

**SURVEY OF MOCCAS PARK, MOCCAS,
HEREFORDSHIRE FOR *MYOLEPTA POTENS*
(DIPTERA, SYRPHIDAE) IN 2019**

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SURVEY OF MOCCAS PARK, MOCCAS, HEREFORDSHIRE FOR *MYOLEPTA POTENS* (DIPTERA, SYRPHIDAE) IN 2019

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SUMMARY

The results of a survey for the Critically Endangered hoverfly *Myolepta potens* (Diptera, Syrphidae) in Moccas Park, Moccas, Herefordshire in 2019 are presented. This is the only known population in the UK for this species and it has not been surveyed for or recorded in the Park since it was found here by the surveyor in 2002. The present survey did record the species but only four females were recorded. One of these was reared from rothole debris taken from an over-mature horse-chestnut whilst another two were found in an emergence trap placed over a horse-chestnut rot-hole and the fourth was recorded from a small water trap placed in the same rot-hole from which the first specimen was reared.

The reason why males were not recorded is unclear but the most likely explanation would be that they emerged first and were somehow missed by the survey, even though it commenced at the same time as the more successful survey in 2002 which resulted in 23 males and 32 females being recorded. Poor weather may have also been a factor in the poorer results in 2019. It is unlikely that conditions in Moccas Park have led to a decline in *Myolepta potens* population but the number of suitable trees will be diminishing and climate change may also have an impact.

Several other saproxylic Diptera were also recorded and have been identified and listed in the report. The larvae of some of these (i.e. *Systemus* spp, *Mallota cimbiciformis*, *Phaonia exoleta*, etc) may be similar to *Myolepta potens* in that they are rot-hole species. A small number of saproxylic Coleoptera have also been identified and the beetle by-catch has been passed to an expert coleopterist for determination and the records will be fed back to Buglife and Natural England.

SURVEY OF MOCCAS PARK, MOCCAS, HEREFORDSHIRE FOR *MYOLEPTA POTENS* (DIPTERA, SYRPHIDAE) IN 2019

INTRODUCTION

Buglife requested a survey of Moccas Park NNR for the hoverfly *Myolepta potens* (Diptera, Syrphidae). *Myolepta potens* was recorded in Britain until 1961 when it was found in the Bristol area. It was thought to be extinct and given Red Data Book 1 status and BAP Priority status. It was not recorded again until 2002 when it was found at Moccas Park NNR by the surveyor and David Heaver in a survey funded by Natural England (Godfrey ****). Subsequently, it has been reported in low numbers from the Forest of Dean (Phillips 2009). The present survey aimed to determine whether the species was still present at Moccas Park and assess its status there.

SITE DESCRIPTION

Moccas Park is an ancient deer park lying on a north-east scarp approximately equidistant from Hereford and Hay-on-Wye. It is one of the largest and best examples of wood pasture in Britain. The steep, upper slopes support a closed canopy dominated by oaks, silver birch and rowan with a varied scrub layer. The lower lying areas to the north-east include pools, wetland vegetation and more typical parkland with more sporadic, but more mature and veteran trees dominated again by oaks, but also including ash, limes and other species. Horse-chestnuts are more frequent on the wooded slopes and *Myolepta potens* uses rot holes in these for its development. The SSSI citation for the NNR which describes further features on the site may be found at:

<https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1002723.pdf>

SURVEY METHODOLOGY

SAMPLING METHODS

Emergence traps

These comprised small nets (made from retired aerial nets for collecting insects) placed over rot holes on horse chestnuts. They were held in place by rubber bands, wire and/or string and a collecting tube or jar with a small amount of antifreeze was located at the apex of the net. Examples can be seen in the photographs at the end of this report. These were installed in late June 2019 when it was clear that other methods were not producing *Myolepta*. They were emptied, checked for repairs and replenished in August and September, when they were removed. Photographs of the emergence traps are shown at the end of the report.

