

DUSKY-HORNED NOMAD BEE, *NOMADA BIFASCIATA*, NEW TO BRITAIN (HYMENOPTERA: APIDAE)

STEVEN J. FALK & ROSIE EARWAKER

10 Fishponds Road, Kenilworth, Warwickshire CV8 1EX
falkentomology@gmail.com
13 Kings Road, Tonbridge, Kent TN9 2HB

ABSTRACT

The nomad bee *Nomada bifasciata* Olivier, a cleptoparasite of the mining bee *Andrena gravida* Imhoff, is added to the British list from two sites in Kent, UK. Its distinctions from the similar *N. fucata* Panzer, are summarised.

INTRODUCTION

The genus *Nomada* Scopoli, is proving to be fertile ground for the discovery of new British bee species with a number of additions made over the past few years. Some of these have resulted from scrutiny of existing taxa and do not appear to represent recent colonists. This includes the discrimination of *N. subcornuta* (Kirby) from *N. fulvicornis* F. by Falk (2004, 2015) and of *N. facilis* Schwarz, from *N. integra* Brullé, by Notton & Norman (2017). Old British material of both these species can be found in museums. Other additions seem to represent recent colonisation events from continental Europe and include *N. alboguttata* Herrich-Schäffer, and *N. zonata* Panzer, added by Kirby-Lambert (2016) plus the species subject of this paper. This fits in with informal reports of a northward spread of numerous bee species within continental Europe that is thought to be linked with climate change (EEA, 2012). It also reveals that some relatively small bees are able to bridge the many miles of open water that separate Britain from the rest of Europe and then establish here.

GENERAL

The first specimen of *N. bifasciata* found was a female (with slightly deformed tergites) taken by SF from fixed dune grassland at the edge of Sandwich Bay Estate, Kent (TR363571) on 20th April 2018 (Fig. 1). It was flying over a sandy slope close to a fence line and at the time it was considered to be either a very dark-looking individual of *N. fucata* Panzer or an unusual variety of *N. zonata*, the latter having been recorded nearby earlier that day. Several males of *Andrena gravida* Imhoff (the host of *N. bifasciata*) were recorded in the area on this day and the day after. The *Nomada* was eventually identified using Smit (2004, 2018) and Amiet *et al.* (2007) plus images from various reliable continental websites e.g. De Nederlandse bijen <http://www.wildebijen.nl/wildebijen.html>.

The second specimen was a female taken by RE at Leysdown Coastal Park on the Isle of Sheppey, Kent (TR043698) on 7th May 2018 (Fig. 2). This site is former coastal grazing marsh now managed as a popular country park and with a mix of grasslands and blossoming tree and scrub blocks. The bee was flying along a road verge characterised by taller vegetation and bare, open areas of ground created by rabbit disturbance. After failing to positively identify the specimen using British *Nomada* keys, photographs were sent to SF who eventually realised the identity of it having confirmed the identity of the first specimen. The host *Andrena*, which has a British distribution restricted to SE England, and mostly within Kent, is not



Fig. 1. The Sandwich Bay *N. bifasciata* female (tergites 3 and 4 somewhat deformed).



Fig. 2. The Leysdown female *N. bifasciata*.

recorded from the Isle of Sheppey (Geoff Allen *pers. comm.*), but the presence of *N. bifasciata* suggests it may well be there undetected.

Identification

Females of *N. bifasciata* resemble those of *N. fucata* in having a single large yellow spot on the scutellum, a combination of black, yellow and red markings on the upper side of the abdomen and antennae that are extensively red or yellow as opposed to almost entirely black (*N. rufipes* F.). In Falk (2015) they will fall out awkwardly alongside *fucata* at couplet 3 of the *Nomada* Female Group D key on page 318, but

will cause confusion due to the yellow markings of tergites 2 and 3 being broadly divided in the middle by red (tergite 2) or black/red (tergite 3). The following amendment to the Female Group D key will allow identification of *N. bifasciata*:

- 1 Scutellum with a single yellow or red mark 2
- Scutellum with a pair of yellow, orange or red spots. 4
- 2 Scutellar spot and pronotal tubercles orange or red. Abdomen (in fresh specimens) with creamy-white rather than yellow spots on the sides of tergites 2 and 3 and tergite 4 black without paler markings. Smaller, wing length to 5.5 mm ***roberjeotiana***
- Scutellar spot and pronotal tubercles bright yellow. Abdomen with any bands or spots on tergites 2 and 3 bright yellow rather than creamy-white. Tergite 4 with a complete yellow band. Larger, wing length usually 6.5–8.5 mm 3a
- 3a Antennae black except for the reddish ventral faces of the scape, pedicel and first flagellar segment. Surface of scutum shining between the punctures ***rufipes* (red-marked individuals)**
- Antennae with at least the basal segments entirely yellow or reddish, the scape and pedicel not darkened above. Surface of scutum very dull and roughened at least for the most part 3b
- 3b Tegulae bright yellow. Antennal flagella not becoming darker above apically. Antennal segment 3 viewed on its ventral side about 1.5 × as long as its apical width (Fig. 5). Sternites marked yellow. Tergites 2 and 3 with yellow markings usually forming an uninterrupted band but if interrupted, on tergite 2 this is rarely for a distance more than one-fifth the width of the tergite ***fucata***
- Tegulae completely or predominantly reddish-orange. Antennal flagella noticeably darker above in the distal half or more (Fig. 3). Antennal segment 3 viewed on its ventral side about twice as long as its apical width (Fig. 4). Sternites entirely reddish (Fig. 6). Tergites 2 and 3 with lateral yellow markings that are always separated by red (tergite 2 or red/black (tergite 3) for a distance that on tergite 2 is usually more one-third the width of the tergite . . . ***bifasciata***

