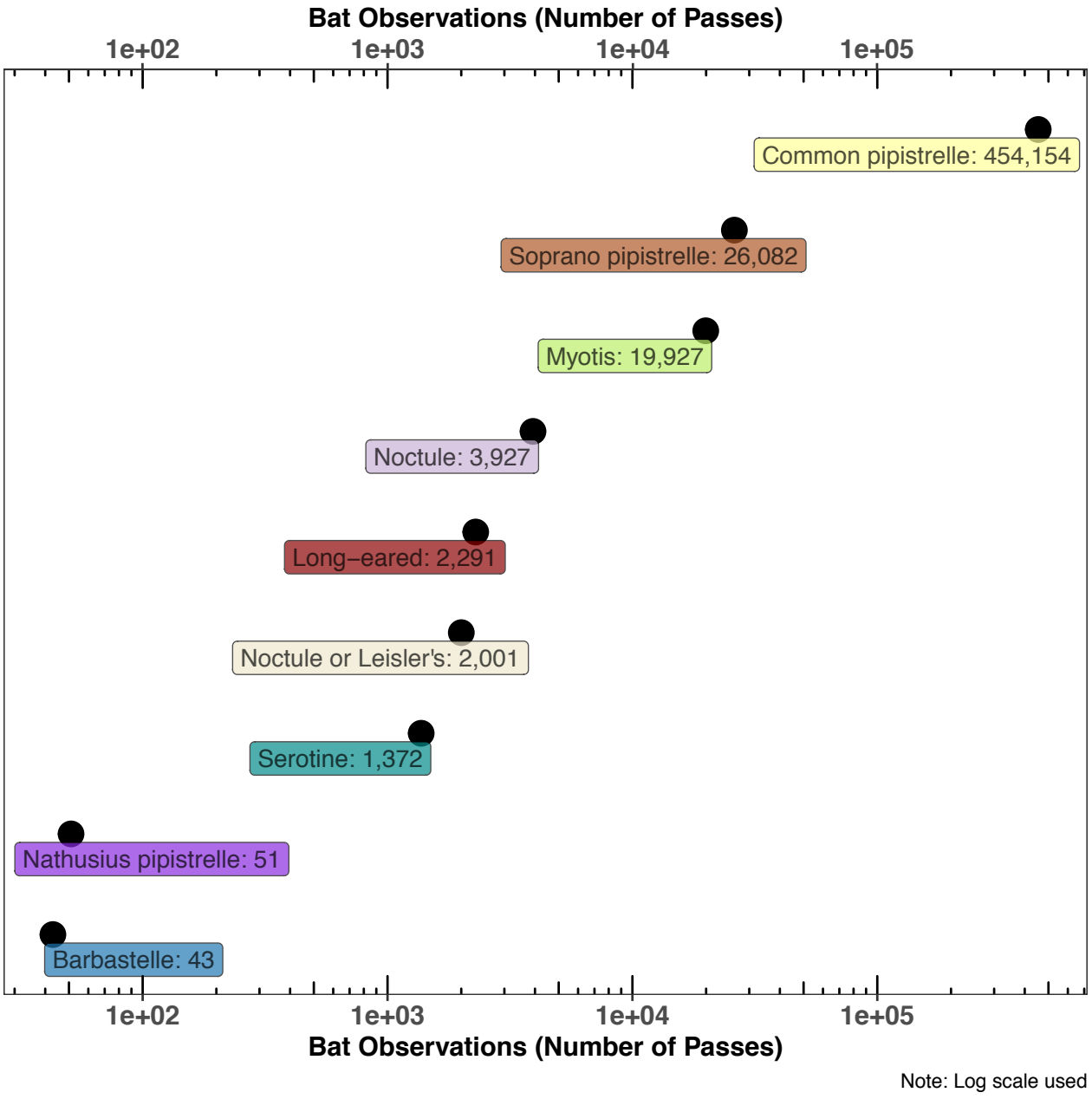


Figure 4: Count of All Species Observations

3.5 Dot Chart: Count of Species Observations by Location

Figure 5 shows the count of all the species observations by location as a dot chart

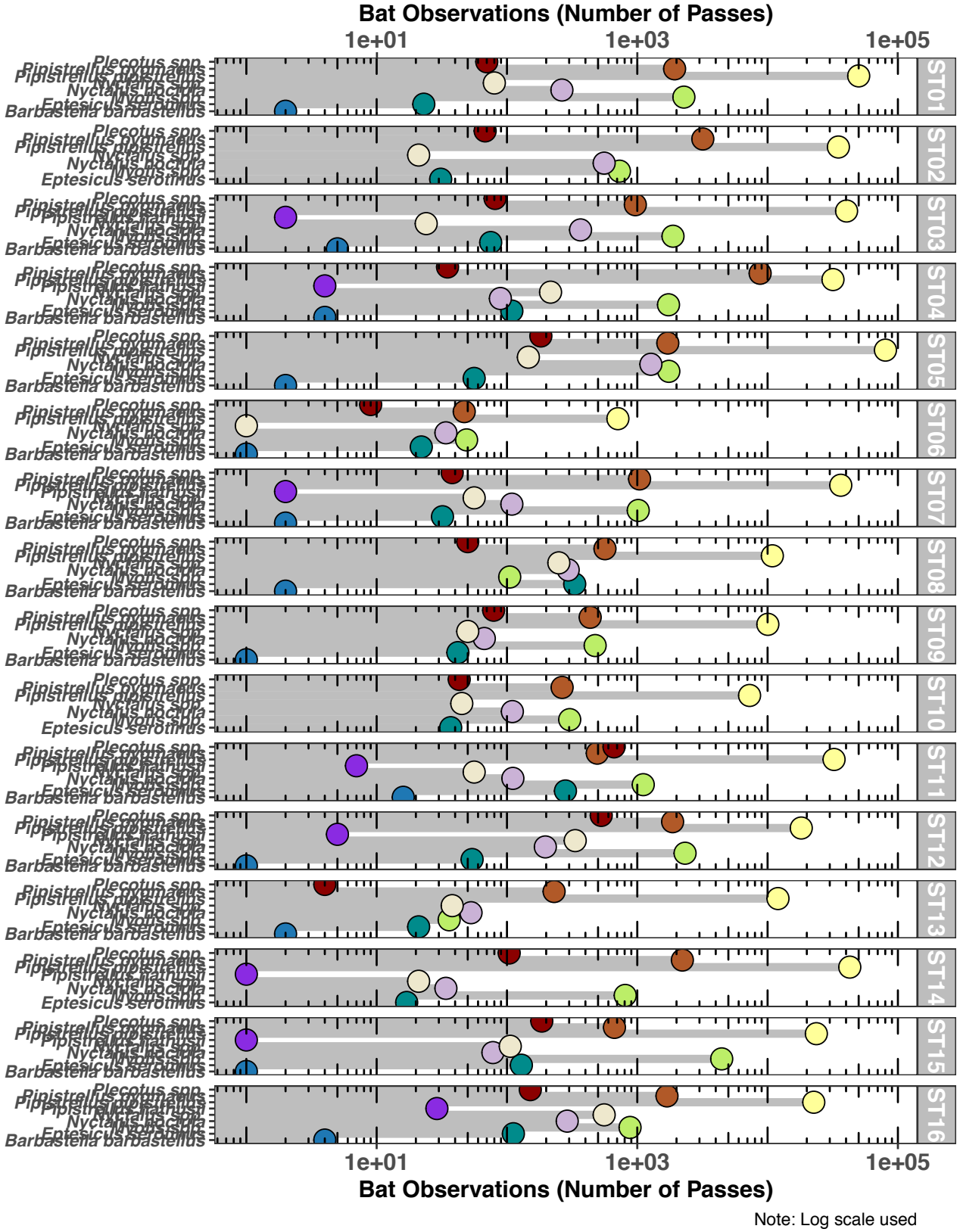


Figure 5: Count of Species Observations by Location

3.6 Roost and Observed Emergence by Location

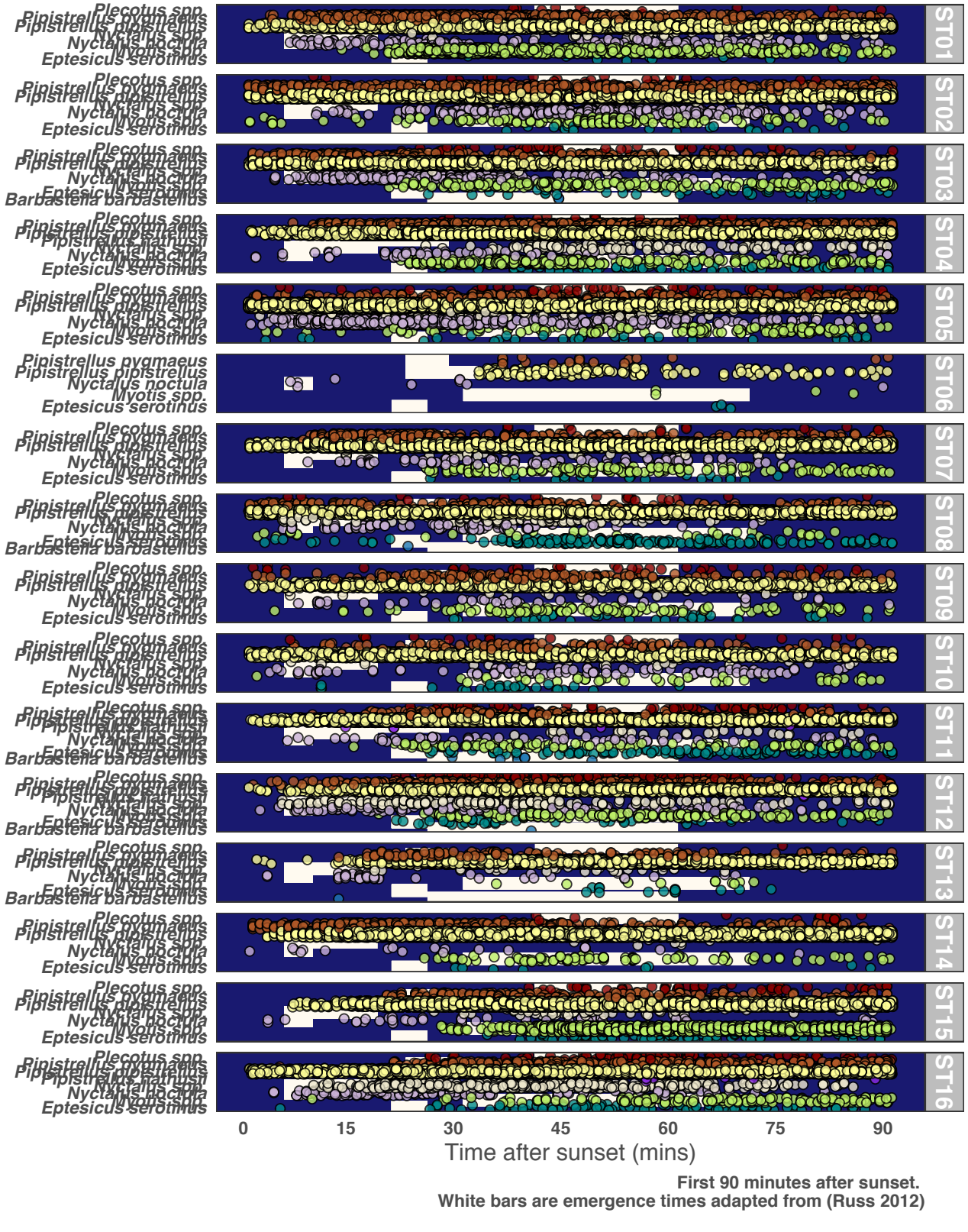


Figure 6: Roost and Observed Emergence by Location

3.7 Roost and Observed Emergence by Location and Year

Figure 7 shows the potential nearness of a roost based on an observed emergence time of less than 90 minutes after sunset. The white bars show the emergance time for the species based on (Russ 2012). The results are shown for location and year

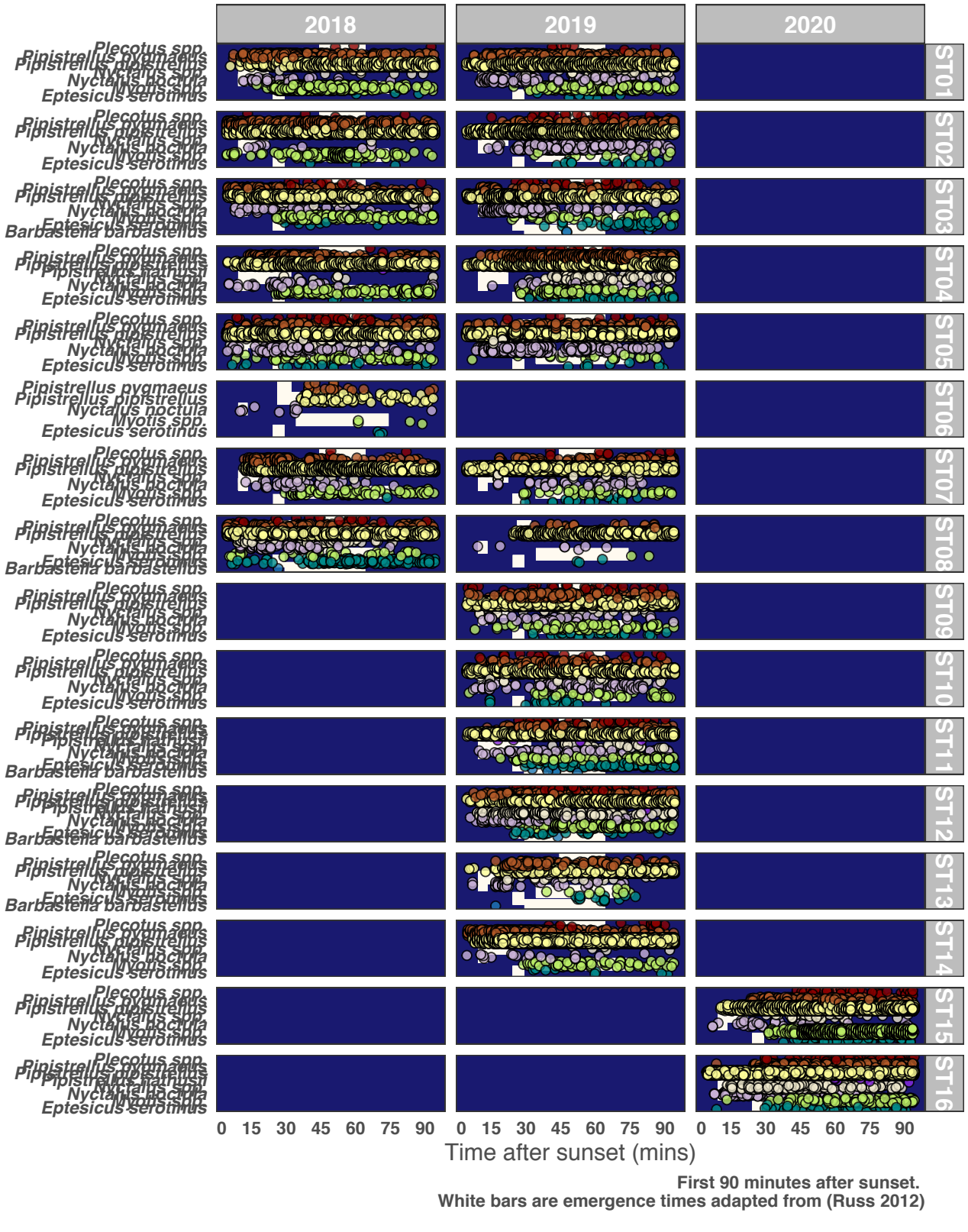
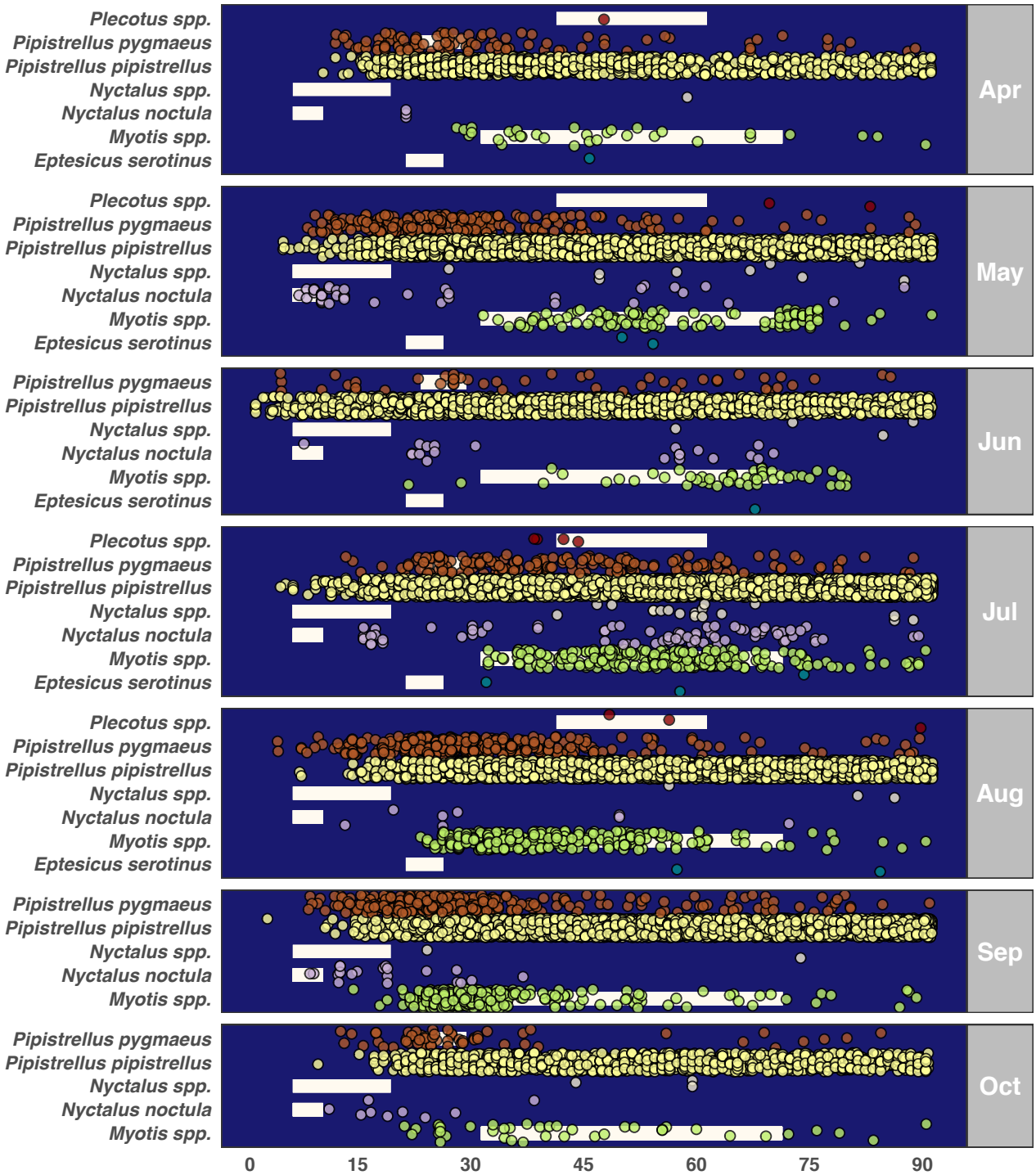


Figure 7: Roost and Observed Emergence by Location and Year

3.8 Location and Observed Emergence by Month

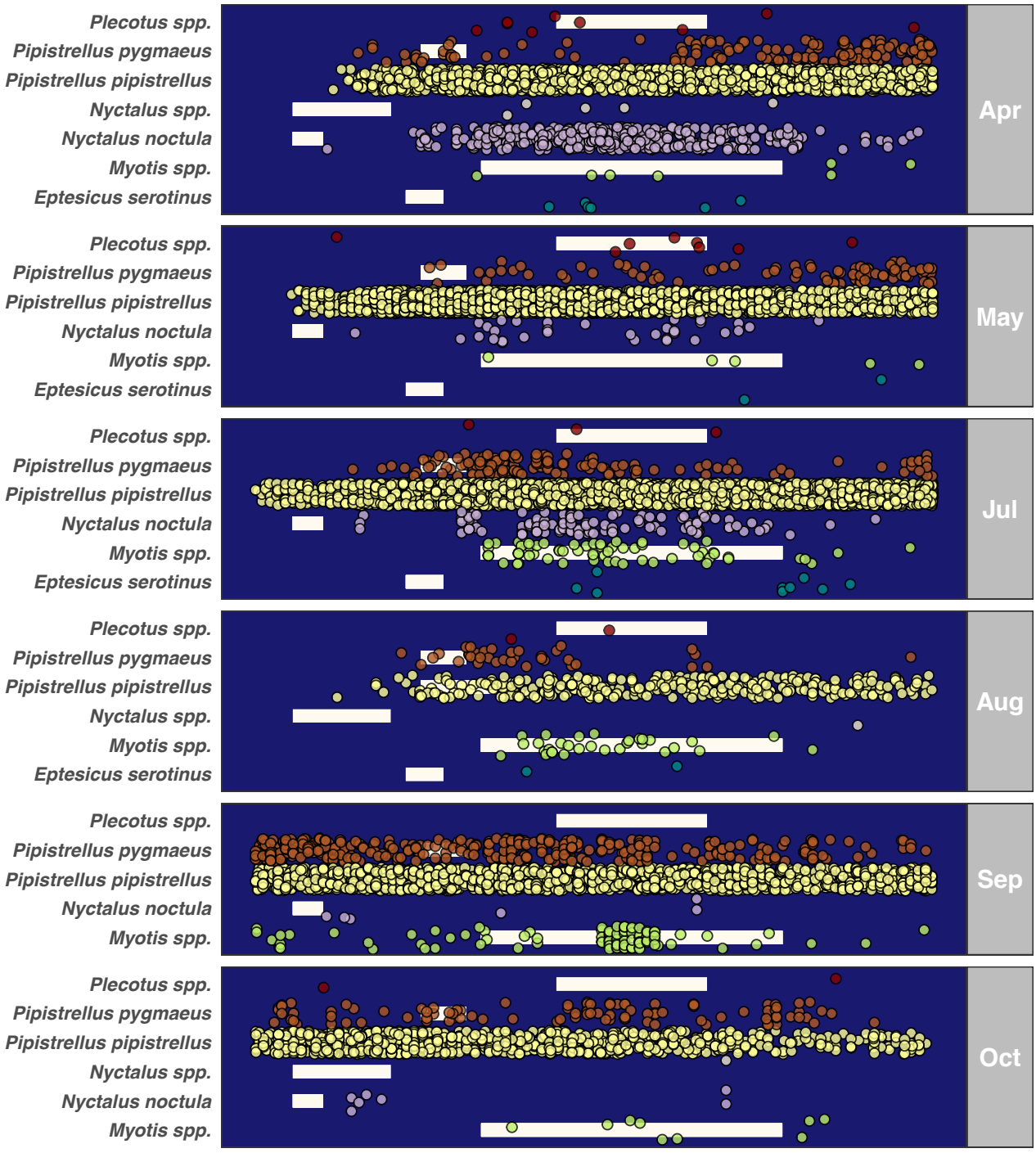
The Figures below show the potential nearness of a roost based on an observed emergence time of less than 90 minutes after sunset for each month. The white bars show the emergance time for the species based on (Russ 2012).

3.8.1 Location :ST01



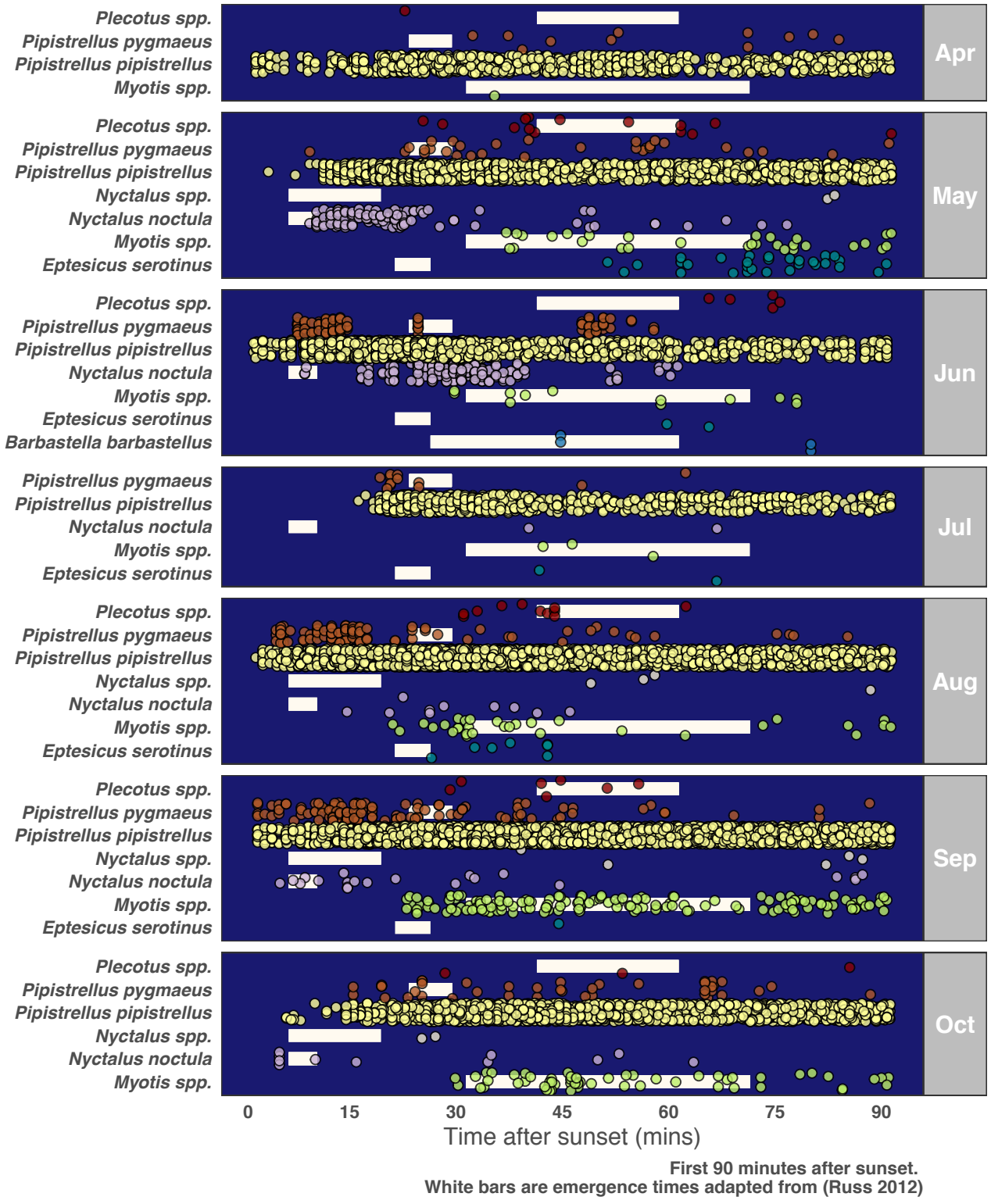
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.2 Location :ST02



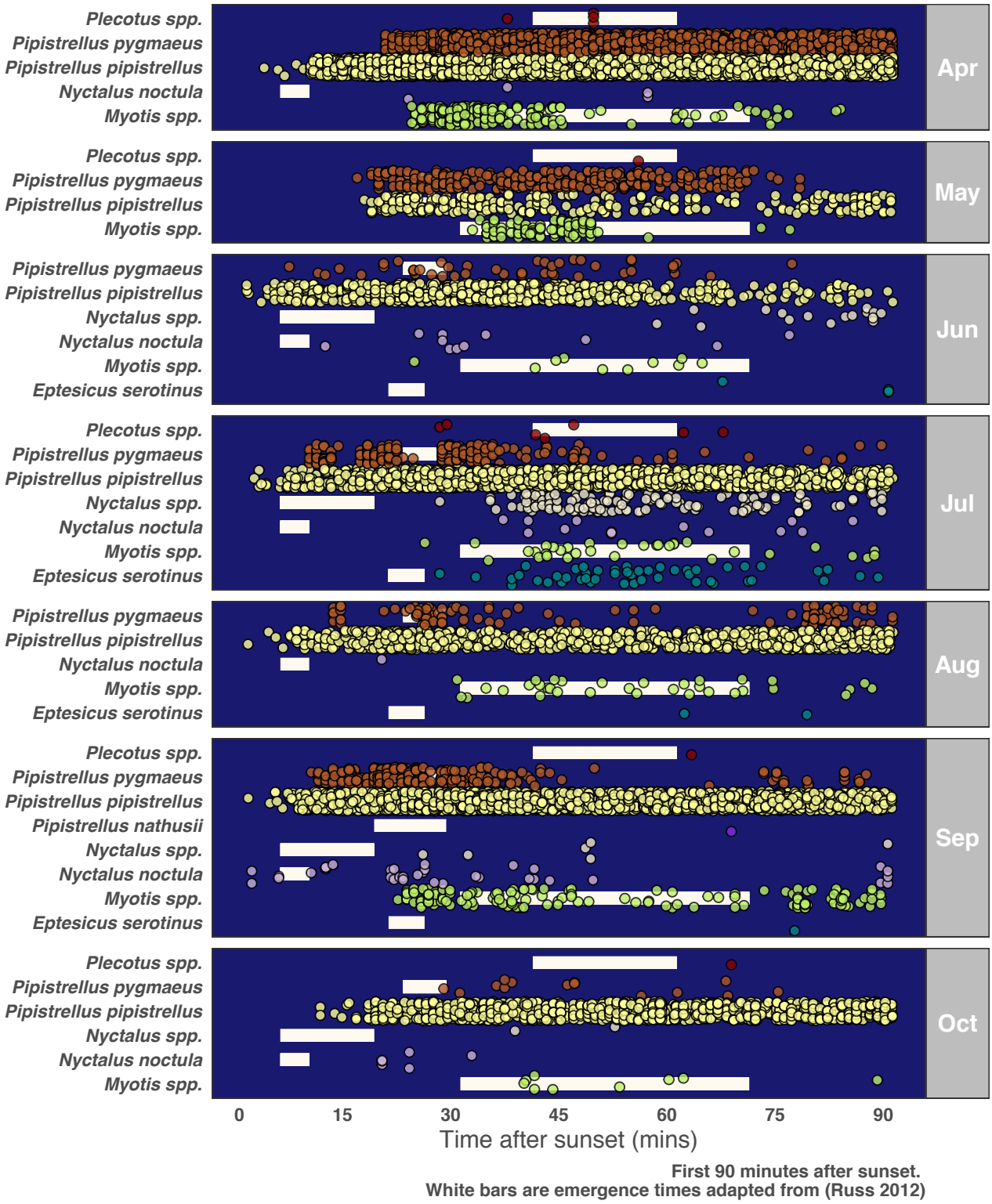
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.3 Location :ST03



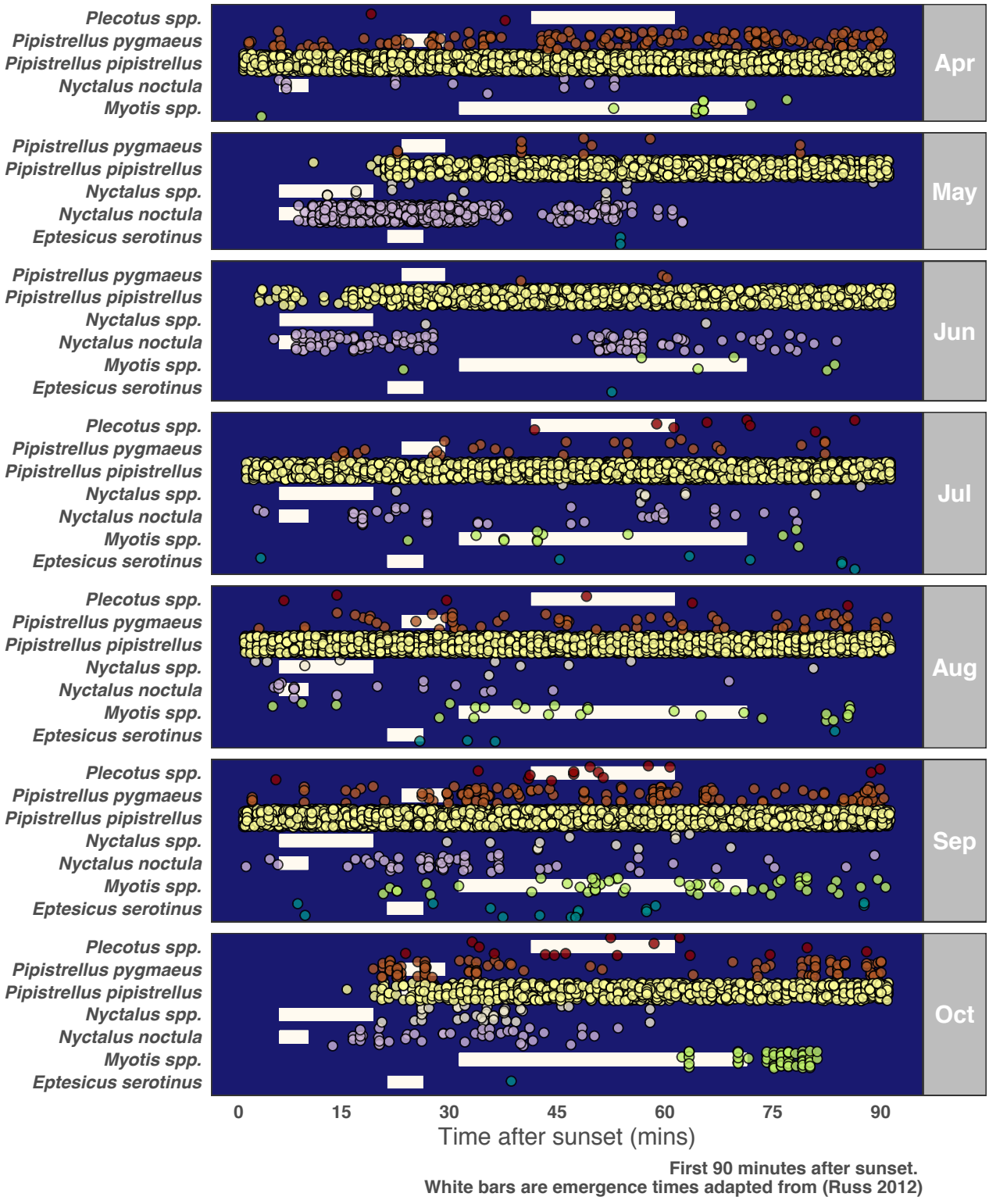
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.4 Location :ST04



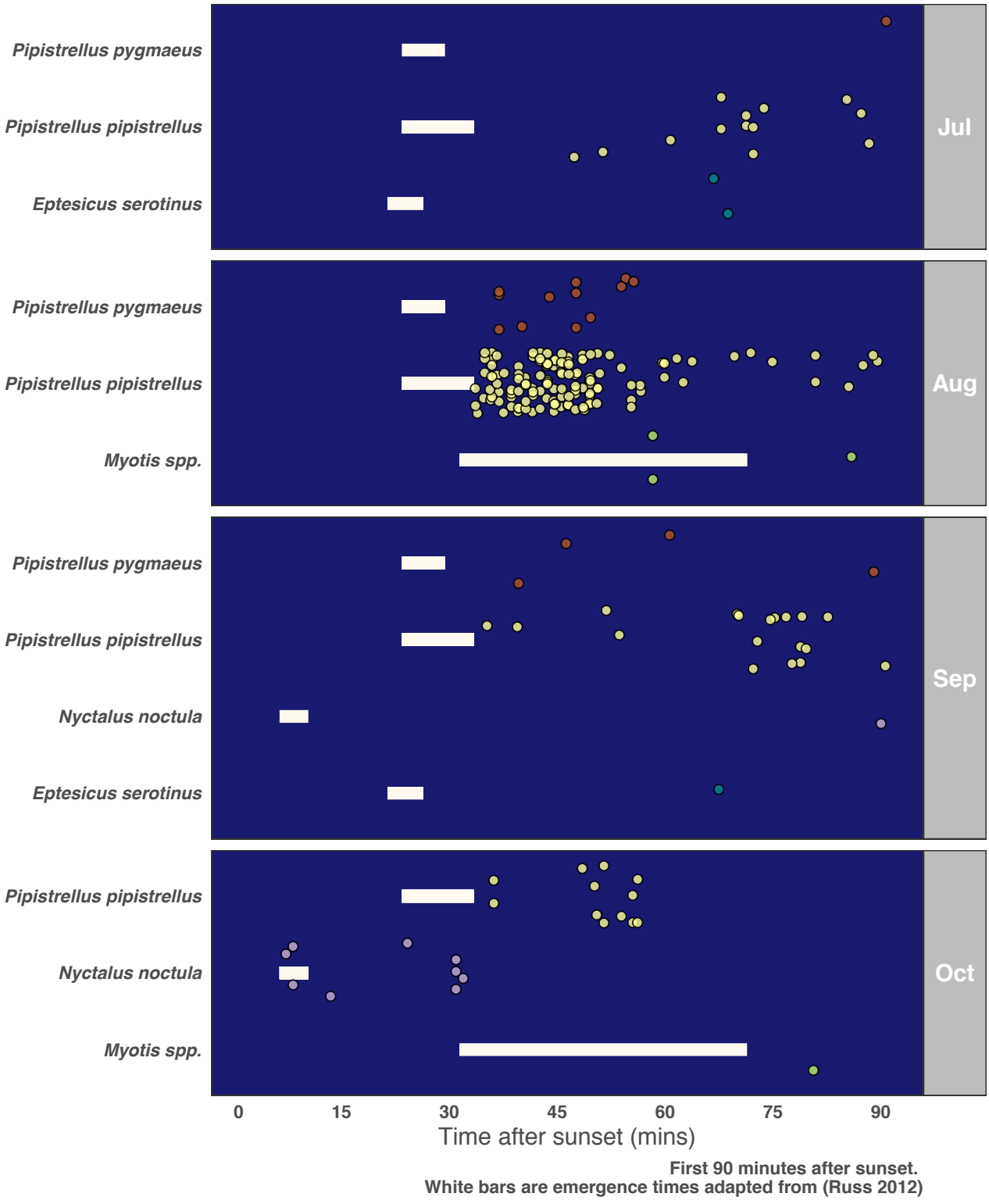
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.5 Location :ST05