Malaise traps

Two Malaise traps were installed in horse-chestnut dominated stands. These had failed previously to detect *Myolepta potens* so the surveyor did not expect them to record the species and was not worried about Malaise traps collecting large numbers of an endangered species. Photographs of the Malaise traps are shown at the end of the report.

Samples taken for rearing

Samples of rot hole material from horse chestnuts were taken for rearing in May and June 2019. The samples were transferred to labelled plastic bags, kept in the shade until they could be transported to the survey vehicle and placed in a cool box for the journey home. Once back from the visit, the bags were placed in buckets or other plastic containers with the bags

open at the mouth and the containers were covered with netting held in place by rubberbands. The containers were carefully labelled, sprayed with water periodically and kept in a garden shed. They were checked periodically for emerging insects. Photographs of the trees and rot holes sampled and the interior of some of the rot holes are shown at the end of the report.

Vane traps

These comprise two vertical acetate sheets held at 90° to each other and mounted above a plastic funnel underneath which is placed a collecting container containing anti-freeze. The traps also were fitted with rain covers made of acetate sheet. The traps used comprised commercially available traps (known as Polytraps see: <https://cahurel-entomologie.com/shop/gb/traps/434-piege-polytrap.html>) which were suspended from tree branches or placed within tree cavities. These were probably unlikely to collect the target species but they did collect other saproxylic Diptera and it was considered worth trialling them. Photographs of the vane (or Polytraps) are shown at the end of the report.

Water traps

Water traps comprising old margarine or ice cream tubs or washing-up bowls one third filled with water to which yellow anti-freeze was added were employed mainly in tree cavities but also on broken tree limbs, on horse chestnuts throughout the park. These were checked periodically. Photographs of the trees and rot holes where the water traps were placed are shown at the end of the report.

Other Methods

Direct searching was not employed since the surveyor has not encountered *Myolepta potens* in the field or by sweep netting. Phillips (2009) did record one individual on brambles and 1-2 more in the field, so direct searching, possibly on bramble and other flowers may work in the right conditions.

PERSONNEL

All work was undertaken by Andy Godfrey who is an experienced Dipterist and has twice before undertaken Diptera surveys in Moccas Park (both for Natural England/English Nature). The surveyor was accompanied by Alice James (Natural England) on one of the field visits.

Coleoptera from the survey have been passed onto experienced coleopterist Mike Denton for identification since Moccas Park is an important site for this group as well. A list of the beetles recorded from the site can be made available to Buglife and Natural England when this has been undertaken but obviously it is not a priority.

Most of the Diptera from the survey have been identified with the exception of the Malaise trap material. A small number of fungus gnats were not identified and most of the Phoridae and Sciaridae were not identified because of problems in identification. Most material has been retained for later determination.

WEATHER CONDITIONS

Details of the weather conditions are provided in Table 1.

PREVIOUS RECORDS OF *MYOLEPTA POTENS*

Myolepta potens was recorded as new to Britain in 1947 following its discovery at two sites in the Somerset Levels, namely Loxley Wood and Edington village (Collin 1950). Three

specimens were also taken on the Blaise Castle estate, Bristol in 1945 and 1949 (Collin 1950) and larvae were found on the Ashton Court estate nearby (Hartley 1961), of which a single larva was preserved and five adults bred out (Rotheray 1991). These larvae were found in a small rot-hole in an old beech (*Fagus sylvatica*) from which black watery liquid was dripping at about 10 feet above ground level in May 1961. Both the Bristol sites have ancient woodland remnants and are open public spaces (Levy and Levy 1998). Prior to the 2002 survey, there were less than 20 British specimens of *Myolepta potens*, including three ancient females, which were re-identified by the well-known dipterist J.E. Collin from other collections, labelled as the other British species, *Myolepta dubia* (= *luteola*). One specimen is thought to date back to 1828. Unfortunately, the collectors and localities of these early specimens are unknown. Many Dipterists have searched for this species at the Bristol and Somerset sites but it avoided capture since 1961 and was thought to be extinct.

