

SMALL-HEADED RESIN BEE, *HERIADES RUBICOLA*, NEW TO BRITAIN (HYMENOPTERA: MEGACHILIDAE)

IAN CROSS¹ & DAVID G. NOTTON^{2*}

¹16 Briantspuddle, Dorchester, Dorset DT2 7HS, United Kingdom
iancrossbadgers@hotmail.co.uk

²Department of Life Sciences, The Natural History Museum, Cromwell Road,
London SW7 5BD, United Kingdom
d.notton@nhm.ac.uk

ABSTRACT

Small-headed Resin Bee, *Heriades rubicola* Pérez, is formally recorded as new to Britain following its mention by Falk & Lewington (2015) and based on two specimens, one from Dorset and one from London. Morphological characters are given and illustrated, to establish its identity and to distinguish it from other British bees. Notes are provided on bionomics, the circumstances of its arrival and its status in Britain.

INTRODUCTION

Knowledge of the distribution and status of British bees is timely in the context of understanding and managing pollinator services, the conservation of bees generally and understanding their responses to challenges such as climate change, land-use change and pesticides (Carvell *et al.*, 2016; Nowakowski & Pywell, 2016). The discovery of a bee new to the British fauna is therefore of considerable interest. Small-headed Resin Bee, *Heriades (Heriades) rubicola* Pérez, 1890 (Hymenoptera, Megachilidae, Osmiini), is here recorded as new to Britain based on two specimens, one from Dorset and one from London. Morphological characters are provided and illustrated to establish its identity and to distinguish it from other north-west European *Heriades*. Notes are provided on the bionomics of *H. rubicola* in Britain supplemented with observations from Portugal and on the circumstances of its arrival in Britain and its possible status as a breeding species in Britain. This is the third paper reporting novel Hymenoptera from Greenwich Peninsula Ecology Park/Southern Park; previously Notton, Tang, & Day (2016) and Notton (2016).

METHODS

Bees were collected by hand netting, with voucher specimens deposited in the personal collection of Ian Cross (ICPC) and the Natural History Museum, London (NHMUK). Plant associates were identified using Stace (2010). All British *Heriades truncorum* (L.) in NHMUK were checked and labelled to be sure no *H. rubicola* were present and all *H. rubicola* were examined to be sure there were no additional British specimens. London specimens were imaged using a Canon EOS 550D digital camera connected to a Leica M125 stereomicroscope; images were processed with Helicon Focus image stacking software. Nomenclature follows Ascher and Pickering (2014) and Else, Bolton and Broad (2016).

* corresponding author.

Key to species of north-west European *Heriades*

According to Ungricht, Müller & Dorn (2008) there are three species of *Heriades* found in north-west Europe; *H. truncorum*, *H. rubicola* and *H. crenulata* Nylander, the last is not reported from Britain but because of its similarity to *H. rubicola* and close proximity of its distribution to Britain it seems prudent to provide a key here including all three. The following is translated and adapted from Amiet *et al.* (2004), with the addition of some distinctive new characters in the key to males: the pubescence of sternites 1–2 and the form of the genitalia.

Females

- 1 Lower margin of clypeus with two protruding medial tubercles (Plate 1, Fig. 1). Body length 6–7 mm *H. truncorum* (Linnaeus)
- Lower margin of clypeus finely crenulate, i.e. with numerous small denticles (Plate 1, Fig. 2) 2
- 2 Inner orbits almost parallel (Plate 1, Fig. 3). Gena as wide as compound eye (Plate 1, Fig. 5). Mesonotum about as strongly punctured as vertex. Body length 6–7 mm *H. crenulata* Nylander
- Inner orbits distinctly converging below (Plate 1, Fig. 4). Gena narrower than compound eye (Plate 1, Fig. 6). Mesonotum more coarsely punctured than vertex. 5–6 mm. *H. rubicola* Pérez

