HAWK'S-BEARD NOMAD BEE, *NOMADA FACILIS*, NEW TO BRITAIN (HYMENOPTERA: APIDAE)

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ABSTRACT

Hawk's-beard Nomad Bee, *Nomada facilis* Schwarz, is recorded as new to Britain. Morphological characters are given to establish its identity and DNA sequencing was used to independently confirm the identification. An illustrated key to the *Nomada integra* species group in Britain is provided. Based on limited material found in the Natural History Museum, London and Oxford University Museum of Natural History collections *N. facilis* is a very rare and declining native species in Britain. Its bionomics are reviewed and some original observations are made indicating *Andrena fulvago* (Christ) is the host in Britain.

INTRODUCTION

Knowledge of the distribution and status of British bees is timely in the context of understanding pollinator services, their management and responses to challenges such as climate change, land-use change and pesticides (Carvell *et al.*, 2016; Nowakowski & Pywell, 2016). The discovery of a new bee for the British fauna is therefore of considerable interest. Hawk's-beard Nomad Bee, *Nomada facilis* Schwarz, 1967, is here recorded as new to Britain, based on 12 specimens from southern England. Morphological characters are provided, and illustrated, to establish its identity and to distinguish it from other British bees and DNA sequencing of a single specimen was used to independently confirm the morphological identification. The barcode gene (Cytochrome oxidase c subunit I (COI)) was used as a reference marker, which has been shown to have good resolution among bees (Sheffield *et al.*, 2009; Magnacca & Brown, 2012; Schmidt, Schmid-Egger & Ere, 2015; Notton, Tang & Day, 2016; Tang, Notton *et al.*, in press) and is a widely accepted gene for the purposes of species identification, or in this case confirmation (Hebert, Cywinska & Ball, 2003). The barcode will be included in BOLD, a curated DNA barcode repository (Ratnasingham & Hebert, 2007) to underpin future projects using DNA barcoding for identification such as the UK National Pollinator and Pollination Monitoring Framework (Carvell *et al.*, 2016). Based on limited material found in the NHMUK and OUMNH collections *N. facilis* is a very rare and declining native species in Britain. Its bionomics are reviewed and some original observations are made indicating *Andrena fulvago* (Christ) is the host in Britain.

METHODS

Initially one specimen of *N. facilis* was collected serendipitously in Lewisham by hand netting and, following identification (as described below), this ultimately

resulted in the discovery of additional previously unrecognised British and continental European specimens in the collections of the Natural History Museum, London, UK (NHMUK) and the Oxford University Museum of Natural History, Oxford, UK (OUMNH). The collection of the National Museum of Scotland was examined but no specimens of *N. facilis* were found there. At the NHMUK and OUMNH all identified British specimens of the closely related *Nomada argentata* Herrich-Schäffer and *N. integra* Brullé were re-examined, as were all unidentified British *Nomada*, and *Nomada* in the historic William Kirby Collection (NHMUK) and Dale Collection (OUMNH). Specimens of *N. facilis*, *N. integra* and *Andrena fulvago* from NHMUK used in the study were assigned unique NHMUK specimen numbers. Images were taken using a Canon EOS 550D digital camera connected to a Leica M125 stereomicroscope, with images processed with Helicon Focus image stacking software. Head measurements/ratios for female *N. facilis* were measured using a binocular microscope and graticule eyepiece: head width is the greatest distance across the eyes; head height the distance between the margin of the clypeus and the vertex along the mid line when viewing the face perpendicularly. Specimen data and images for NHMUK specimens were recorded on the NHMUK database, and will be made publically available through the NHMUK Data Portal (Natural History Museum, 2014).

Specimen data extracted from labels have been supplemented by reference to previous publications and unpublished archival sources at NHMUK and OUMNH as far as possible and updated to reflect current geographical names. Locality details for Marsham's specimen, now in the Kirby collection, are taken from Kirby (1802: 218, as *Apis ferruginata* Linnaeus, 1767; see also Yarrow, 1970: 173 as *Nomada stigma* Fabricius, 1805). Data for specimens from the O. W. Richards collection (Register number BMNH-ENT-1967-510) were checked against his card index at the NHMUK. Chitty's locality Huntingfield is a house near Faversham, in Kent, not the village of the same name in Suffolk (Morley, 1944). The Dale notebooks at OUMNH were consulted but no data could be associated with the specimen from the Dale collection, except to say that it must predate 1906 when the collection was acquired by OUMNH. DMAP for Windows 3.0 mapping programme (Morton, 1993) was used to produce the map. Where not recorded on the labels, grid references have been inferred where the locality allowed. Plants visited were identified using Stace (2010).