The surveyor undertook a saproxylic Diptera survey of Moccas park in 2002 (Godfrey & Drake 2003). The surveyor undertook the saproxylic survey with the assistance of David Heaver whilst Dr Martin Drake undertook a survey of the wetlands within the Park at the same time. The methods used were similar to those used on the present survey, one difference being that the use of two people meant that a full length ladder could be employed which meant rotholes higher up could be examined. In 2019, with only one surveyor, height access was restricted to what could be reached with a step ladder. Limited sweep netting was also undertaken in 2019 but this did not produce *Myolepta potens*.

The 2002 survey recorded 23 male and 32 female *Myolepta potens* and a number of larvae. 14 males and 24 females were reared from rot hole material, 8 males and 7 females were taken in water traps placed in rot holes and one and one female were taken in emergence traps. Many of the specimens were teneral. The rot hole material was all collected in early May except for one sample on 10th June. The adults from the rot hole material were recorded over a narrow period from 30 June to 2nd July 2002. The *Myolepta potens* from the water traps were recorded on 10th June or 20th July whilst the emergence trap specimens were recorded on 20th July.

The 2002 survey was able to establish the continued presence of *Myolepta potens* in Britain at Moccas Park after a gap of 41 years. The species was found to be breeding throughout the Upper Park on the slopes above the bracken line in mature and over-mature horse-chestnuts (*Aesculus hippocastanum*). Records were obtained from eight mature to over mature trees. The Diameter Breast Height (DBH) of the eight trees ranged from 89.1 to 156cm with an average of 128.7cm. According to Harding and Wall (2000) many of the horse chestnuts in the Upper Park were planted between the period 1793 and c. 1836 giving them an age of between 210 and 177 years.

Phillips (2009) published records of two individuals, on a track, one on brambles, in Welshbury Wood in the Forest of Dean.

EUROPEAN PERSPECTIVE

Reemer et al (2004) published a review of the genus in the West Palaearctic region. They mention that this species appears to be a rare and predominantly European species, with a range from southern Britain and France, through Germany and eastern Europe, to the Balkan Peninsula and Turkey. They record it as being associated with well-developed deciduous woodland (*Fagus*, *Quercus*) with overmature trees, including alluvial forests and also in cork oak (*Quercus suber*) evergreen forests. The adults have been observed visiting flowers of

yellow umbellifers. Males can be found on the ground at the foot of overmature oaks with trunk cavities or sitting on the adjacent bark, apparently awaiting females. Both sexes visit sap runs. Females can be found walking over the surface of the bark at the edge of trunk cavities and sap runs, or over the exposed wood. The flight period is given from May 7th until August 16th

SURVEY LIMITATIONS

Heavy rain usually on days or nights before the survey did affect the field work and may have affected the emergence of Diptera. The use of passive traps such as emergence traps, Malaise traps and water traps and taking samples for rearing reduces the dependence on good weather for surveys.

Possibly an earlier start in March or April might have helped with walkovers, installing traps and collecting samples for rearing but the surveyor started in early May which should have been early enough to catch the flight season of *Myolepta potens*.

SURVEY RESULTS

MYOLEPTA POTENS

Myolepta potens was found in 2019 but in lower numbers (4) compared to 2002 and only females were recorded. Records were confined to two mature horse-chestnuts with –

- one reared from rot-hole debris from an untagged horse-chestnut which had a girth (at 1.3m) of 267cm, an estimated age of 111 years and was classified as a non-veteran. Photographs 29 & 39; and
- three from a horse-chestnut (two from an emergence trap, one from a water trap) with a girth of 530cm, an estimated age of 380 years and was classified as a non-veteran. Photographs 3 & 30.

[Further information is available on the trees but the surveyor does not have a key to the various codes used although this has been requested. It would also be worth going back to the 2002 data and looking at the tree data for the eleven trees from which *Myolepta potens* was recorded].