Males

- 1 Sternites 1 and 2 with short hairs, not concealing the cuticle below, the longest hairs about as long as the width of the hind basitarsus, and about as long as the hairs medially on tergite 6 (Plate 1, Fig. 7). Tergite 6 with the lateral pits shallow (Plate 1, Fig. 7). Genitalia with gonoforceps slender, weakly curved (Plate 2, Fig. 2). 5–6 mm *H. rubicola* Pérez
- Sternites 1 and 2 with long dense hairs, concealing the cuticle below, the longest hairs about 1.5 times as long as the width of the hind basitarsus, and much longer than the hairs medially on tergite 6 (Plate 1, Fig. 8; Plate 2, Fig. 1). Tergite 6 with the lateral pits deep (Plate 1, Fig. 8; Plate 2, Fig. 1). Genitalia with gonoforceps stout, strongly curved or angled apically (Plate 2, Figs 3, 4) . . 2
- 2 Tergite 6 with the two pits broadly separated by more than a third of the tergite width (Plate 1, Fig. 8). Apex of gonoforceps abruptly angled (Plate 2, Fig. 3). Body length 6–7 mm *H. crenulata* Nylander
- Tergite 6 with the lateral pits narrowly separated, by less than a fifth of the tergite width (Plate 2, Fig. 1). Apex of gonoforceps evenly curved (Plate 2, Fig. 4). Body length 5–7 mm *H. truncorum* (Linnaeus)

HERIADES Spinola, 1808 *Heriades (Heriades) rubicola* Pérez, 1890

Plate 1, Figs 2, 4, 6, 7; Plate 2, Figs 2, 5–8.

Identification

The first British specimen of *Heriades rubicola*, found in 2006, could not be identified using available British literature but using a key for the continental European fauna (Amiet *et al.*, 2004) it was keyed to *H. rubicola* by ICPC and this was confirmed by George Else (pers. comm.). Based on this specimen the species was briefly reported and included in the most recent key to British bees (Falk & Lewington, 2015)

as an accidental introduction or vagrant. The second British specimen found in 2016 was identified by DGN using Falk & Lewington (2015) and confirmed with Amiet *et al.* (2004) and by comparison with specimens of this species in the NHMUK collection, including specimens recently determined by Andreas Müller. Among the British fauna, *H. rubicola* is hard to identify and, because of its small size and similarity to *H. truncorum*, voucher specimens are recommended, preferably of the more distinctive males. The key to north-west European *Heriades* above is provided to enhance existing identification resources. In the field, fresh specimens are usually slightly smaller and paler than *H. truncorum* and like that species are usually found in association with yellow-flowered Asteraceae. The vernacular name Small-headed Resin Bee was proposed for this species by Falk and Lewington (2015) and is recommended here. The name Bramble Carpenter Bee (National Biodiversity Network, 2016: NHMSYS0020936564) is not recommended because *H. rubicola* does not have a preferential association with *Rubus* spp., as it also nests in dead wood or reed stems. Furthermore, the name carpenter bee is more usually used for bees of the subfamily Xylocopinae.

Material examined

UK: Dorset: Briantspuddle: SY816931: 26.vii.2006: ♀ : at flowers of *Pulicaria dysenterica*: I. Cross (ICPC); London: Greenwich Peninsula: Southern Park: TQ400791: 6.viii.2016: ♀ : at flowers of *Picris heiracioides*: D. G. Notton (NHMUK010264949). **FRANCE:** Var: Fréjus: 4.vi.1971: 2♂ ♂ : K.M. Guichard (NHMUK010264959, NHMUK010264974). **SPAIN:** 20 km north of Madrid: Rio Guadarrama: 3.vi.1979: ♀ : K.M. Guichard (NHMUK010264977).

Distribution

To date *Heriades rubicola* has only been found at two sites in Britain but may well have been overlooked elsewhere because of its small size. *Heriades rubicola* is widespread in southern Europe, north Africa, and Asia (Amiet *et al.*, 2004; Müller, 2016). The nearest populations to Britain appear to be in France (Müller, 2016) and the Channel Islands (BWARS, 2016).

Habitat

The Briantspuddle site is a mature, rural, wildlife garden of about 0.1 ha. The garden contains bramble, *Rubus fruticosus* agg. and, as it is situated in a river valley, there is abundant Common Reed, *Phragmites australis*, within 200 m. Southern Park is adjacent to the Greenwich Peninsula Ecology Park, situated within the former gasworks site on Greenwich Peninsula. The latter totals 1.72 ha in size and comprises artificial lakes, reed bed, grassland, scrub and woodland, as well as a building and supporting access infrastructure (The Land Trust, 2014; Notton, Tang & Day, 2016). At the time of collecting, there was an adjacent brownfield site including grassland habitat with bramble, *R. fruticosus* agg., and abundant yellow flowered Asteraceae; the last site is being built over at the time of writing.

Flight period

From the limited observations to date British females *H. rubicola* have been seen flying from July to August. Elsewhere it has been recorded from June-September in France and Switzerland (Pérez, 1890; Benoist, 1929; Amiet *et al.*, 2004). In southern Iberia it is at least double, and probably multiple brooded, with adults being recorded from late March to early November.