DNA was extracted from a single mid leg using a Qiagen DNeasy Blood and Tissue Kit. To promote the extraction of DNA, the leg was incubated at 56°C in the extraction buffer overnight in a shaking incubator at 75 rpm. We used the bee specific primers, designed by Tang (Notton, Tang & Day, 2016) using a total of 84 bee mitochondrial genomes, to amplify COI (BEEf [5′ – TWY TCW ACW AAY CAT AAA GAT ATT GG – 3′] and BEEr [5′ – TAW ACT TCW GGR TGW CCA AAA AAT CA – 3′]), which have higher amplification success than previously published primers. The PCR (polymerase chain reactions) conditions consisted of 2 ml of DNA, 0.75 ml of each primer (at 10 mM), 2.5 ml of the NH4 Reaction buffer (Bioline), 0.75 ml of $MgCl_2$ solution, 0.25 ml of dNTPs, 1 unit of BioTaq (Bioline), and ddH_2O up the final volume of 25 ml. Standard PCR cycle conditions were used for COI developed by the Canadian Centre for DNA Barcoding (CCDB): specifically, an initial denaturation at 94°C for 2 min, followed by five cycles of 94°C for 30 s, annealing at 45°C for 40 s, and extension at 72°C for 60 s, 35 cycles of 94°C for 30 s, annealing at 51°C for 40 s, and extension at 72°C for 60 s, and a final extension at 72°C for 10 min. The success of the PCR was checked by gel electrophoresis using a 2% TAE gel run for 40 min at 100 V. PCR products were

purified using a QIAquick PCR Purification Kit (Qiagen) and sequenced in both directions using ABI dye terminator sequencing at the NHMUK Sequencing Facility. Sequence chromatograms were assembled into contigs and manually edited using Geneious v9.1.3. (http://www.geneious.com; Kearse *et al.*, 2012). The sequence was translated using the Invertebrate mitochondrial table (5) and checked for stop codons (indicative of NuMTs; Song *et al.*, 2008). A BLAST search was performed to identify the sequence. To confirm the identification of *Nomada facilis*, 603 *Nomada* sequences representing 93 species including five *N. facilis* sequences were downloaded from BOLD (Ratnasingham & Hebert, 2007), aligned with our *N. facilis* sequence using the MAFFT v1.3. (Katoh, Asimenos & Toh, 2009) on the command line, and a Bayesian tree was generated using BEAST (Drummond *et al.*, 2012) on the Cipres Science Gateway. The phylogenetic placement of the sequence was used to identify the sequence.

Results

NOMADA Scopoli, 1770
Nomada facilis Schwarz, 1967

Identification

The male specimen of *Nomada facilis* initially collected from Lewisham could not be conclusively identified using the most recent key to the morphology of British bees (Falk & Lewington, 2015) nor did it agree with specimens of any of the previously known British species of *Nomada* in the NHMUK collection, as listed in the recent British and Irish checklist (Else, Bolton & Broad, 2016). Using keys for the continental European fauna (Scheuchl, 2000; Amiet *et al.*, 2007) it keyed out consistently to *N. facilis*. The morphological identification was independently confirmed by the DNA sequence (BOLD record number: NOMA001-17: Ratnasingham & Hebert, 2007). BLAST assessment of the focal COI sequence identified it as *N. facilis*, with the top matches all *N. facilis* and sharing >99% identity to the target sequence. The next closest matches were of *N. integra*, which shared 93% identity with the target COI sequence. The identity of this sequence was also confirmed by phylogenetic placement of the sequence among other *Nomada* sequences (Fig. 1). The new sequence fell within a clade of other *N. facilis* sequences supported by a posterior probability of one, no other species are within this clade and no *N. facilis* sequences fell outside this clade. The *N. facilis* sequences cluster with other members of the *N. integra* species group, a group previously identified by morphology and by phylogenetic analysis (Schwarz, 1967, as the *cinctiventris* group; Alexander, 1994; Alexander & Schwarz, 1994). Once the identification was confirmed by the DNA sequence additional British and continental European specimens were located in the NHMUK and OUMNH collections and keyed using Scheuchl (2000).

Partial keys are provided here to assist students of the British fauna in the identification of *N. facilis* and are intended to supplement the keys in Falk & Lewington (2015): females from *Nomada* female group A, couplet 6; and males from *Nomada* Group B, couplet 4. The keys re-use some characters from Scheuchl (2000) and Falk and Lewington (2015) but are greatly adapted by the addition of new characters, including propodeal sculpture, wing venation, head proportions, and leg colour in the key to females; and propodeal sculpture, head proportions, facial pubescence, leg colour, and details of the genitalia in the key to males. The difference in head proportions is easily appreciable for males, however for females it is more subtle and needs to be measured carefully (Fig. 2). The key to females should be