The paucity of specimens compared with a similar programme of survey in 2002 is unclear. The earlier survey may have sampled more rot-holes at height, but since the majority of rot-holes are accessible without a ladder or with a step ladder, this is unlikely to be a valid reason. Wet weather did affect the survey in 2019 and this could have affected the flight period but adults would still have been expected in the rot-hole samples taken for rearing and in the emergence traps and water traps when the weather improved. The mature and over-mature horse-chestnuts at Moccas Park are mainly on the slopes some of which are steep and others are flushed or saturated. These factors taken with the advanced age of the trees means that veteran and over-mature horse-chestnuts are probably being lost annually and there are few or no younger trees to replace these. Climate change may also be a factor with warmer summers causing rot-holes to evaporate more or dry out.

The results from the rot-hole rearing appear to be particularly poor in 2019. This is normally a reliable method for obtaining rare saproxylic Diptera and it was effective in 2002 at Moccas. A slightly earlier start in collecting the samples in late April may have helped in ensuring that no emerging adults were lost but the survey started at the same time of year as in 2002 so this is only likely to be a minor issue at best.

The absence of males in 2019 may reflect the fact that the males emerged before the survey started and were missed for this reason, but this does not reflect the results in 2002 when males and females were found from May to July (the sex ratio was roughly 2:3).

The results indicate that *Myolepta potens* still occurs at Moccas Park but numbers in 2019 were down considerably compared with 2002. The reasons for this are unclear but poor weather and climate change may be factors.

OTHER INVERTEBRATES RECORDED

Most of the invertebrates recorded have been identified and details are available in Appendix 1.

Several rare and uncommon saproxylic Diptera and three Notable Coleoptera were recorded on the survey and these have been listed below.

<i>Hydropsche fulvipes</i>	Hydropsychidae	Trichoptera	Notable
<i>Platycis minuta</i>	Lycidae	Coleoptera	Notable B
<i>Prionocyphon serricornis</i>	Scirtidae	Coleoptera	Notable B
<i>Anaglyptus mysticus</i>	Cerambycidae	Coleoptera	Notable B
<i>Ctenophora pectinicornis</i>	Tipulidae	Diptera	Notable
<i>Rhipidia ctenophora</i>	Limoniidae	Diptera	Red Data Book 2
<i>Mycetobia</i> sp	Mycetobiidae	Diptera	Notable
<i>Eupachygaster tarsalis</i>	Stratiomyidae	Diptera	Nationally Scarce
<i>Ptiolina obscura</i>	Rhagionidae	Diptera	Least Concern
<i>Systemus leucurus</i>	Dolichopodidae	Diptera	Nationally Scarce
<i>Systemus scholtzii</i>	Dolichopodidae	Diptera	Nationally Scarce
<i>Systemus tener</i>	Dolichopodidae	Diptera	Near Threatened
<i>Brachyopa bicolor</i>	Syrphidae	Diptera	Nationally Scarce
<i>Mallota cimbiciformis</i>	Syrphidae	Diptera	Nationally Scarce
<i>Myolepta potens</i>	Syrphidae	Diptera	Critically Endangered
<i>Pherbellia annulipes</i>	Sciomyzidae	Diptera	Notable
<i>Lasiambia brevibuca</i>	Chloropidae	Diptera	pNationally Scarce
<i>Aulacigaster leucopeza</i>	Aulacigasteridae	Diptera	pNationally Scarce
<i>Paraclusia tigrina</i>	Clusiidae	Diptera	pNationally Scarce
<i>Amiota basdeni</i>	Drosophilidae	Diptera	Data Deficient
<i>Phaonia exoleta</i>	Muscidae	Diptera	pNationally Scarce

Several additional rare or scarce Diptera were recorded which belong to families which have not been given rarity statuses. These include the psychodid *Trichomyia urbica*, the scatopsids *Ectaetia lignicola* and *E. platyscelis?* and the tachinids *Actia infantula* and *Admontia seria*. An unidentified psychodid belonging to the genus *Telmatoscopus* may also be of interest.