Nesting biology

Nesting of *H. rubicola* has not been observed in Britain although the Dorset female was carrying pollen and so is assumed to have been nesting. Both bramble, *Rubus* spp., and Common Reed, *Phragmites australis* (Cav.) Trin. ex Steud, the stems of which are known to be used for nesting outside Britain, are abundant at Southern Park, Greenwich. In France *H. rubicola* has been reported nesting in *Phragmites* ('roseaux') and *Rubus* ('ronce'), with the cells separated by plant resin or gum (Pérez, 1890; Ferton, 1894; Benoist, 1929). More recently in the Czech Republic it has recently been reported by Bogusch, Astapenková & Heneberg (2015) nesting in empty galls of *Lipara* spp. (Diptera, Chloropidae) on *P. australis*. In Portugal it nests in beetle burrows in wood with the nest closure being made of resin with small particles incorporated, probably sand, and some green particles, possibly leaf material or plant gum (Plate 2, Figs 6–7).

Flowers visited

In Britain *H. rubicola* females have been seen visiting Common Fleabane, *Pulicaria dysenterica* (L.) Bernh., and Hawkweed Oxtongue, *Picris hebracioides* (L.). This bee is oligolectic on Asteraceae (Amiet *et al.*, 2004) and apparently prefers to forage on yellow-flowered species of Senecioneae and Inuleae. In Portugal and Spain early broods visit a variety of yellow Asteraceae including *Helichrysum stoechas* (L.) Moench, and late broods are frequently seen visiting Woody Fleabane, *Dittrichia viscosa* (L.) Greuter (Plate 2, Fig. 8).

Status

Heriades rubicola has not been formally published as new for Britain but was first mentioned as British in Falk and Lewington's (2015) field guide. Else, Bolton and Broad (2016) list it as British but were apparently unaware of Falk and Lewington's mention and erroneously say it was introduced to the British list in another work which is currently unpublished. Falk and Lewington suggest the first specimen of *H. rubicola* was an accidental introduction or vagrant. However, the discovery of a second specimen ten years later at a different locality suggests that it may have established in Britain at low density. It is an inconspicuous bee, and could easily have been established for some time without detection. It was not noticed in two recent entomological surveys of Greenwich Peninsula Ecology Park: an unpublished list of bees recorded during 2009 prepared by Thomas C. Ings, Anglia Ruskin University (pers. comm.); and a survey report covering all insects, including bees (Colin Plant Associates, 2015). There is no evidence to suggest how *H. rubicola* might have reached Britain although it could easily have been imported with wood products or horticultural plants with hollow stems containing nests. In time it may become widespread in southern Britain because it appears that its pollen host and nesting requirements can be easily met. The occurrence of this bee in Britain has been notified to the GB Non-Native Species Secretariat however, there is no evidence currently to suggest that it poses any threat to native bees. *Heriades rubicola* is not endangered in a whole European context, it has the status 'of Least Concern' in IUCN red lists categories and is not endemic to Europe (Nieto *et al.*, 2014). *Heriades rubicola* is apparently expanding its range northwards in Europe, being reported in Czech Republic for the first time in 2007 (Bogusch *et al.*, 2015) and becoming increasingly common there, and also apparently expanding its range in Austria (Planner, 2016).

ACKNOWLEDGEMENTS

Thanks are due to The Land Trust (The Land Trust, 2016) for permission to collect at Southern Park, The Conservation Volunteers (The Conservation Volunteers, 2016) and loyal friends of the Park who manage the habitats for bees, and to Theresa Howard (formerly Collections Manager for Entomology, Natural History Museum, UK).

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SHORT COMMUNICATION

Submergence tolerance of *Cionus scrophulariae* (L.) (Coleoptera: Curculionidae) on Water Figwort at Kew Bridge, London. – For six years I have been aware of a large stand of Water Figwort *Scrophularia auriculata* growing at Kew Bridge, London which supports a large resident population of the weevil *Cionus scrophulariae* (L.) (Curtis, 2011). I have often wondered how *C. scrophulariae* responds to the year round, twice monthly Spring tide flooding of the Thames bank. Regular observations reveal that adult beetles can be found on the figwort in mid winter, mainly hidden among the dried florets of tall intact stems that are above the highest level of flooding. On 4.iv.2016 I made the key observation on a new clump of figwort, situated low down on the footings of the west side of the bridge. Arriving soon after the tide had receded, with fronds saturated and slumped over, I found three mating pairs of *C. scrophulariae* – strong evidence that adult beetles can survive temporary submergence. In view of the timing it is highly likely that the initiation of mating occurred before the period of submergence. – CLIVE R. CURTIS, 3 Cressage House, Walnut Tree Road, Brentford, Middlesex TW8 0LA.

