

The bordered brown lacewing *Megalomus hirtus* (L. 1761) rediscovered: an invertebrate survey in Holyrood Park, Edinburgh

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ABSTRACT

The bordered brown lacewing, *Megalomus hirtus* (L. 1761), is a Scottish Biodiversity List species last recorded in the U.K at Holyrood Park, Edinburgh in 1982. A survey of the invertebrate fauna of Holyrood Park specifically looking for this species of lacewing was carried out between June to September 2015. A single specimen of the bordered brown lacewing was collected revealing that this species is still extant in the U.K. although not in great numbers. Further surveying work needs to be done to discern the lacewings ecological requirements, and distribution.

INTRODUCTION

The bordered brown lacewing, *Megalomus hirtus* (L. 1761) is widely distributed in northern and central Europe. In the UK, this species has a very restricted distribution and is only thought to still be extant within Holyrood Park in Edinburgh. The last record from Holyrood Park was from 1982 (Plant, 1994; Littlewood and Stockan, 2013). As a result of its restricted distribution, the bordered brown lacewing is classified as a UK Biodiversity Action Plan (UKBAP) priority species (JNCC 2010). It is also on the Scottish Biodiversity List and falls into the category of 'conservation action needed' (Scottish Government, 2012).

There is very little information on the ecology of the bordered brown lacewing. It is thought to have an association with wood sage (*Teucrium scorodonia*) growing on rocky slopes (Plant, 1994). The flight season is known to occur from June to August, but there is no information on the duration of the flight season (Littlewood and Stockan, 2013). The National Museum of Scotland (NMS) in Edinburgh holds several specimens of the bordered brown lacewing. The date these specimens were collected suggests that the main flight season of this particular species is in June (24 specimens) and July (34 specimens). They only hold two specimens collected from August.

Given the conservation status, the poor knowledge of its current distribution and limited understanding of its ecology there is a pressing need to research the bordered brown lacewing. To answer these questions a project was initiated by

Buglife to discover whether the bordered brown lacewing is still extant in the UK and if so to devise a conservation plan. In addition to this a more general invertebrate survey of the invertebrates of the park was conducted. While the Holyrood Park service (run by Historic Scotland) currently runs regular surveys on bumblebees and butterflies there are no other invertebrate groups that are routinely surveyed.

MATERIAL AND METHODS

A variety of techniques, including sweep netting, light trapping, bug-vaccing (a leaf blower on reverse) and direct observations were used when surveying Holyrood Park for the bordered brown lacewing and other invertebrates. All surveying was completed between 23rd June 2015 and 27th September 2015.

Bug-vaccing was conducted over 20 separate 2x2m quadrats, each quadrat surveyed three times. The bug-vac was used over each quadrat for 2 minutes and was kept close to the ground whilst moving in a back and forth motion. Once the two minutes were finished the contents of the bug-vac were emptied into a sweep net and sorted. Specimens were identified in the field where possible and then released. Anything that could not be identified in the field was preserved in 70% ethanol to be identified later. Sweep netting was conducted over transects, with the net being swept at intervals of 5-10 metres. Again specimens that could be identified in the field were released, with the remainder identified later.

Light traps were set up between 9th July 2015 and 18th September 2015, for a total of seven evenings. Three traps were set out every session, alternating between nine sites in total. Light trapping was conducted using a rigid portable trap, with a battery powered 6W actinic bulb. A photographic record of all species observed in light traps was taken to aid identification.

RESULTS

A specimen of bordered brown lacewing was collected on the 30th June 2015 by sweep netting an area covered in wood sage on a rocky slope near the summit of Arthur's Seat, (NT 27527288). This was

the only specimen that was collected over the whole surveying period, and no other species of lacewing were recorded during the survey.

A total of 123 invertebrate species were recorded over the surveying period, split between 12 insect and other invertebrate orders (Table I). Of these, 100 were new records for Holyrood Park. Lepidoptera were the most commonly recorded order with a total of 48 new species, with the remaining 52 new species split between 11 insect and other invertebrate orders. 9 species recorded during the surveys are new records for the vice county of Midlothian (VC83) (Table II). Some of these have been recorded in neighbouring vice-county areas, while others have more distant records. There were a further 11 species discovered that are on the Scottish Biodiversity List. (Table III).

Order	Number of Species
Lepidoptera (butterflies and wasps)	62
Hymenoptera (bees, wasps and ants)	11
Diptera (true flies)	10
Hemiptera (true bugs)	11
Coleoptera (beetles)	14
Neuroptera (lacewing)	1
Collembola (springtails)	1
Trichoptera (caddisflies)	1
Orthoptera (grasshoppers)	2
Dermoptera (earwigs)	1
Aranaea (spiders)	7
Opiliones (harvestmen)	2

Table I. The number of species recorded in each invertebrate order.