It is likely that several rare and uncommon saproxylic Coleoptera were collected and these will be identified in due course by an experienced coleopterist. All the Malaise trap material has not been worked through as yet but some has been visually checked for *Myolepta* and none was present. The Malaise trap material will be worked through in due course.

HABITAT MANAGEMENT

Various recommendations for habitat management are provided below based on the survey and the findings.

Leave sawn timber to decay naturally under trees. Timber left to dry out in the sun will desiccate more rapidly and consequently be of less value to saproxylic invertebrates. Do not saw up fallen timber since this will accelerate drying-out. Chipping wood destroys the invertebrates in the wood so should not be undertaken in the Park.

Undertake sympathetic tree surgery of horse-chestnuts and native broad-leaved trees (especially oaks and beech) to retain over-mature and veteran trees.

Promote brambles (*Rubus fruticosus* agg.) and umbellifers, since both have been reported as being visited by *Myolepta potens*. Other flowering shrubs such as blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*) may be utilised.

Plant horse-chestnuts to provide the next cohort of trees.

Remove non-native conifers and conifer plantations from the Park.

Pheasant rearing prevents seedlings from growing and consequently reduces the capacity of young native trees to grow particularly in and around the rearing pens and around feeding stations.

A new pheasant rearing enclosure was being erected during survey in middle part of Park A 2m wide grassy strip had been mown around the compound presumably to aid management of the pen. Traps appear to have been put in place to catch rats. Some of these activities may be questionable on a NNR.

RECOMMENDATIONS

Further information is available on the trees but the surveyor does not have a key to the various codes used although this has been requested. It would also be worth going back to the 2002 data and looking at the tree data for the eleven trees from which *Myolepta potens* was recorded.

The ancient parkland at Moccas extends outside the official park boundaries and appears to include the land towards Moccas Court. It may be worth surveying this area in the future.

Survey ancient woodlands and old parklands elsewhere in Herefordshire, Gloucestershire, Avon, etc concentrating on the rot-hole fauna in mature to veteran horse-chestnuts. Other tree species such as beech and oaks should not be ignored but the latter rarely have rot-holes whilst the former tend to have rot-holes in the buttress roots which have not produced rare saproxylic hoverflies in the surveyor's experience.

CONCLUSIONS

The results of a survey for the Critically Endangered hoverfly *Myolepta potens* (Diptera, Syrphidae) in Moccas Park, Moccas, Herefordshire in 2019 are presented. This is the only known population in the UK for this species and it has not been surveyed for or recorded in the Park since it was found here by the surveyor in 2002. The present survey did record the species but only four females were recorded. One of these was reared from rothole debris taken from an over-mature horse-chestnut whilst another two were found in an emergence trap placed over a horse-chestnut rot-hole and the fourth was recorded from a small water trap placed in the same rot-hole from which the first specimen was reared.

The reason why males were not recorded is unclear but the most likely explanation would be that they emerged first and were somehow missed by the survey, even though it commenced at the same time as the more successful survey in 2002 which resulted in 23 males and 32 females being recorded. Poor weather may have also been a factor in the poorer results in 2019. It is unlikely that conditions in Moccas Park have led to a decline in *Myolepta potens*

population but the number of suitable trees will be diminishing and climate change may also have an impact.

Several other saproxylic Diptera were also recorded and have been identified and listed in the report. The larvae of some of these (i.e. *Systemus* spp, *Mallota cimbiciformis*, *Phaonia exoleta*, etc) may be similar to *Myolepta potens* in that they are rot-hole species. A small number of saproxylic Coleoptera have also been identified and the beetle by-catch has been passed to an expert coleopterist for determination and the records will be fed back to Buglife and Natural England.