Males of *N. bifasciata* are much more similar to *N. fucata*. The following amendment to the *Nomada* Male Group D key on page 324 of Falk (2015), based on Amiet *et al.* (2007), Scheuchl (2000) and Smit (2004, 2018) should allow their identification and also fixes a glitch with male *N. roberjeotiana* Panzer, which tend to have a single red mark on the scutellum:

- 1 Scutellum with a single bright yellow mark 2
- Scutellum with a pair of yellow or red spots, or if fused, these are reddish, never yellow. 4
- 2 Antennal flagella usually entirely black above (segment 3 occasionally reddish above). Surface of scutum shining between the punctures. Front coxae with an apical projection some ***rufipes***
- Antennal flagella extensively pale above. Surface of scutum very dull and roughened. Front coxae blunt apically. 3a
- 3a Sternites extensively yellow-marked. Hind tibia usually entirely or mostly yellow on anterior face. Antennal segment 3 viewed on its ventral side about 1.5 × as long as its apical width (Fig. 5), the antennae usually with only segments 7 and 8 darkened above ***fucata***
- Sternites predominantly or entirely red. Hind tibia mainly orange. Antennal segment 3 viewed on its ventral side about twice as long as its apical width (Fig. 4), the antennae usually with at least segments 7–9 darkened above . . . ***bifasciata***



Fig. 3. *Nomada fucata* female antennal base, ventral view



Fig. 5. *N. bifasciata* female antennal base, ventral view.



Fig. 4. *N. bifasciata* female antenna dorsal view.



Fig. 6. *N. bifasciata* female sternites.

In addition to the above, *N. bifasciata* averages slightly larger than *N. fucata* and females have a more conspicuous black hair pile on the top of the head and thorax. The main variation affecting females is the extent of the yellow markings on tergites 2 and 3, and as this also varies to some extent in *N. fucata*, with the yellow bands sometimes divided medially, care must be taken when using abdominal pattern. A yellow metanotal spot of variable size can be present just below the scutellar spot but is not evident in the two British specimens. Towards the south of its range in locations such as Mallorca, all yellow and orange markings of the female are

replaced by red ones i.e. the abdomen is red with black bands on the hind margin of each tergite, and the tegulae, pronotal tubercles, legs, pale parts of the antennae and markings of the scutellum and metanotum are red (David Baldock *pers. comm.*). The cited continental keys perhaps over-emphasise the usefulness of antennal segment ratios, suggesting that in both sexes of *N. fucata* antennal segment 3 is barely longer than its terminal breadth on its ventral side and much shorter than in *N. bifasciata*. In the material seen, the flagellar segments of *N. bifasciata* are indeed relatively slightly longer and slimmer than those of *N. fucata* though segment 3 of *N. fucata* is still considerably longer than broad when viewed in this way, and this character is difficult to apply without comparative material or photos (see Figs 4 and 5).

High resolution images of *N. bifasciata* and other British *Nomada* species can be obtained from SF's Flickr site: <https://www.flickr.com/photos/63075200@N07/sets/72157706621407085/>

Ecology and conservation of *N. bifasciata*

N. bifasciata is the special cleptoparasite of *A. gravida* and best regarded as a recent British colonist at the northern edge of its climatic range here in Britain. It stands a good chance of becoming fully established within the range of its host even without human intervention. *Andrena gravida* is currently very restricted within Britain with modern records only for Kent and East Sussex (Allen, 2009; Else & Edwards, 2018) but it is not especially rare in Kent and may be expanding in East Sussex. *Andrena gravida* is also seemingly at the edge of its climatic range here but is not a habitat specialist and basically requires landscapes with plentiful spring blossom (notably of *Prunus* and *Salix* species and including commercial orchards) combined with suitable nesting habitat (typically unshaded south-facing slopes with short-cropped or sparse vegetation).

Andrena gravida is typically univoltine in Britain peaking in April, and this is likely to be reflected in the flight period of *N. bifasciata* here. This contrasts markedly with *N. fucata* and its host *Andrena flavipes* Panzer, which are strongly bivoltine, peaking both in spring and late summer. However, *N. bifasciata* and its host are bivoltine in other parts of their overseas range. *Nomada bifasciata* is occasionally recorded in August in the Netherlands (Smit, 2018; De Nederlandse bijen website) and *A. gravida* also shows a tendency to produce a small second generation in Kent when summers are dry and hot (Allen, 2009; Ian Beavis – *pers. comm.*).