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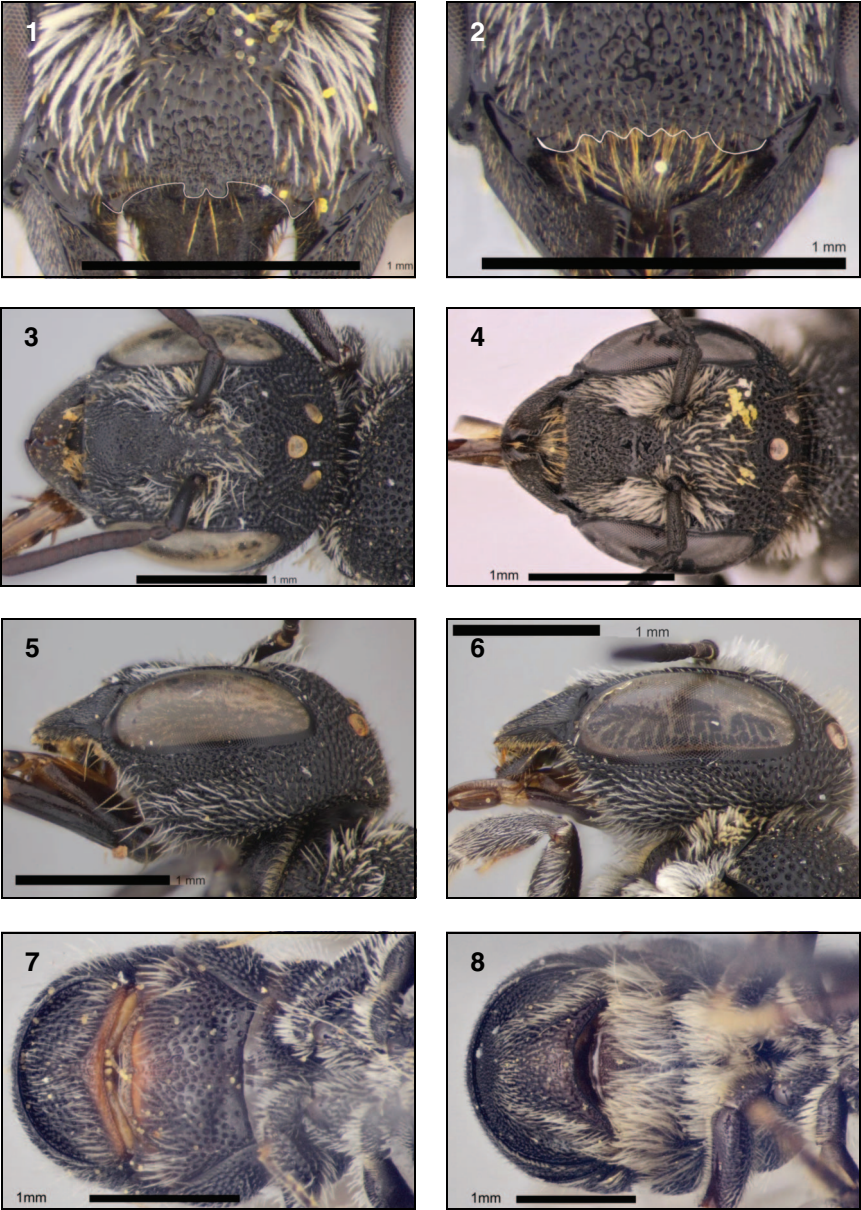


PLATE 1. Fig. 1. *Heriades truncorum*, ♀ clypeus, with white line added to show shape of margin (NHMUK010264951). Fig. 2. *H. rubicola*, ♀ clypeus, with white line added to show shape of margin (NHMUK010264949). Fig. 3. *H. crenulata*, ♀ face (NHMUK010264975); Fig. 4. *H. rubicola*, ♀ face (NHMUK010264949). Fig. 5. *H. crenulata*, ♀ head, lateral (NHMUK010264976); Fig. 6. *H. rubicola*, ♀ head, lateral (NHMUK010264977). Fig. 7. *H. rubicola*, ♂ metasoma, ventral, sternites 1, 2 and 6 (NHMUK010264974). Fig. 8. *H. crenulata*, ♂ metasoma, ventral, sternites 1, 2 and 6 (NHMUK010264973). Scale bars 1 mm.