REFERENCES

- Collin, J.E. (1950) A second British species of *Myolepta* (Diptera, Syrphidae). *Journal for British Entomology*, Vol. **3**, Part 3: 133-137
- Godfrey, A. & Drake, C.M. (2003) Diptera Survey of Moccas Park NNR, Herefordshire. Unpublished Report to English Nature
- Harding, P.T. and Wall, T, (2000) Moccas: an English Deer Park. English Nature, Peterborough.
- Hartley, J.C. (1961) A Taxonomic Account of the Larvae of some British Syrphidae. *Proc. Zool. Soc. Lond.* **136** (4): 505-573
- Levy, E.T. and Levy, D.A. (1998) Somerset Hoverflies. Privately published.
- Phillips, J. (2009) *Myolepta potens* in Gloucestershire. *Hoverfly Newsletter* **47**: 2
- Reemer, M, Hauser, M. & Speight, M.C.D. (2004) The genus *Myolepta* Newman in the West-Palaeartic region (Diptera, Syrphidae). *Studia Dipterologica* **11** Heft 2: 553-580
- Rotheray, G. (1991)

DATE	ACTIVITY	WEATHER
4 May 2019	Site walkover & identification of trees to sample.	Cold wind with 70% blue sky but sunny and dry at 9am.
5 May 2019	Samples taken for rearing. Erected Malaise trap.	Cold, 100% cloud. Sunny intervals. Dry. Drizzle turning to light rain later on. Rain stopped, brightened up with 20% blue sky.
6 May 2019	Put out water traps.	Cool/cold dry. Cool breeze. 100% cloud cover.
25 May 2019	Checked water traps & Malaise trap. Samples taken for rearing.	Sunny and warm.
26 May 2019	Erected Polytraps.	Sunny and dry.
22 June 2019	Checked water traps. Re-installed Malaise trap 1 & checked Malaise trap 2. Installed Polytraps.	Sunny, dry with no cloud cover.
23 June 2019	Erected emergence traps. Samples taken for rearing.	Dry, mild, still cool at 9.30-10am.
10 August 2019	Emptied, replenished and repaired various traps.	Rain, ground and vegetation wet from heavy rain previous day. Rain eventually stopped with sunny periods thereafter.
11 August 2019	Emptied, replenished and repaired various traps.	More rain overnight and in morning. Ground and vegetation wet.
22 September 2019	Emptied and removed all traps	Raining, wet.

TABLE 1: WEATHER CONDITIONS ON THE SURVEY DAYS

DATE INSTALLED	NOTES
23 June 2019	Photograph 28.
23 June 2019	Photograph 2.
23 June 2019	Photograph 29.
23 June 2019	Photographs 30 & 31.
23 June 2019	Photograph 33.
23 June 2019	Cavity at height. Photograph of emergence trap here from side (Photograph 7).

TABLE 2: LOCATION OF EMERGENCE TRAPS

DATE INSTALLED	TRAP NUMBER
5 May 2019	Malaise 1a. Found on ground, damaged and contents discarded on 22 June 2019 so re-installed at 1b on same day. Photographs 15, 21 & 26.
22 June 2019	Malaise 1b
6 May 2019	Malaise 2. Photograph 17.

TABLE 3: LOCATION OF MALAISE TRAPS

DATE TAKEN	NOTES
5 May 2019	Photograph 1
5 May 2019	Photograph 2 & 38
5 May 2019	Photograph 3

5 May 2019	Photograph 5
5 May 2019	Main rot hole. Photograph 11
5 May 2019	'Crocodile tree'. Photographs 12 & 13
6 May 2019	Smaller rot hole. Photograph 11
25 May 2019	Near Nestbox 65. Photographs 18 & 19
25 May 2019	Small cavity in cleft
25 May 2019	Wet cavity in limb
26 May 2019	Small rot hole in limb. Photograph 23
23 June 2019	Photograph 39
23 June 2019	Sap run below water filled cavity
23 June 2019	Photograph 3
23 June 2019	Sample from sap run. Photograph 32
23 June 2019	Photograph of cavity from side.
23 June 2019	Small cavity at height. Sampled with ladder. Photograph 34.
23 June 2019	Cavity at height. Photographs 35 & 41.