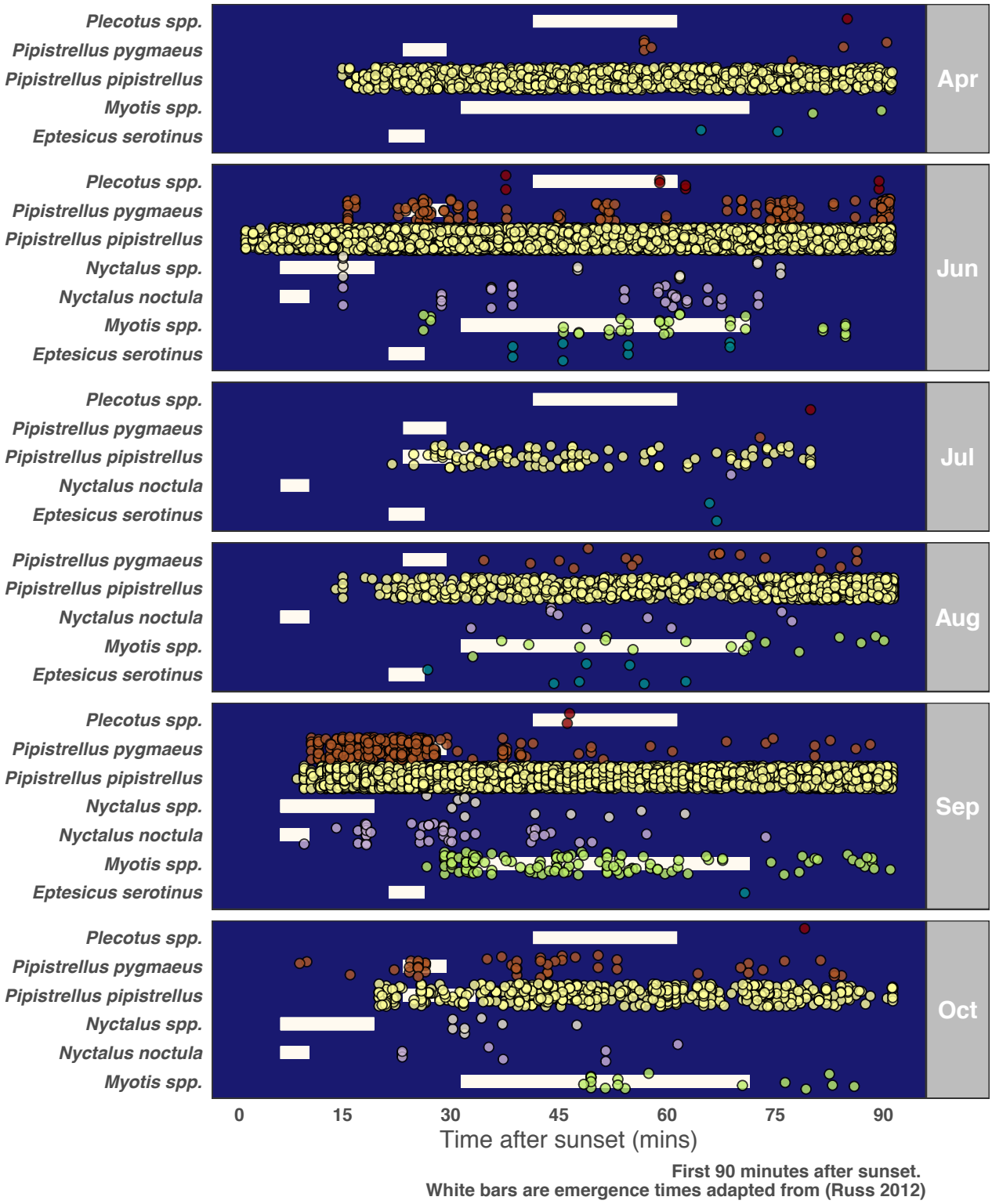
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.6 Location :ST06



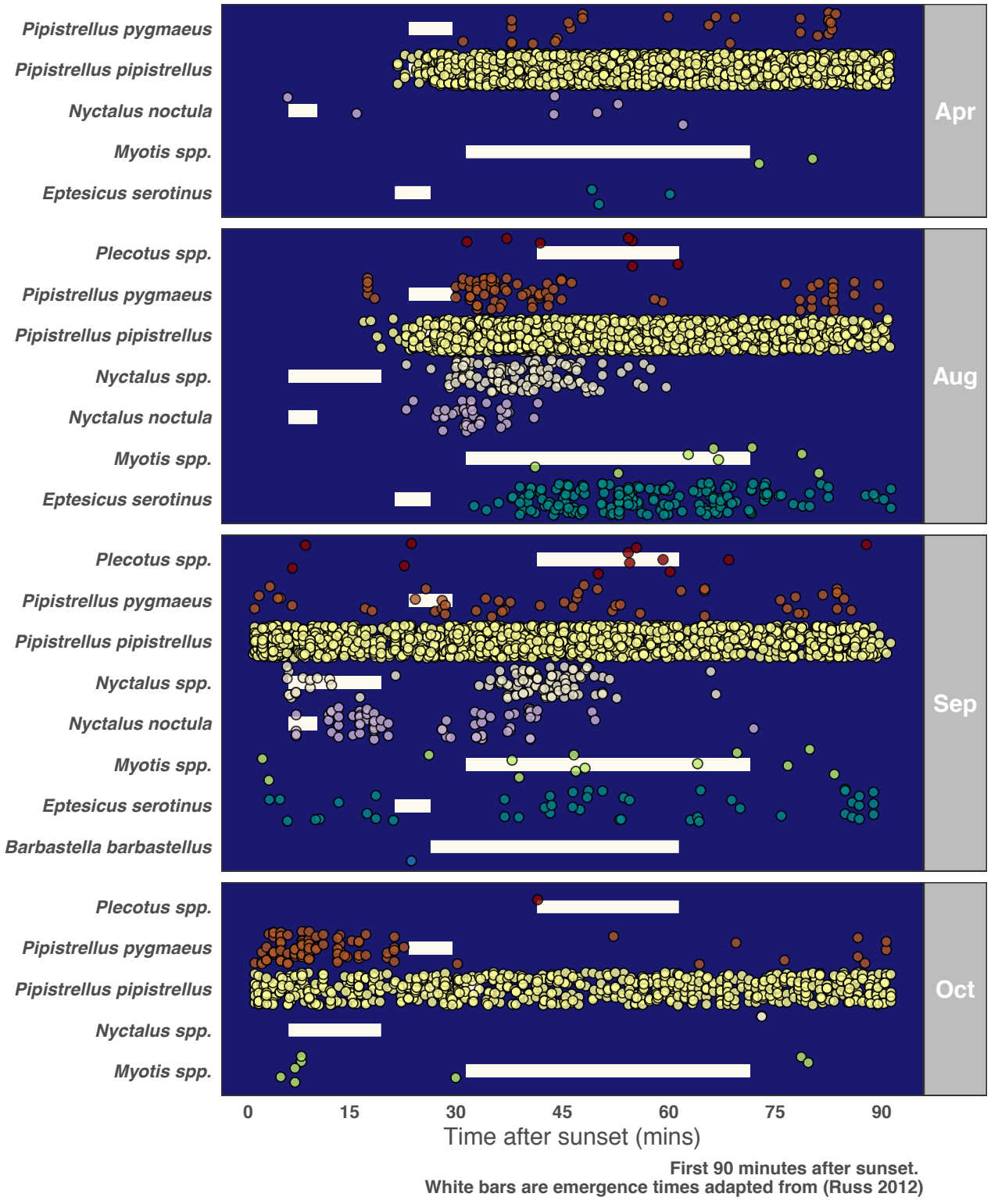
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.7 Location :ST07



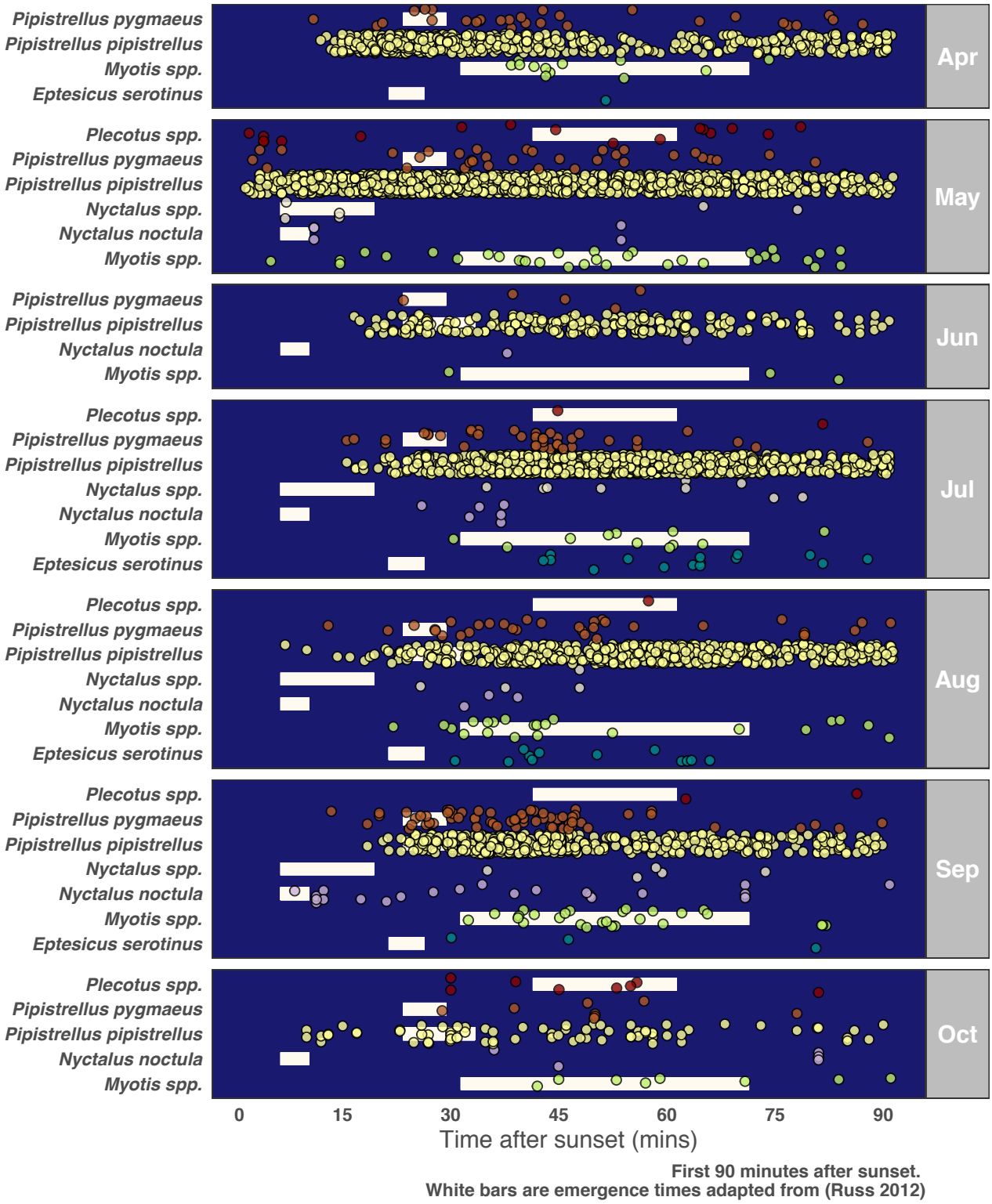
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.8 Location :ST08



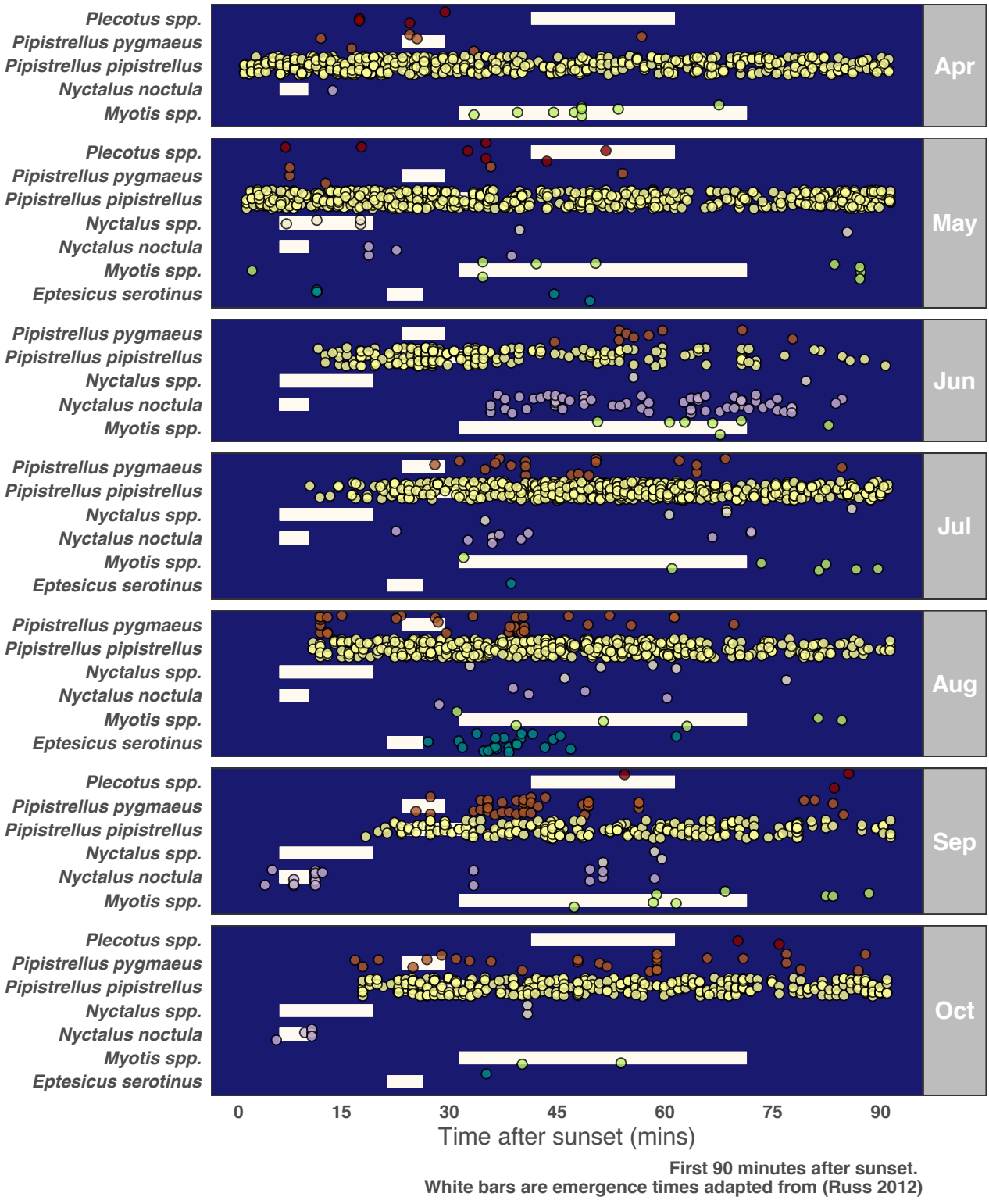
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.9 Location :ST09



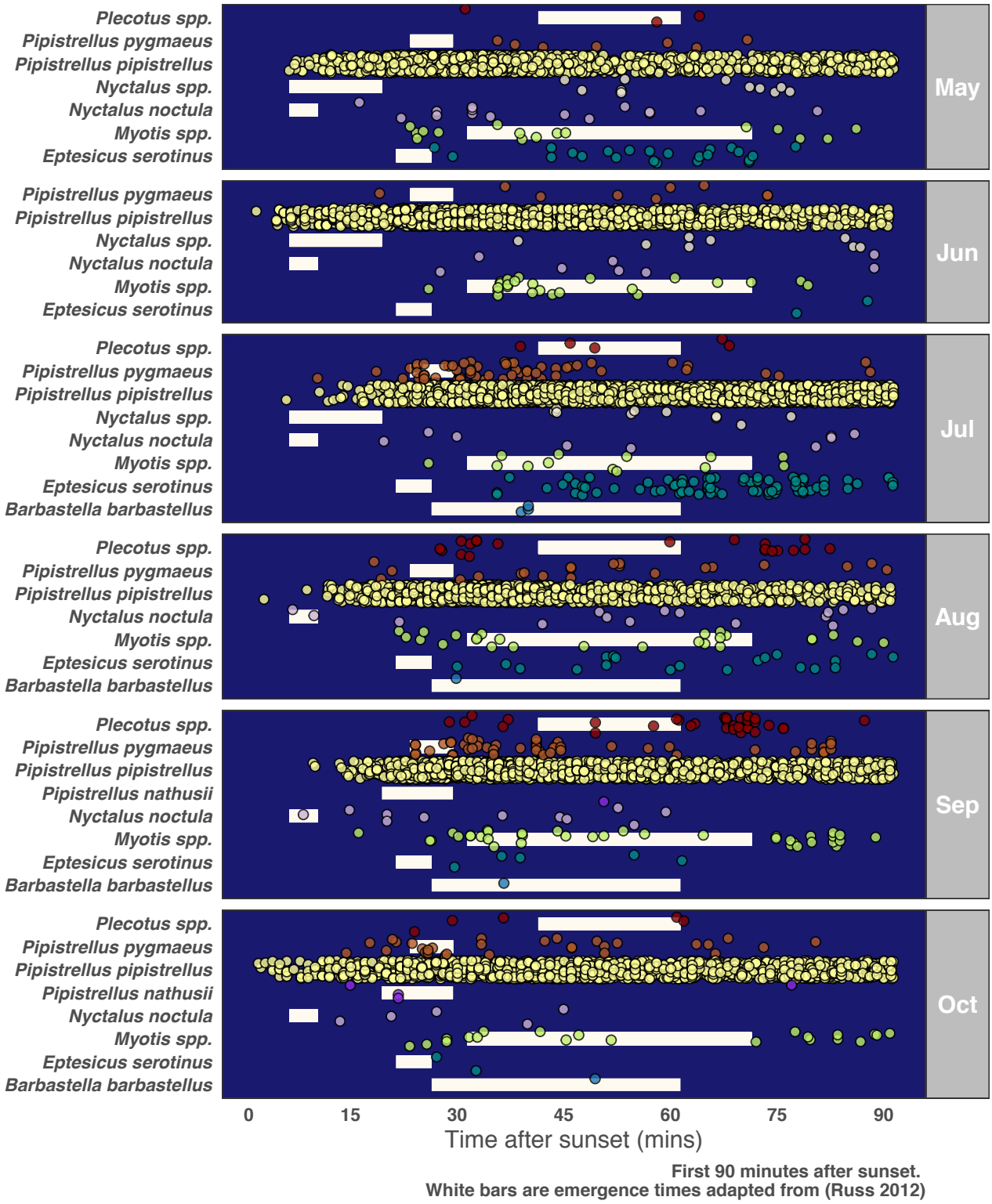
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.10 Location :ST10



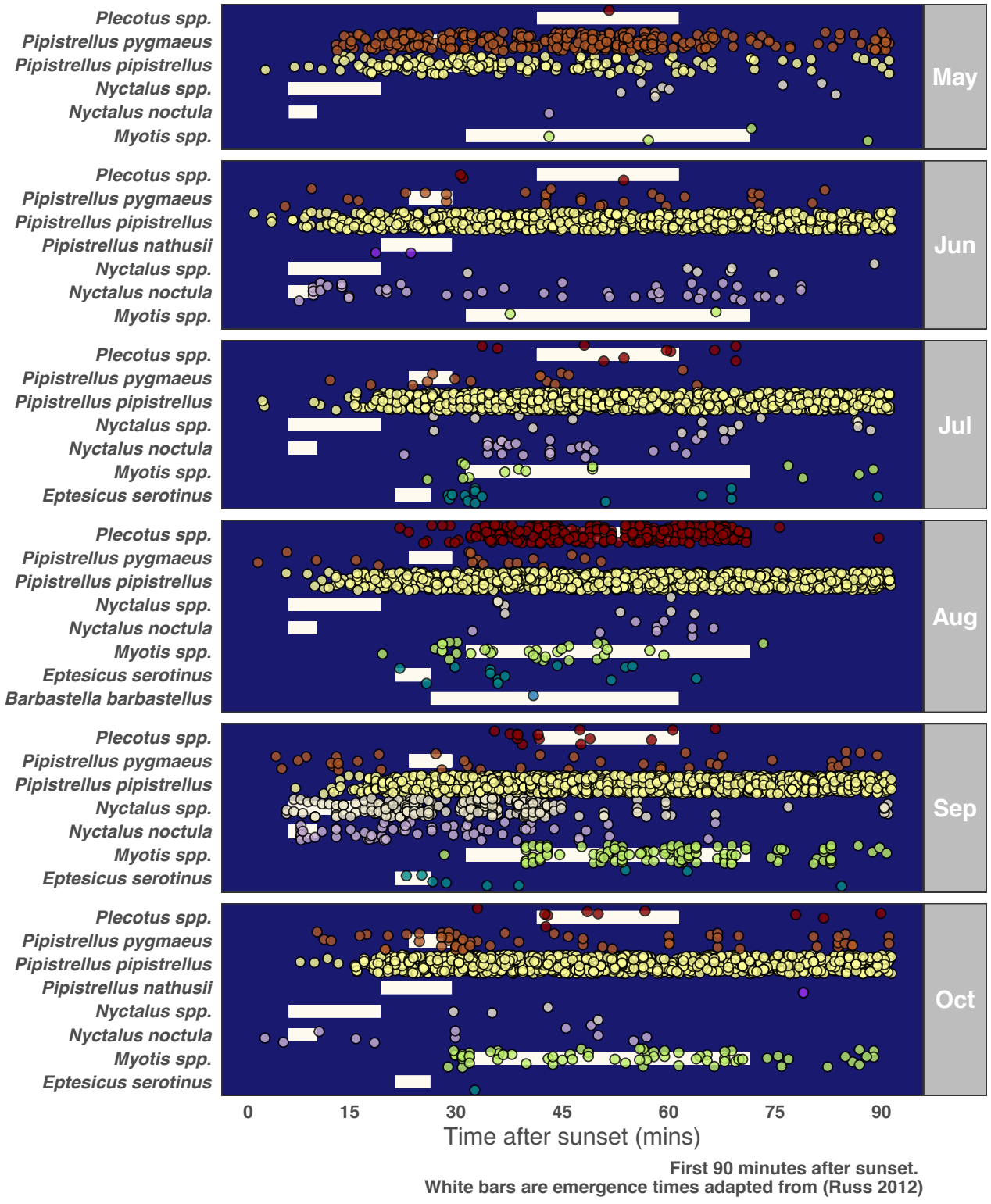
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.11 Location :ST11



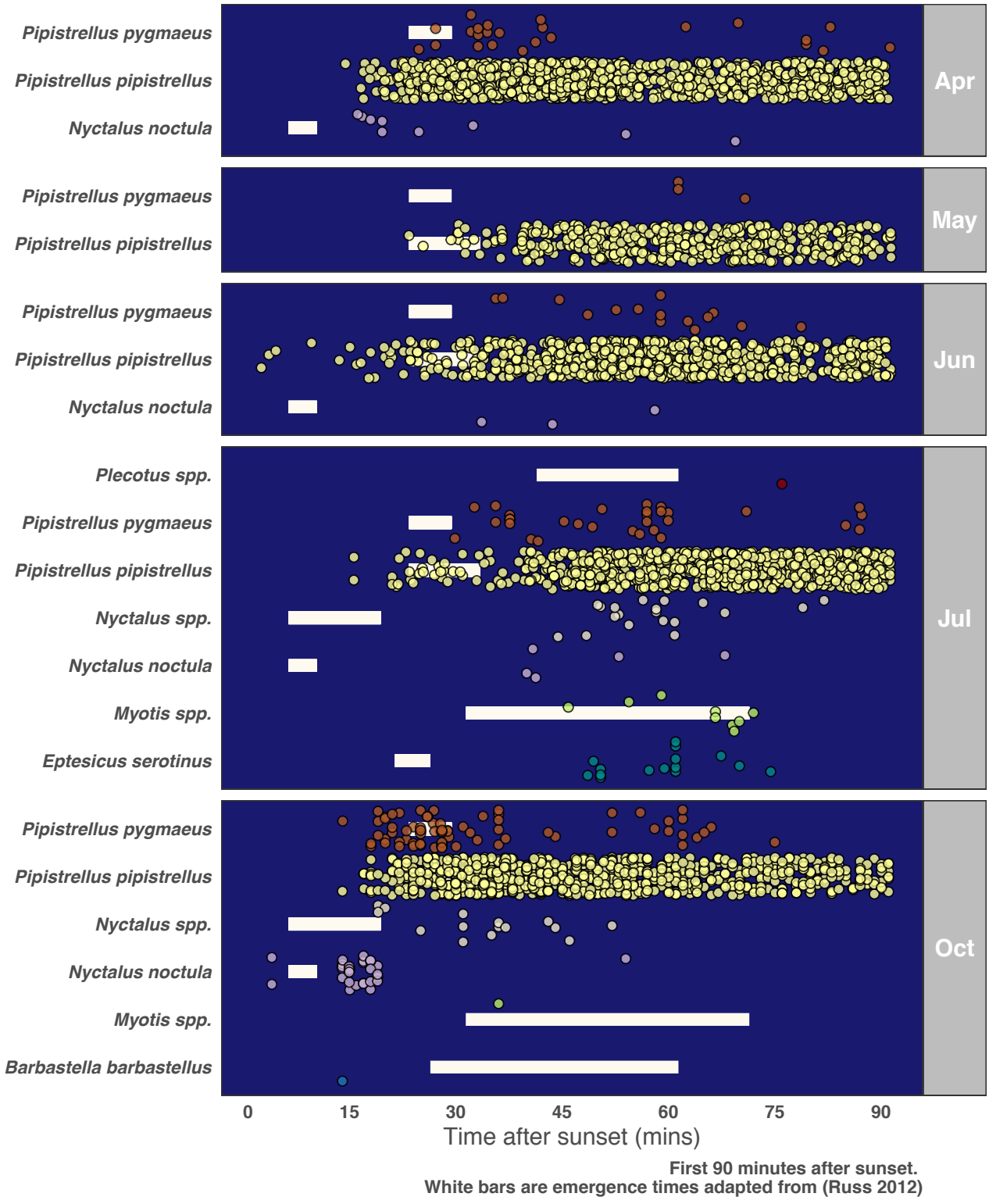
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.12 Location :ST12



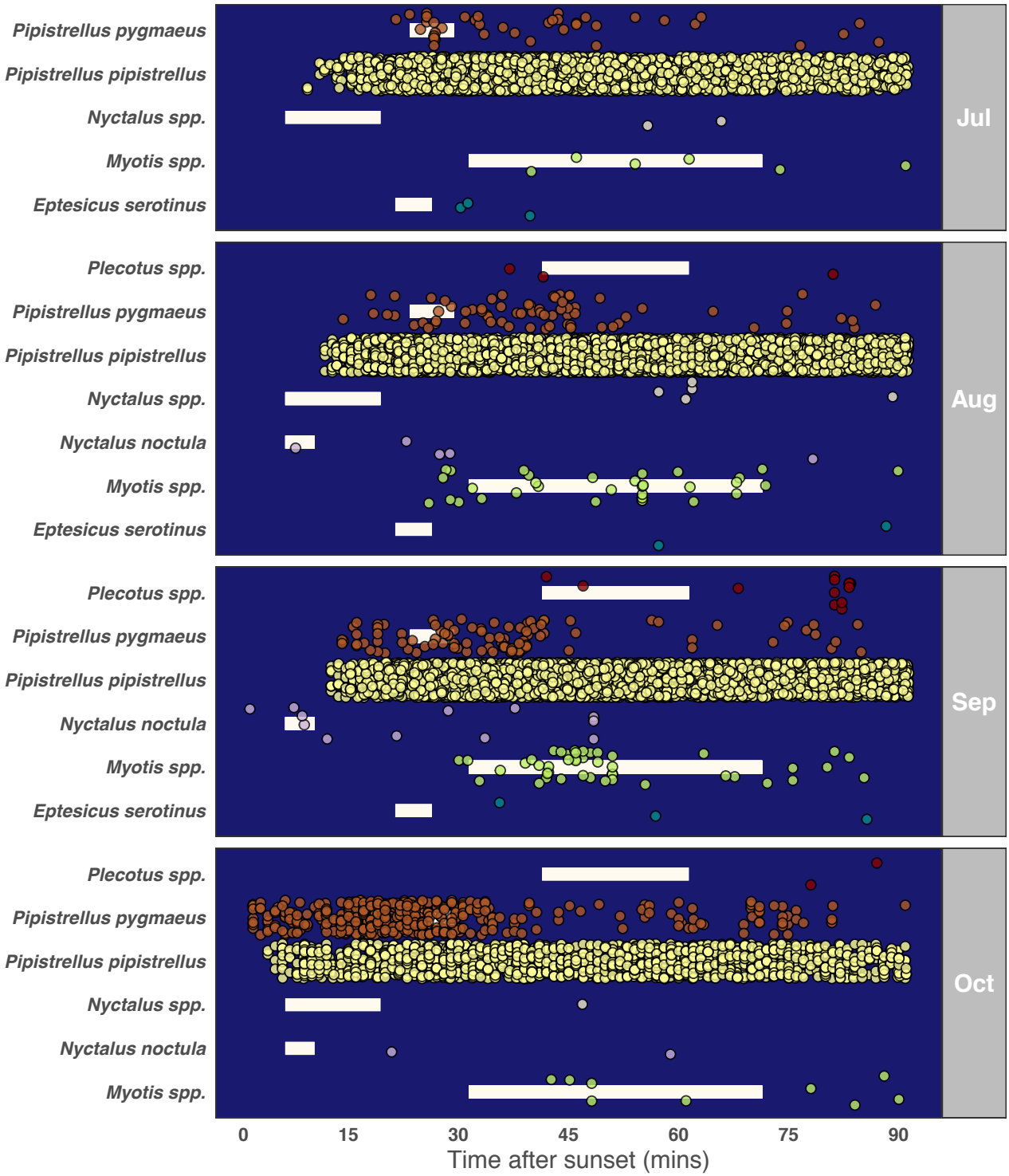
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.13 Location :ST13



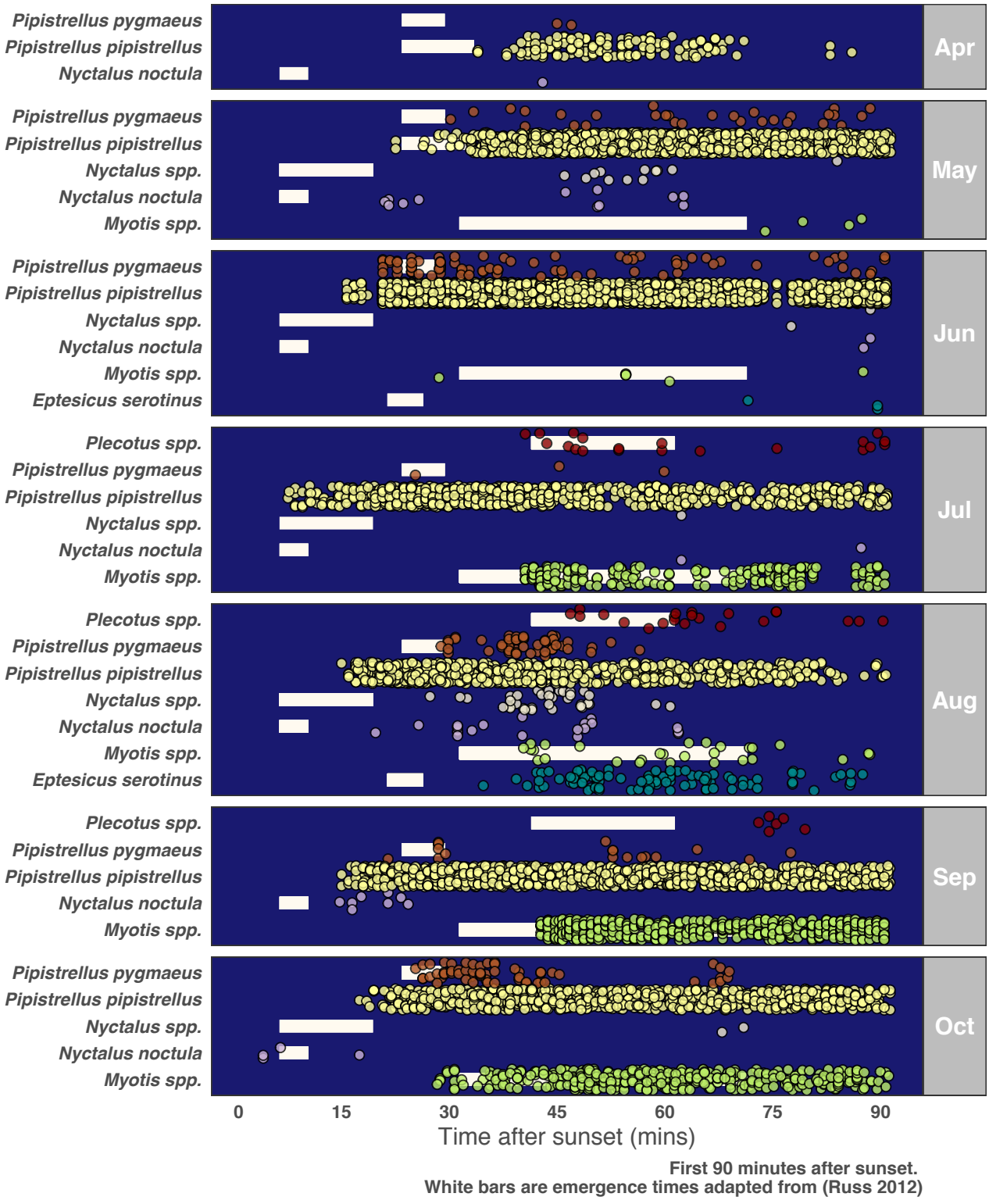
First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.14 Location :ST14



First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.15 Location :ST15



First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

3.8.16 Location :ST16

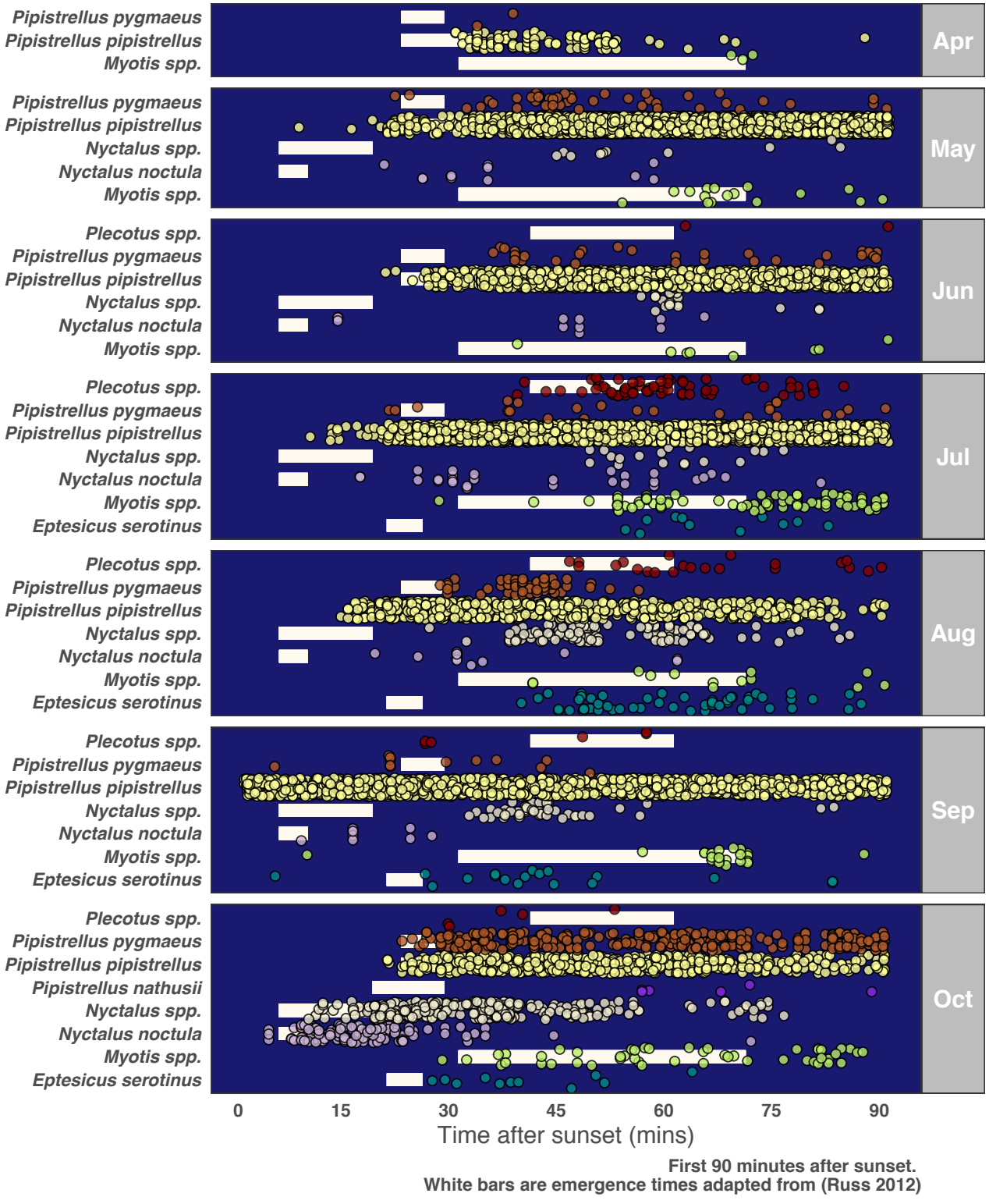


Figure 8: Roost and Observed Emergence by Month

3.9 Observed Dawn Activity by Location

Figure 9 shows the observed dawn activity by location; potentially indicating the nearness of a bat roost.