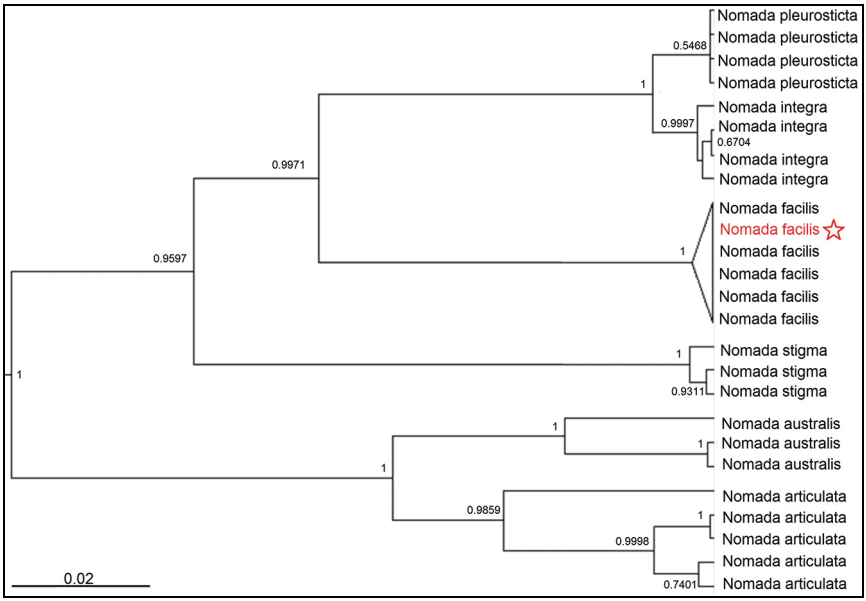

Fig. 1. Bayesian tree reconstructed using BEAST using 603 *Nomada* COI sequences from the same clade as *Nomada facilis* downloaded from BOLD. Representatives from *Epeolus*, *Triepeolus* and *Holcopasites* were used as an outgroup (not shown). All 603 *Nomada* sequences available on BOLD were analysed but for clarity only the clade of species closest to *N. facilis* is shown (24 sequences). Posterior probabilities above 0.5 are shown above the branches. The collapsed clade shown with a triangle represents the clade of all of the *N. facilis* sequences and the second tip within this clade (*) represents the new British *N. facilis* sequence generated in this study. In the tree, branch length scale refers to the number of substitutions per site.

regarded as provisional because of the small number of females of *N. facilis* available for study. The colour characters are taken from English specimens only; colour variation may be wider in non-British specimens. It should be noted that the field appearance, or habitus (Plate 12, Figs 1–2) of *N. facilis* is virtually identical to *N. integra* and voucher specimens are essential to confirm identification. The vernacular name Hawk's-beard Nomad Bee is proposed for this species, by reference to its likely host, *Andrena fulvago*, the Hawk's-beard Mining Bee, which is associated with yellow flowered Asteraceae including, but not only, Hawk's-beards (*Crepis* spp.).

Key to British species of the Nomada integra *species group*

Females

6 Hind femur below with basal half shining and with sparse punctures; propodeum posteriorly with lateral zones densely hairy, giving a silvery appearance; medial zone with small medio-basal zone of stout, straight, convergent carinae; antennal flagellum dark reddish brown below, barely contrasting with upper side; mesopleuron usually with a variably sized red mark, rarely the red mark is absent. . . . . ***Nomada argentata* Herrich-Schäffer, 1839**

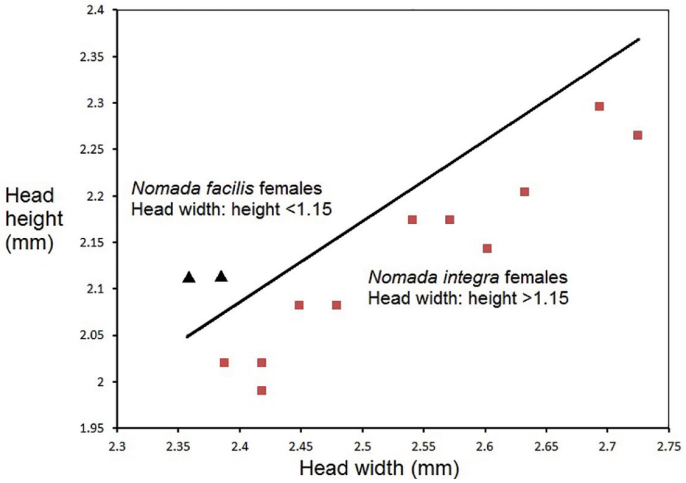

Fig. 2. Scatter plot showing head measurements for female *Nomada facilis* and *N. integra*. Straight line shows ratio 1:1.15.