TABLE 4: LOCATION OF SAMPLES TAKEN FOR REARING

DATE INSTALLED	NOTES
26 May 2019	Horse chestnut. Photograph 20
26 May 2019	Close to Malaise 1. Relocated to sap run on 3429 on 22 June 2019. Photograph 21
26 May 2019	Close to 'Crocodile tree'. Photograph 24
22 June 2019	Alongside sap run. Photograph 27
26 May 2019	Last site at western end of Park. Photograph 25.

TABLE 5: LOCATION OF VANE TRAPS

DATE INSTALLED	NOTES
6 May 2019	In rot hole. Photograph 1
6 May 2019	In rot hole. Photograph 2
6 May 2019	In rot hole. Photograph 3
6 May 2019	Large water trap at base of large cavity created by heart rot. Photograph 4
6 May 2019	Large water trap on limb. Photograph 5
6 May 2019	Large water trap where limb has broken. Photograph 8
6 May 2019	Small and large water traps placed here. Photograph 11
6 May 2019	Two large water traps, one in trunk cavity, other on fallen limb. Photograph 10
6 May 2019	Small cavity at 2m height below Malaise trap 1a.
6 May 2019	'Crocodile tree'. Photographs 12 & 13.

TABLE 6: LOCATION OF WATER TRAPS

APPENDIX 1: INVERTEBRATES RECORDED FROM MOCCAS PARK, MOCCAS, HEREFORDSHIRE: 2019

Species of enhanced nature conservation value have been emboldened in the spreadsheet.

PHOTOGRAPHS



PHOTOGRAPH 1: HORSE-CHESTNUT WITH ROT-HOLE. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 2: HORSE-CHESTNUT. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 3: HORSE-CHESTNUT. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 4: HORSE-CHESTNUT WITH HEART WOOD DECAY. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 5: HORSE-CHESTNUT WITH SPLIT ALONG MAJOR BRANCH AND AN 'EYE'-SHAPED CAVITY (CENTRE OF PHOTO). PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 6: HORSE-CHESTNUT WITH CAVITY HIGHER UP. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 7: HORSE-CHESTNUT SHOWING AT LEAST ONE CAVITY. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 8: HORSE-CHESTNUT WITH DRY CAVITY. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 9: HORSE-CHESTNUT WITH HEART ROT DECAY. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 10: HORSE-CHESTNUT WITH HEART ROT. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 11: HORSE-CHESTNUT. WET ROT HOLE PRESENT WHERE THE PENCIL IS WITH A SMALLER ROT HOLE ABOVE LEFT. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 12: THIS IS THE 'CROCODILE TREE' BECAUSE OF ITS 'GAPING JAWS'. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 13: ROT HOLE IN THE 'CROCODILE TREE'. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 14: TREE KNARLED AND TWISTED WITH MUCH DEADWOOD AND DEAD HOLLOW LIMBS. THE GPS IS LOCATED IN A DRY CAVITY. PHOTO TAKEN 4 MAY 2019.



PHOTOGRAPH 15: THIS MALAISE TRAP HAD BEEN TAKEN DOWN ON THE FOLLOWING VISIT AND WAS SUBSEQUENTLY RELOCATED ELSEWHERE. PHOTO TAKEN 5 MAY 2019.



PHOTOGRAPH 16: CAVITIES ARE PRESENT AT HEIGHT ON THE OPPOSITE SIDE OF THIS TREE AND WERE SAMPLED. PHOTO TAKEN 6 MAY 2019.



PHOTOGRAPH 17: MALAISE TRAP 2. THIS IS IN THE UPPER MIDDLE OF THE PARK. PHOTO TAKEN 6 MAY 2019.