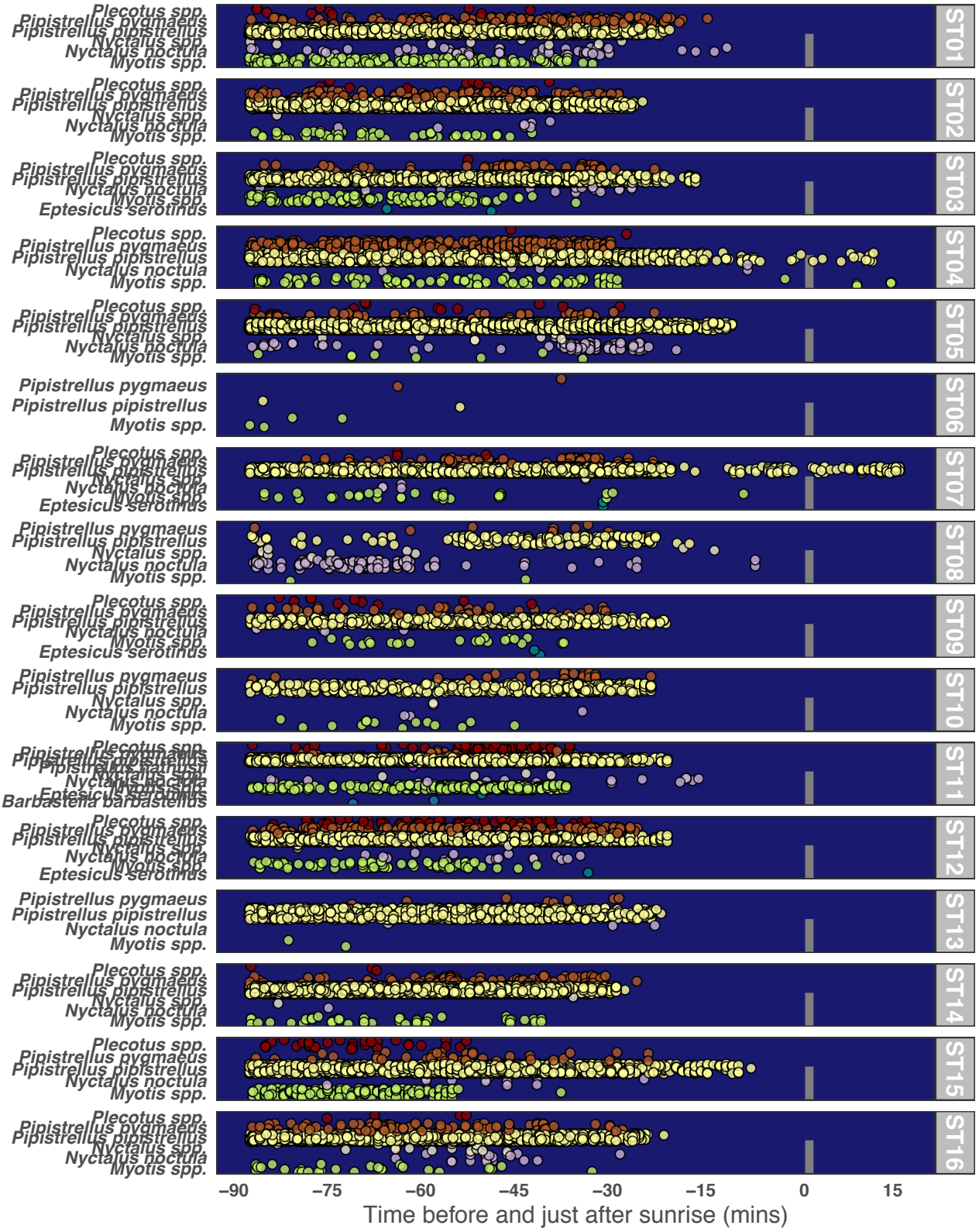
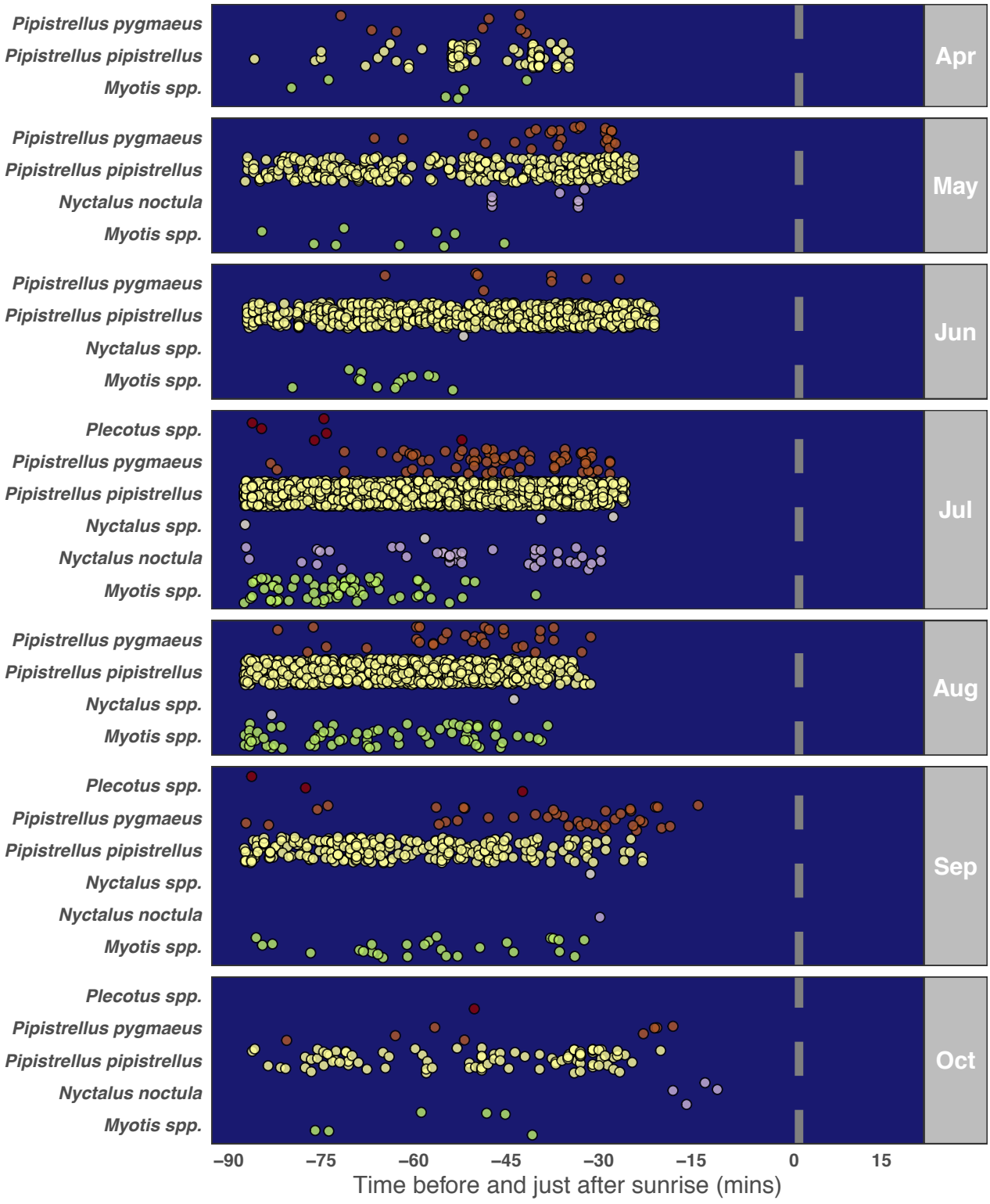


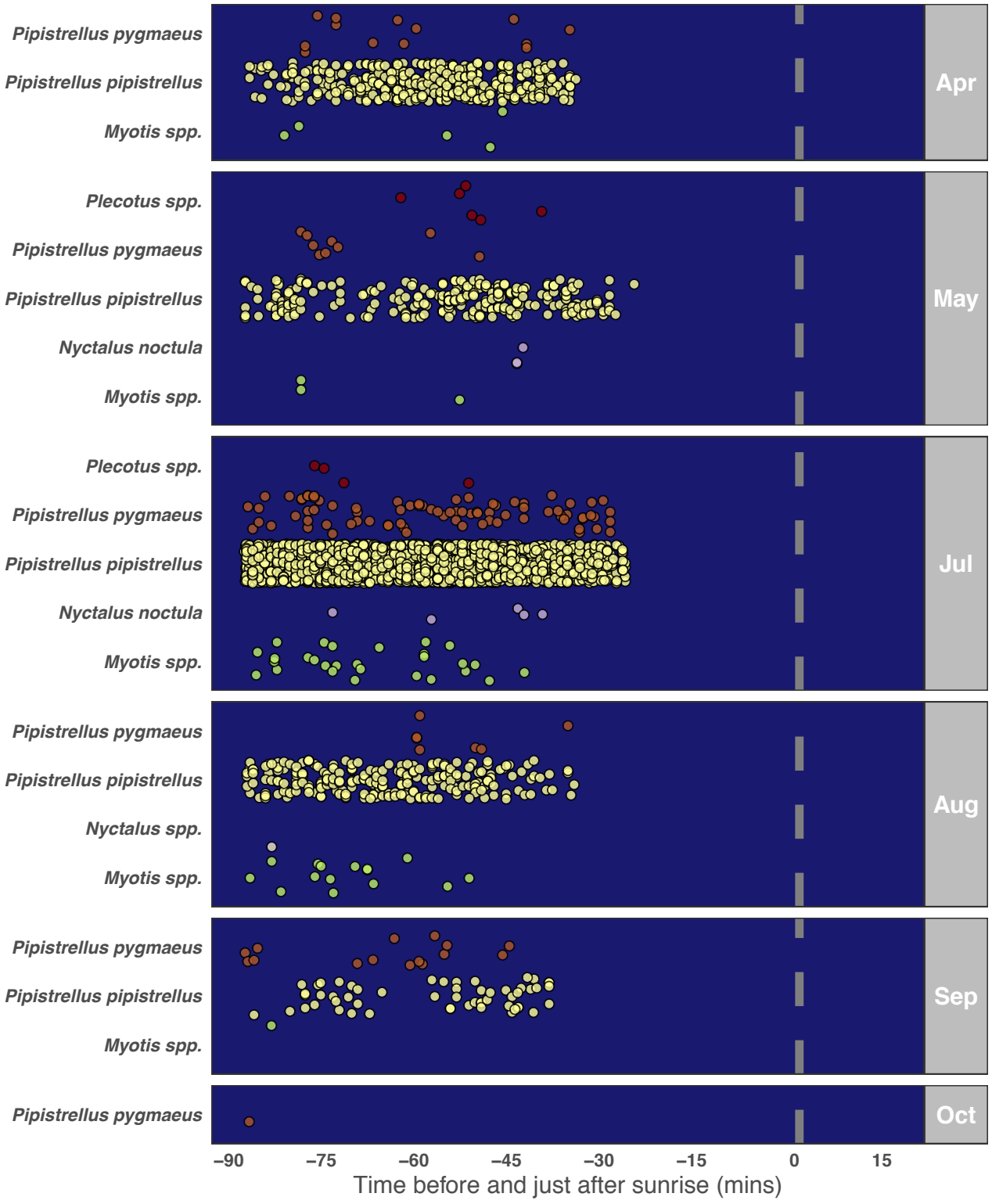
Figure 9: Observed Dawn Activity by Location