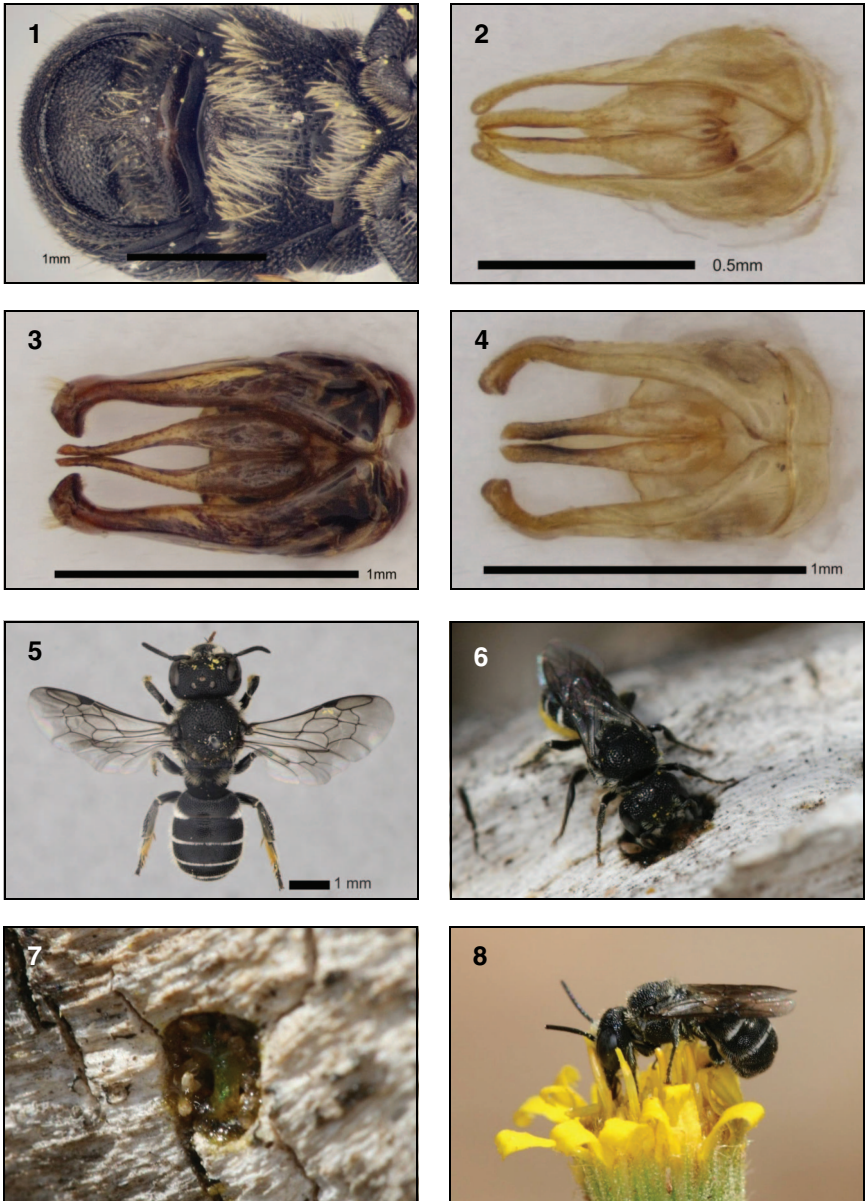


PLATE 2. Fig. 1. *Heriades truncorum*, ♂ metasoma, ventral, sternites 1, 2 and 6 (NHMUK010264972). Fig. 2. *H. rubicola*, ♂ genitalia (NHMUK010264959). Fig. 3. *H. crenulata*, ♂ genitalia (NHMUK010264960). Fig. 4. *H. truncorum*, ♂ genitalia (NHMUK010264962). Fig. 5. *H. rubicola*, ♀ dorsal habitus (NHMUK010264949). Fig. 6. *H. rubicola*, ♀ capping nest with a mixture of resin and small stones, Portugal. Fig. 7. *H. rubicola*, nest capping of resin and small stones, Portugal. Fig. 8. *H. rubicola*, ♂ visiting flowers of *Dittrichia viscosa* near Lagos in the Algarve, Portugal. Scale bars 1 mm, Fig. 1, 3–5; 0.5 mm, Fig. 2. Photo credits: DGN (NHMUK), Figs 1–5; IC, Figs 6–8.