– Hind femur below with basal half dulled and with dense punctures; propodeum posteriorly with lateral zones sparsely hairy; medial zone with mediobasal carinae weaker, irregular, not convergent; antennal flagellum clear orange-red below, usually a little darker above; mesopleuron black. 7

7 Basal flagellum with a3 slightly shorter than or equal to a4 in anterior view (Plate 12, Fig. 3); anterior margins of second and third submarginal cells together longer than or occasionally equal to posterior margin of third submarginal cell (Plate 12, Fig. 5); apex of pygidium obtuse, usually broadly rounded, at most with slight angle at apex (Plate 12, Fig. 7); head, as seen perpendicular to the face, distinctly wider than high, ratio of head width: head height > 1.15 ($n = 12$); hind femur dorsally with red more extensive and boundary between red and black sharply defined (Plate 13, Fig. 1). . . . . ***Nomada integra* Brullé, 1832**

– Basal flagellum with a3 slightly longer than a4 in anterior view (Plate 12, Fig. 4); anterior margins of second and third submarginal cells together shorter than posterior margin of third submarginal cell (Plate 12, Fig. 6); apex of pygidium acute, distinctly pointed (Plate 12, Fig. 8); head, as seen perpendicular to the face, slightly wider than high, ratio of head width: head height < 1.15 ($n = 2$); hind femur dorsally with red less extensive and boundary between red and black less clearly defined (Plate 13, Fig. 2) . . . . . ***Nomada facilis* Schwarz, 1967**

Males

4 Hind femur below with basal half shining, with sparse punctures and sparse hairs; antennal flagellum having a5–10 ventrally with low rounded projections; propodeum posteriorly with lateral zones densely hairy, giving a silvery appearance; medial zone with small medio-basal zone of stout straight convergent carinae; antennal flagellum