3.10 Observed Dawn Activity by Location & Month

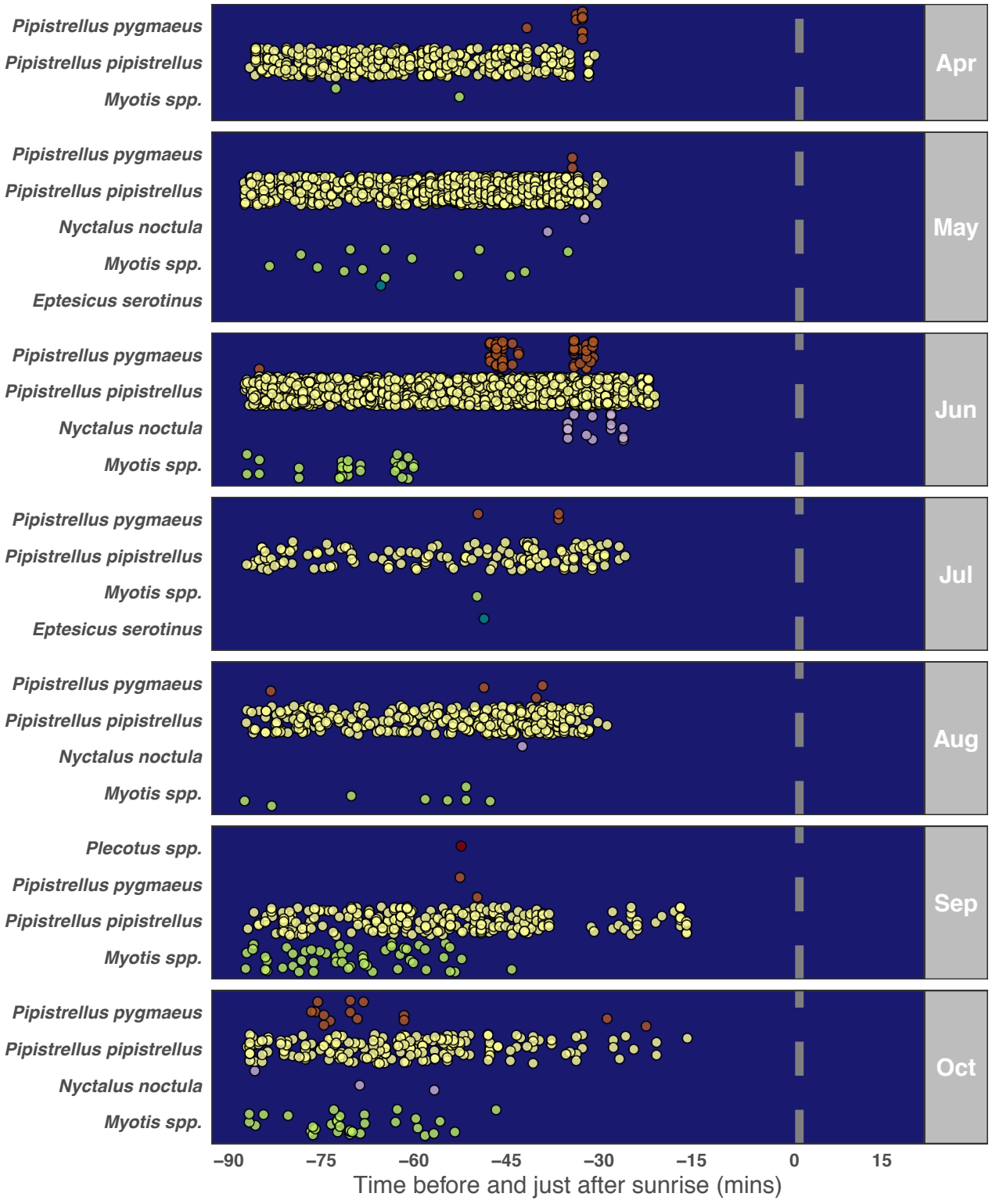
3.10.1 Location :ST01



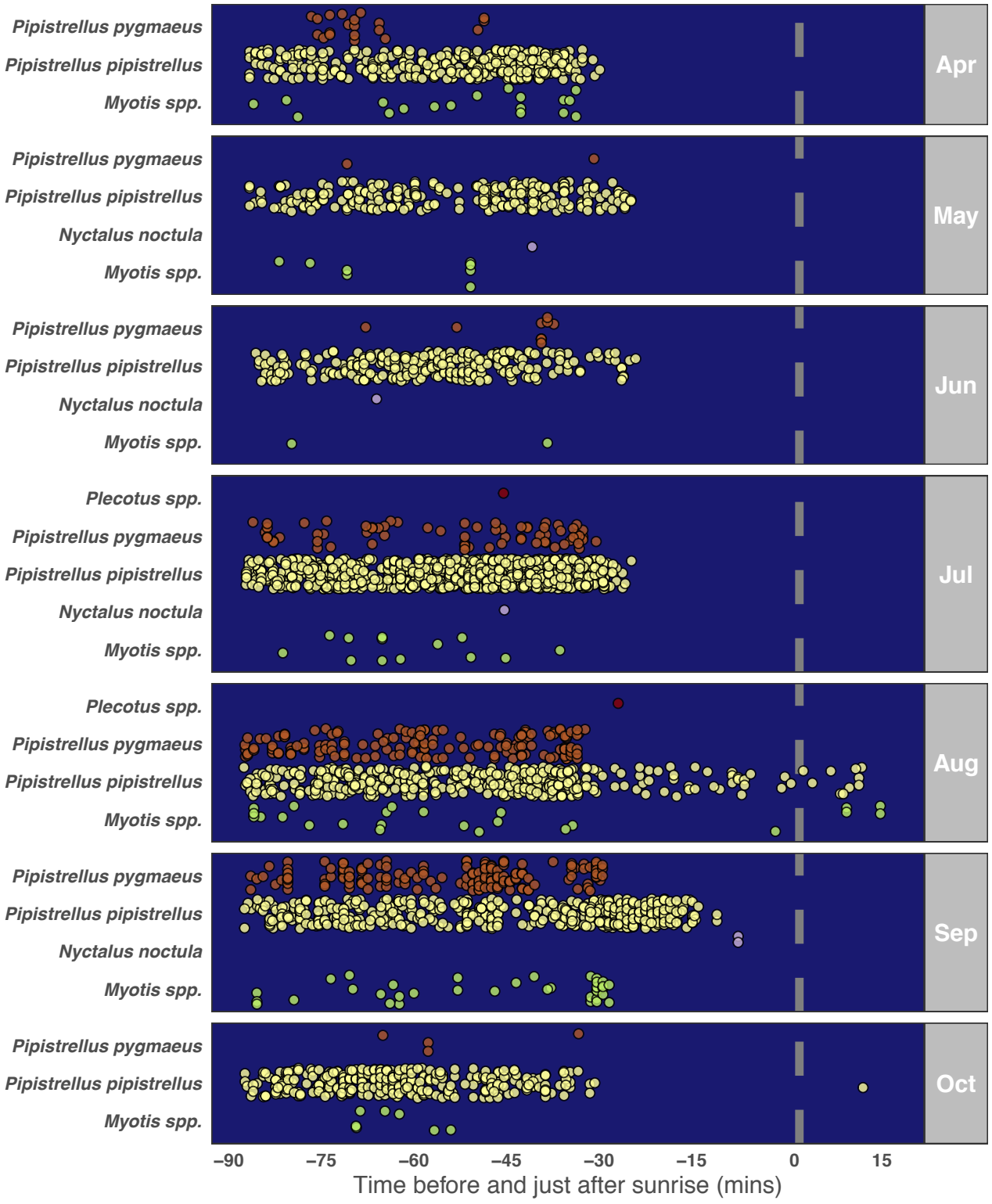
3.10.2 Location :ST02



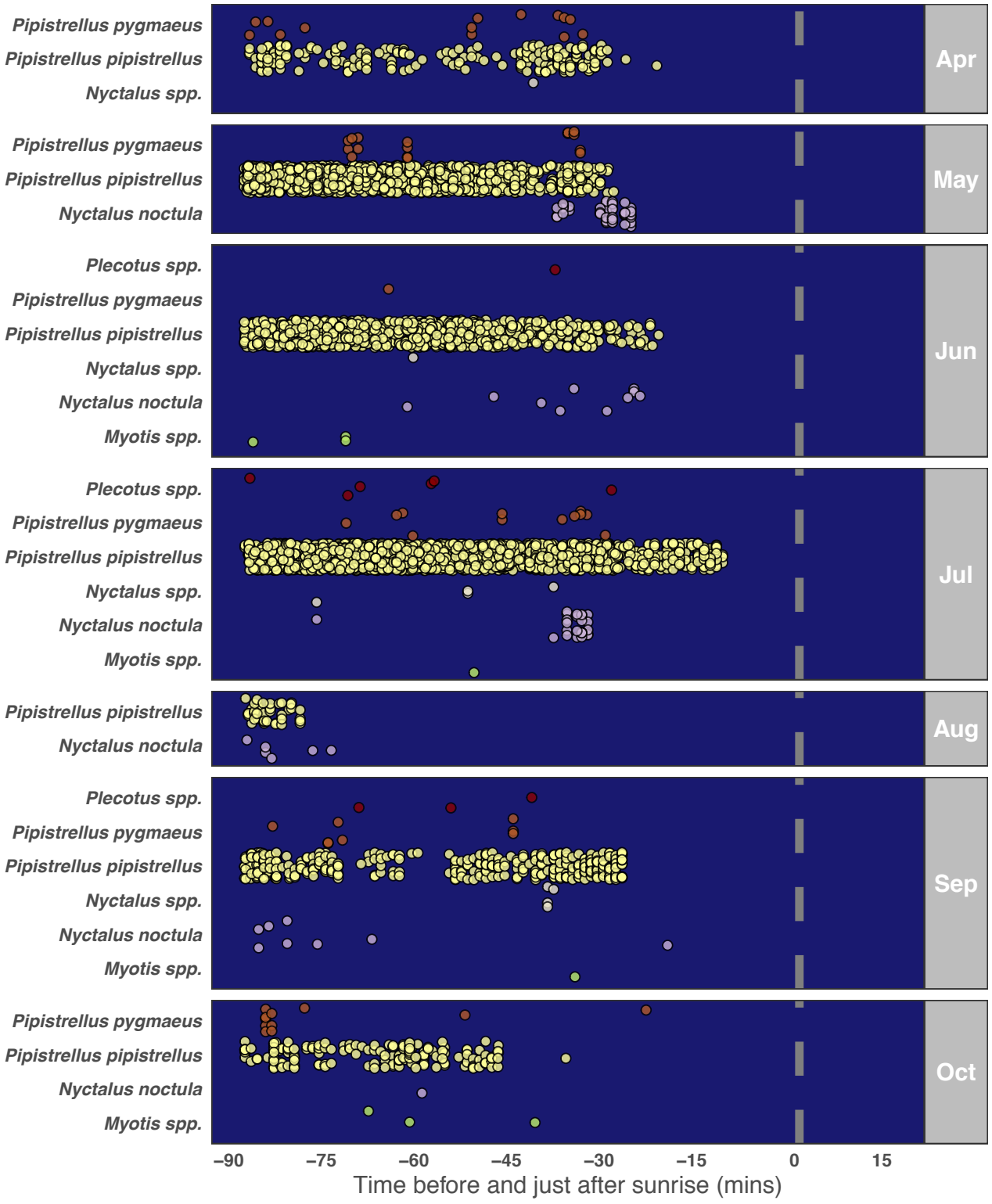
3.10.3 Location :ST03



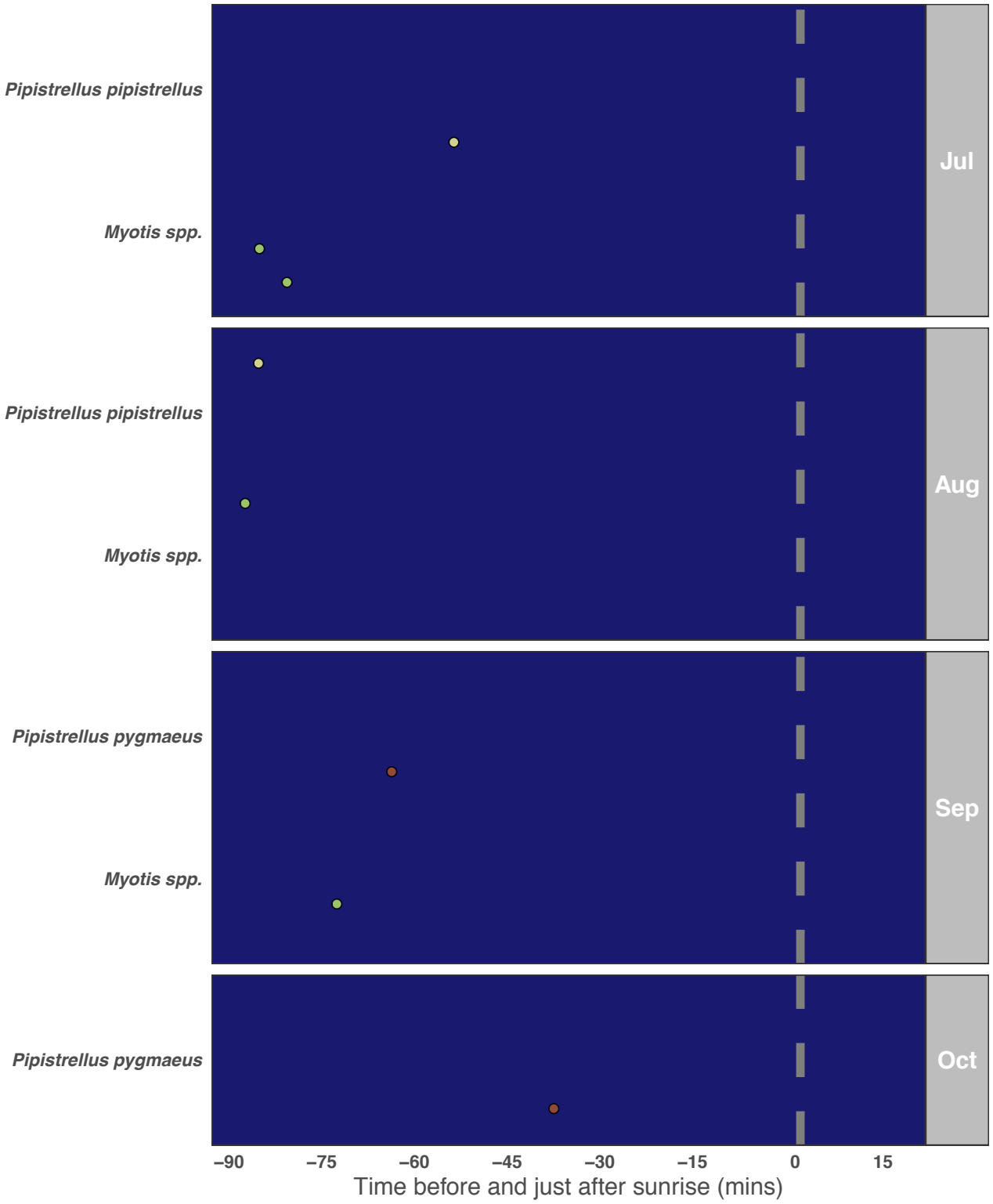
3.10.4 Location :ST04



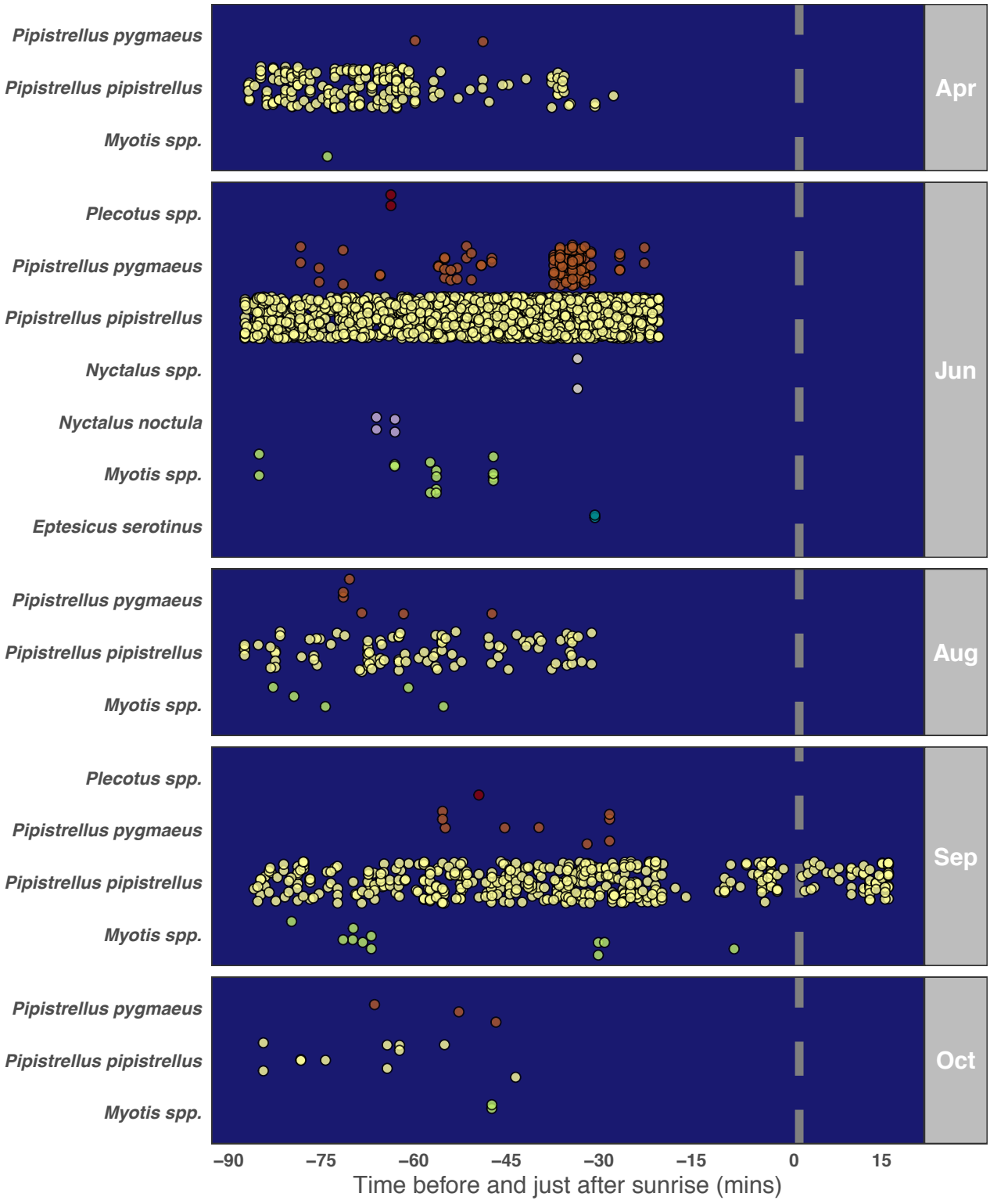
3.10.5 Location :ST05



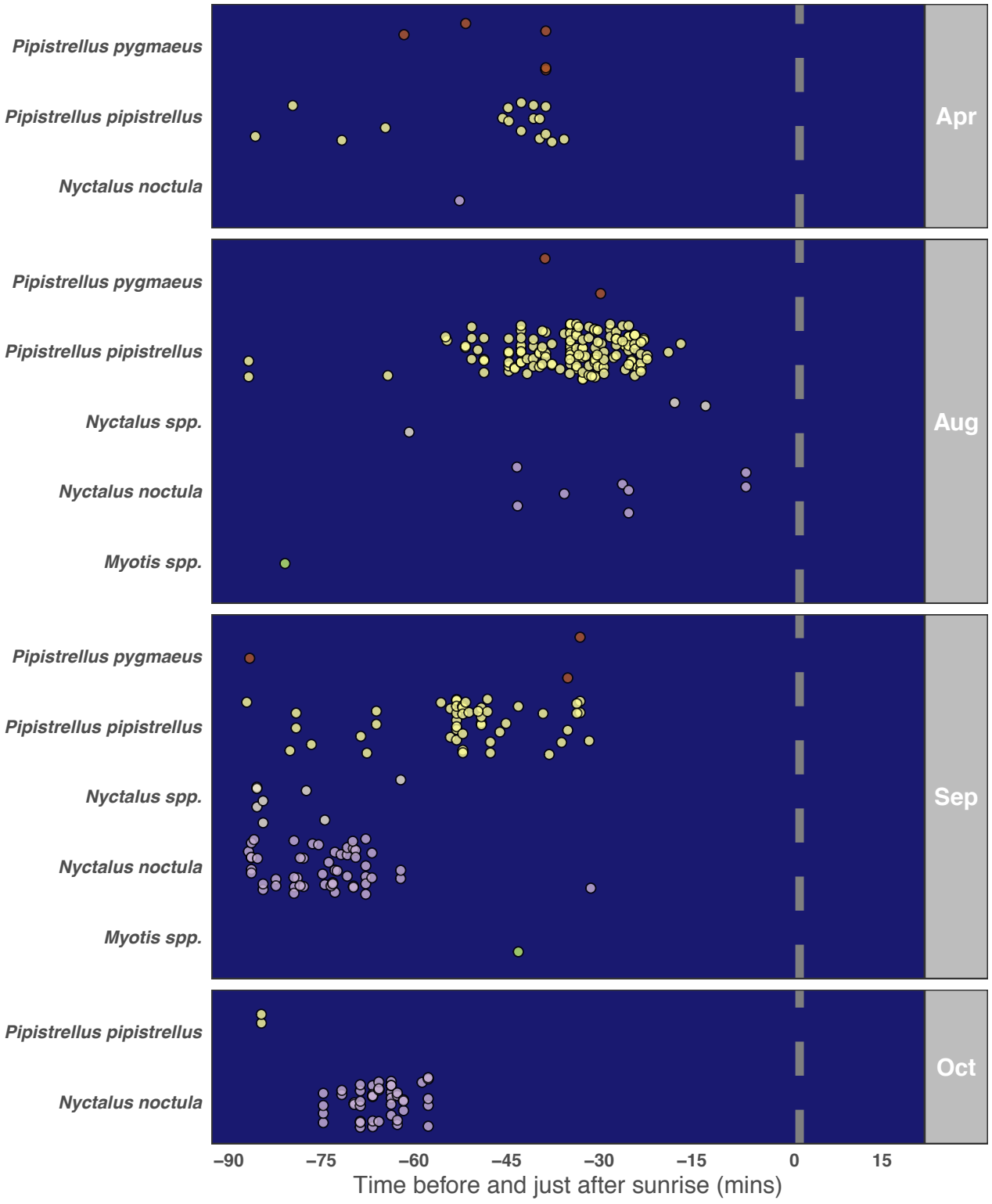
3.10.6 Location :ST06



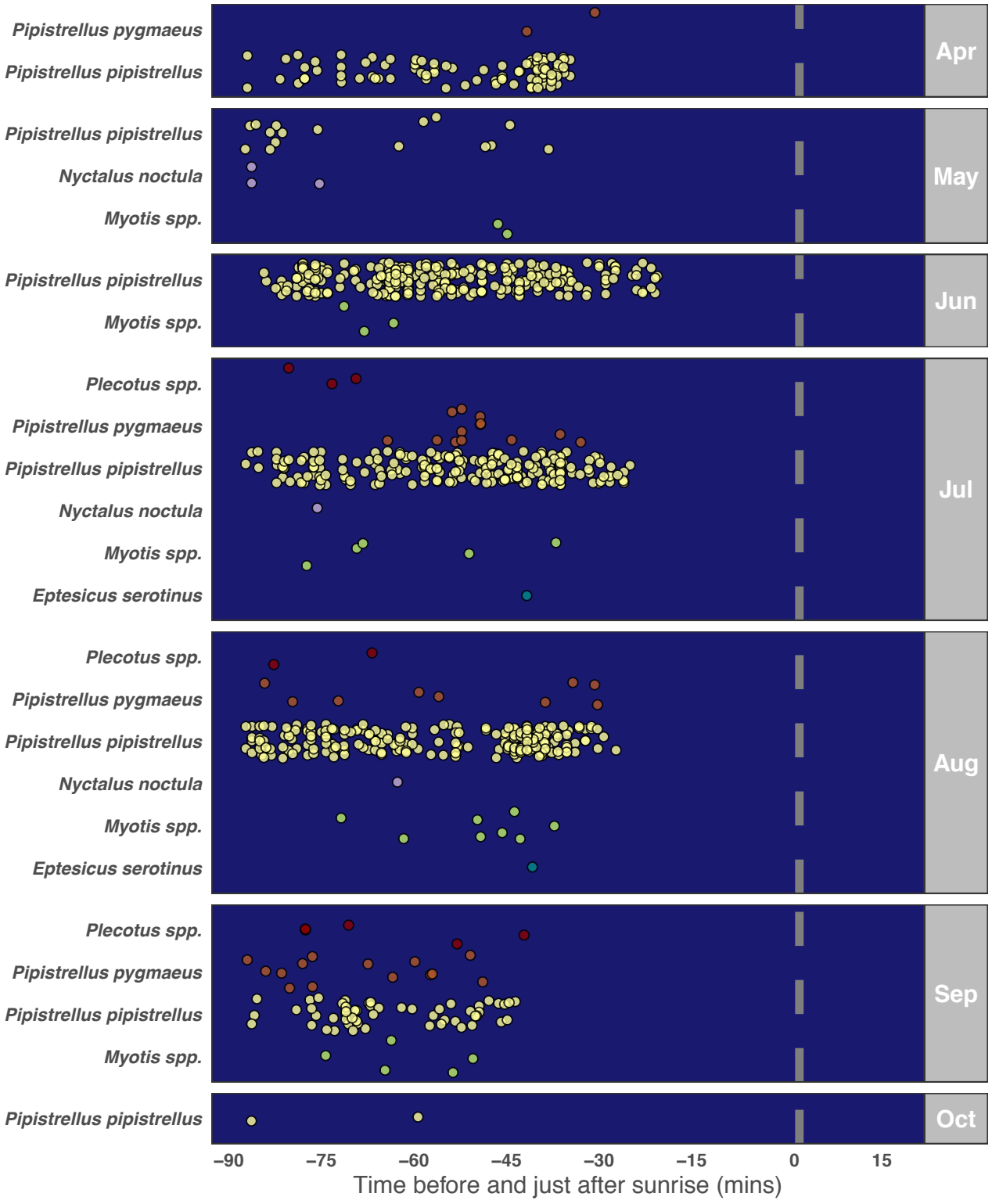
3.10.7 Location :ST07



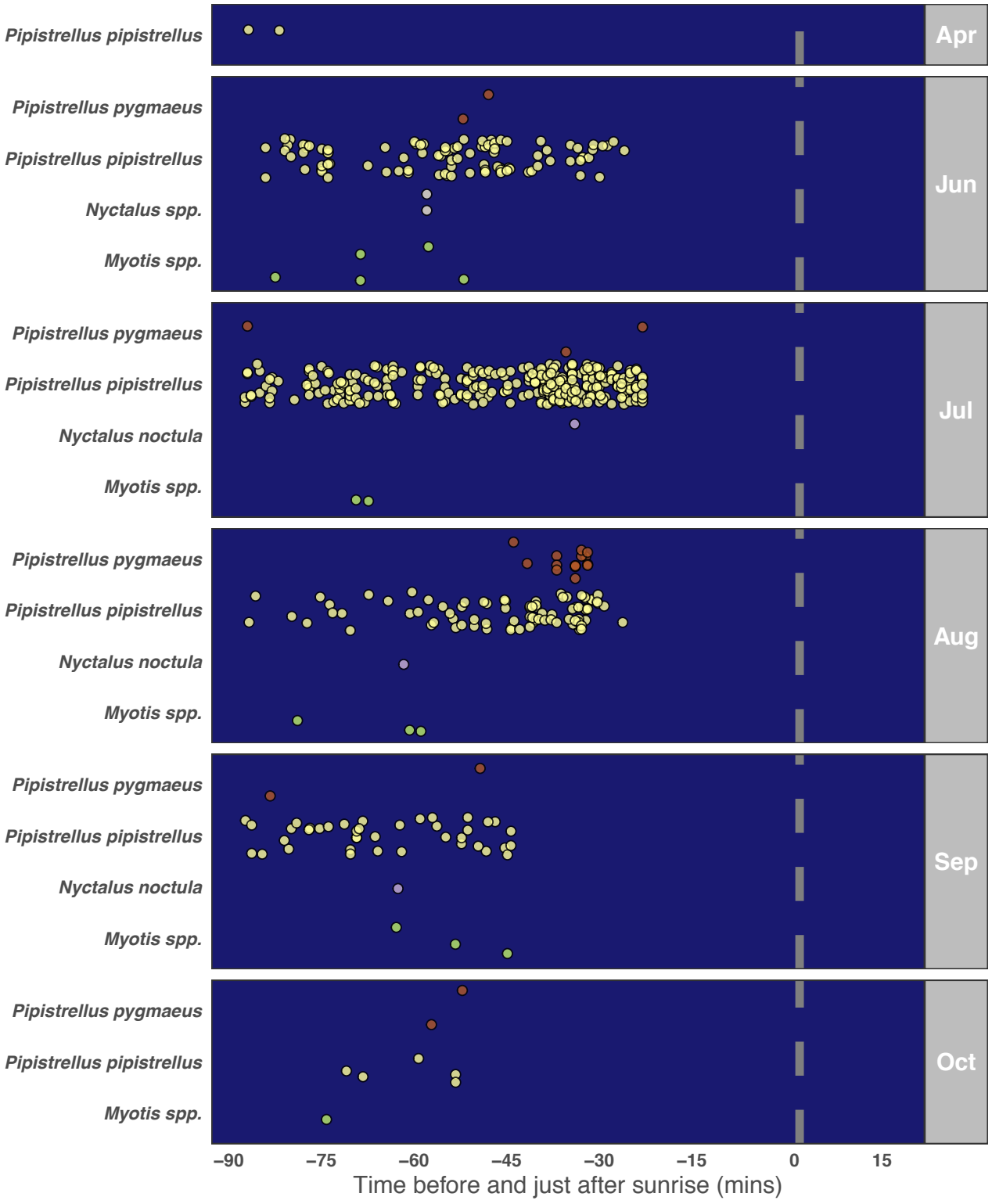
3.10.8 Location :ST08



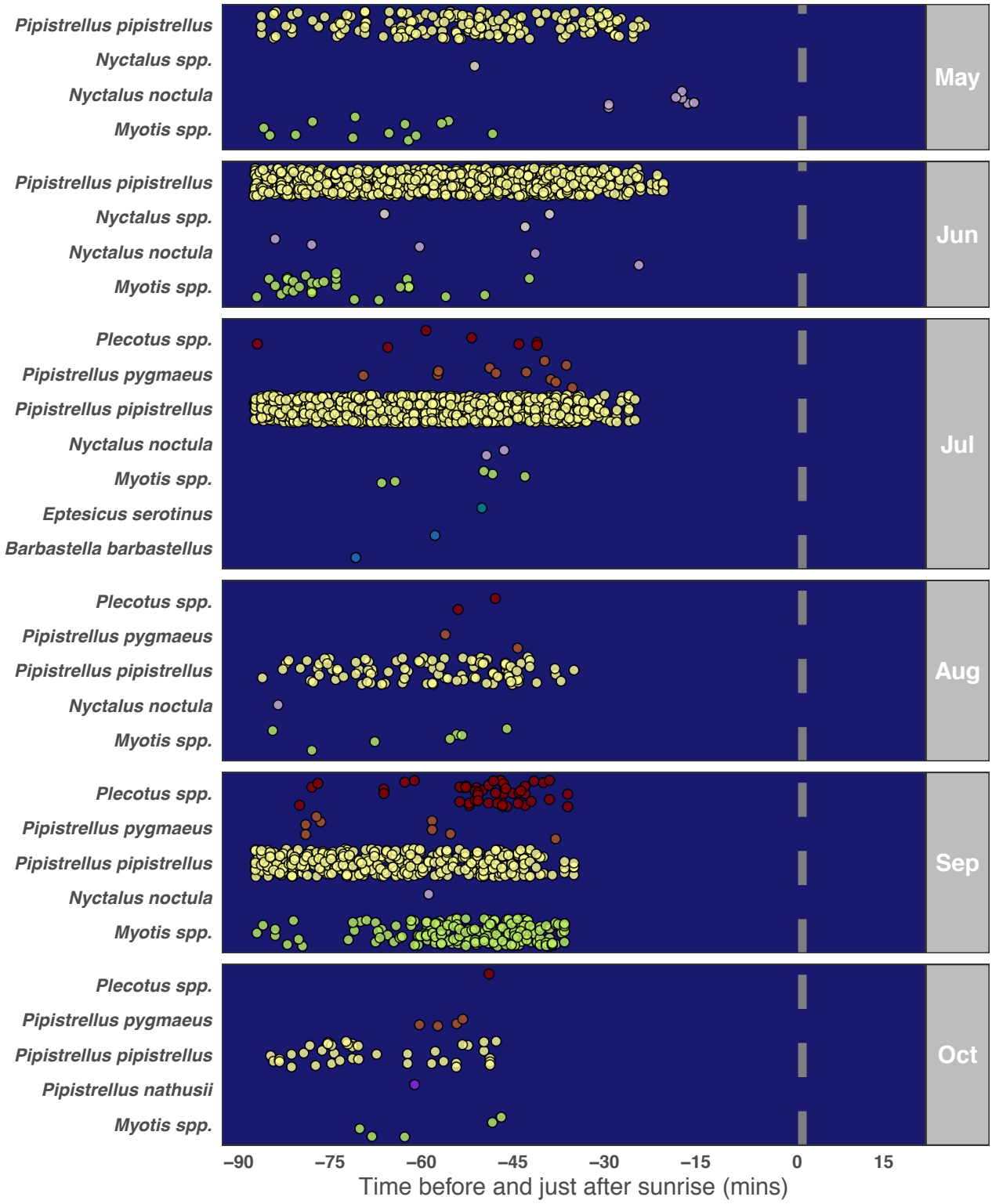
3.10.9 Location :ST09



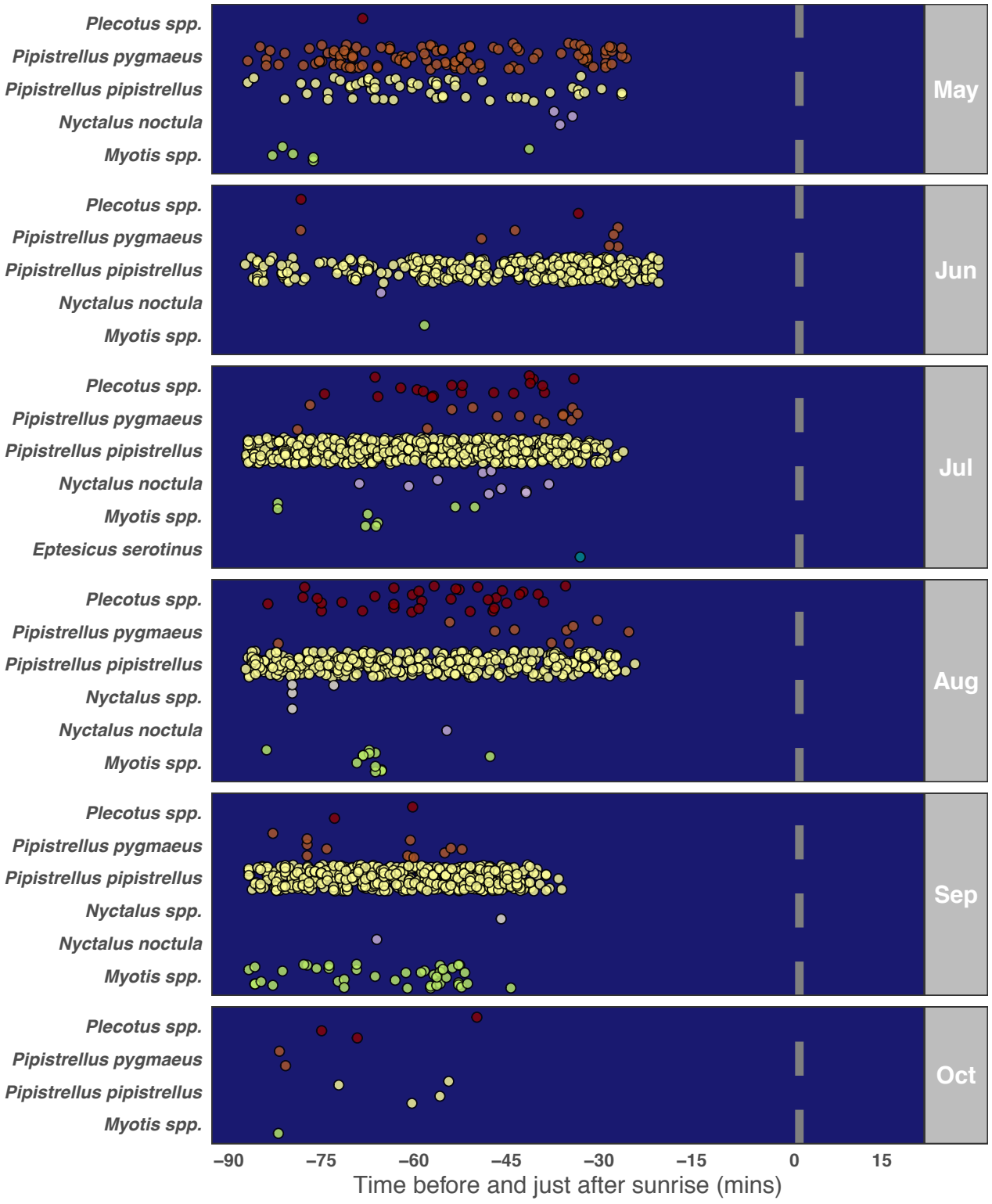
3.10.10 Location :ST10



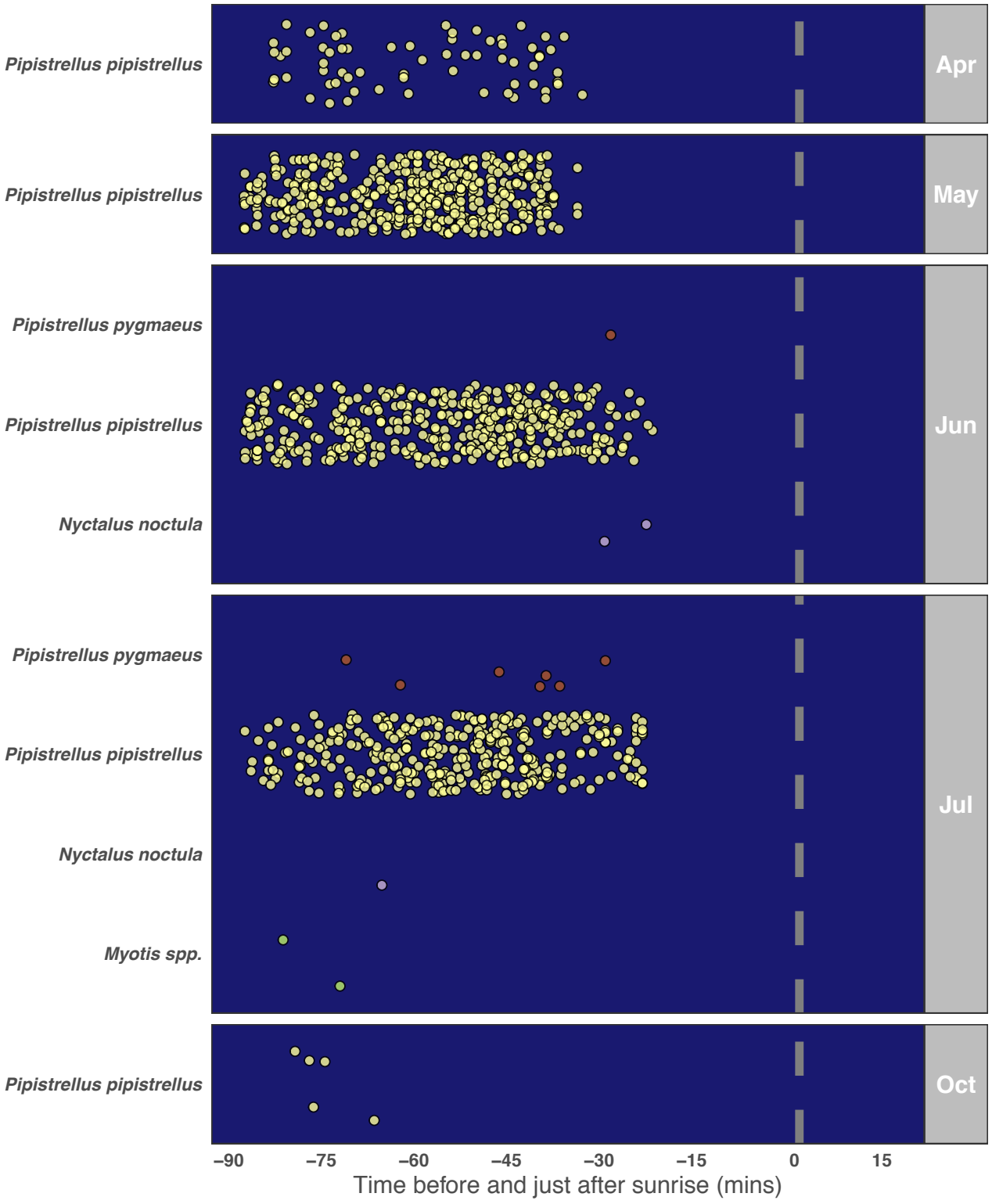
3.10.11 Location :ST11



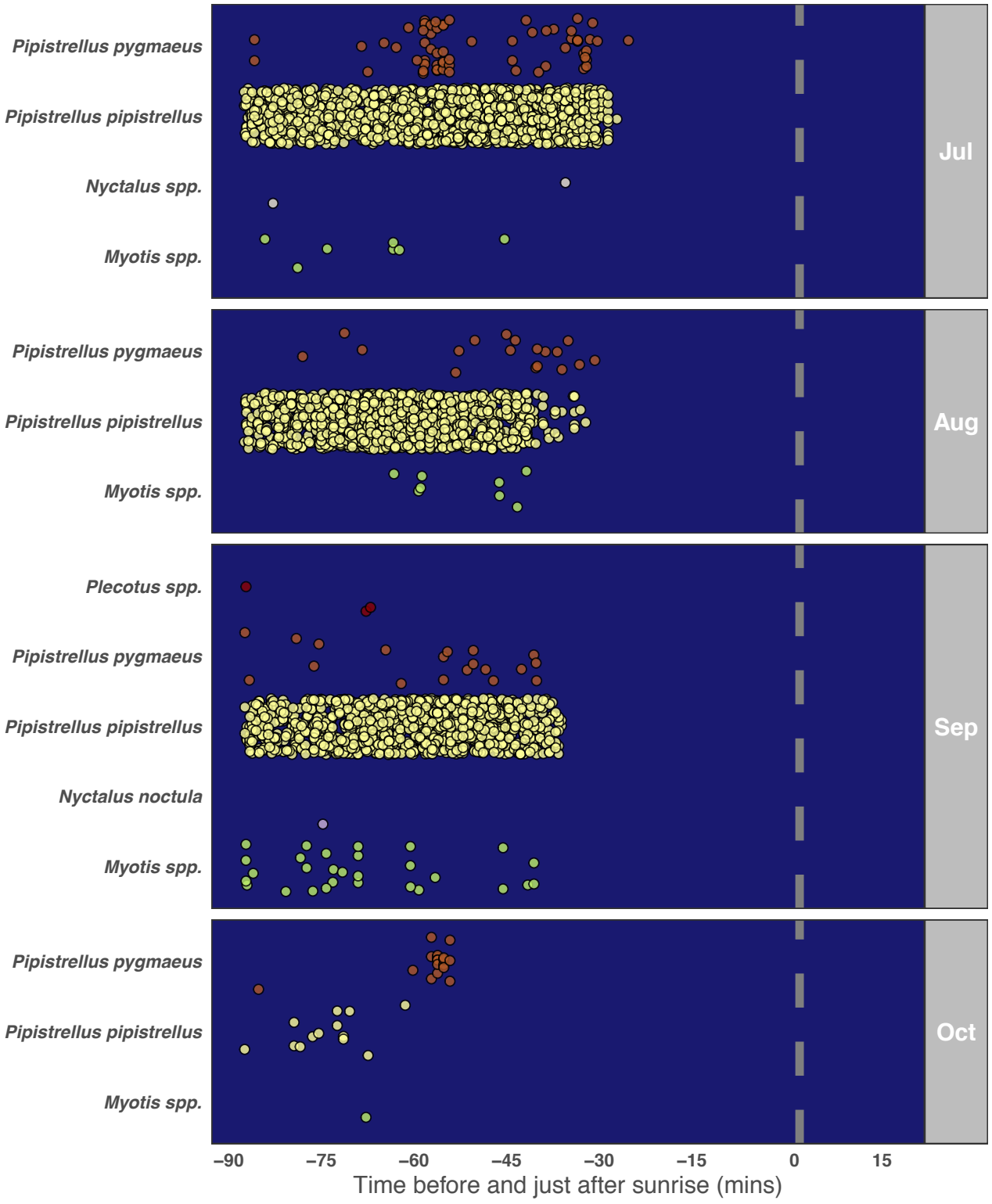
3.10.12 Location :ST12



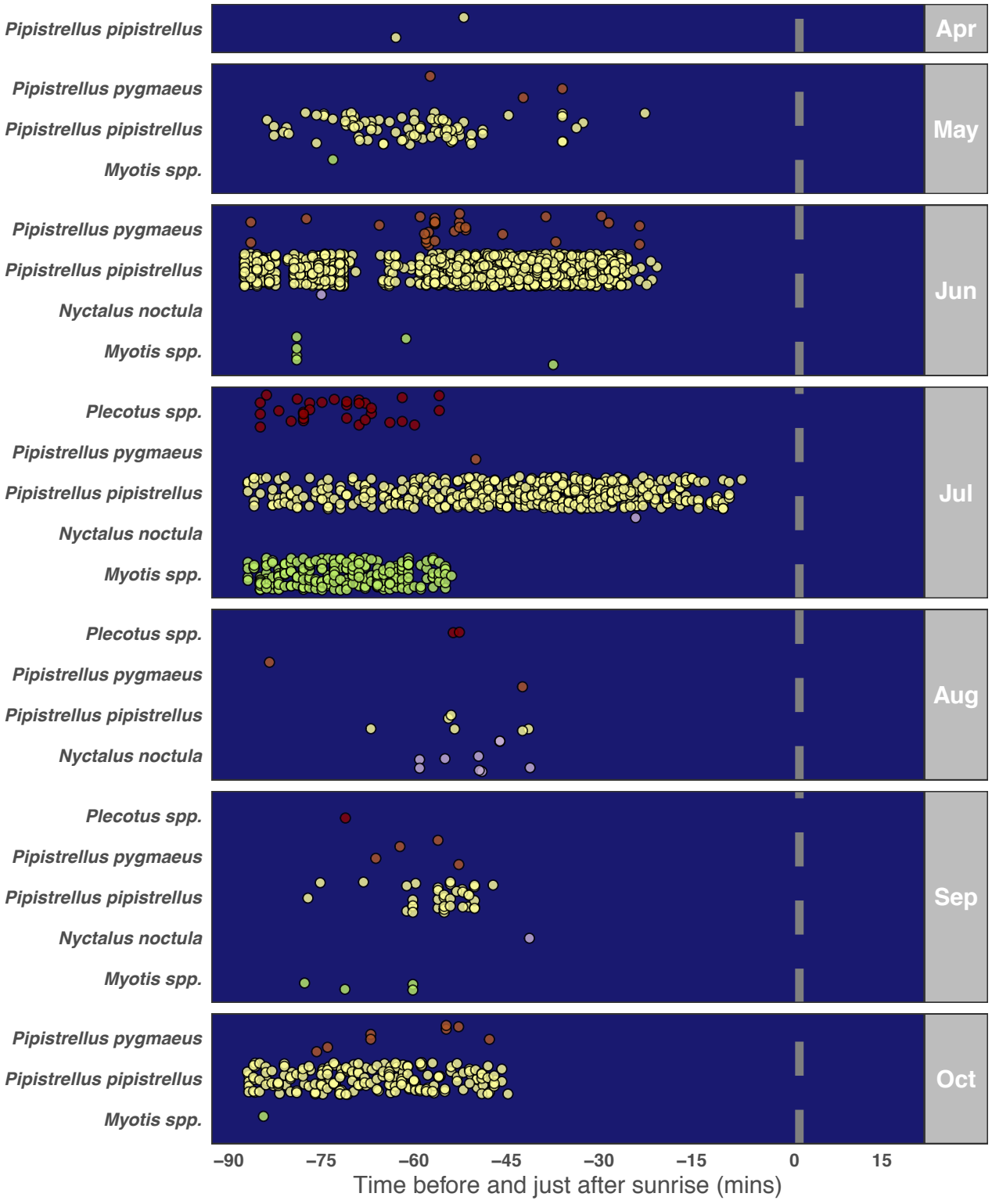
3.10.13 Location :ST13



3.10.14 Location :ST14



3.10.15 Location :ST15



3.10.16 Location :ST16

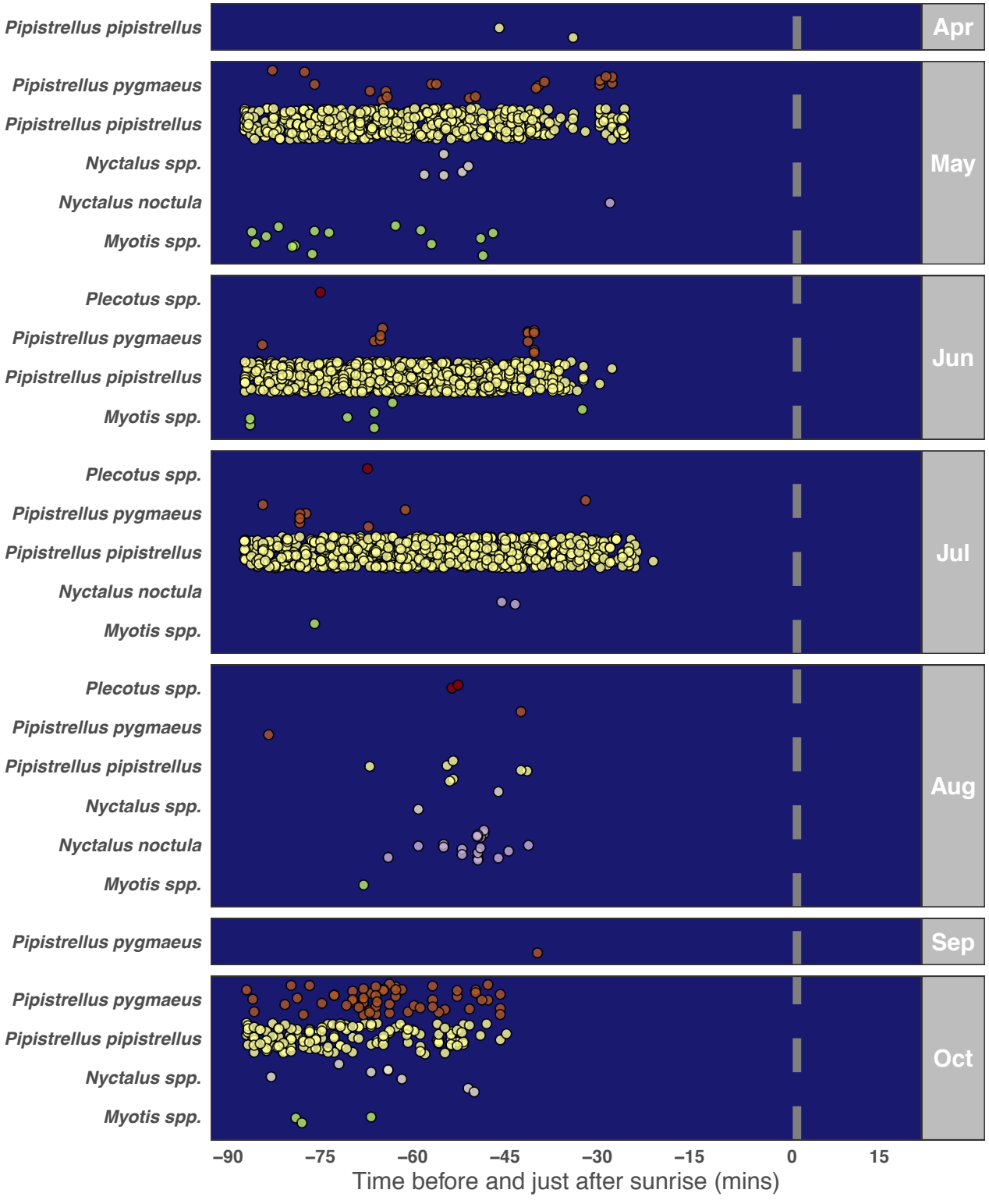


Figure 10: Observed Dawn Activity by Location & Month

3.11 Species and Location with the Number of Passes

Figure 11 shows the species and location with the number of passes



Figure 11: Species and Location with the Number of Passes

3.12 Hourly Activity by Location and Month

Figure 12 shows the hourly activity by location and month

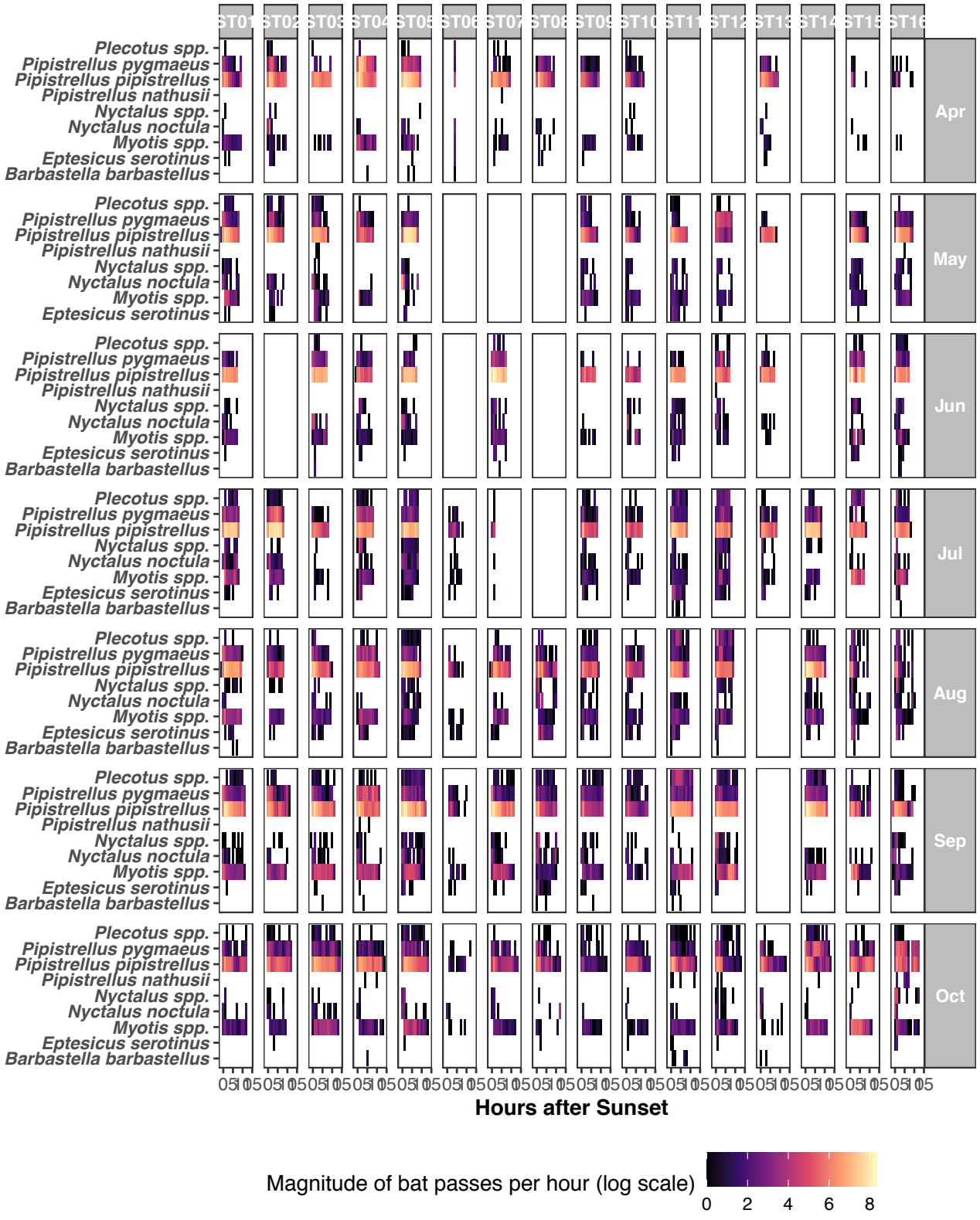


Figure 12: Hourly Activity by Location and Month

4 STATISTICS

4.1 Comparison of Location Activity by Species

The average bat pass rate has been calculated for the night at each survey location; ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16 using the formula:

$$\frac{Batpasses}{Nightlength}$$

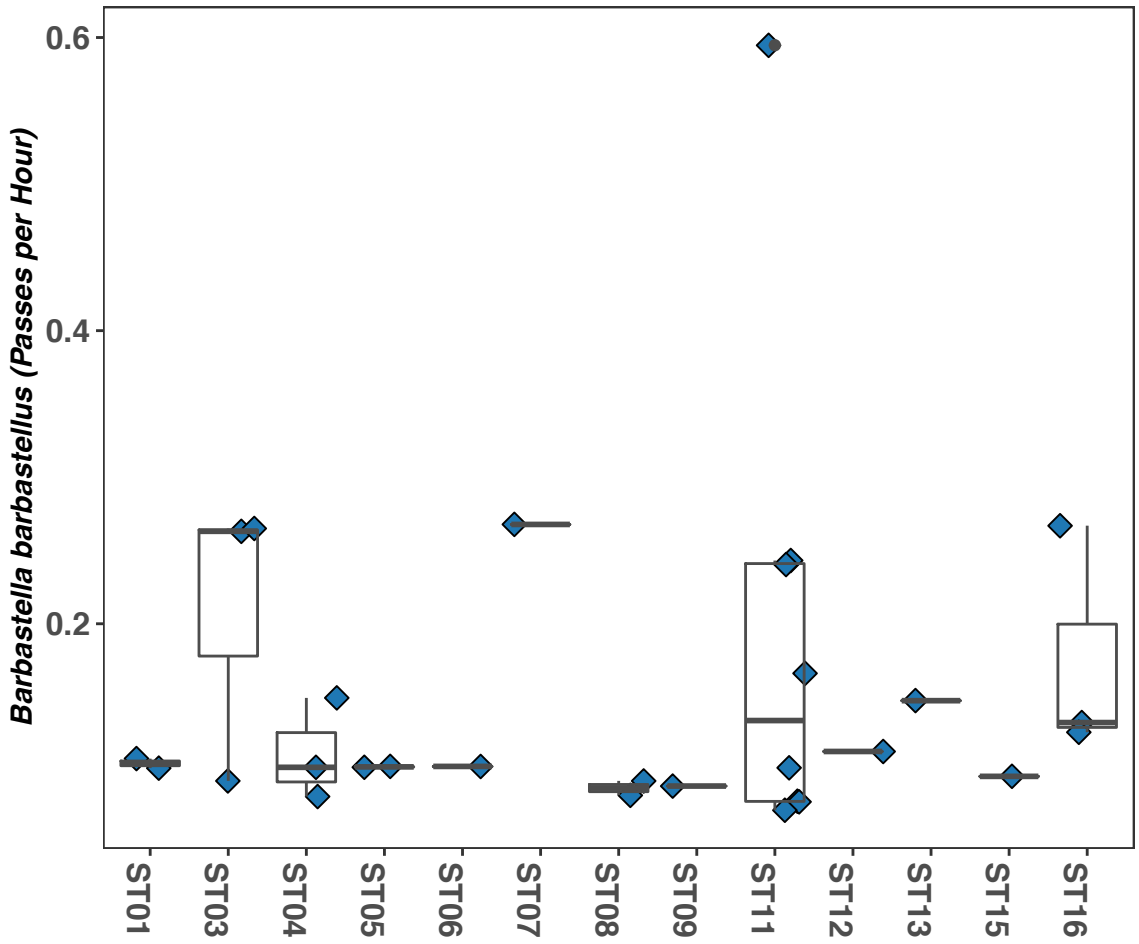
Where:

Batpasses = number of bat pass during the night at the location
Nightlength = Length of the night in decimal hours

The comparison of locations is undertaken with the Mann-Whitney-Wilcoxon or Kruskal-Wallis test. The Kruskal–Wallis test is a rank-based test that is similar to the Mann-Whitney-Wilcoxon test, but can be applied to one-way data with more than two groups. If there are just two locations the Mann-Whitney-Wilcoxon test is applied. The Kruskal–Wallis test *may* be used when there are only two samples, but the Mann-Whitney-Wilcoxon is more powerful for two samples and is preferred. Both tests assume that the observations are independent. The probability threshold for *statistical significance* used in the tests is: 0.05

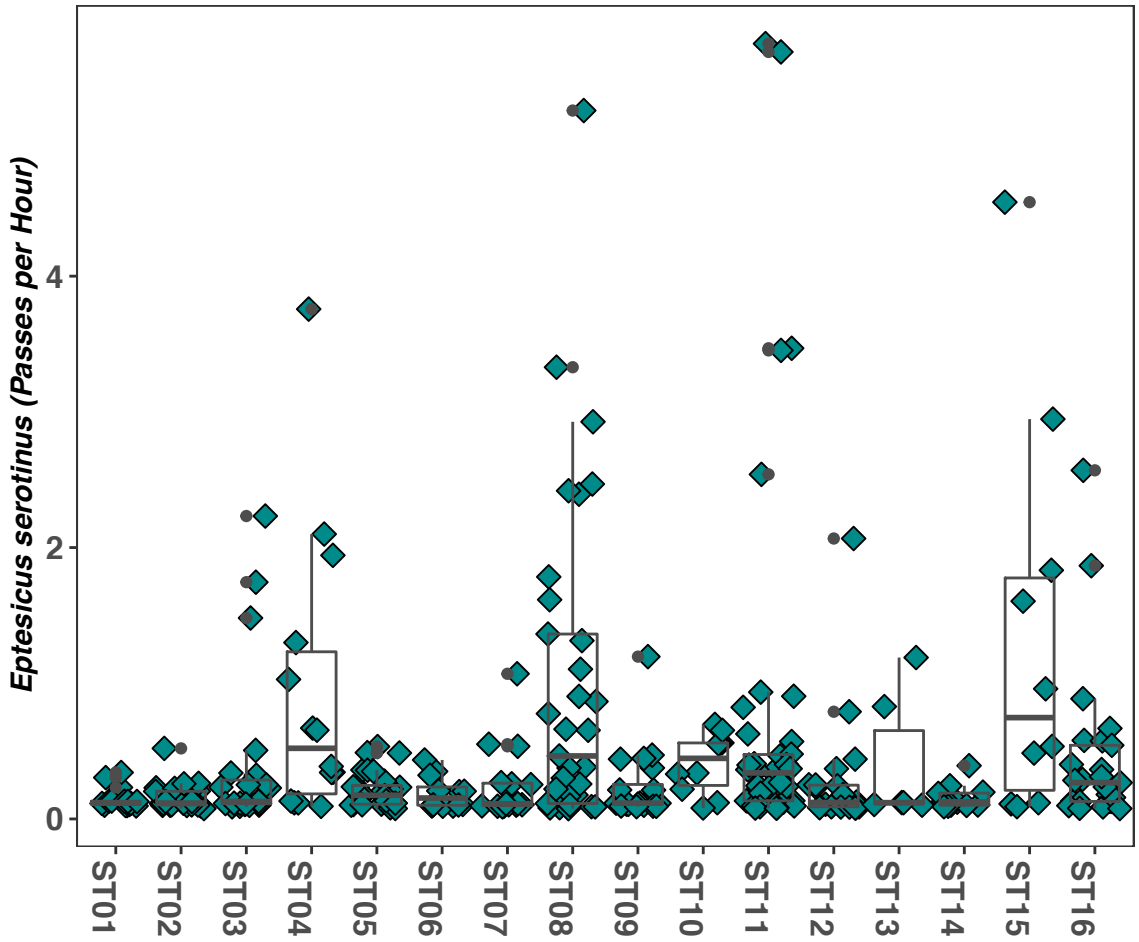
- **The Null Hypothesis:** *bat pass rates per hour* are from distributions with the same median.
- **The Alternative Hypothesis:** *bat pass rates per hour* are from distributions with a different median.