Order	Species	Grid Reference	Date	Notes
Hymenoptera	<i>Gonatopus bicolor</i> (Haliday, 1828)	NT27047348	29/07/2015	Female. Only previous record in Scotland was from Gretna in 1937.
Hemiptera	<i>Kleidocerys ericae</i> (Horváth, 1908)	NT27847306 NT27787364	03/07/2015 28/08/2015	Records from Highlands, and Cumbria.
Hemiptera	<i>Dicranotropis hamata</i> (Boheman, 1847)	NT27047348	29/07/2015	Nearest records from Stirlingshire, but other than that no other records from central belt (other records from Highlands and North East England).
Hemiptera	<i>Javesella discolor</i> (Boheman, 1847)	NT27347275	25/06/2015	Closest record from England-Scotland Border in the Borders.
Diptera	<i>Urophora jaceana</i> (Hering, 1935)	NT27117289	23/06/2015	Has been found in neighbouring vice-county East Lothian (VC82). In vicinity of Common knapweed (<i>Centaurea nigra</i>) its larval host plant.
Diptera	<i>Tachina fera</i> (L. 1761)	NT268735	02/09/2015	Has been found in neighbouring vice-county East Lothian (VC82).
Coleoptera	<i>Syntomus truncatellus</i> (L. 1761)	NT27457339	09/09/2015	Only one previous record in Scotland, on Isle of May from 1970.
Coleoptera	<i>Hadroplontus litura</i> (Fabricius 1775)	NT267729	07/09/2015	Previous records in Scotland from Ardeer, Ayrshire, also found in North East England. Casual observation on Creeping thistle (<i>Cirsium arvense</i>).
Lepidoptera	<i>Standfussiana lucerneae</i> (L. 1758)	NT27527288		Records from neighbouring vice-counties East Lothian (VC82) and West Lothian (VC84).

Table II. Showing new species records for vice county area (VC83) based on records held in the National Biodiversity Network (NBN) database, the Scottish Invertebrate Records Index (SIRI) database, and consultation of local vice county moth recorder. Notes detail where nearest records are found, as well as other observations.

Species	Scottish Biodiversity List Reason
<i>Amphipyra tragopoginis</i> (Clerck 1759)	UKBAP, >25% Scottish Decline
<i>Diarsia rubi</i> (Vieweg 1790)	UKBAP
<i>Ecliptopera silaceata</i> (Denis & Schiffermüller 1775)	UKBAP
<i>Eugnorisma glareosa</i> (Esper 1788)	UKBAP, >25% Scottish Decline
<i>Euxoa nigricans</i> (L. 1761)	UKBAP
<i>Hoplodrina blanda</i> (Denis & Schiffermüller 1775)	UKBAP
<i>Melanchra pisi</i> (L. 1758)	UKBAP, >25% Scottish Decline
<i>Mesoligia literosa</i> (Haworth 1809)	UKBAP, >25% Scottish Decline
<i>Tyria jacobaeae</i> (L. 1758)	UKBAP
<i>Megalomus hirtus</i> (L. 1761)	Rare in UK, Rare in Scotland
<i>Colletes daviesanus</i> (Smith, F. 1846)	Rare in Scotland

Table III. Showing species discovered that are on Scottish Biodiversity List, and reasons as to why they are listed. UKBAP= United Kingdom Biodiversity Action Plan. Rare in UK= recorded in fewer than 16 10km squares. Rare in Scotland= recorded in fewer than 6 10km squares.

DISCUSSION

The discovery of the bordered brown lacewing confirms that it is still extant in the UK. There is still uncertainty about the extent of this population and ecological requirements. The one specimen caught may represent low population levels, or it may suggest that the surveying period took place towards the end of the flight season. Its discovery on a rocky slope with wood sage supports previous ecological associations (Littlewood, 2013; Plant, 1997). However, with only one specimen found during the study it is not possible to conclusively support this association. The poor weather during the study period may have contributed to the lack of specimens found, of this species, and of other lacewing species. There is a clear need to take forward this work and there are plans to continue survey work in Holyrood Park, conducted by the ranger service. Other sites with historic records such as Blackford Hill, Edinburgh, would also benefit from being resurveyed.

A total of 100 new species of invertebrate were recorded for Holyrood Park, 12 of which are new records for the vice-county, and a further 11 of which are on the Scottish Biodiversity List. This partly reflects the fact that there have been few invertebrate surveys conducted in Holyrood Park. Additionally the records that are new for the vice-county area are mostly from insect and other invertebrate orders that are under recorded (Hymenoptera, Hemiptera, Coleoptera and Diptera). This means that it is difficult to discern whether these new records are as a result of an expanding distribution, or due to under recording. This increase in invertebrate records highlights the importance of Holyrood Park for invertebrate biodiversity in a built-up urban area.

All collected specimens are stored at the Buglife Scotland office, Stirling. Copies of the report (including a full species list) written as a result of this project can be viewed at the Buglife website www.buglife.org.uk.

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REFERENCES

- JNCC (2010). UK priority species data collection. *Megalomus hirtus* version 2. http://jncc.defra.gov.uk/_speciespages/2409.pdf (last accessed 5 May 2016).
- Littlewood, N.A, Stockan, J.A. (2013). Surveillance of priority terrestrial invertebrates in Scotland. *Scottish Natural Heritage Commissioned Report No. 609*. pp. 115-116.
- Plant, C.W. (1994). Provisional Atlas of lacewings and allied insects (Neuroptera, Megaloptera, Raphidioptera and Mecoptera) of Britain and Ireland. Institute of Terrestrial Ecology. Edited for the Biological Records Centre by PT Harding, BC Eversham and HR Arnold. Huntingdon: Biological Records Centre, pp. 140-141.
- Plant, C.W. (1997). *A key to the adults of British Lacewings and their allies*. Telford, Field Studies Council Publications.
- Scottish Government (2012). Scottish Biodiversity List <http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL> (last accessed 5 May 2016).