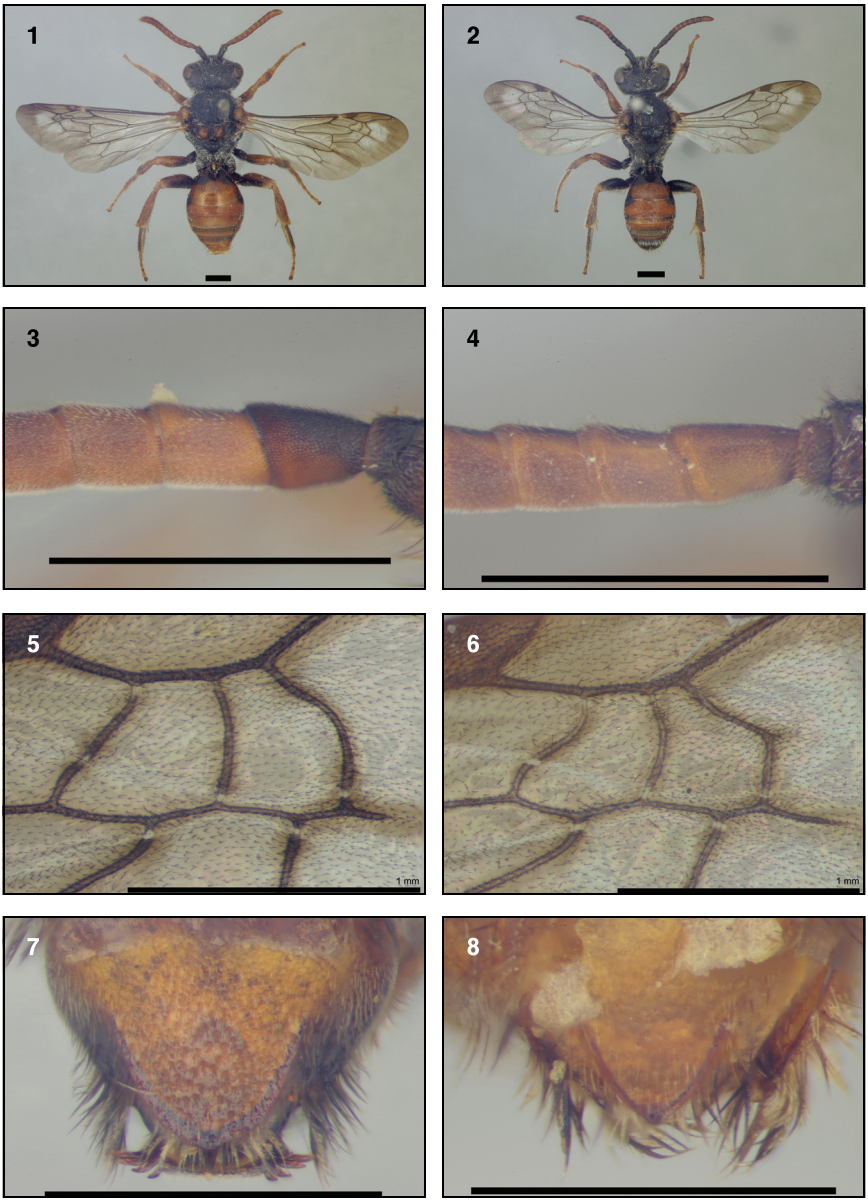

PLATE 12. Fig. 1. *Nomada facilis* ♀, dorsal habitus, NHMUK010811984; Fig. 2. *N. facilis* ♂, dorsal habitus, NHMUK010815874; Fig. 3. *Nomada integra* ♀, right basal flagellar segments, anterior view, NHMUK010812280; Fig. 4. *N. facilis* ♀, right basal flagellar segments, anterior view, NHMUK010811984; Fig. 5. *N. integra* ♀, submarginal cells two and three, NHMUK010812280; Fig. 6. *N. facilis* ♀, submarginal cells two and three, NHMUK010811984; Fig. 7. *N. integra* ♀, pygidium, NHMUK010812288; Fig. 8. *N. facilis* ♀, pygidium, NHMUK010811984. All scale bars 1mm. Photo credits: DGN (NHMUK).

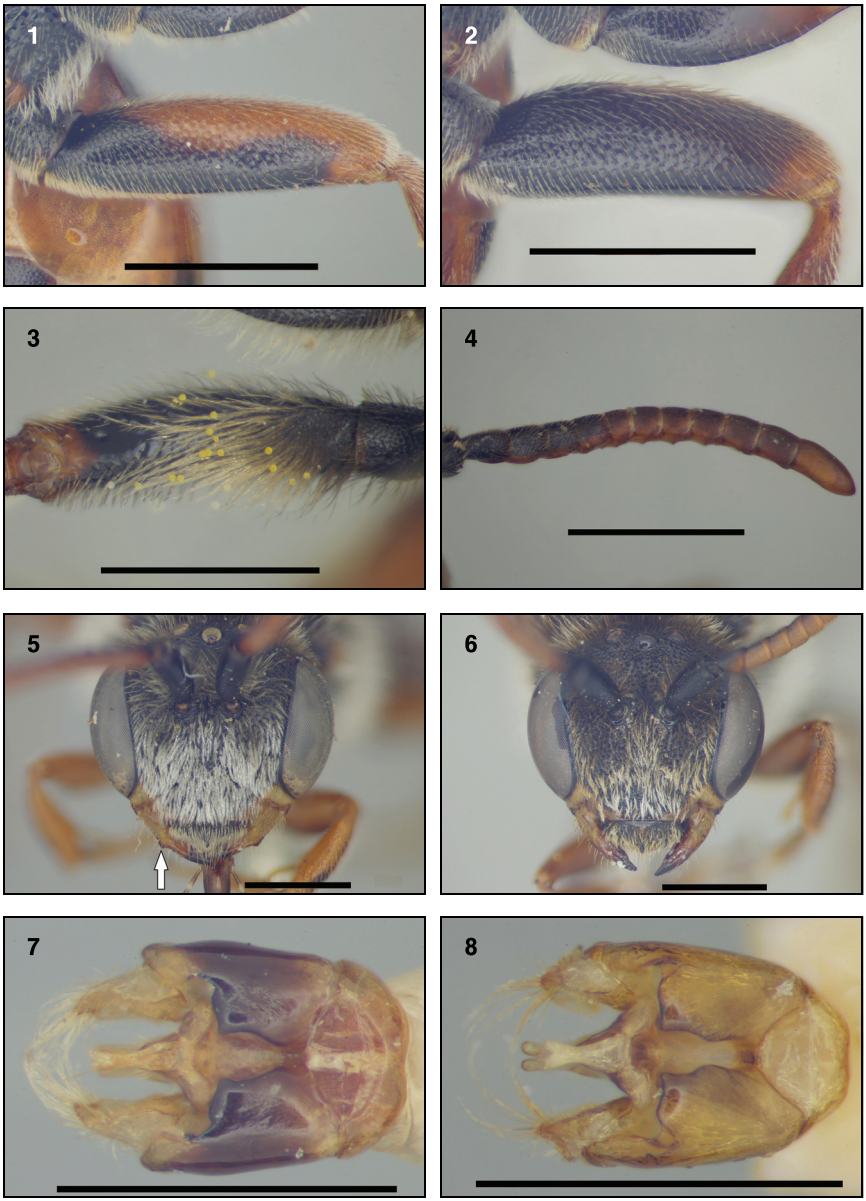

PLATE 13. Fig. 1. *Nomada integra* ♀, left hind femur, anterior view, NHMUK010812283; Fig. 2. *Nomada facilis* ♀, left hind femur, anterior view, NHMUK010811985; Fig. 3. *N. facilis* ♂, right hind femur, ventral view, NHMUK010815537; Fig. 4. *N. facilis* ♂, right flagellum, posterior view, NHMUK010815874; Fig. 5. *N. integra* ♂, face, NHMUK010812204; Fig. 6. *N. facilis* ♂, face, NHMUK010815537; Fig. 7. *N. integra* ♂, genitalia, NHMUK010812261; Fig. 8. *N. facilis* ♂, genitalia, NHMUK010815537. All scale bars 1mm. Photo credits: DGN (NHMUK).