4.1.1 *Barbastella barbastellus*: Statistical Comparison of Activity Between Locations



There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

4.1.2 *Eptesicus serotinus*: Statistical Comparison of Activity Between Locations



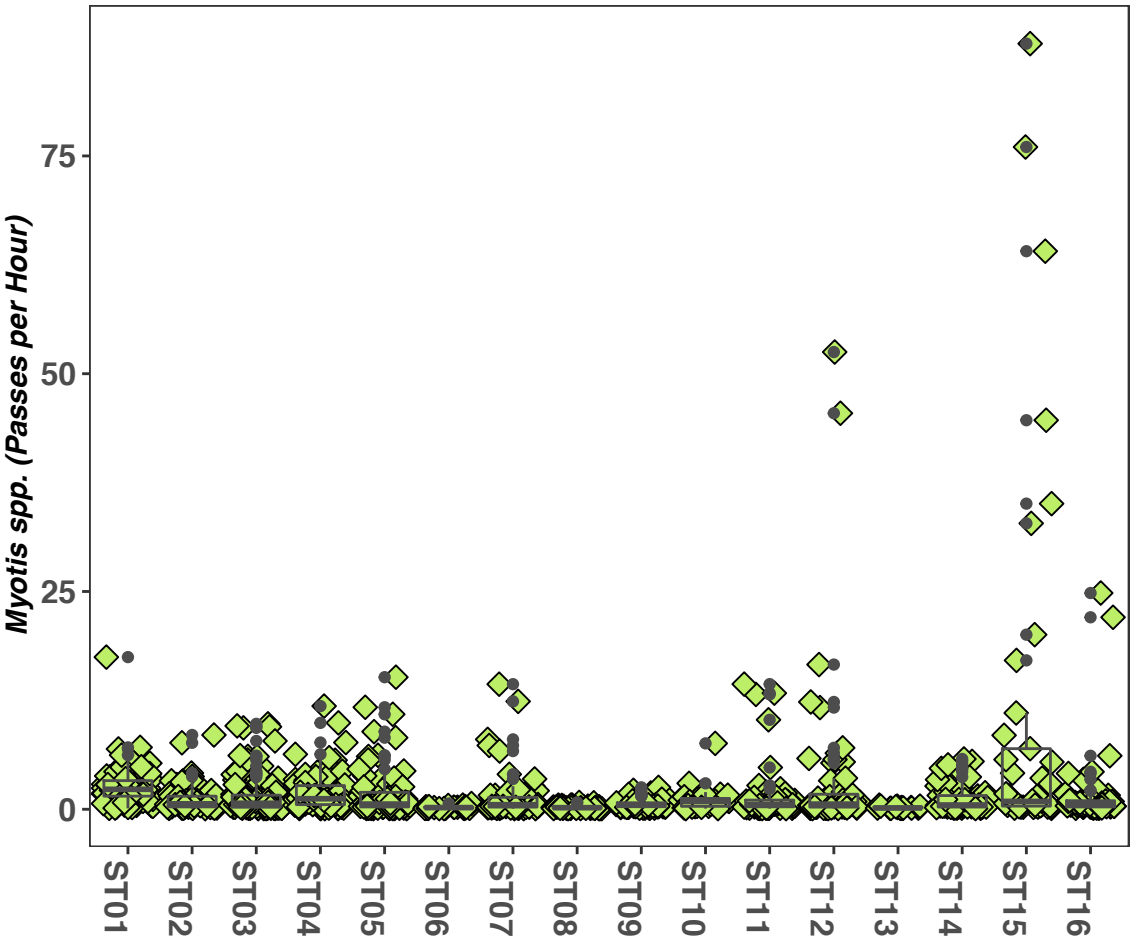
The Kruskal-Wallis test was undertaken for *Eptesicus serotinus* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at P<0.05. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

Table 18: Post hoc Test Results (Dunn's Test) for Eptesicus serotinus

Locations with a significant difference	adjusted P
ST02 - ST04	0.0431097

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

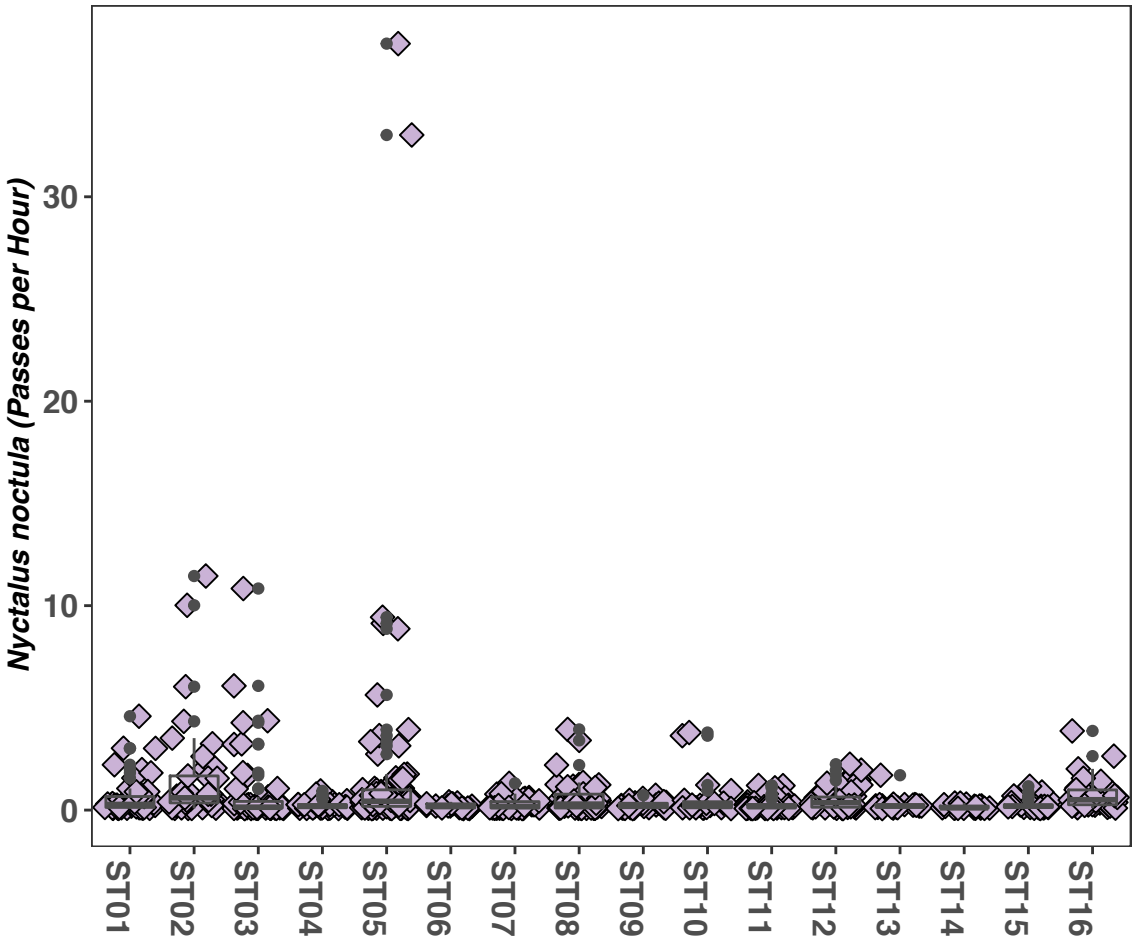
4.1.3 *Myotis spp.*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Myotis spp.* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

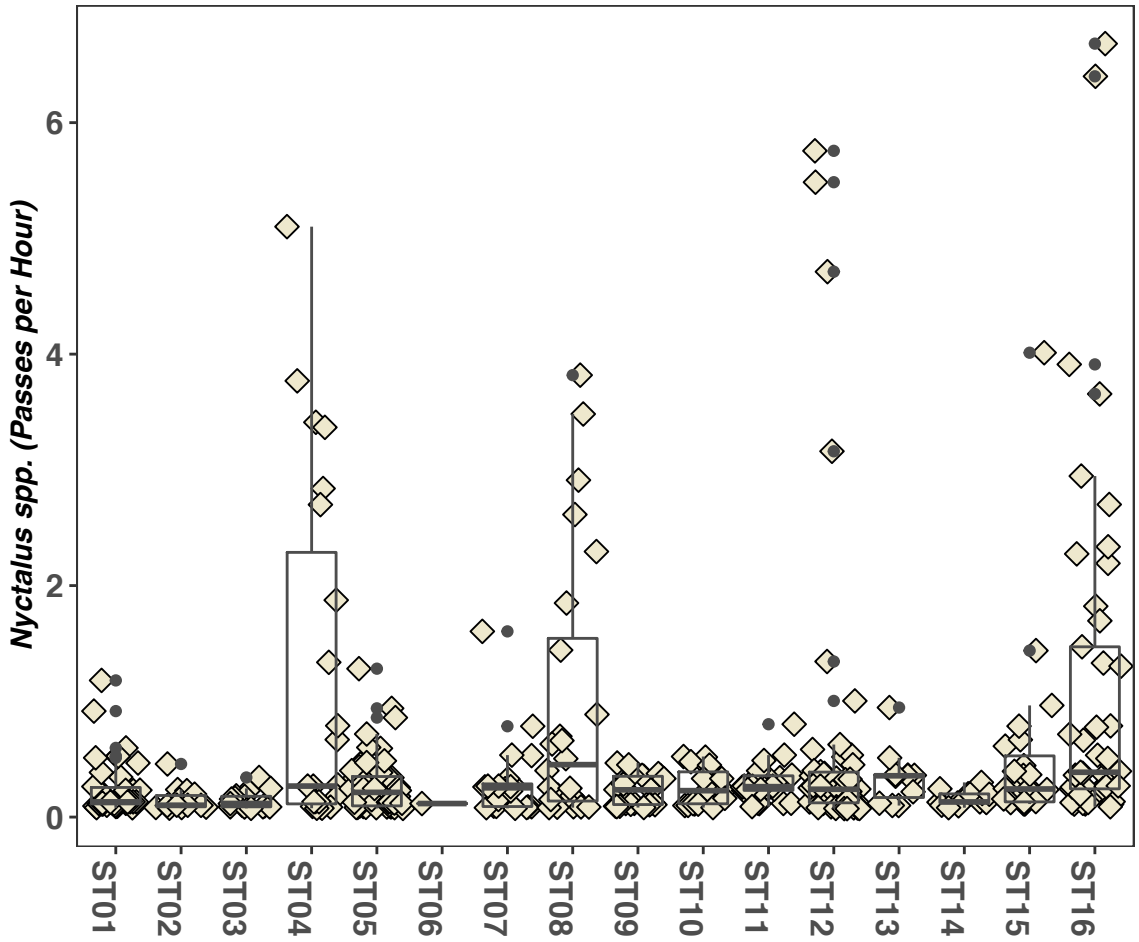
4.1.4 *Nyctalus noctula*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Nyctalus noctula* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

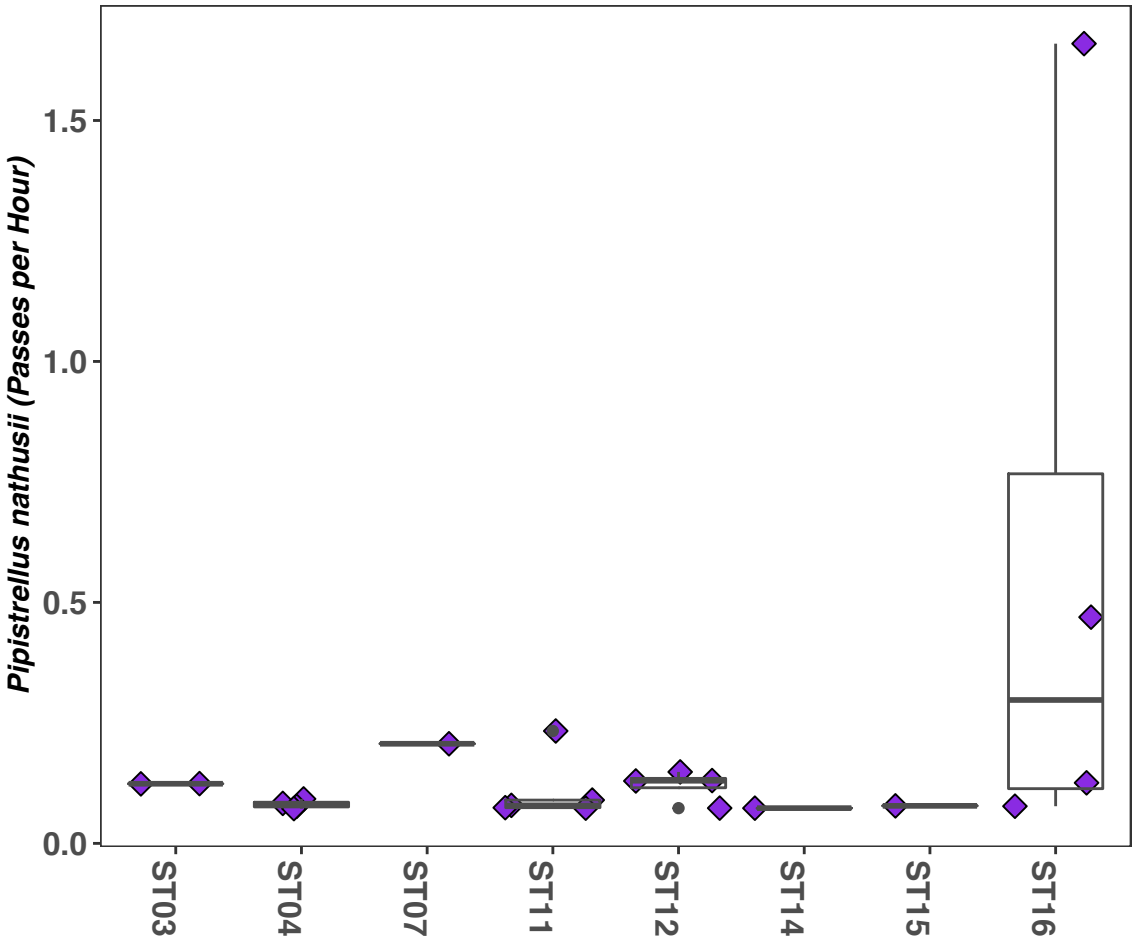
4.1.5 *Nyctalus spp.*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Nyctalus spp.* between the following locations: ST01, ST02, ST03, ST04, ST05, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

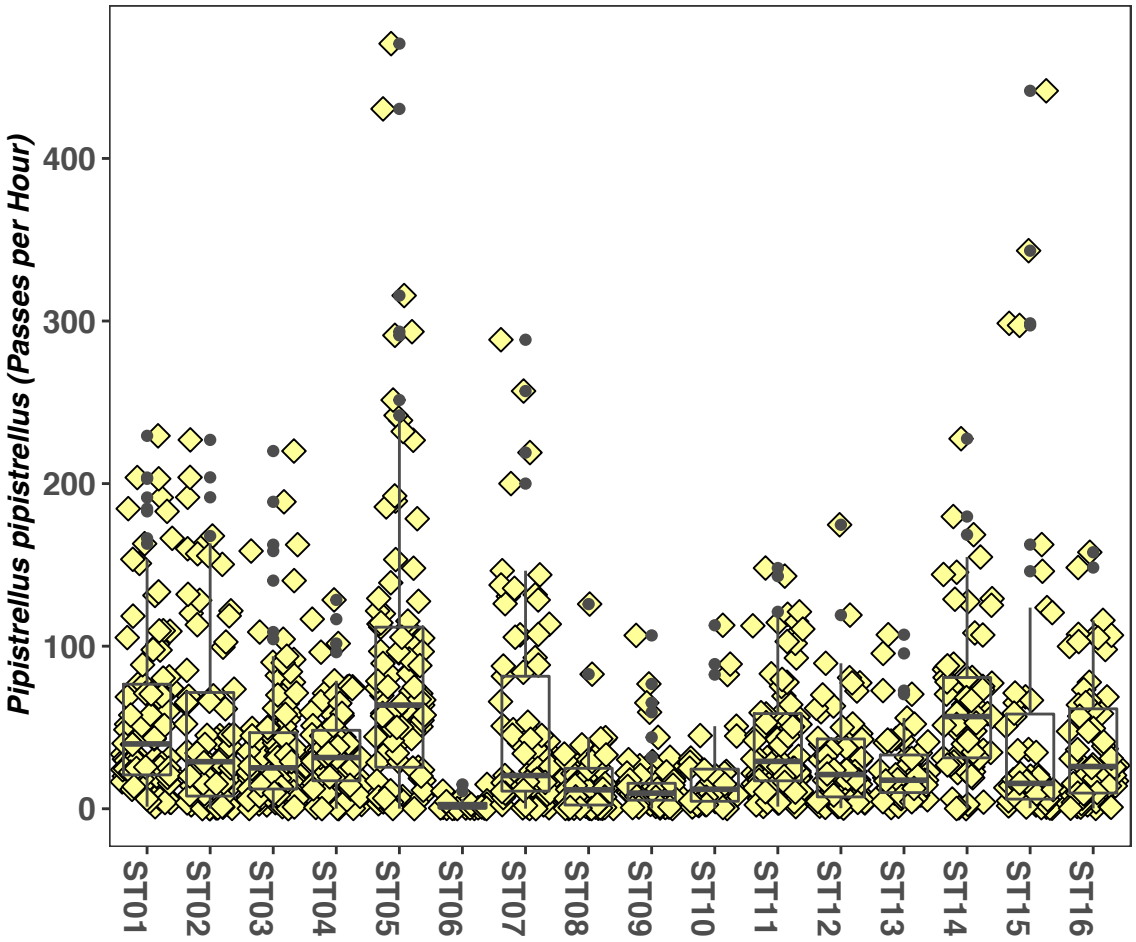
The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

4.1.6 *Pipistrellus nathusii*: Statistical Comparison of Activity Between Locations



There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

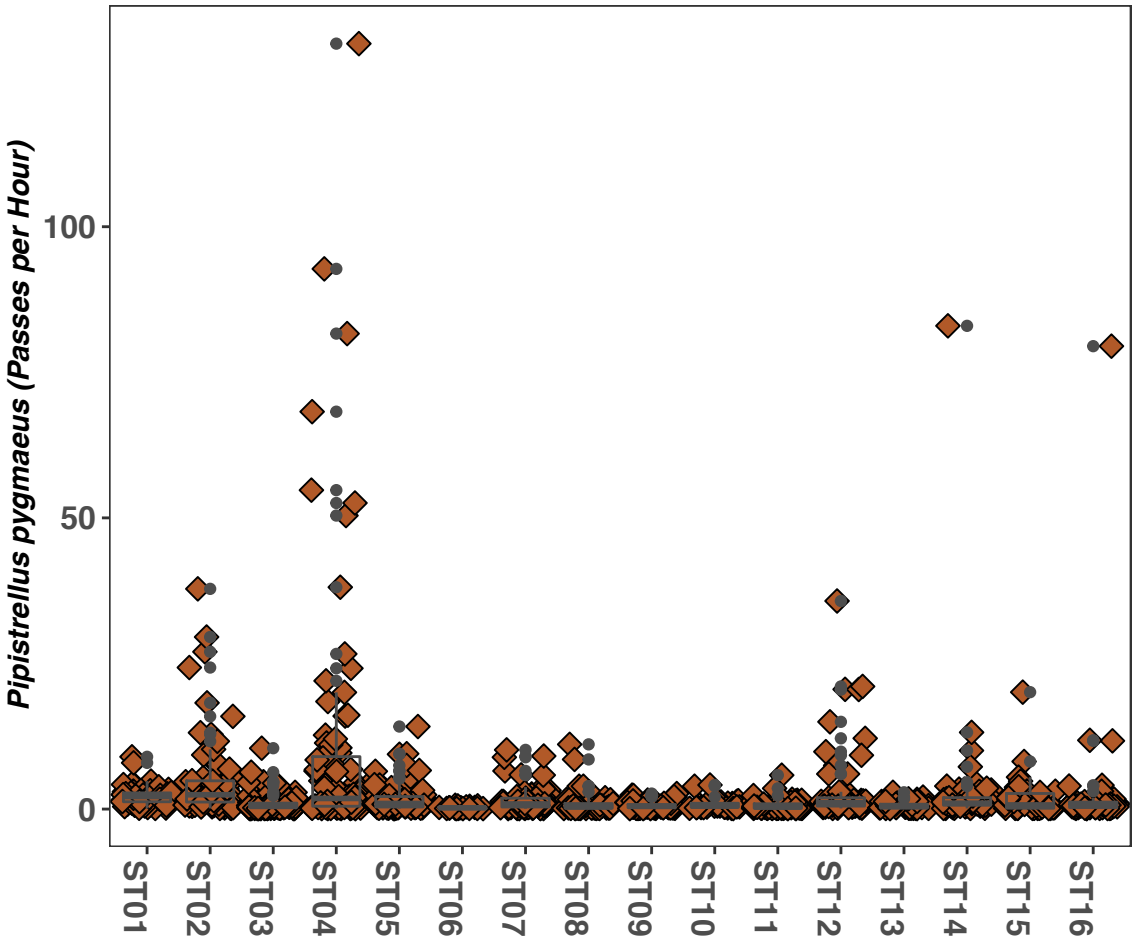
4.1.7 *Pipistrellus pipistrellus*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Pipistrellus pipistrellus* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

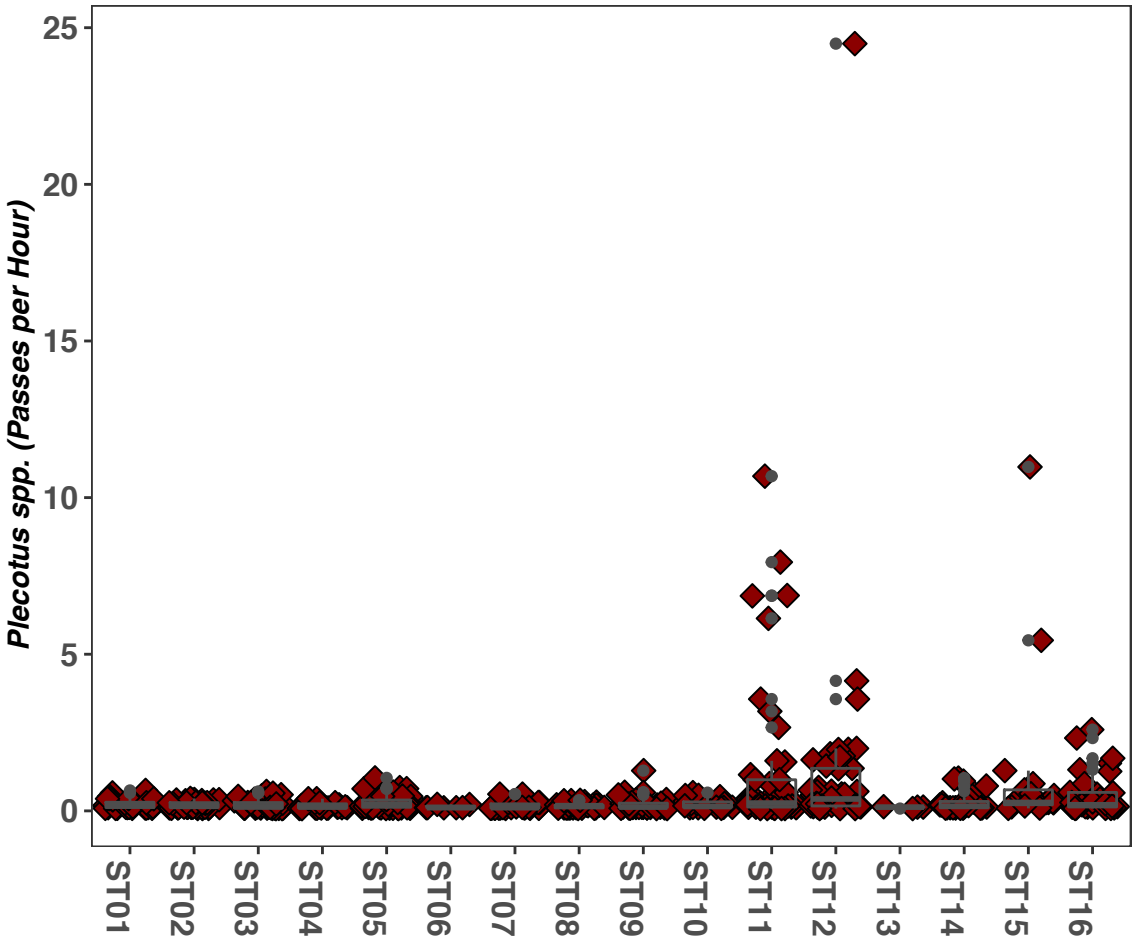
4.1.8 *Pipistrellus pygmaeus*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Pipistrellus pygmaeus* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST13, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

4.1.9 *Plecotus spp.*: Statistical Comparison of Activity Between Locations



The Kruskal-Wallis test was undertaken for *Plecotus spp.* between the following locations: ST01, ST02, ST03, ST04, ST05, ST06, ST07, ST08, ST09, ST10, ST11, ST12, ST14, ST15, and ST16.The null hypothesis is rejected at $P<0.05$. Activity between some locations is likely to be different. *Post hoc* testing with the Dunn's Test, has been applied to determine which locations are different; the results are shown below.

The P value adjustment has been made with the Bonferroni method. The Bonferroni method is a simple technique for controlling the overall probability of a false significant result when multiple comparisons are to be carried out.

5 REFERENCES

The visualisation and analysis has been undertaken in R (R Core Team 2018) using R version 3.6.1 (2019-07-05); R is an open-source statistical programming language. This document has been produced dynamically using `knitr` (Xie 2015) and `rmarkdown` (Allaire et al. 2019), integrating the data, analysis and reporting. For clarity the R script that generates the analysis is not shown. The graphics have been produced using the R package `ggplot2` (Wickham, Chang, et al. 2019). The wrangling of data was undertaken with `dplyr` (Wickham, François, et al. 2019) and `tidyr` (Wickham and Henry 2019) packages. The data in *csv* and *Excel* files has been imported with `readr` (Wickham, Hester, and Francois 2018) and `readxl` (Wickham and Bryan 2019) packages respectivily. The computation with dates and times has been accomplished with `lubridate` (Spinu, Grolemund, and Wickham 2018) package. Suntimes have been obtained with the `suncalcs` (Thieurmel and Elmarhraoui 2019) package. The manipulation of text was through the `stringr` (Wickham 2019) package. Summary statistics have been produced with the `mosaic` (Pruim, Kaplan, and Horton 2019) package. Tables have been enhanced and made more readable with the `kableExtra` (Zhu 2019) package. The `broman` (Broman and Aimee Teo Broman 2018) package provided some useful R functions. The `scales` (Wickham 2018) package improves the clarity of scales on `ggplot` graphics.

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Table 19: Post hoc Test Results (Dunn's Test) for Myotis spp.

Locations with a significant difference	adjusted P
ST01 - ST02	0.0000028
ST01 - ST03	0.0000002
ST01 - ST05	0.0000002
ST01 - ST06	0.0000000
ST02 - ST06	0.0006328
ST03 - ST06	0.0000208
ST04 - ST06	0.0000000
ST05 - ST06	0.0000651
ST01 - ST07	0.0000000
ST04 - ST07	0.0230002
ST06 - ST07	0.0018389
ST01 - ST08	0.0000000
ST02 - ST08	0.0000487
ST03 - ST08	0.0000002
ST04 - ST08	0.0000000
ST05 - ST08	0.0000011
ST07 - ST08	0.0001601
ST01 - ST09	0.0000000
ST04 - ST09	0.0008898
ST06 - ST09	0.0099094
ST08 - ST09	0.0014117
ST01 - ST10	0.0034714
ST06 - ST10	0.0010507
ST08 - ST10	0.0002026
ST01 - ST11	0.0000000
ST04 - ST11	0.0098745
ST06 - ST11	0.0016118
ST08 - ST11	0.0001131
ST01 - ST12	0.0000222
ST06 - ST12	0.0001852
ST08 - ST12	0.0000095
ST01 - ST13	0.0000000
ST02 - ST13	0.0028729
ST03 - ST13	0.0001904
ST04 - ST13	0.0000000
ST05 - ST13	0.0004773
ST07 - ST13	0.0076894
ST09 - ST13	0.0335660
ST10 - ST13	0.0035472
ST11 - ST13	0.0071604
ST12 - ST13	0.0009901
ST01 - ST14	0.0000026
ST06 - ST14	0.0004984
ST08 - ST14	0.0000338
ST13 - ST14	0.0023658
ST06 - ST15	0.0000004
ST08 - ST15	0.0000000
ST13 - ST15	0.0000043
ST01 - ST16	0.0000007

Table 20: Post hoc Test Results (Dunn's Test) for Nyctalus noctula

Locations with a significant difference	adjusted P
ST02 - ST03	0.0068697
ST02 - ST04	0.0084664
ST03 - ST05	0.0489207
ST02 - ST06	0.0244396
ST02 - ST07	0.0055391
ST05 - ST07	0.0397477
ST02 - ST09	0.0169575
ST02 - ST11	0.0008362
ST05 - ST11	0.0053610
ST02 - ST14	0.0001593
ST05 - ST14	0.0011036
ST02 - ST15	0.0487698
ST03 - ST16	0.0082717
ST04 - ST16	0.0099469
ST06 - ST16	0.0269870
ST07 - ST16	0.0066015
ST09 - ST16	0.0194322
ST11 - ST16	0.0010388
ST14 - ST16	0.0001883

Table 21: Post hoc Test Results (Dunn's Test) for Nyctalus spp.

Locations with a significant difference	adjusted P
ST02 - ST08	0.0287503
ST03 - ST08	0.0298489
ST01 - ST16	0.0009609
ST02 - ST16	0.0001118
ST03 - ST16	0.0000783
ST05 - ST16	0.0019162
ST09 - ST16	0.0148892
ST14 - ST16	0.0069508

Table 22: Post hoc Test Results (Dunn's Test) for Pipistrellus pipistrellus

Locations with a significant difference	adjusted P
ST02 - ST05	0.0352140
ST03 - ST05	0.0003170
ST04 - ST05	0.0405925
ST01 - ST06	0.0000000
ST02 - ST06	0.0000000
ST03 - ST06	0.0000000
ST04 - ST06	0.0000000
ST05 - ST06	0.0000000
ST05 - ST07	0.0114755
ST06 - ST07	0.0000000
ST01 - ST08	0.0000000
ST02 - ST08	0.0002513
ST03 - ST08	0.0006499
ST04 - ST08	0.0000380
ST05 - ST08	0.0000000
ST07 - ST08	0.0004301
ST01 - ST09	0.0000000
ST02 - ST09	0.0000061
ST03 - ST09	0.0000110
ST04 - ST09	0.0000004
ST05 - ST09	0.0000000
ST07 - ST09	0.0000105
ST01 - ST10	0.0002609
ST05 - ST10	0.0000013
ST06 - ST10	0.0104661
ST06 - ST11	0.0000000
ST08 - ST11	0.0000048
ST09 - ST11	0.0000000
ST10 - ST11	0.0395286
ST01 - ST12	0.0113472
ST05 - ST12	0.0000446
ST06 - ST12	0.0000021
ST09 - ST12	0.0379617
ST01 - ST13	0.0037888
ST05 - ST13	0.0000138
ST06 - ST13	0.0000192
ST03 - ST14	0.0017353
ST06 - ST14	0.0000000
ST07 - ST14	0.0286461
ST08 - ST14	0.0000000
ST09 - ST14	0.0000000
ST10 - ST14	0.0000049
ST12 - ST14	0.0001950
ST13 - ST14	0.0000623
ST01 - ST15	0.0441249
ST05 - ST15	0.0004008
ST06 - ST15	0.0000039
ST14 - ST15	0.0011283
ST05 - ST16	0.0115970

Table 23: Post hoc Test Results (Dunn's Test) for Pipistrellus pygmaeus

Locations with a significant difference	adjusted P
ST01 - ST03	0.0000000
ST02 - ST03	0.0000000
ST03 - ST04	0.0000016
ST01 - ST05	0.0067913
ST02 - ST05	0.0125017
ST03 - ST05	0.0124490
ST01 - ST06	0.0000000
ST02 - ST06	0.0000000
ST04 - ST06	0.0000000
ST05 - ST06	0.0000174
ST01 - ST07	0.0008116
ST02 - ST07	0.0015926
ST06 - ST07	0.0004866
ST01 - ST08	0.0000000
ST02 - ST08	0.0000000
ST04 - ST08	0.0000101
ST05 - ST08	0.0118769
ST01 - ST09	0.0000000
ST02 - ST09	0.0000000
ST04 - ST09	0.0000002
ST05 - ST09	0.0015564
ST01 - ST10	0.0000355
ST02 - ST10	0.0000570
ST04 - ST10	0.0156568
ST01 - ST11	0.0000000
ST02 - ST11	0.0000000
ST04 - ST11	0.0000000
ST05 - ST11	0.0004434
ST07 - ST11	0.0441015
ST03 - ST12	0.0091247
ST06 - ST12	0.0000103
ST08 - ST12	0.0069175
ST09 - ST12	0.0012178
ST11 - ST12	0.0003918
ST01 - ST13	0.0000000
ST02 - ST13	0.0000001
ST04 - ST13	0.0000976
ST05 - ST13	0.0395155
ST12 - ST13	0.0208963
ST03 - ST14	0.0052708
ST06 - ST14	0.0000068
ST08 - ST14	0.0045530
ST09 - ST14	0.0006847
ST11 - ST14	0.0002094
ST13 - ST14	0.0150000
ST01 - ST15	0.0007695
ST02 - ST15	0.0011551
ST06 - ST15	0.0189150
ST01 - ST16	0.0000012

Table 24: Post hoc Test Results (Dunn's Test) for Plecotus spp.