PHOTOGRAPH 18: CAVITIES IN LIMBS OF HORSE-CHESTNUT. PHOTO TAKEN 25 MAY 2019



PHOTOGRAPH 19: CLOSE-UP OF DEBRIS IN ONE OF THE CAVITIES IN THE TREE SHOWN IN PHOTOGRAPH 18. PHOTO TAKEN 25 MAY 2019



PHOTOGRAPH 20: POLYTRAP IN HORSE-CHESTNUT. THE VANES OF THE POLYTRAP ARE DIFFICULT TO SEE THROUGH THE RE-GROWTH. ANTI-FREEZE WAS ADDED TO THE COLLECTING POT AFTER THE PHOTO WAS TAKEN. PHOTO TAKEN 25 MAY 2019



PHOTOGRAPH 21: POLYTRAP AND MALAISE TRAP 1 (SEE PHOTOGRAPH 15). PHOTO TAKEN 25 MAY 2019. THE TREE IS AN OAK IN A STAND OF HORSE-CHESTNUT



PHOTOGRAPH 22: SAP RUN ON HORSE-CHESTNUT . THIS SUPPORTED *BRACHYOPA BICOLOR* AND *AULACIGASTER LEUCOPEZA*. PHOTO TAKEN 25 MAY 2019



PHOTOGRAPH 23: SMALL WET CAVITY IN HORSE-CHESTNUT . THIS IS THE SAME TREE AS SHOWN IN THE PREVIOUS PHOTO. PHOTO TAKEN 25 MAY 2019.



PHOTOGRAPH 24: POLTRAP IN HORSE-CHESTNUT (ABOVE THE 'CROCODILE TREE'). PHOTO TAKEN 25 MAY 2019.



PHOTOGRAPH 25: POLYTRAP ON HORSE-CHESTNUT . PHOTO TAKEN 25 MAY 2019



PHOTOGRAPH 26: MALAISE TRAP 1 ON 22nd JUNE 2019.



PHOTOGRAPH 27: POLYTRAP NEXT TO SAP-RUN SHOWN IN PHOTO 21. PHOTO TAKEN 22 JUNE 2019.



PHOTOGRAPH 28: EMERGENCE TRAP. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 29: EMERGENCE TRAP. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 30: CLOSE-UP OF WET CAVITY . A SAMPLE WAS TAKEN FOR REARING. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 31: EMERGENCE TRAP OVER THE CAVITY SHOWN IN THE PREVIOUS PHOTO. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 32: SAP RUN ON TREE TWO. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 33: EMERGENCE TRAP. PHOTO TAKEN 23 JUNE 2019.



PHOTOGRAPH 34: CAVITIES AT HEIGHT. WET MOULD WAS PRESENT IN THE CAVITY TO THE UPPER RIGHT OF THE LADDER AND A SAMPLE WAS TAKEN FOR REARING.



PHOTOGRAPH 35: EMERGENCE TRAP AT THE TOP OF THE PARK. A SAMPLE OF THE ROT HOLE MATERIAL WAS ALSO TAKEN FOR REARING.



PHOTOGRAPH 36: HORSE CHESTNUT WHICH HAS RECENTLY COLLAPSED.
PHOTO TAKEN 11 AUGUST 2019



PHOTOGRAPH 37: GRAYLING PHOTOGRAPHED ON THE MAIN TRACK THAT RUNS ALONG THROUGH THE UPPER PART OF THE PARK. PHOTO TAKEN 11 AUGUST 2019



PHOTOGRAPH 38: ROT HOLE . PHOTO TAKEN 22 SEPTEMBER 2019



PHOTOGRAPH 39: ROT HOLE IN HORSE CHESTNUT WHICH WAS COVERED BY AN EMERGENCE TRAP. PHOTO TAKEN 22 SEPTEMBER 2019



PHOTOGRAPH 40: CLOSE-UP OF ROT HOLE. PHOTO TAKEN 22 SEPTEMBER 2019



PHOTOGRAPH 41: CLOSE-UP OF ROT HOLE . PHOTO TAKEN 22 SEPTEMBER 2019



PHOTOGRAPH 42: MAIN FOOTPATH THROUGH THE UPPER PART OF THE PARK AFTER HEAVY RAIN. PHOTO TAKEN 22 SEPTEMBER 2019.