dark reddish brown below, barely contrasting with the upper side; metasoma dorsally at most with red band across apex of t1, and bases of t2, t3, but usually darker. . . . . ***Nomada argentata*** **Herrich-Schäffer, 1839**

– Hind femur below with basal half dulled by dense punctures and more or less concealed by dense shaggy hairs (Plate 13, Fig. 3); antennal flagellum ventrally having a3–5 with low rounded projections and a6–10 with more or less sharp ridges (giving the appearance of spines when viewed from some angles) (Plate 13, Fig. 4); propodeum posteriorly with lateral zones sparsely hairy; medial zone with mediobasal carinae weaker, irregular, not convergent; antennal flagellum clear orange-red below, a little darker above; metasoma dorsally largely red. 4a

4a Mandible with tubercle half-way along ventral margin (Plate 13, Fig. 5); head, as seen perpendicular to the face distinctly transverse (Plate 13, Fig. 5); face with silvery adpressed hairs more extensive, covering the whole area below the toruli (Plate 13, Fig. 5); pygidium with sides more or less straight, the tip at most slightly indented, often evenly rounded and not indented at all; hind femur dorsally with red more extensive and boundary between red and black sharply defined; gonostylus longer than penis valve; apical hair tuft of gonostylus denser (Plate 13, Fig. 7). . . . . .***Nomada integra*** **Brullé, 1832**

– Mandible evenly rounded (Plate 13, Fig. 6); head, as seen perpendicular to the face subround, almost as high as wide (Plate 13, Fig. 6); face with silvery adpressed hairs less extensive, on the clypeus, mid line of the face and next to the eyes (Plate 13, Fig. 6); pygidium with sides very slightly concave, tip at least slightly indented; hind femur dorsally with red less extensive and boundary between red and black less clearly defined; gonostylus shorter than penis valve; apical hair of gonostylus tuft less dense (Plate 13, Fig. 8) . . . . . ***Nomada facilis*** **Schwarz, 1967**

Material seen

ENGLAND: Britain (presumably England), pre-1853, ♀, J. F. Stephens (NHMUK010811984); Britain (presumably England), pre-1857, ♀ ex coll. J. O. Westwood (OUMNH); Britain (presumably England), pre-1906, ♀, Dale Collection (OUMNH); Britain (presumably England), pre-1930, ♂, ex old British collection (OUMNH); Berks, Reading, SU77, v.1950, ♂, R. W. Crosskey (NHMUK010815874); Bucks, w. of Slough, SU98, 30.v.1945, ♂, swept, O. W. Richards (NHMUK010815538); Gloucestershire, Rodborough, SO80, 29.v.1939, ♂, T. Bainbrigge Fletcher (NHMUK010815539); Kent, near Faversham, Huntingfield House, TQ95, 30.v.1903, ♂, A. J. Chitty (OUMNH); London, Lewisham, TQ376762, 20.v.2017, ♂, garden, at flowers of *Chelidonium majus*, D. G. Notton (NHMUK010815537); London (near), pre-1802, ♂, T. Marsham (NHMUK010811986); Somerset, Edington, ST33, 4.vi.1944, ♂, J. Cowley (NHMUK010815873); ditto, ♀ (NHMUK010811985). **FRANCE:** Brittany, Ille-et-Vilaine, Vitré area, iv.1940, 2♂, K. M. Guichard (NHMUK010812275, NHMUK010812276). **SLOVAKIA:** Žilina, Ružomberok, 4.vi.1932, ♂, D. Aubertin & E. Trewavas (NHMUK010812277). **SWITZERLAND:** Vaud, Lausanne, Bois de Belmont, 12.v.1943, ♂, J. de Beaumont (NMHUK010812279); Valais, Val d'Hérens, Les Haudères, 4–5,000 ft., 6-27.vi.1935, ♂, J. E. Benson & R. B. Benson (NMHUK010812278).

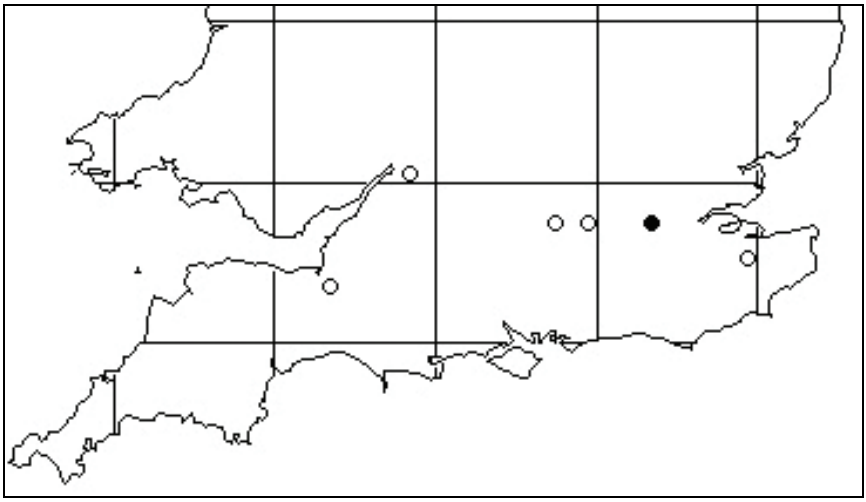

Fig. 3. Provisional British distribution map for *Nomada facilis*. Open circles pre 1997, closed circles post 1996.