Locations with a significant difference	adjusted P
ST07 - ST11	0.0012670
ST08 - ST11	0.0267821
ST02 - ST12	0.0284071
ST03 - ST12	0.0043689
ST04 - ST12	0.0027066
ST07 - ST12	0.0000318
ST08 - ST12	0.0010364
ST09 - ST12	0.0103278
ST07 - ST15	0.0057253
ST07 - ST16	0.0494730

Appendix A

Transect Survey

Data Analysis and Visualisation

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1 INTRODUCTION

1.1 GENERAL INFORMATION ON BAT SPECIES OBSERVED

Below is a general introduction to the species observed on the survey. Further information can be found on the Bat Conservation Trust website https://www.bats.org.uk/about-bats/what-are-bats/uk-bats.

Common Pipistrelle *Pipistrellus pipistrellus*
Common pipistrelles are the most common and widespread of all British bat species. They are found in lots of places, including towns and cities, as well as in the countryside. They are small, and their flight is fast and jerky as they pursue small insects which they catch and eat whilst flying. A single pipistrelle can consume up to 3,000 insects in one night!

Leisler's or Noctule
These two bats belong to the same family, and are fairly large for a British bat. The noctule is generally one of the first bats to be seen of an evening, and they like to hunt over open ground, particularly pasture. Leisler's are more likely to be found in woodland, but they can also be found in the same places as noctules-making them hard to tell apart!

Myotis Species
The Myotis are a group of bats which includes Alcathoe, Bechstein's, Brandt's, Daubenton's, Natterer's and Whiskered bats. They all make very similar sounds which mean that sometimes it is very hard to tell them apart from their recordings alone.

Natterer's Bat *Myotis nattereri*
This medium-sized species has long, slightly curved ears, and a fringe of very stiff bristles along the trailing edge of its broad tail membrane. Natterer's bat is highly agile in tight spaces, making quick, sharp turns. This means it can hunt very close to vegetation, picking up insects off leaves and twigs and catching insects flying close to dense vegetation. They tend to hunt in dense woodland, along tree-lined rivers and over water bodies, but are also found in woodland clearings, meadows and parkland.

Serotine *Eptesicus serotinus* The serotine is one of Britain's largest bat species and usually one of the first to appear in the evening, often emerging in good light. It flies at about tree-top height (to about 10 m) often close to vegetation, and will sometimes flop, wings outstretched, on to the foliage to catch large insects. The serotine will feed around street lamps and even catch prey from the ground.

Serotines roost mainly in buildings with high gables and cavity walls. They can be found in much older buildings and churches, but are less often found in modern buildings.

Soprano Pipistrelle *Pipistrellus pygmaeus*
The soprano pipistrelle was discovered as a different species to the common pipistrelle in the 1990s - they are very similar but they use slightly different echolocation calls

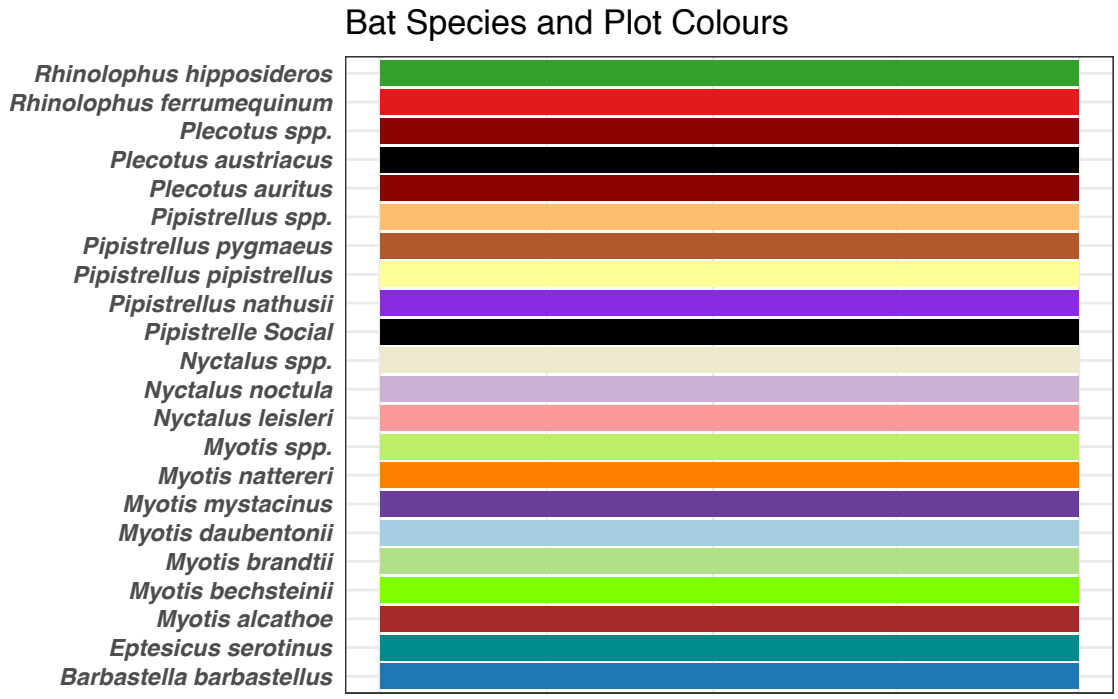
and there are subtle differences in how they look. They also tend to roost and hunt in slightly different places, with the soprano pipistrelle favouring river habitat and wetland areas.

Soprano Pipistrelle *Pipistrellus pygmaeus*

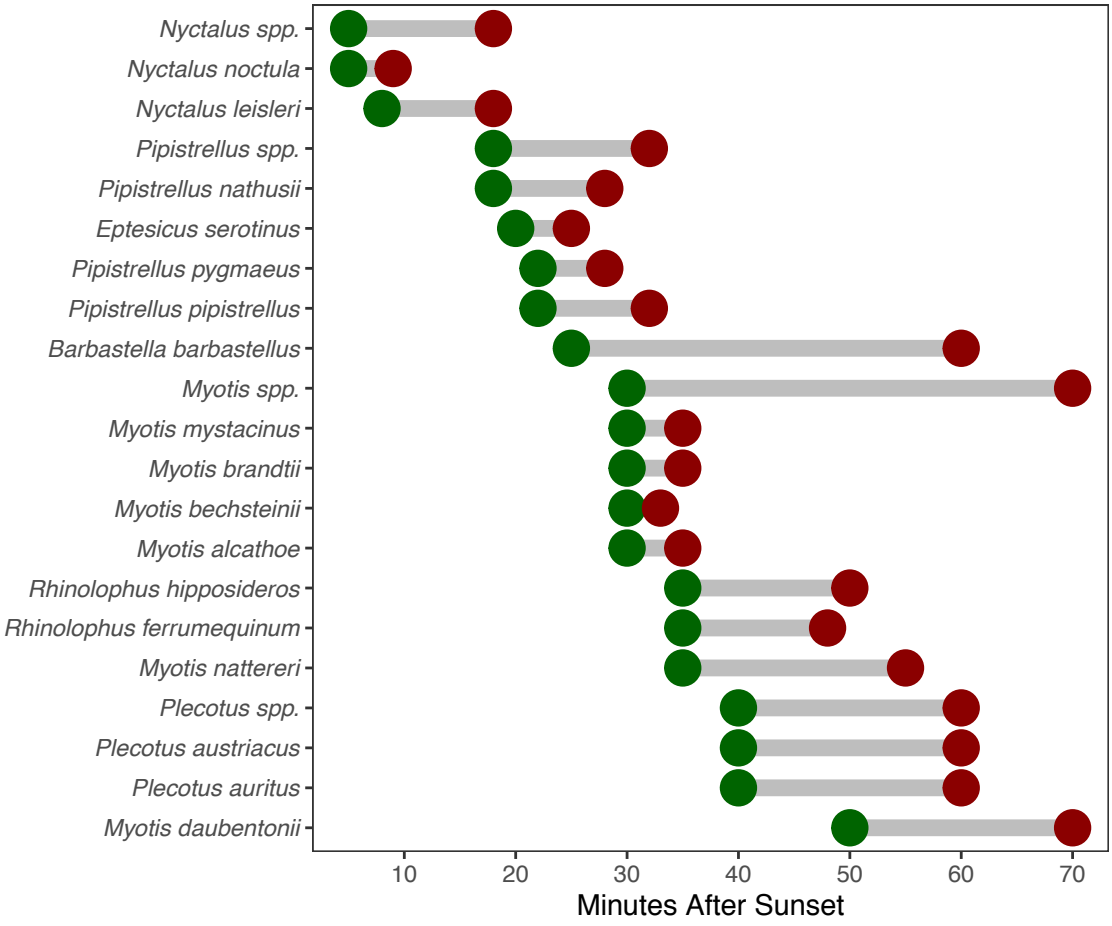
The soprano pipistrelle was discovered as a different species to the common pipistrelle in the 1990s - they are very similar but they use slightly different echolocation calls and there are subtle differences in how they look. They also tend to roost and hunt in slightly different places, with the soprano pipistrelle favouring river habitat and wetland areas.

2 GRAPHS

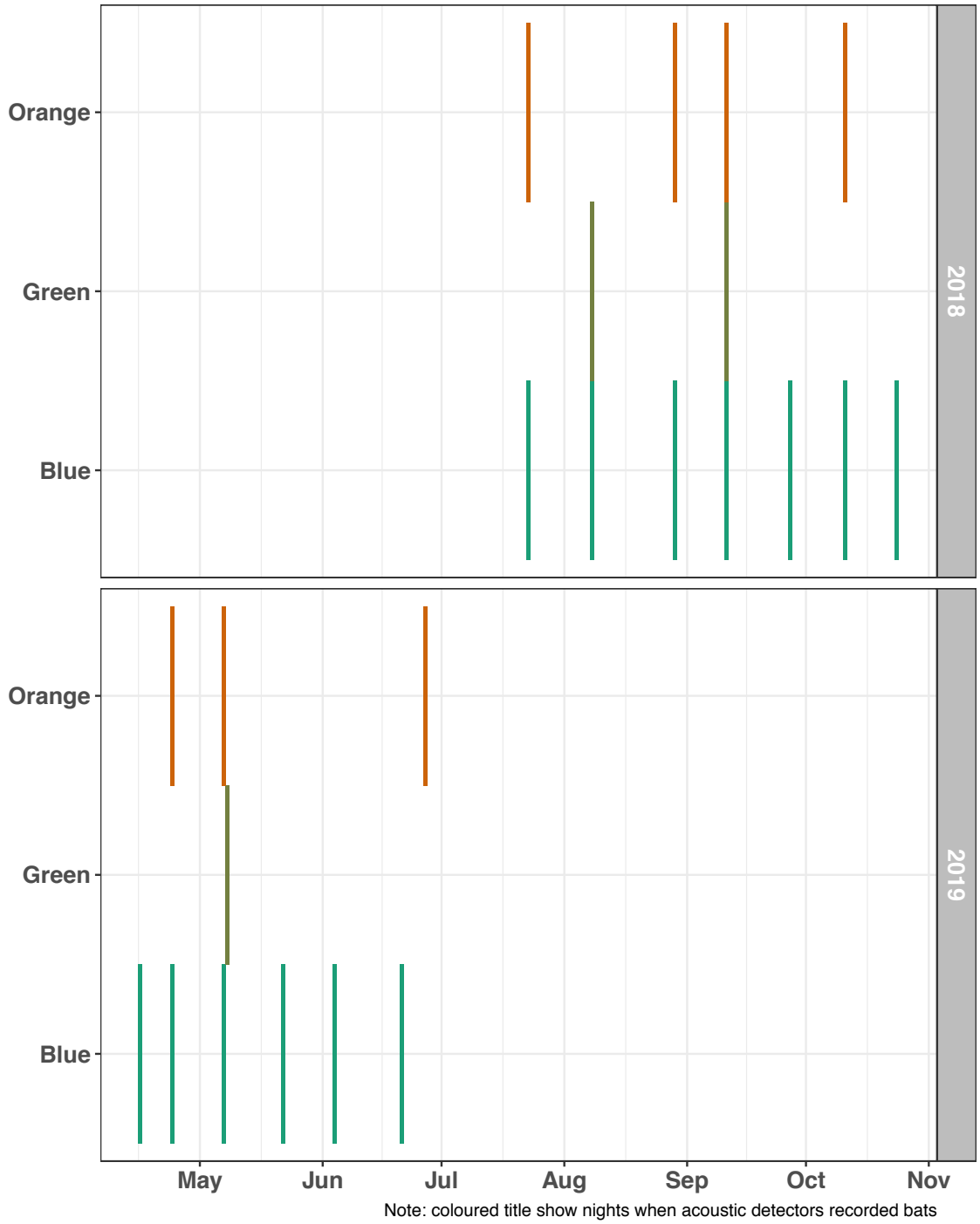
2.1 BAT COLOURS



2.2 ROOST EMERGENCE TIMES AFTER SUNSET

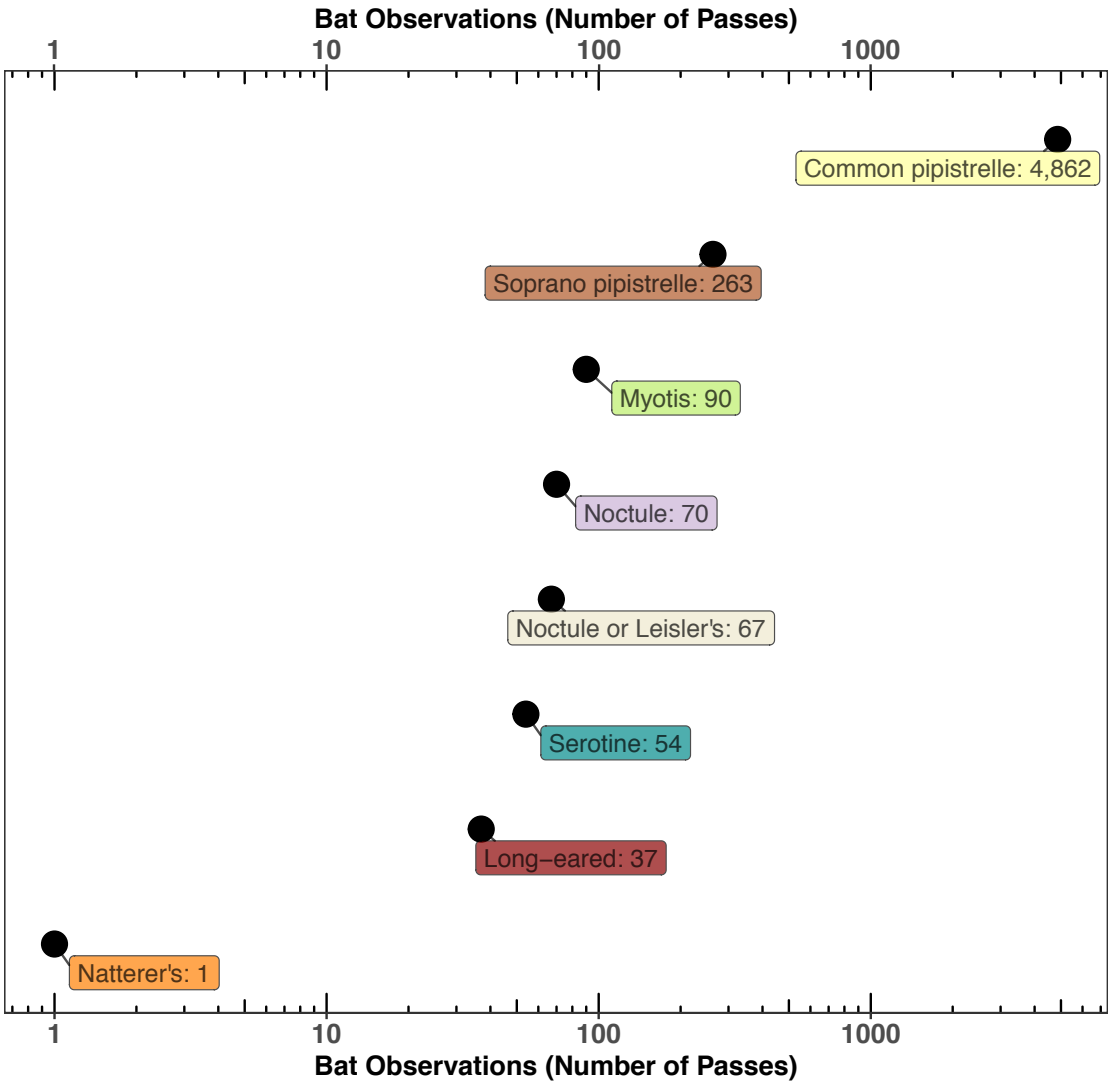


2.3 PERIOD OF DETECTOR RECORDED BATS



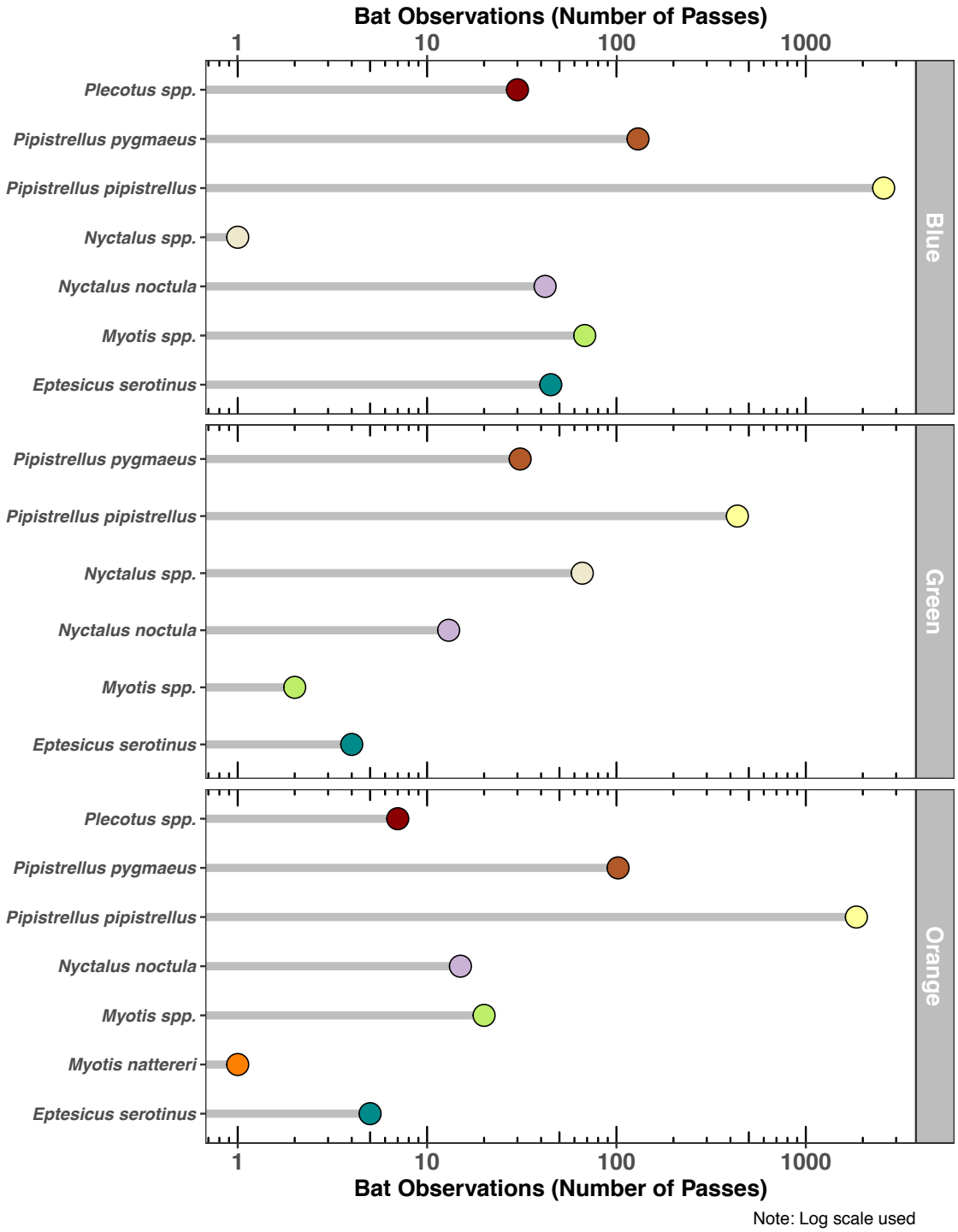
Note: coloured title show nights when acoustic detectors recorded bats