Nomada bifasciata has an overseas distribution that takes in West, South, Central, South-east and East Europe, plus the Canary Islands, North Africa and the Middle East (Turkey) and extending into Russia and Asia (Smit, 2018). As well as attacking *A. gravida*, it is thought to attack the non-British *A. savignyi* Spinola, in Spain.

Nomada bifasciata is listed as a species of Least Concern in the European Red List of Bees (Nieto *et al.*, 2014). Any conservation actions that increase the quantity and connectivity of spring-blossoming shrubs in south-east England have potential to encourage the spread of *N. bifasciata* and its host.

ACKNOWLEDGEMENTS

SF is grateful to Sandwich Bay Bird Observatory and its volunteers for facilitating surveying of the Sandwich Bay area. Both authors are grateful to the Kent County Aculeate Recorder, Geoff Allen, for furnishing up-to-date information on *Andrena gravida* and to David Baldock for additional comments.

REFERENCES

- Allen, G. 2009. *Bees, wasps and ants of Kent*. Kent Field Club. Pp 127.
- Amiet, F. Herrmann, M., Müller, A. & Meumeyer, R. 2007. Apidae 5. *Fauna Helvetica* **20**: 1–356.
- EEA. 2012. *Climate change, impacts and vulnerability in Europe 2012*. European Environment Agency. Copenhagen. Pp 300.
- Else, G. R. & Edwards, M. 2018. *Handbook of the Bees of the British Isles*. The Ray Society, London (2 volumes). Pp 775.
- Falk, S. J. 2004. The form of *Nomada fulvicornis* F. (Hymenoptera Apidae) associated with the mining bee *Andrena nigrospina* Thomson. *British Journal of Entomology and Natural History* **17**: 229–235.
- Falk, S. 2015. *Field Guide to the Bees of Great Britain and Ireland*. Bloomsbury, London. Pp 432.
- Kirby-Lambert, C. 2016. *Nomada alboguttata* Herrich-Schäffer, 1839 new to the British Isles and *N. zonata* Panzer, 1798 first record for mainland Britain. *BWARS Newsletter Autumn 2016*. Bees, Wasps and Ants Recording Society: 29–31.
- Nieto A., Roberts S. P. M., Kemp J., Rasmont P., Kuhlmann M., Biesmeijer J. C., Bogusch P., Dathe H. H., De la Rúa P., De Meulemeester T., Dehon M., Dewulf A., García Criado M., Ortiz-Sánchez F. J., Lhomme P., Pauly A., Potts S. G., Praz C., Quaranta M., Radchenko V. G., Scheuchl E., Smit J., Straka J., Terzo M., Tomozii B., Window J. and Michez D. 2014. *European Red List of bees*. Luxembourg: Publication Office of the European Union. Pp 83.
- Notton, D. G. & Norman, H. 2017. Hawk's-beard Nomad Bee, *Nomada facilis*, new to Britain (Hymenoptera: Apidae). *British Journal of Entomology and Natural History* **30**: 201–214.
- Scheuchl, E. 2000. *Illustrierte Bestimmungstabellen der Wildbienen Deutschlands und Österreichs. Band 1. Schlüsselder Gattungen und der Arten der familie Anthophoridae. 2. erweiterte Auflage*. Velden. Pp xxxi + 158.
- Smit, J. 2004. De wespbijen (*Nomada*) van Nederland (Hymenoptera: Apidae). *Nederlandse Faunistische Mededelingen* **20**: 33–125.
- Smit, J. 2018. Identification key to the European species of the bee genus *Nomada* Scopoli, 1770 (Hymenoptera: Apidae), including 23 new species. *Entomofauna Monographie* **3**: 1–253.

SHORT COMMUNICATIONS

Early records for *Nomada zonata* Panzer (Hymenoptera: Apidae) in Britain. – The cleptoparasitic bee *Nomada zonata* was first recorded in the British Isles in 2011 from Jersey, Channel Islands (Else & Edwards, 2018). In 2016 it was identified for the first time in Britain from Kent (Kirby-Lambert, 2016), and since then recording indicates it is widely established in south-eastern England (Else & Edwards, 2018). This short communication puts on record *Nomada zonata*'s presence in the British Isles prior to 2011, and its presence in Britain prior to 2016.

Probably like many entomologists with an interest in bees I have a backlog of specimens, identification having awaited the publishing of up to date keys. In 2018 I got to grips with my backlog of *Nomada*, and in amongst these specimens I encountered two instances of *N. zonata* from 30.vii.2010 (male) and 31.vii.2011 (female), both from the Kent Wildlife Trust reserve at Lydden Temple Ewell TR 2830 4491. The site itself is a large area of chalk grassland along a dry valley in the North Downs, which reaches the sea at Dover. It is an important site for insects including Wartbiter, *Decticus verrucivorus* (L.), and its chalk grassland plants. It is perhaps unsurprising that these early records for the occurrence in Britain of *N. zonata* come from here; it is a high quality flowery grassland site, in proximity to the closest part of Britain to the continental mainland. These records also demonstrate how even a quite readily diagnosable species can remain undiscovered prior to its formal recording in Britain (in this instance at least six years).