Distribution

Nomada facilis is recorded here as new to Britain; a provisional British distribution map (Fig. 3) shows that it is restricted to a handful of sites in the south of England. In continental Europe, *N. facilis* is widely distributed but common nowhere: Austria (Schwarz, 1967); Belgium (Terzo, 2007); Czech Republic (Schwarz, 1967); France (Rasmont *et al*., 1995; Lair, Livory & Sagot, 2007; Dufrêne, Schwarz & Smit, 2014) confirmed here; Germany (Schwarz, 1967); Greece (Schwarz, 1967); Hungary (Schwarz, 1967); Italy, including Sicily (Schwarz, 1967; Pagliano, 1994; Nobile & Turrisi, 2016); Luxembourg (Rasmont *et al*., 1995); Poland (Celary, 1995; Banaszak, 2000); Romania (Schwarz, 1967); Slovakia (Schwarz, 1967) confirmed here; Spain (Ortiz-Sánchez, 2011); Sweden (Schwarz, 1986; Janzon, Svensson & Erlandsson, 1991; Celary, 1995; Cederberg, 2015); Switzerland (Schwarz, 1967; Rasmont *et al*., 1995; Amiet *et al*., 2007; confirmed here).

Habitat

Specific information on the preferred habitats of *N. facilis* in England is not available, the only specimen with precise geographical data (Lewisham) was a single male from a town garden, and had presumably wandered some way from its usual habitat. An association with flower rich, and often calcareous, grassland, seems likely, since the presumed host, *Andrena fulvago*, is associated with short open grassland and light soils, often on chalk, often coastal but also sometimes non-calcareous grassland (Falk, 1991; Falk & Lewington, 2015) and it can also be frequent on acid grassland (DGN unpublished observations at Blackheath, London) although *N. facilis* may be more demanding since it is more restricted, possibly it is selecting sites with the warmest microclimates as it is near the northern edge of its range in Britain. Certainly two of the British sites for *N. facilis* have significant calcareous grassland nearby, Rodborough in Gloucestershire and Huntingfield House, on the North Downs.

Flight period

From very limited data so far, British *N. facilis* have been found as follows: males from 20 May–4 June (n = 5); and female 4 June (n = 1). In Germany, at similar latitude to Britain, the flight period is from May–June (Scheuchl, 2000). Apparently the flight period is short compared to some *Nomada*.

Host relations

There are no good biological observations of *N. facilis* from the British Isles, even Perkins (1919), in his seminal paper on *Andrena* and *Nomada*, did not find any *Nomada* associated with *Andrena fulvago*, and recent attempts by DGN to find it on Blackheath, London were unsuccessful, but there are a number of papers about this species in continental Europe which suggest likely hosts. As Alexander (1991) observed however information on host relationships for *Nomada* species is generally scarce and it is often hard to assess the quality of published records, certainly many are based on circumstantial evidence rather than confirmed rearing from host nests. Initially Schwarz (1967) suggested a doubtful association of *N. facilis* with *Andrena labialis* (Kirby) but this has not been accepted by later authors who have suggested instead *Andrena humilis* Imhoff more or less doubtfully, or more recently *A. fulvago*, for example Amiet (2007), Celary (1995), Celary & Winiowski (2007), Scheuchl (2000), Svensson & Nilsson (2006), although it is often not clear what evidence they had or whether they were just citing a previous author. More interestingly Cederberg & Nilsson (2001) reported seeing *N. facilis* near a burrow of *A. fulvago* and Terzo (2007) noted that *A. humilis* was not present at the site where he found *N. facilis* so he could not confirm this host association. It is of course worth remembering that both the *Nomada* and its putative hosts are hard to identify in the field and some of the above records may include confusions between the putative hosts or even with the very similar *Nomada integra* which does attack *A. humilis*.