2.4 DOT CHART: COUNT OF ALL SPECIES OBSERVATIONS



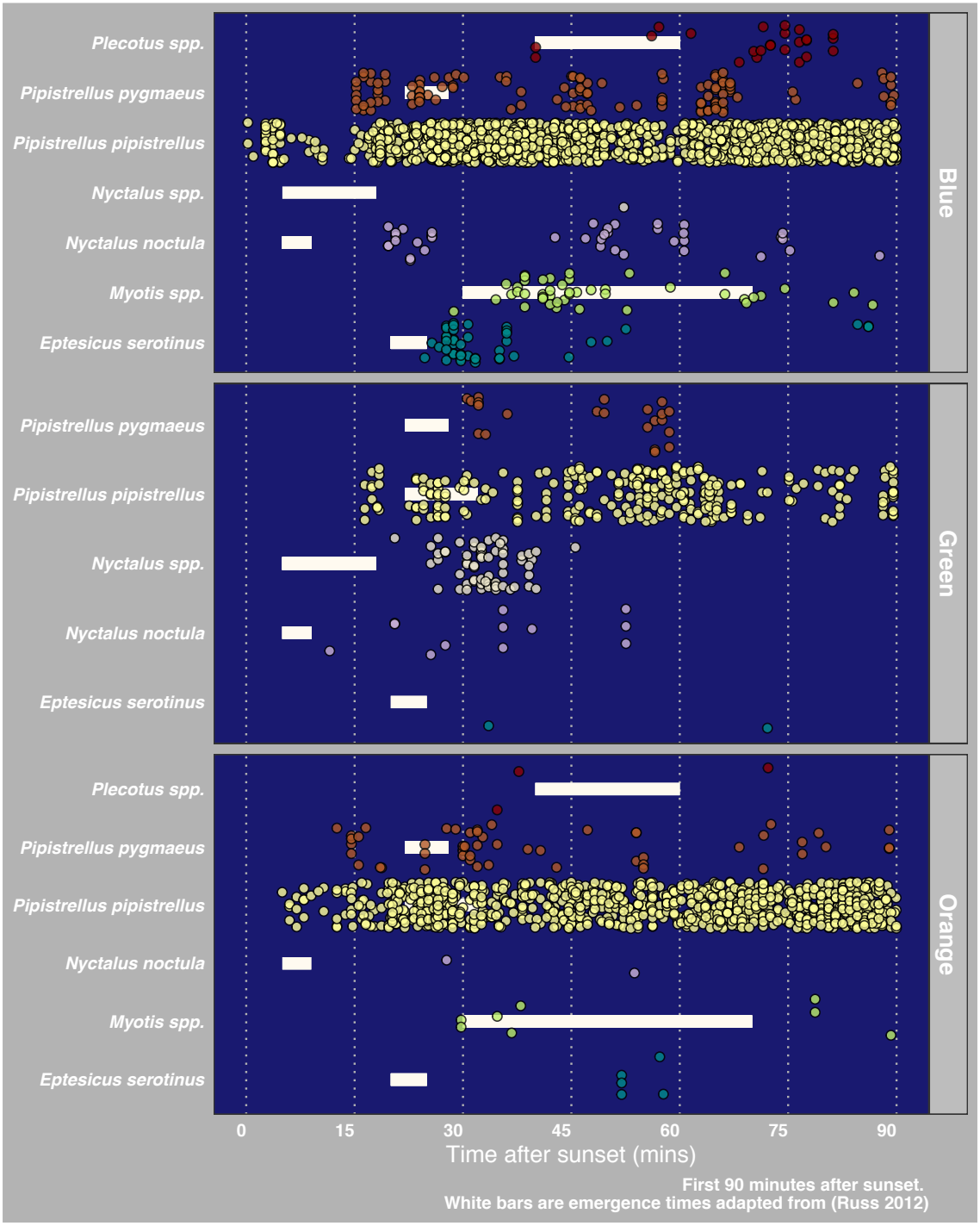
Note: Log scale used

2.5 DOT CHART: COUNT OF SPECIES OBSERVATIONS BY LOCATION

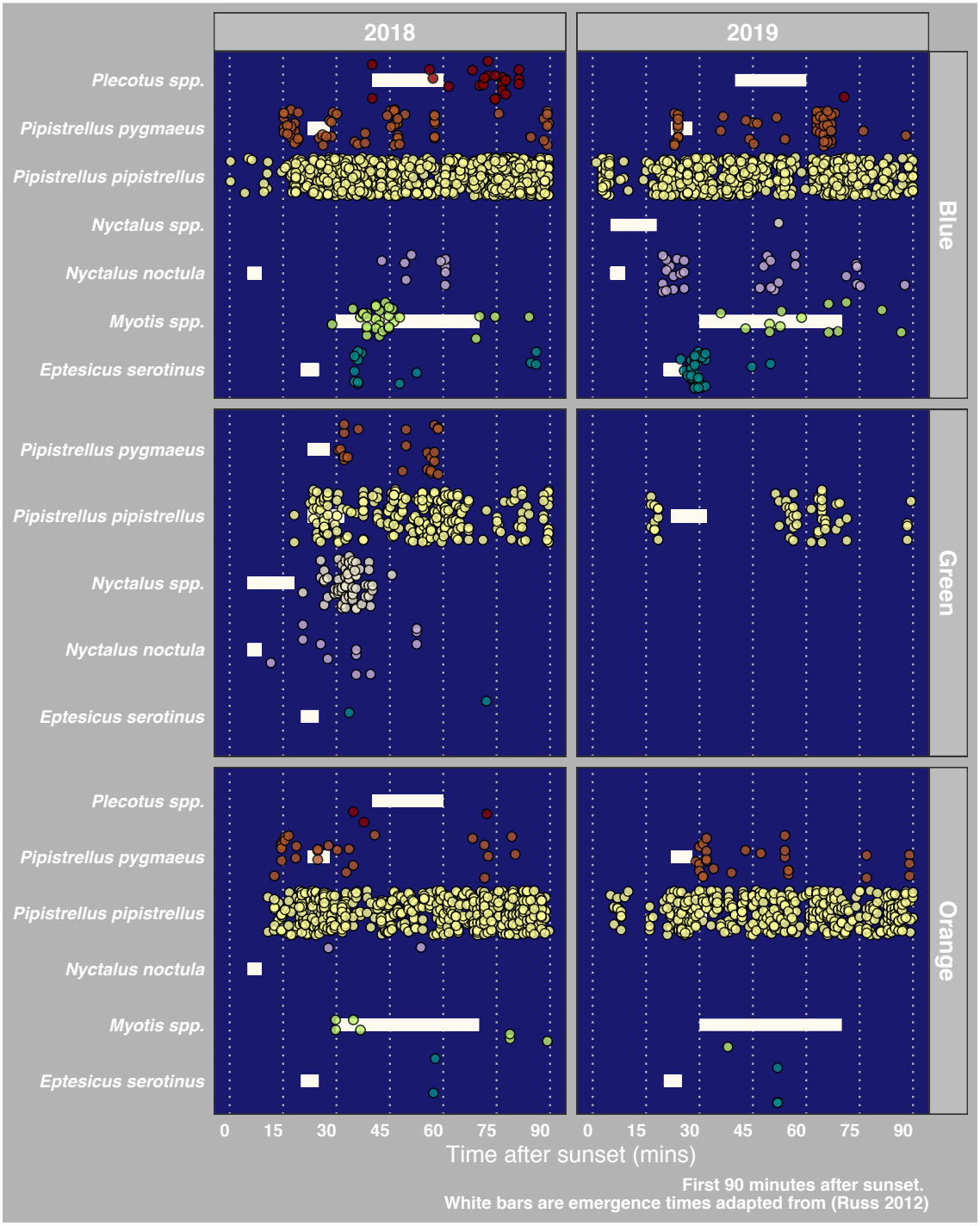


Note: Log scale used

2.6 ROOST AND OBSERVED EMERGENCE BY LOCATION

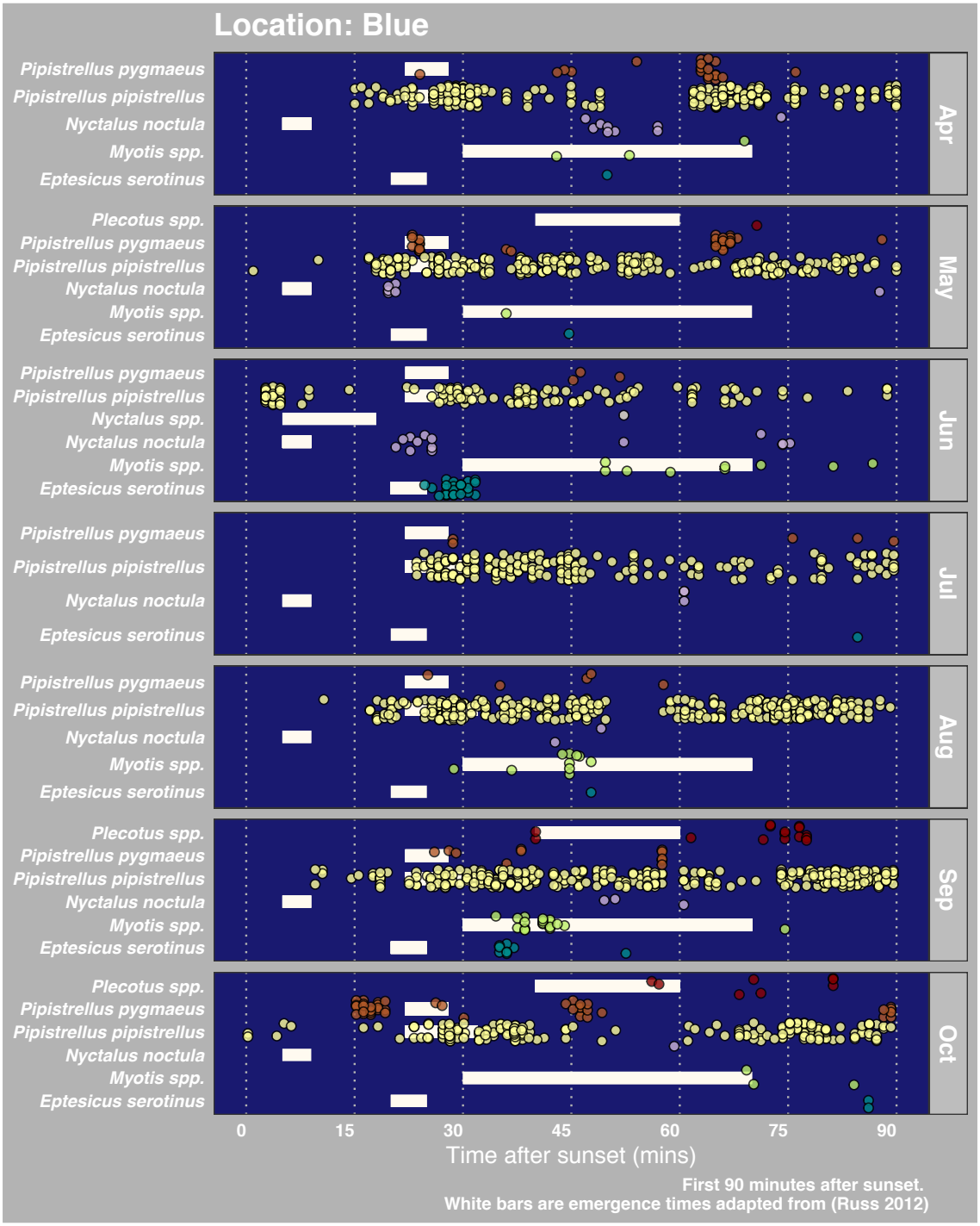


2.7 ROOST AND OBSERVED EMERGENCE BY LOCATION AND YEAR

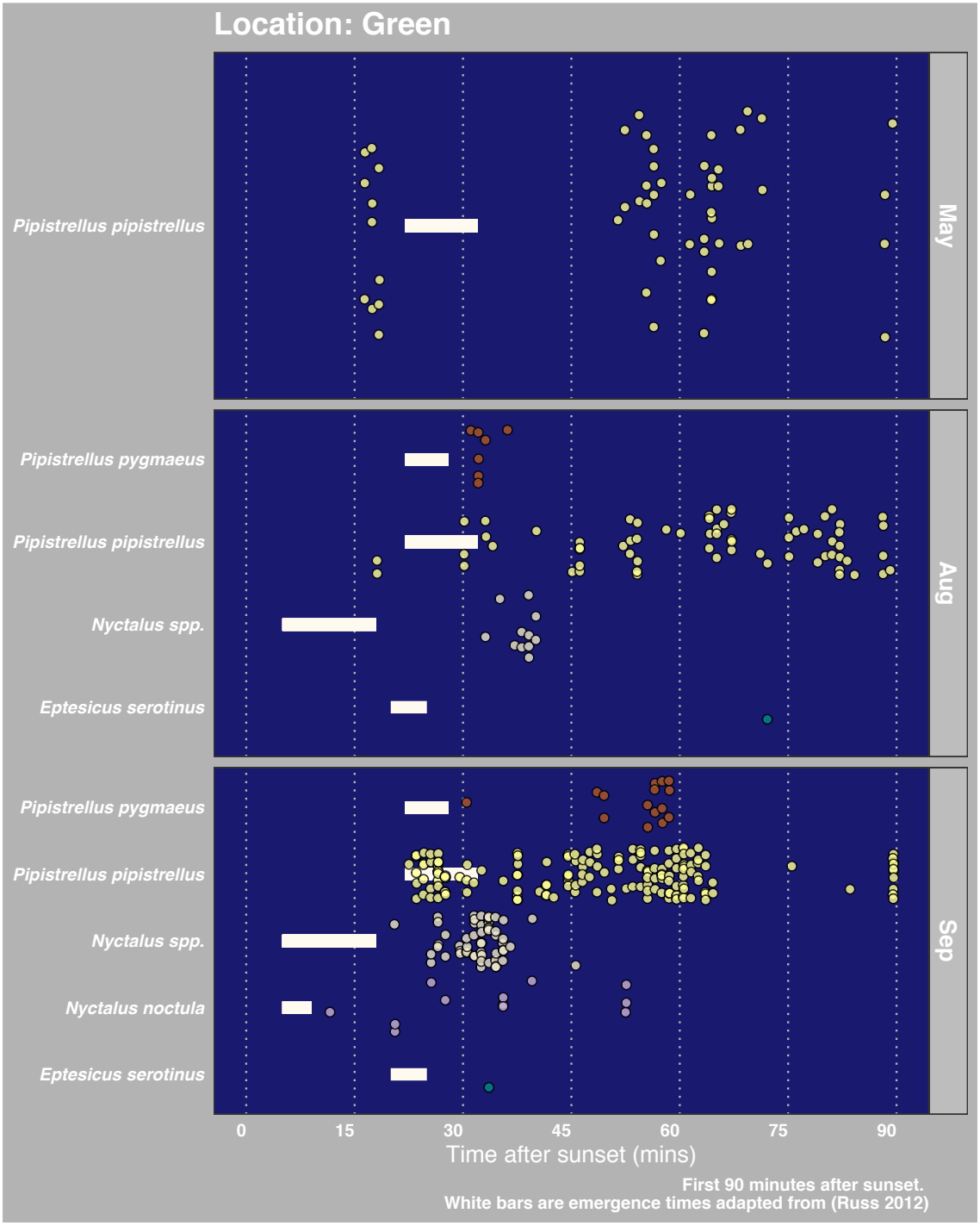


2.8 LOCATION AND OBSERVED EMERGENCE BY MONTH

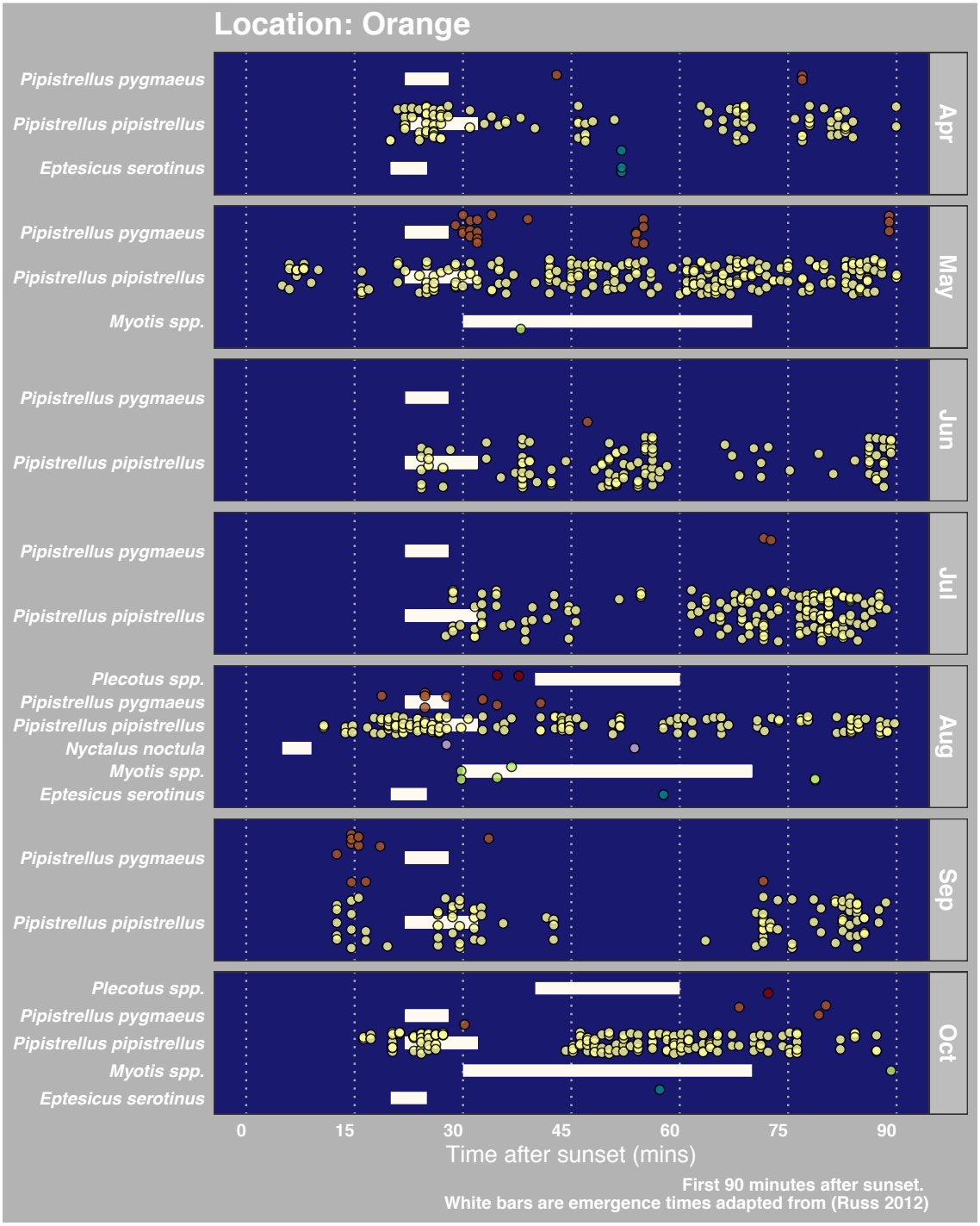
2.8.1 Location :Blue



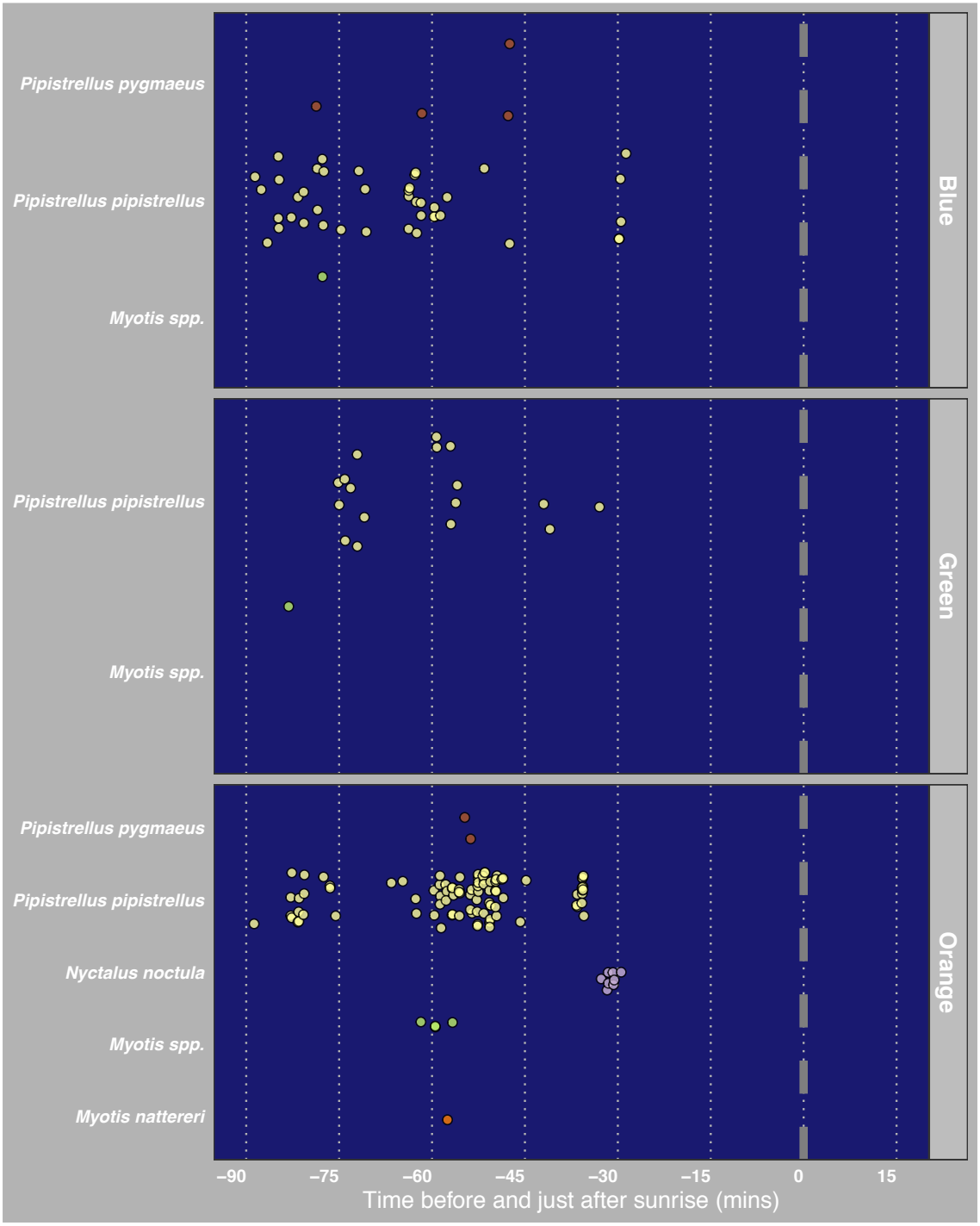
2.8.2 Location :Green



2.8.3 Location :Orange

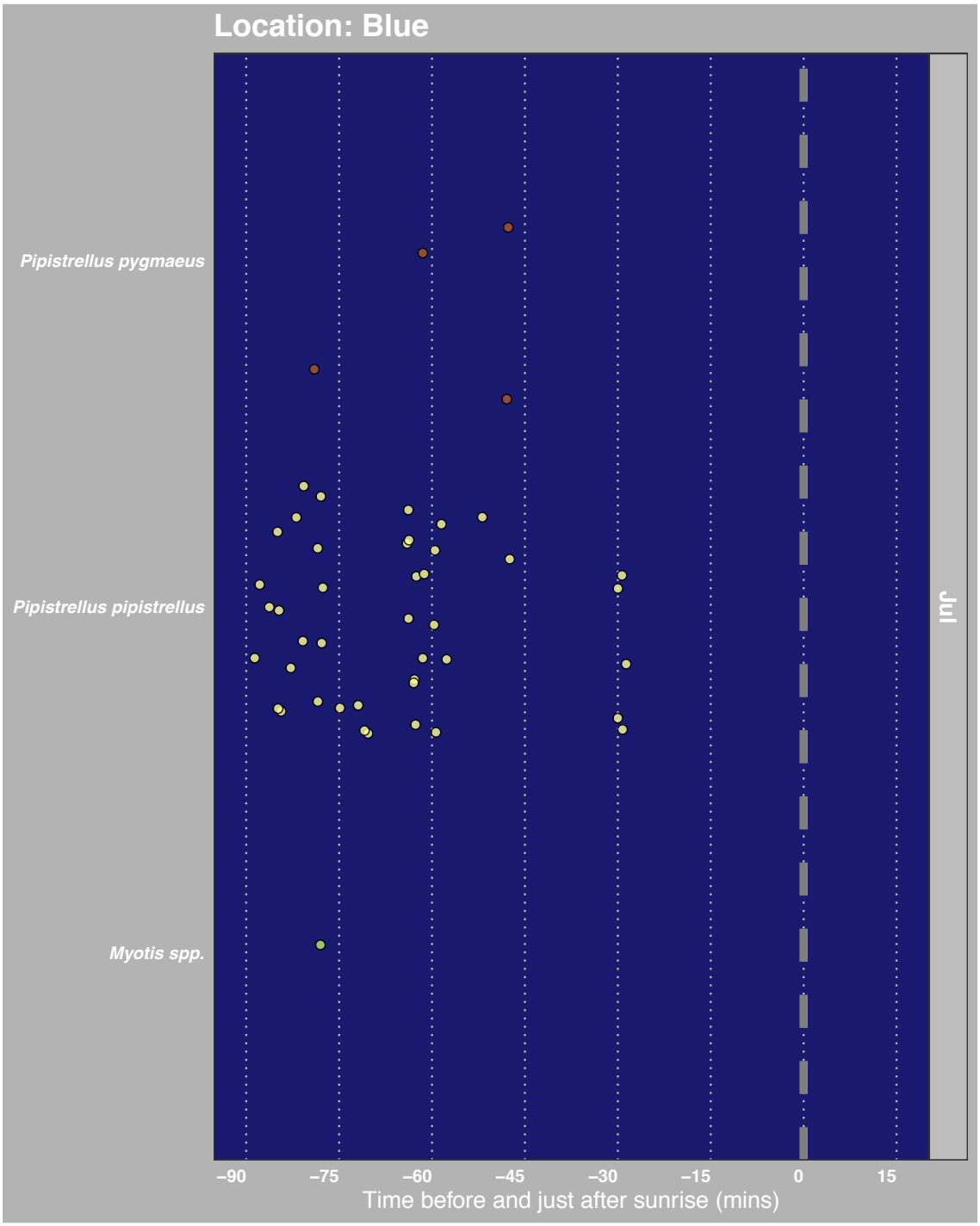


2.9 OBSERVED RE-ENTRY BY LOCATION

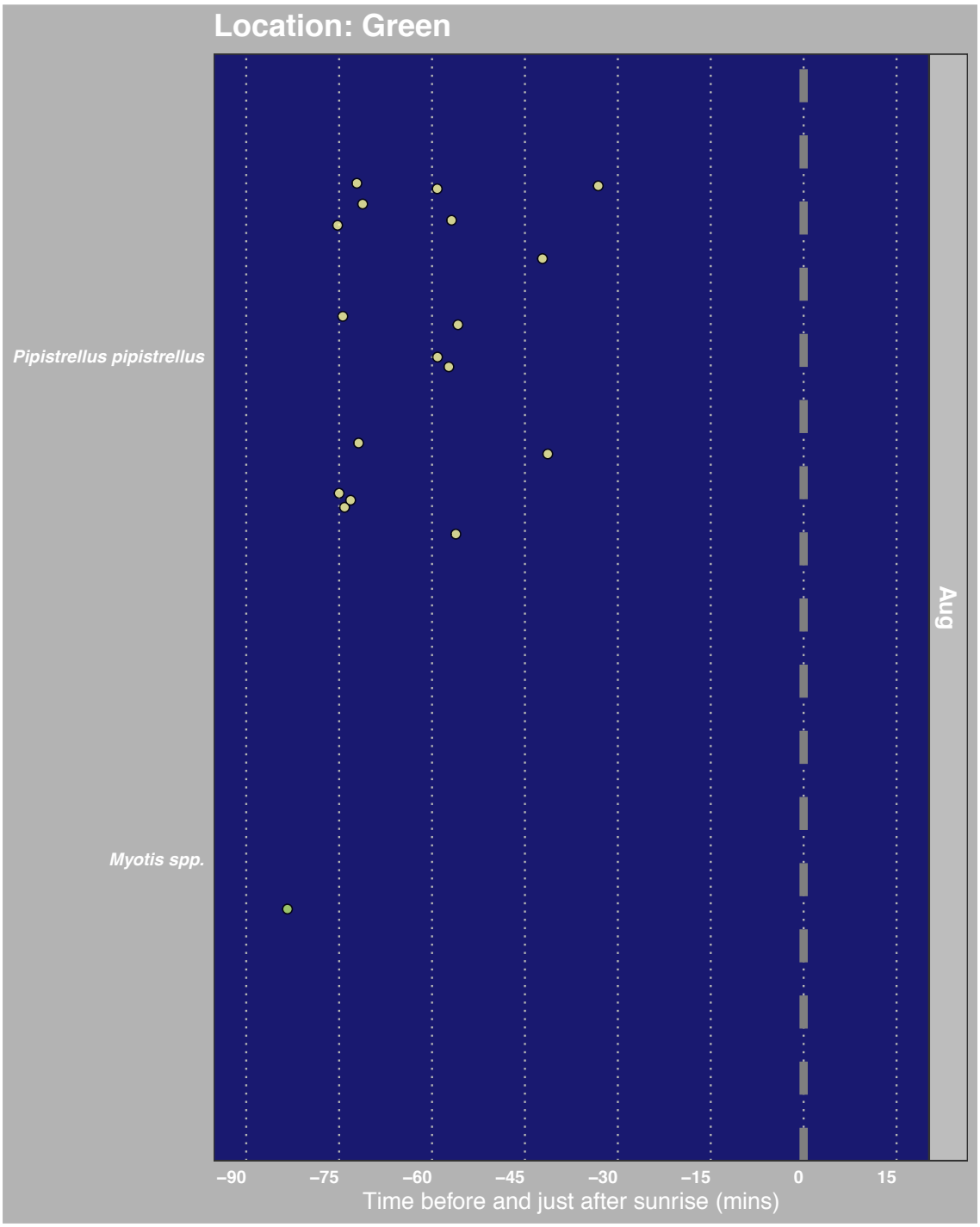


2.10 LOCATION AND OBSERVED RE-ENTRY BY MONTH

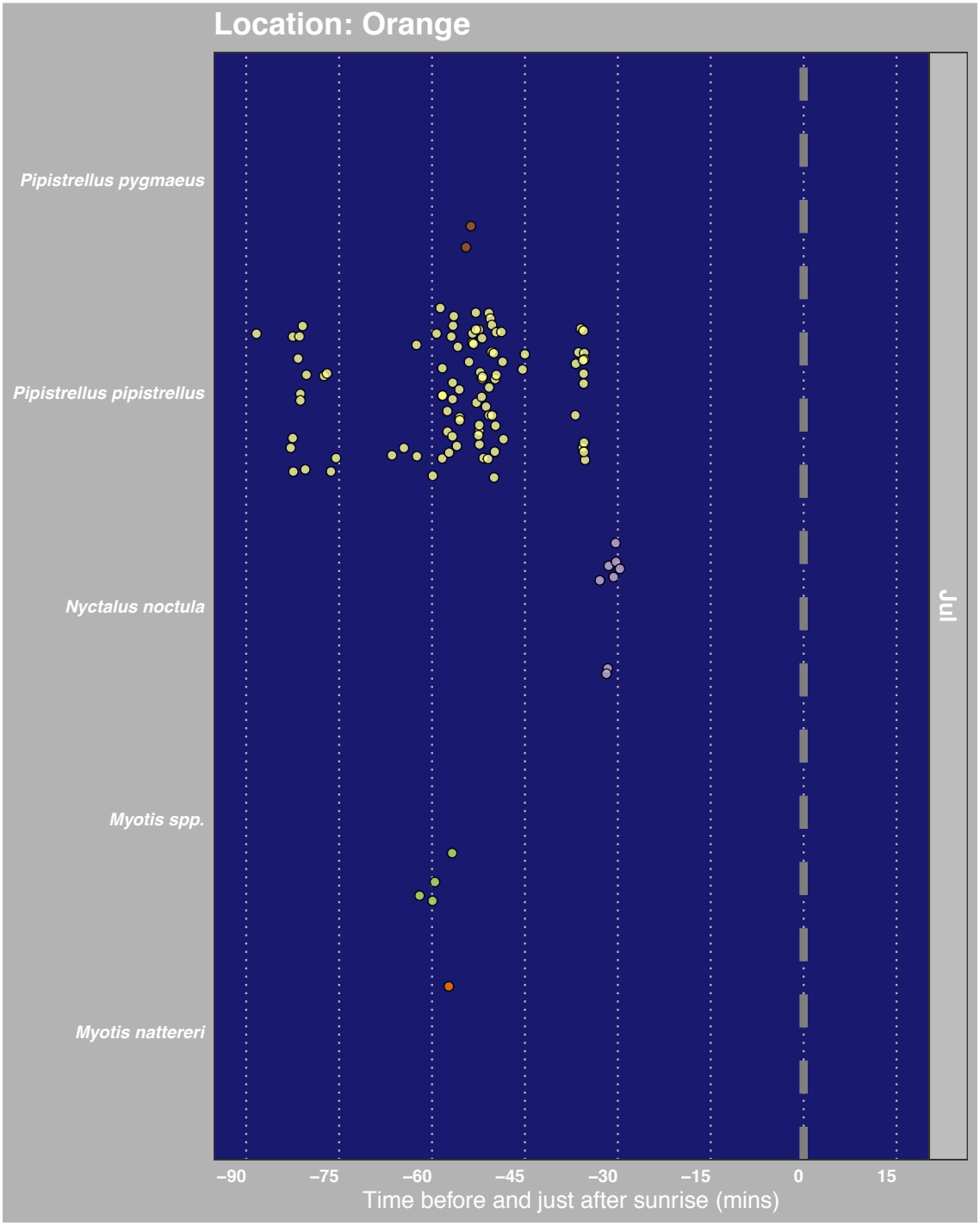
2.10.1 Location :Blue



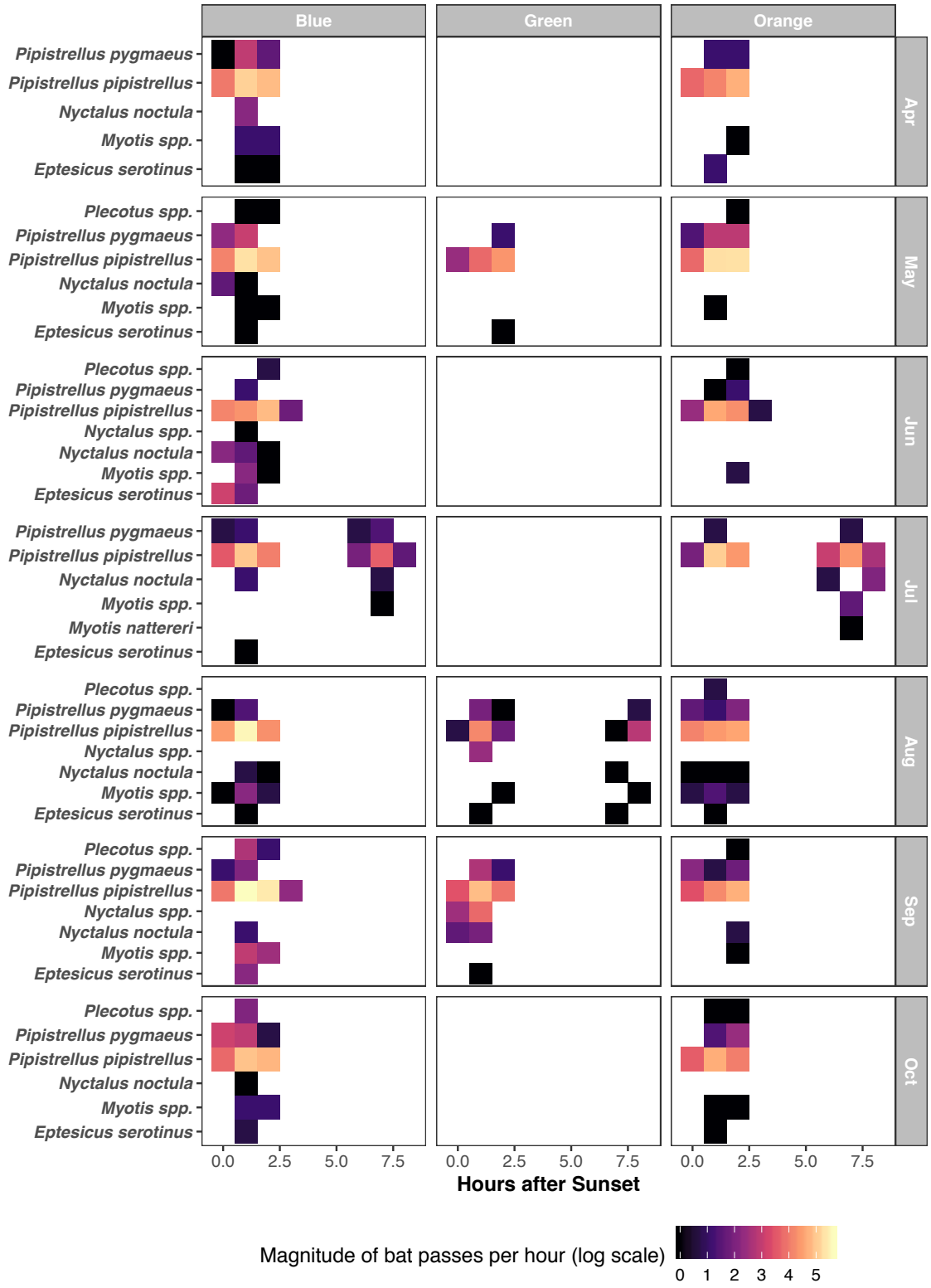
2.10.2 Location :Green



2.10.3 Location :Orange



2.11 HOURLY ACTIVITY BY LOCATION AND MONTH



3 STATISTICS

3.1 COMPARISON OF LOCATION ACTIVITY BY SPECIES

The average bat pass rate has been calculated for the night at each survey location; Blue, Green, and Orange using the formula:

$$\frac{Batpasses}{Nightlength}$$

Where:

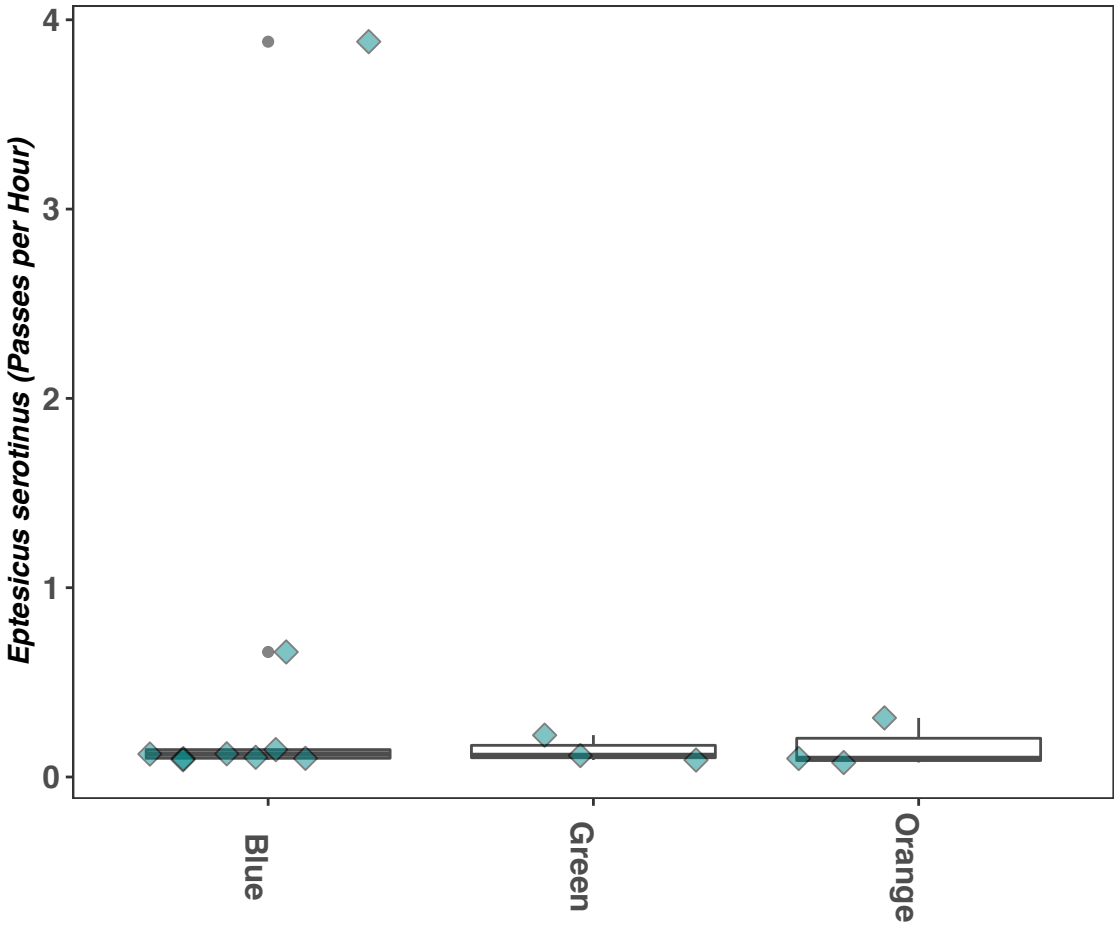
Batpasses = number of bat pass during the night at the location
Nightlength = Length of the night in decimal hours

The comparison of locations is undertaken with the Mann-Whitney-Wilcoxon or Kruskal-Wallis test. The Kruskal–Wallis test is a rank-based test that is similar to the Mann-Whitney-Wilcoxon test, but can be applied to one-way data with more than two groups. If there are just two locations the Mann-Whitney-Wilcoxon test is applied. The Kruskal–Wallis test *may* be used when there are only two samples, but the Mann-Whitney-Wilcoxon is more powerful for two samples and is preferred. Both tests assume that the observations are independent. The probability threshold for *statistical significance* used in the tests is: 0.05

- **The Null Hypothesis:** *bat pass rates per hour* are from distributions with the same median.

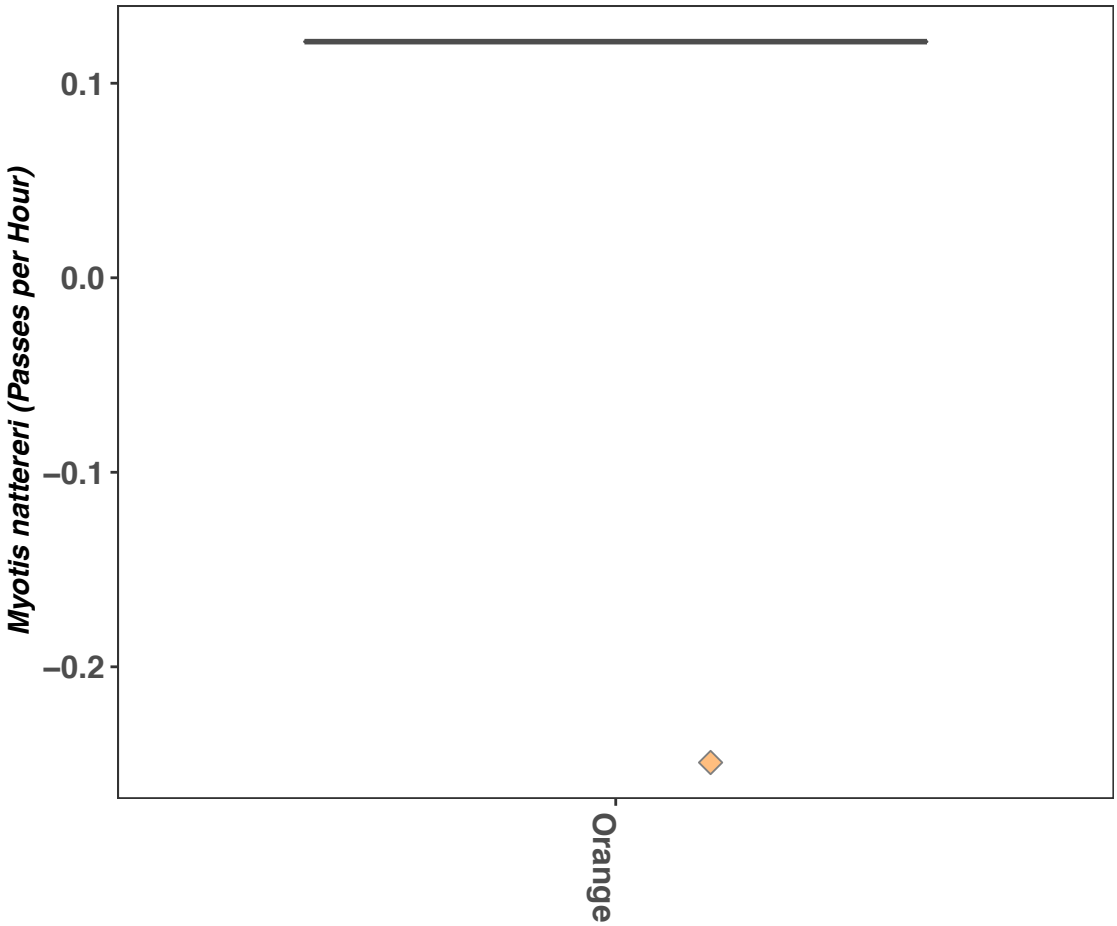
- **The Alternative Hypothesis:** *bat pass rates per hour* are from distributions with a different median.

3.1.1 *Eptesicus serotinus*: Statistical Comparison of Activity Between Locations



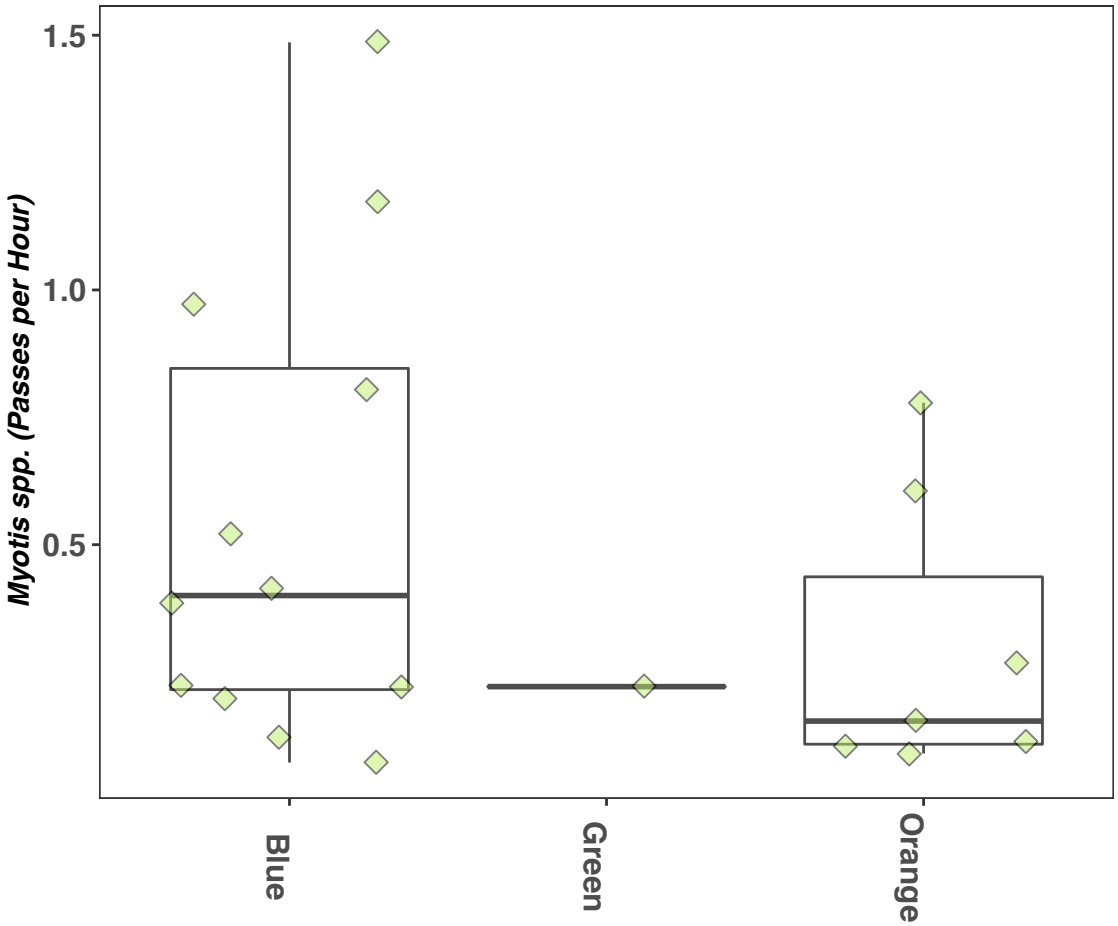
There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

3.1.2 *Myotis nattereri*: Statistical Comparison of Activity Between Locations



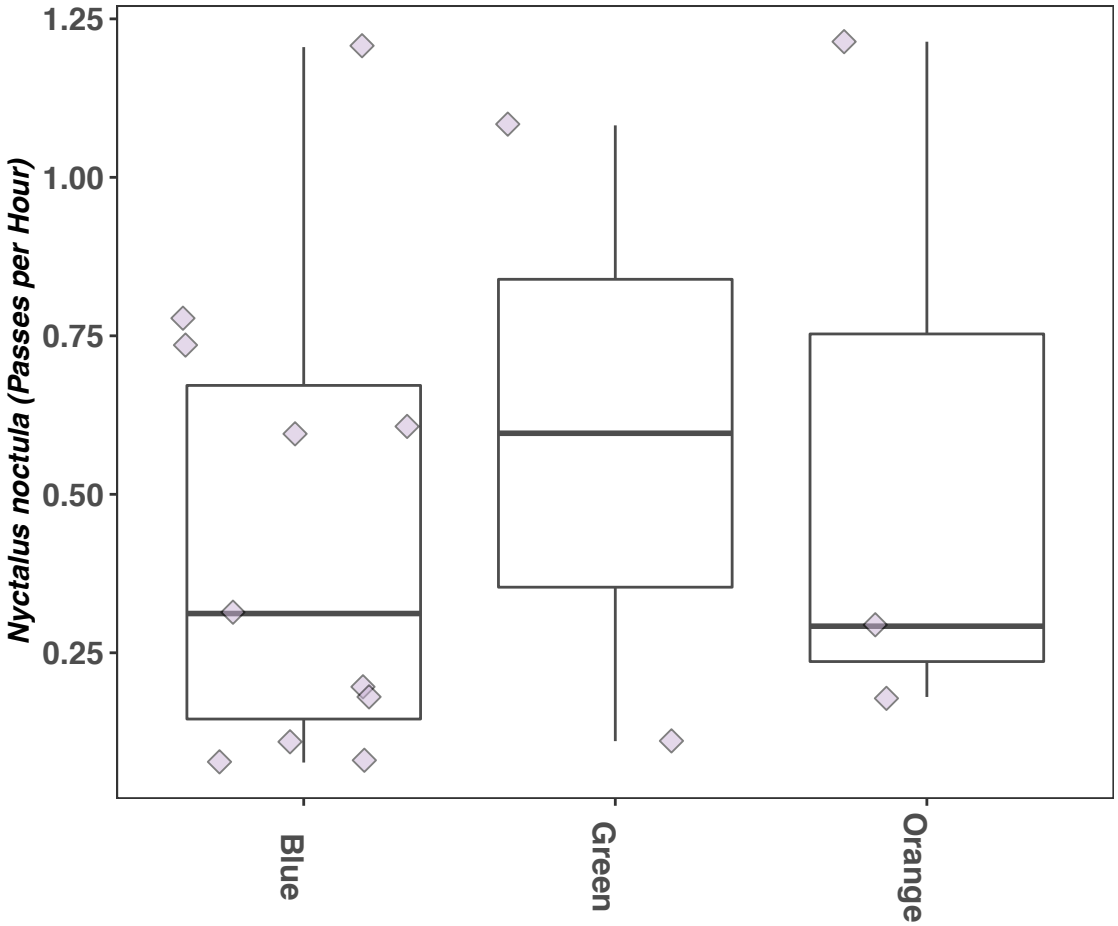
There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

3.1.3 *Myotis spp.*: Statistical Comparison of Activity Between Locations



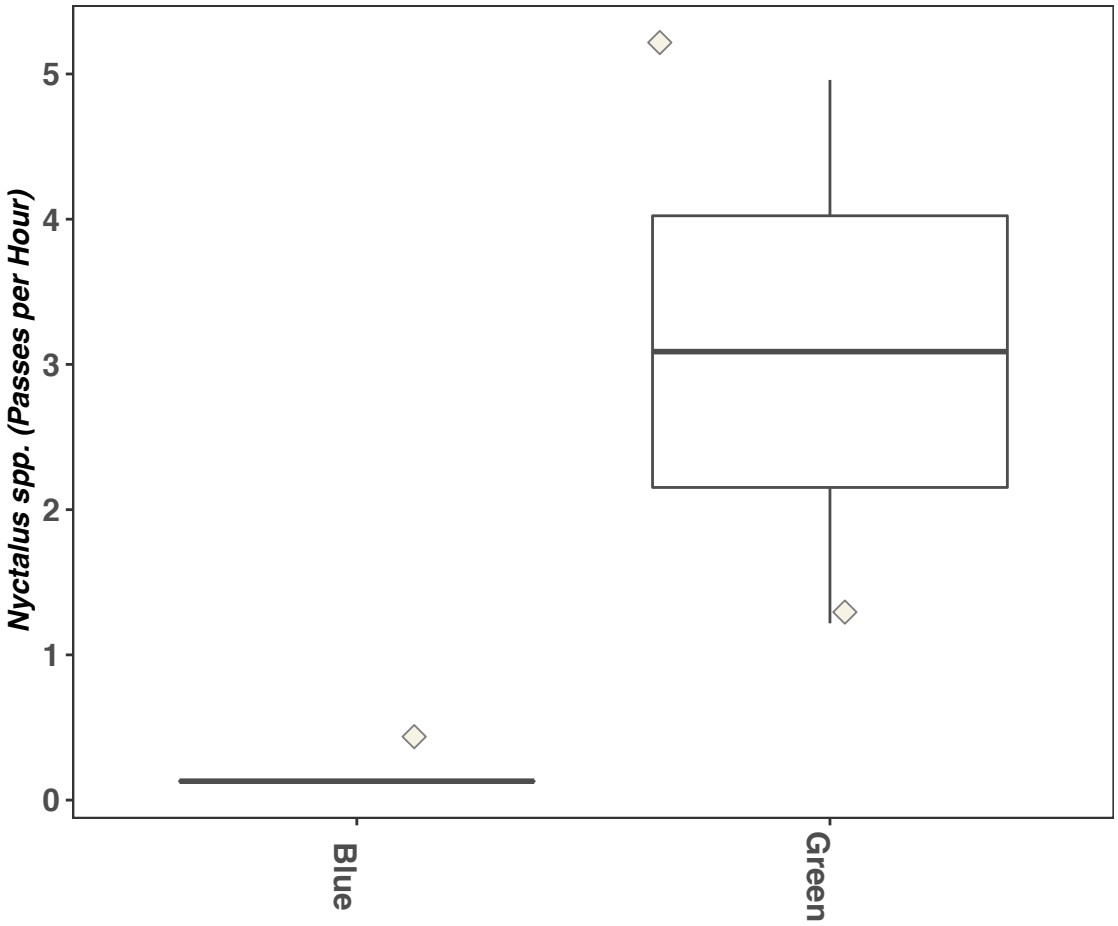
The Mann-Whitney-Wilcoxon test was undertaken for *Myotis spp.* between the following locations: Blue and Orange.The null hypothesis is accepted at P<0.05. Activity between the two locations is unlikely to be different.

3.1.4 *Nyctalus noctula*: Statistical Comparison of Activity Between Locations



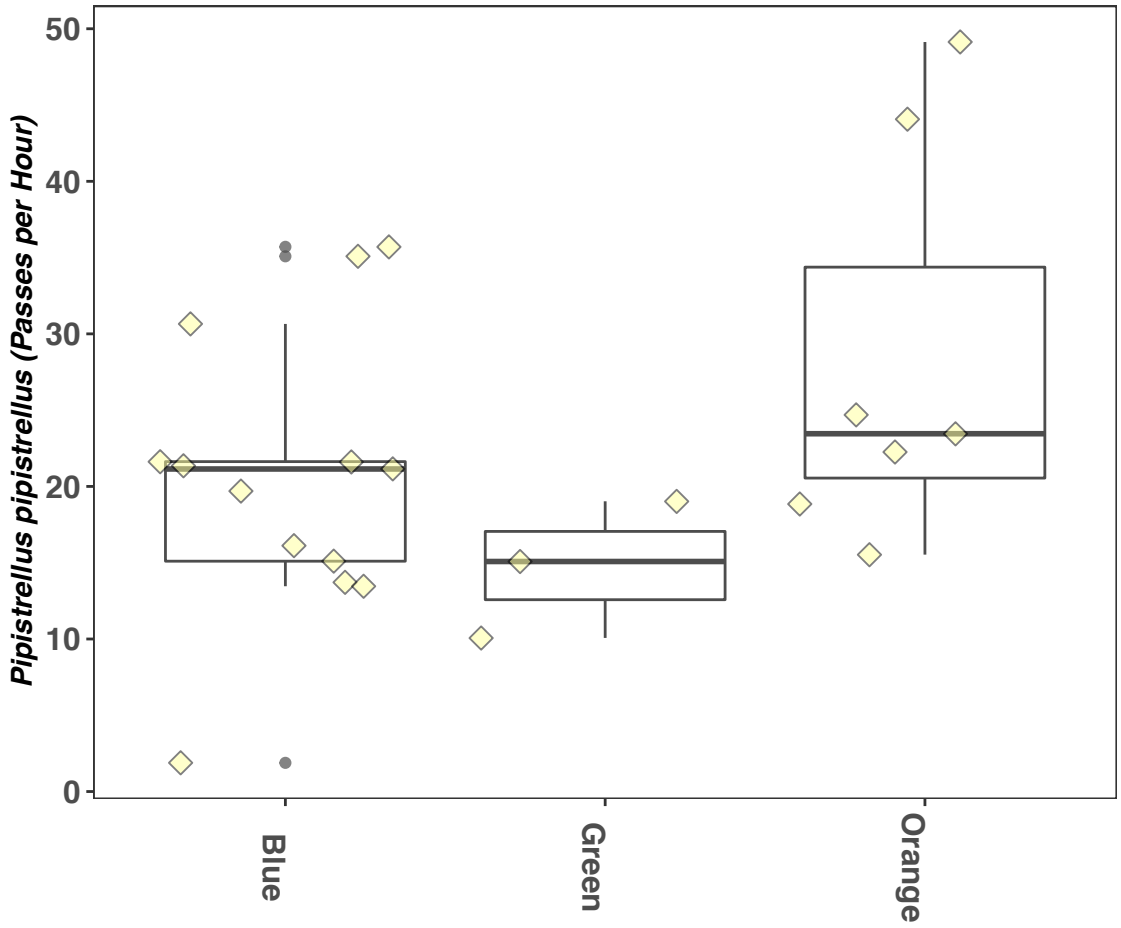
There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

3.1.5 *Nyctalus spp.*: Statistical Comparison of Activity Between Locations



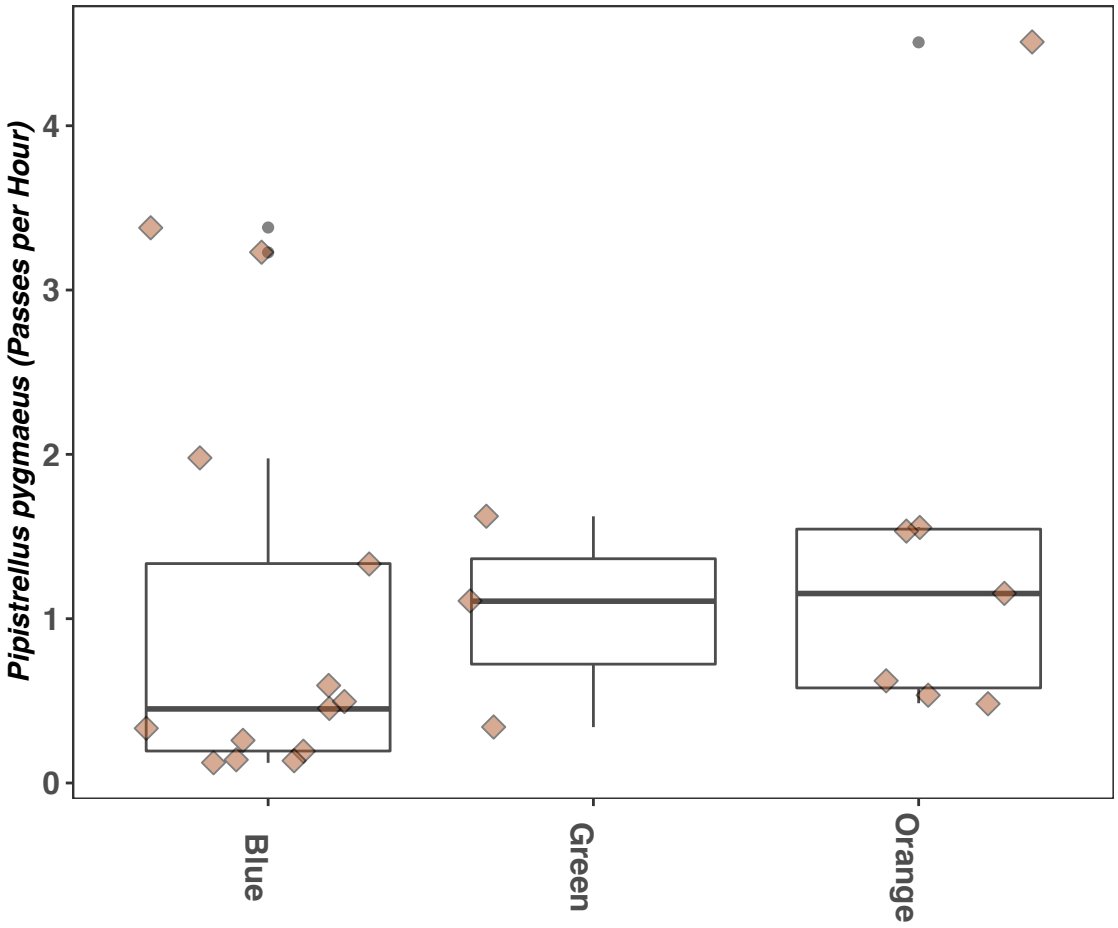
There is insufficient data to undertake the Kruskal-Wallis or Mann-Whitney-Wilcoxon test

3.1.6 *Pipistrellus pipistrellus*: Statistical Comparison of Activity Between Locations



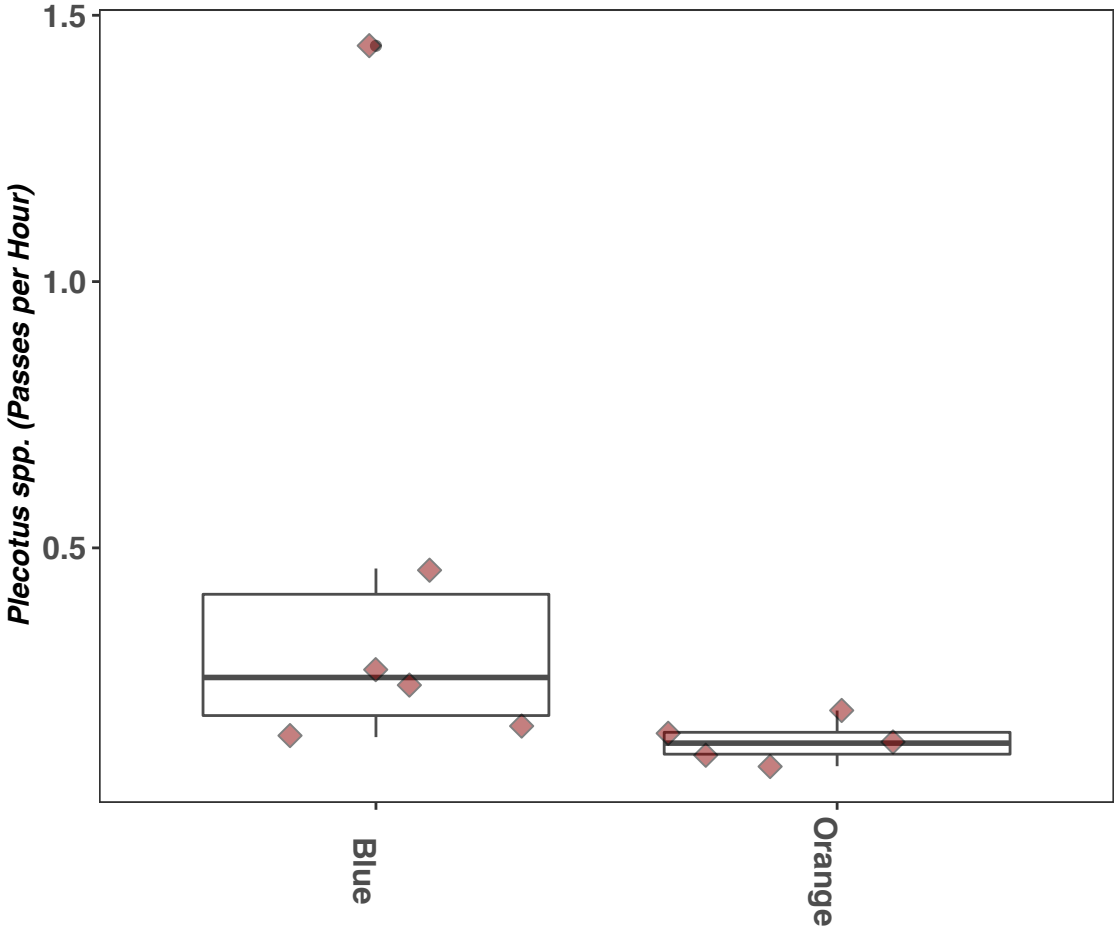
The Mann-Whitney-Wilcoxon test was undertaken for *Pipistrellus pipistrellus* between the following locations: Blue and Orange.The null hypothesis is accepted at P<0.05. Activity between the two locations is unlikely to be different.

3.1.7 *Pipistrellus pygmaeus*: Statistical Comparison of Activity Between Locations



The Mann-Whitney-Wilcoxon test was undertaken for *Pipistrellus pygmaeus* between the following locations: Blue and Orange.The null hypothesis is accepted at P<0.05. Activity between the two locations is unlikely to be different.

3.1.8 *Plecotus spp.*: Statistical Comparison of Activity Between Locations



The Mann-Whitney-Wilcoxon test was undertaken for *Plecotus spp.* between the following locations: Blue and Orange.The null hypothesis is rejected at P<0.05. Activity between the two locations is likely to be different.

4 TABLES

4.1 TABLE OF SUNTIMES

Bats are nocturnal, active at night rather than day; therefore the surveys are reported relative to the *night* which runs from the date at sunset to dawn the following day.

Table 1: Suntimes for each Survey Night

Night	Sunset (hh:mm)	Sunrise (hh:mm)	Night Length (hours)
23 July 2018	21:06	05:20	8.2
08 August 2018	20:41	05:44	9.0
29 August 2018	20:00	06:16	10.3
11 September 2018	19:31	06:36	11.1
27 September 2018	18:54	07:01	12.1
11 October 2018	18:23	07:24	13.0
24 October 2018	17:56	07:46	13.8
16 April 2019	20:01	06:08	10.1
24 April 2019	20:15	05:52	9.6
07 May 2019	20:36	05:28	8.9
08 May 2019	20:37	05:26	8.8
22 May 2019	20:58	05:07	8.1
04 June 2019	21:13	04:55	7.7
21 June 2019	21:24	04:52	7.5
27 June 2019	21:24	04:54	7.5

4.2 BAT PASSES PER SPECIES

The Table below shows total number of passes recorded for each species across all of the detectors. A total of 5,444 passes were recorded.

Table 2: Species and Number of Bat Passes

Scientific Name	**Common Name**	**Count (No)**	**Percentage of total (%)**
Pipistrellus pipistrellus	**Common pipistrelle**	4862	89.31
Pipistrellus pygmaeus	**Soprano pipistrelle**	263	4.83
Myotis spp.	**Myotis**	90	1.65
Nyctalus noctula	**Noctule**	70	1.29
Nyctalus spp.	**Noctule or Leisler's**	67	1.23
Eptesicus serotinus	**Serotine**	54	0.99
Plecotus spp.	**Long-eared**	37	0.68
Myotis nattereri	**Natterer's**	1	0.02

4.3 LOCATION AND NUMBER OF BAT PASSES

Table 3: Number of Bat Passes and Location

Location	Eptesicus serotinus	Myotis nattereri	Myotis spp.	Nyctalus noctula	Nyctalus spp.	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus spp.
Blue	45		68	42	1	2,577	130	30
Green	4		2	13	66	435	31	
Orange	5	1	20	15		1,850	102	7

4.4 MONTH AND NUMBER OF BAT PASSES

Table 4: Number of Bat Passes and Month

Month	Eptesicus serotinus	Myotis nattereri	Myotis spp.	Nyctalus noctula	Nyctalus spp.	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus spp.
Apr	5		7	9		558	31	
May	2		3	6		964	74	3
Jun	29		12	15	1	456	7	3
Jul	1	1	6	15		652	15	
Aug	4		22	7	11	747	31	2
Sep	10		32	17	55	982	46	19
Oct	3		8	1		503	59	10

4.5 MONTH/LOCATION AND NUMBER OF BAT PASSES

Table 5: Number of Bat Passes and Month and Location

Month	Location	*Eptesicus serotinus*	*Myotis nattereri*	*Myotis spp.*	*Nyctalus noctula*	*Nyctalus spp.*	*Pipistrellus pipistrellus*	*Pipistrellus pygmaeus*	*Plecotus spp.*
April	**Blue**	2		6	9		344	25	
	Orange	3		1			214	6	
May	**Blue**	1		2	6		395	31	2
	Green	1					133	3	
	Orange			1			436	40	1
June	**Blue**	29		10	15	1	271	3	2
	Orange			2			185	4	1
July	**Blue**	1		1	5		289	11	
	Orange		1	5	10		363	4	
August	**Blue**	1		12	3		415	5	
	Green	2		2	1	11	91	10	
	Orange	1		8	3		241	16	2
September	**Blue**	9		31	3		562	11	18
	Green	1			12	55	211	18	
	Orange			1	2		209	17	1
October	**Blue**	2		6	1		301	44	8
	Orange	1		2			202	15	2

4.6 MEDIAN BAT PASSES PER HOUR BY LOCATION

The median Nightly Pass Rate (bat passes per hour, per night) of each species.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean.

Table 6: Median Bat Passes per Hour by Location

Location	Eptesicus serotinus	Myotis nattereri	Myotis spp.	Nyctalus noctula	Nyctalus spp.	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus spp.
Blue	0.12		0.40	0.31	0.13	21.14	0.45	0.26
Green	0.11		0.22	0.60	3.09	15.08	1.11	
Orange	0.10	0.12	0.15	0.29		23.45	1.15	0.13

4.7 MEDIAN BAT PASSES PER HOUR BY MONTH

The median Nightly Pass Rate (bat passes per hour, per night) of each species.

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean.

Table 7: Median Bat Passes per Hour by Month

Month	Eptesicus serotinus	Myotis nattereri	Myotis spp.	Nyctalus noctula	Nyctalus spp.	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus spp.
Apr	0.26		0.36	0.45		28.67	1.60	
May	0.12		0.34	0.74		15.10	0.34	0.18
Jun	3.88		0.52	0.99	0.13	19.69	0.26	0.20
Jul	0.12	0.12	0.73	1.82		79.15	1.82	
Aug	0.21		1.10	0.35	1.22	38.24	1.60	0.19
Sep	0.42		1.37	0.76	4.96	43.64	2.05	0.85
Oct	0.11		0.31	0.08		19.28	2.26	0.38

4.8 SUMMARY STATISTICS: BAT PASSES PER HOUR GROUPED BY SPECIES/LOCATION

Table 8: Summary Statistics: Bat Pass Rate (per hour)

Species	Location	Minimum	Q1	Mean	Median	Q3	Maximum	S
Eptesicus serotinus	Blue	0.09	0.10	0.59	0.12	0.14	3.88	0.0
	Green	0.09	0.10	0.14	0.11	0.17	0.22	0.0
	Orange	0.08	0.09	0.16	0.10	0.20	0.31	0.0
Myotis nattereri		0.12	0.12	0.12	0.12	0.12	0.12	0.1
Myotis spp.	Blue	0.07	0.22	0.55	0.40	0.85	1.49	0.0
	Green	0.22	0.22	0.22	0.22	0.22	0.22	0.2
	Orange	0.09	0.11	0.30	0.15	0.44	0.78	0.0
Nyctalus noctula	Blue	0.08	0.15	0.44	0.31	0.67	1.21	0.0
	Green	0.11	0.35	0.60	0.60	0.84	1.08	0.1
	Orange	0.18	0.24	0.56	0.29	0.75	1.21	0.1
Nyctalus spp.	Blue	0.13	0.13	0.13	0.13	0.13	0.13	0.1
	Green	1.22	2.15	3.09	3.09	4.02	4.96	1.2
Pipistrellus pipistrellus	Blue	1.88	15.10	20.55	21.14	21.63	35.71	1.8
	Green	10.07	12.57	14.72	15.08	17.05	19.02	10.0
	Orange	15.53	20.55	28.28	23.45	34.37	49.13	15.5
Pipistrellus pygmaeus	Blue	0.12	0.19	0.97	0.45	1.34	3.38	0.1
	Green	0.34	0.72	1.02	1.11	1.36	1.62	0.3
	Orange	0.49	0.58	1.48	1.15	1.54	4.51	0.4
Plecotus spp.	Blue	0.14	0.19	0.45	0.26	0.41	1.44	0.1
	Orange	0.09	0.11	0.14	0.13	0.15	0.19	0.0

4.9 SUMMARY STATISTICS: BAT PASSES PER HOUR GROUPED BY SPECIES/MONTH

Table 9: Summary Statistics: Bat Pass Rate (per hour)

Species	Month	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Eptesicus serotinus	Apr	0.10	0.18	0.26	0.26	0.34	0.42	0.10
	May	0.11	0.12	0.12	0.12	0.12	0.12	0.11
	Jun	3.88	3.88	3.88	3.88	3.88	3.88	3.88
	Jul	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Aug	0.19	0.20	0.21	0.21	0.21	0.22	0.19
	Sep	0.18	0.30	0.42	0.42	0.54	0.66	0.18
	Oct	0.08	0.09	0.11	0.11	0.13	0.14	0.08
Myotis nattereri	Jul	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Myotis spp.	Apr	0.20	0.28	0.36	0.36	0.44	0.52	0.20
	May	0.34	0.34	0.34	0.34	0.34	0.34	0.34
	Jun	0.27	0.39	0.53	0.52	0.66	0.80	0.27
	Jul	0.73	0.73	0.73	0.73	0.73	0.73	0.73
	Aug	0.44	0.77	1.10	1.10	1.42	1.75	0.44
	Sep	1.26	1.32	1.37	1.37	1.43	1.49	1.26
	Oct	0.07	0.19	0.31	0.31	0.42	0.54	0.07
Nyctalus noctula	Apr	0.31	0.38	0.45	0.45	0.52	0.59	0.31
	May	0.74	0.74	0.74	0.74	0.74	0.74	0.74
	Jun	0.78	0.89	0.99	0.99	1.10	1.21	0.78
	Jul	1.82	1.82	1.82	1.82	1.82	1.82	1.82
	Aug	0.22	0.29	0.35	0.35	0.42	0.49	0.22
	Sep	0.08	0.42	0.76	0.76	1.10	1.44	0.08
	Oct	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Nyctalus spp.	Jun	0.13	0.13	0.13	0.13	0.13	0.13	0.13
	Aug	1.22	1.22	1.22	1.22	1.22	1.22	1.22
	Sep	4.96	4.96	4.96	4.96	4.96	4.96	4.96
Pipistrellus pipistrellus	Apr	13.46	21.06	28.67	28.67	36.27	43.88	13.46
	May	15.08	15.09	36.65	15.10	47.44	79.78	15.08
	Jun	16.11	17.90	20.16	19.69	22.19	24.68	16.11
	Jul	79.15	79.15	79.15	79.15	79.15	79.15	79.15
	Aug	31.43	34.83	38.24	38.24	41.65	45.06	31.43
	Sep	13.70	28.67	43.64	43.64	58.61	73.57	13.70
	Oct	1.88	10.58	19.28	19.28	27.97	36.67	1.88
	Apr	0.59	1.10	1.60	1.60	2.10	2.60	0.59

Table 9: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Species	**Month**	**Minimum**	**Q1**	**Mean**	**Median**	**Q3**	**Maximum**	**SD**
Pipistrellus pygmaeus	May	0.12	0.23	2.78	0.34	4.11	7.89	0.12
	Jun	0.13	0.20	0.31	0.26	0.40	0.53	0.13
	Jul	1.82	1.82	1.82	1.82	1.82	1.82	1.82
	Aug	1.44	1.52	1.60	1.60	1.67	1.75	1.44
	Sep	0.50	1.27	2.05	2.05	2.83	3.61	0.50
	Oct	0.14	1.20	2.26	2.26	3.32	4.38	0.14
Plecotus spp.	May	0.11	0.15	0.18	0.18	0.21	0.25	0.11
	Jun	0.13	0.17	0.20	0.20	0.23	0.27	0.13
	Aug	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	Sep	0.17	0.51	0.85	0.85	1.19	1.53	0.17
	Oct	0.14	0.26	0.38	0.38	0.50	0.62	0.14

4.10 SUMMARY STATISTICS: BAT PASSES PER HOUR GROUPED BY LOCATION

Table 10: Summary Statistics: Bat Pass Rate (per hour)

Location	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	S
Blue	*Eptesicus serotinus*	0.09	0.10	0.59	0.12	0.14	3.88	0.0
	Myotis spp.	0.07	0.22	0.55	0.40	0.85	1.49	0.0
	Nyctalus noctula	0.08	0.15	0.44	0.31	0.67	1.21	0.0
	Nyctalus spp.	0.13	0.13	0.13	0.13	0.13	0.13	0.1
	Pipistrellus pipistrellus	1.88	15.10	20.55	21.14	21.63	35.71	1.8
	Pipistrellus pygmaeus	0.12	0.19	0.97	0.45	1.34	3.38	0.1
	Plecotus spp.	0.14	0.19	0.45	0.26	0.41	1.44	0.1
Green	*Eptesicus serotinus*	0.09	0.10	0.14	0.11	0.17	0.22	0.0
	Myotis spp.	0.22	0.22	0.22	0.22	0.22	0.22	0.2
	Nyctalus noctula	0.11	0.35	0.60	0.60	0.84	1.08	0.1
	Nyctalus spp.	1.22	2.15	3.09	3.09	4.02	4.96	1.2
	Pipistrellus pipistrellus	10.07	12.57	14.72	15.08	17.05	19.02	10.0
	Pipistrellus pygmaeus	0.34	0.72	1.02	1.11	1.36	1.62	0.3
Orange	*Eptesicus serotinus*	0.08	0.09	0.16	0.10	0.20	0.31	0.0
	Myotis nattereri	0.12	0.12	0.12	0.12	0.12	0.12	0.1
	Myotis spp.	0.09	0.11	0.30	0.15	0.44	0.78	0.0
	Nyctalus noctula	0.18	0.24	0.56	0.29	0.75	1.21	0.1
	Pipistrellus pipistrellus	15.53	20.55	28.28	23.45	34.37	49.13	15.5
	Pipistrellus pygmaeus	0.49	0.58	1.48	1.15	1.54	4.51	0.4
	Plecotus spp.	0.09	0.11	0.14	0.13	0.15	0.19	0.0

4.11 SUMMARY STATISTICS: BAT PASSES PER HOUR GROUPED BY MONTH

Table 11: Summary Statistics: Bat Pass Rate (per hour)

Month	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Apr	*Eptesicus serotinus*	0.10	0.18	0.26	0.26	0.34	0.42	0.10
	Myotis spp.	0.20	0.28	0.36	0.36	0.44	0.52	0.20
	Nyctalus noctula	0.31	0.38	0.45	0.45	0.52	0.59	0.31
	Pipistrellus pipistrellus	13.46	21.06	28.67	28.67	36.27	43.88	13.46
	Pipistrellus pygmaeus	0.59	1.10	1.60	1.60	2.10	2.60	0.59
May	*Eptesicus serotinus*	0.11	0.12	0.12	0.12	0.12	0.12	0.11
	Myotis spp.	0.34	0.34	0.34	0.34	0.34	0.34	0.34
	Nyctalus noctula	0.74	0.74	0.74	0.74	0.74	0.74	0.74
	Pipistrellus pipistrellus	15.08	15.09	36.65	15.10	47.44	79.78	15.08
	Pipistrellus pygmaeus	0.12	0.23	2.78	0.34	4.11	7.89	0.12
	Plecotus spp.	0.11	0.15	0.18	0.18	0.21	0.25	0.11
Jun	*Eptesicus serotinus*	3.88	3.88	3.88	3.88	3.88	3.88	3.88
	Myotis spp.	0.27	0.39	0.53	0.52	0.66	0.80	0.27
	Nyctalus noctula	0.78	0.89	0.99	0.99	1.10	1.21	0.78
	Nyctalus spp.	0.13	0.13	0.13	0.13	0.13	0.13	0.13
	Pipistrellus pipistrellus	16.11	17.90	20.16	19.69	22.19	24.68	16.11
	Pipistrellus pygmaeus	0.13	0.20	0.31	0.26	0.40	0.53	0.13
	Plecotus spp.	0.13	0.17	0.20	0.20	0.23	0.27	0.13
Jul	*Eptesicus serotinus*	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Myotis nattereri	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	Myotis spp.	0.73	0.73	0.73	0.73	0.73	0.73	0.73
	Nyctalus noctula	1.82	1.82	1.82	1.82	1.82	1.82	1.82
	Pipistrellus pipistrellus	79.15	79.15	79.15	79.15	79.15	79.15	79.15
	Pipistrellus pygmaeus	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Aug	*Eptesicus serotinus*	0.19	0.20	0.21	0.21	0.21	0.22	0.19
	Myotis spp.	0.44	0.77	1.10	1.10	1.42	1.75	0.44
	Nyctalus noctula	0.22	0.29	0.35	0.35	0.42	0.49	0.22
	Nyctalus spp.	1.22	1.22	1.22	1.22	1.22	1.22	1.22
	Pipistrellus pipistrellus	31.43	34.83	38.24	38.24	41.65	45.06	31.43
	Pipistrellus pygmaeus	1.44	1.52	1.60	1.60	1.67	1.75	1.44
	Plecotus spp.	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	Eptesicus serotinus	0.18	0.30	0.42	0.42	0.54	0.66	0.18
	Myotis spp.	1.26	1.32	1.37	1.37	1.43	1.49	1.26

Table 11: Summary Statistics: Bat Pass Rate (per hour) *(continued)*

Month	*Species*	Minimum	Q1	Mean	Median	Q3	Maximum	SD
Sep	*Nyctalus noctula*	0.08	0.42	0.76	0.76	1.10	1.44	0.08
	Nyctalus spp.	4.96	4.96	4.96	4.96	4.96	4.96	4.96
	Pipistrellus pipistrellus	13.70	28.67	43.64	43.64	58.61	73.57	13.70
	Pipistrellus pygmaeus	0.50	1.27	2.05	2.05	2.83	3.61	0.50
	Plecotus spp.	0.17	0.51	0.85	0.85	1.19	1.53	0.17
Oct	*Eptesicus serotinus*	0.08	0.09	0.11	0.11	0.13	0.14	0.08
	Myotis spp.	0.07	0.19	0.31	0.31	0.42	0.54	0.07
	Nyctalus noctula	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	Pipistrellus pipistrellus	1.88	10.58	19.28	19.28	27.97	36.67	1.88
	Pipistrellus pygmaeus	0.14	1.20	2.26	2.26	3.32	4.38	0.14
	Plecotus spp.	0.14	0.26	0.38	0.38	0.50	0.62	0.14

4.12 LOCATIONS NEAR A BAT ROOST

This table presents the bat observations, within the estimated emergence time, for a species to exit the roost; indicating that a roost for that species is nearby. The roost emergence times for the bat species is based on the work of (Russ 2012); the calculation has used the upper roost emergence time as the threshold to be included in the list of bats potentially near a roost.

Table 12: Locations Near a Bat Roost

Location	*Bat Species*	Bat Passess Near Roost
Blue	*Eptesicus serotinus*	1
	Myotis spp.	39
	Pipistrellus pipistrellus	451
	Pipistrellus pygmaeus	36
	Plecotus spp.	4
Green	*Pipistrellus pipistrellus*	52
Orange	*Myotis spp.*	5
	Pipistrellus pipistrellus	248
	Pipistrellus pygmaeus	14
	Plecotus spp.	2

The table below details the roost emergence time range (Russ 2012) for the bat species recorded at the site. The lower and upper columns show the roost emergence time range (Russ 2012), in minutes, for the bat species relative to sunset; in practice the calculation for the table above only used the upper limit, listing bats recored before this time; any observation nearer or before sunset is likely to be a stronger indication that a roost is nearby.

Table 13: Roost Emergence Times for Bats Observed

Species	lower	upper
Myotis spp.	30	70
Pipistrellus pipistrellus	22	32
Pipistrellus pygmaeus	22	28
Plecotus spp.	40	60
Eptesicus serotinus	20	25

4.13 DATE LOCATION AND ROOST EMERGENCE

Table 14: Locations, Survey Date and Roost Emergence

Location	Night	*Bat Species*	Passess Near Roost (No.)
Blue	23 July 2018	*Pipistrellus pipistrellus*	47
	08 August 2018	*Myotis spp.*	1
	08 August 2018	*Pipistrellus pipistrellus*	46
	08 August 2018	*Pipistrellus pygmaeus*	1
	29 August 2018	*Myotis spp.*	9
	29 August 2018	*Pipistrellus pipistrellus*	45
	11 September 2018	*Myotis spp.*	8
	11 September 2018	*Pipistrellus pipistrellus*	52
	27 September 2018	*Myotis spp.*	10
	27 September 2018	*Pipistrellus pipistrellus*	9
	27 September 2018	*Pipistrellus pygmaeus*	1
	27 September 2018	*Plecotus spp.*	2
	11 October 2018	*Myotis spp.*	1
	11 October 2018	*Pipistrellus pipistrellus*	40
	11 October 2018	*Pipistrellus pygmaeus*	22
	24 October 2018	*Pipistrellus pipistrellus*	6
	24 October 2018	*Pipistrellus pygmaeus*	1
	24 October 2018	*Plecotus spp.*	2
	16 April 2019	*Myotis spp.*	1
	16 April 2019	*Pipistrellus pipistrellus*	26
	16 April 2019	*Pipistrellus pygmaeus*	1
	24 April 2019	*Myotis spp.*	2
	24 April 2019	*Pipistrellus pipistrellus*	44
	07 May 2019	*Myotis spp.*	1
	07 May 2019	*Pipistrellus pipistrellus*	49
	07 May 2019	*Pipistrellus pygmaeus*	10
	22 May 2019	*Pipistrellus pipistrellus*	17
	04 June 2019	*Myotis spp.*	2
	04 June 2019	*Pipistrellus pipistrellus*	27
	21 June 2019	*Eptesicus serotinus*	1
	21 June 2019	*Myotis spp.*	4
	21 June 2019	*Pipistrellus pipistrellus*	43
Green	08 August 2018	*Pipistrellus pipistrellus*	5
	11 September 2018	*Pipistrellus pipistrellus*	36
	08 May 2019	*Pipistrellus pipistrellus*	11
	23 July 2018	*Pipistrellus pipistrellus*	11

Table 14: Locations, Survey Date and Roost Emergence *(continued)*

Location	Night	***Bat Species***	Passess Near Roost (No.)
Orange	29 August 2018	*Myotis spp.*	4
	29 August 2018	*Pipistrellus pipistrellus*	62
	29 August 2018	*Pipistrellus pygmaeus*	5
	29 August 2018	*Plecotus spp.*	2
	11 September 2018	*Pipistrellus pipistrellus*	36
	11 September 2018	*Pipistrellus pygmaeus*	9
	11 October 2018	*Pipistrellus pipistrellus*	37
	24 April 2019	*Pipistrellus pipistrellus*	44
	07 May 2019	*Myotis spp.*	1
	07 May 2019	*Pipistrellus pipistrellus*	47
	27 June 2019	*Pipistrellus pipistrellus*	11

4.14 BAT PASSES EACH HOUR AFTER SUNSET BY LOCATION

Table 15: Bat Passes Each Hour after Sunset

Location	*Species*	0	1	2	3	6	7	8
Blue	*Eptesicus serotinus*	23	21	1				
	Myotis spp.	1	44	22			1	
	Nyctalus noctula	14	24	2			2	
	Nyctalus spp.		1					
	Pipistrellus pipistrellus	392	1,259	860	16	7	38	5
	Pipistrellus pygmaeus	40	77	7		2	4	
	Plecotus spp.		24	6				
Green	*Eptesicus serotinus*		2	1			1	
	Myotis spp.			1				1
	Nyctalus noctula	5	7				1	
	Nyctalus spp.	12	54					
	Pipistrellus pipistrellus	45	237	135			1	17
	Pipistrellus pygmaeus		22	7				2
Orange	*Eptesicus serotinus*		5					
	Myotis nattereri						1	
	Myotis spp.	2	6	7			5	
	Nyctalus noctula	1	1	3		2		8
	Pipistrellus pipistrellus	232	772	727	2	21	82	14
	Pipistrellus pygmaeus	18	33	49			2	
	Plecotus spp.		3	4				

5 REFERENCES

The visualisation and analysis has been undertaken in R (R Core Team 2018) using R version 3.6.1 (2019-07-05); R is an open-source statistical programming language. This document has been produced dynamically using `knitr` (Xie 2015) and `rmarkdown` (Allaire et al. 2019), integrating the data, analysis and reporting. For clarity the R script that generates the analysis is not shown. The graphics have been produced using the R package `ggplot2` (Wickham, Chang, et al. 2019). The wrangling of data was undertaken with `dplyr` (Wickham, François, et al. 2019) and `tidyr` (Wickham and Henry 2019) packages. The data in *csv* and *Excel* files has been imported with `readr` (Wickham, Hester, and Francois 2018) and `readxl` (Wickham and Bryan 2019) packages respectivily. The computation with dates and times has been accomplished with `lubridate` (Spinu, Grolemund, and Wickham 2018) package. Suntimes have been obtained with the `suncalcs` (Thieurmel and Elmarhraoui 2019) package. The manipulation of text was through the `stringr` (Wickham 2019) package. Summary statistics have been produced with the `mosaic` (Pruim, Kaplan, and Horton 2019) package. Tables have been enhanced and made more readable with the `kableExtra` (Zhu 2019) package. The `broman` (Broman and Aimee Teo Broman 2018) package provided some useful R functions. The `scales` (Wickham 2018) package improves the clarity of scales on `ggplot` graphics.

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