Besides published host associations, circumstantial evidence presented here is consistent with *A. fulvago* being the host in England. Firstly the distribution of *N. facilis* fits well within the known distribution of *A. fulvago*, and does not extend into north England where *A. humilis* is found but *A. fulvago* is very scarce or absent. Secondly, based on specimens in NHMUK, *A. fulvago* has been found at or near most of the more specific collection sites for *N. facilis*: Emmer Green, near Reading (*A. fulvago* specimen NHMUK010812262); Slough (NHMUK010812263, NHMUK010812264, NHMUK010812265, NHMUK010812266, NHMUK010812267); Rodborough area (NHMUK010812268, NHMUK010812269, NHMUK010812272, NHMUK010812270, NHMUK010812271); Edington (NHMUK010812273, NHMUK010812274); and has been seen frequently at Blackheath, London (DGN unpublished observations) close to where the Lewisham specimen of *N. facilis* was found, whereas, *A. humilis* has not been found at or near these sites. Based on specimens in OUMNH, *A. fulvago* has occurred at Huntingfield, where Chitty found *N. facilis*. Thirdly, based on collection dates of specimens in NHMUK, the flight period of *N. facilis*, with earliest dates from the third week of May and peak the week after, coincides better with the start of emergence of *A. fulvago*, rather than with *A. humilis* which appears about a week earlier.

Flowers visited

The male specimen of *N. facilis* from Lewisham was seen flying round flowers of *Chelidonium majus* L. In continental Europe this bee has been reported to visit *Senecio vernalis* Waldst. & Kit. by Celary (1995) and an unidentified plant from the family Apiaceae (Celary & Winiowski, 2007).

Status

Nomada facilis has been established in Britain since at least 1802 and so is certainly a previously overlooked native species and, based on the small number of specimens known, it has always been rare, but has decreased in the 20th century as only one specimen has been seen in the past 70 years. The decline of *N. facilis* appears to have coincided with a period of post war intensification of agriculture in Britain when species-rich grassland was lost and a number of other aculeate Hymenoptera went extinct (Ollerton *et al.*, 2014). The likely association with the Nationally Scarce (Nationally Notable) category A host *A. fulvago* in Britain suggests one reason why *N. facilis* is rare. Falk (1991) assessed the status of *A. fulvago*, noting a significant decline in the 20th century, most notably inland, likely due to habitat change, such as the degradation and loss of calcareous grassland and suitable coastal habitats. Some of the localities where *N. facilis* was found in the past such as Slough, Reading, and London have since undergone substantial expansion and development and it seems likely that these localities have become largely unsuitable, although the recent record of *N. facilis* from Lewisham is difficult to interpret in this context, since *A. fulvago* is known to use brownfield sites occasionally, or it might equally have originated from the high quality acid grassland areas of nearby Blackheath where *A. fulvago* is frequent. Of some interest though is the record from Rodborough, likely somewhere near Rodborough Common in Gloucestershire, a steep sided plateau with a large area of herb rich limestone grassland now managed by the National Trust, where *A. fulvago* is known to occur, and *N. facilis* might still be found. *Nomada facilis* is as rare in Britain as some other species of *Nomada* which are considered Endangered (RDB1) however, more study may show that it is more widespread, and its biology and consequently the threats to it are not well understood, so it is proposed here that it is provisionally given the status RDBK pending a more detailed assessment of its status. *Nomada facilis* has most commonly been misidentified as *N. integra* so published records and specimens previously assigned to *N. integra* need to be reviewed.

While *N. facilis* is said not to be endangered in a whole European context, has the status 'of Least Concern' in IUCN red lists categories and is not endemic to Europe (Nieto *et al.*, 2014), individually some other northern European countries which have been assessed show a similar picture to Britain, i.e. a very rare, potentially endangered species, probably much declined, and with the precise threats unclear because data are lacking, for example in Germany (Westrich *et al.*, 2008) and Sweden (Abenius *et al.*, 2015; Cederberg, 2015; Cederberg & Nilsson, 2001; Cederberg *et al.*, 2010). Also for Poland, although not formally listed, it has been considered data deficient (Gowaciñski, 1992) and rare (Banaszak, 2000) or very rare (Celary & Winiowski, 2007).

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SHORT COMMUNICATION

Pondweed Hopper *Erotettix cyane* (Boheman) (Hemiptera-Auchenorrhyncha: Cicadellidae) in North Hampshire (VC12). – On 31st July 2017, I found six adults on large rafts of *Potamogeton natans* on the surface of a silt pond near Winchfield, North Hampshire (SU752550). This appears to be the first record of this species for Hampshire and VC12, but somewhat overdue given its recent discovery in Berkshire (Denton, 2013) and Dorset (John Buckley, pers. comm.). Its behaviour may partly explain its apparent rarity, for it prefers to stay as far from the pond shoreline as possible, and thus often remains well out of reach. Binoculars or even a telescope are useful for scanning suitable stands of broad-leaved pondweed. Monitoring at the only known Surrey colony at Newdigate in 2017 also found very low numbers, but here the foodplant was restricted to the shallower pond margins, yet even here the hoppers avoided the inshore leaves. Large numbers of nymphs were present into autumn at the Berkshire site, which suggests that some might overwinter as an adult. The mystery remains as to where they migrate to, given that the host plant leaves rot away. – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX.

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