

A revised account of British nomad bees (Apidae: *Nomada*)

Steven Falk, 2024

General description

Nomad bees are small to moderately large (wing length 3.5-10mm in the British species), relatively hairless bees, often with bold wasp-like markings. Indeed, many are more likely to be confused with hunting wasps such as *Crabro*, *Ectemnius* and *Gorytes* species than bees by general naturalists, though the body hairs remain branched as in other bees, the hind basitarsis has a dense brush of hairs on its posterior surface (hind basitarsis cylindrical and hairless in most hunting wasps), and the tibiae lack any bristles along the shaft. The most similar British bee genus is *Epeolus* but these have projecting axillae on either side of the scutellum and a general body pattern that is readily recognised. Not all nomad bees are wasp-like. Some are extensively red marked. A few (e.g. male *N. argentata*) are almost entirely black. The term ‘tricolored’ is used for those species with a body pattern comprised of a combination of black, red/brown, and yellow/white e.g. *Nomada flava*. We don’t use the term ‘bicolored’ for nomads because it could refer either to black and yellow patterned species such as *N. goodeniana* or black and red species such as *N. integra*.

Biology

All nomad bees are cleptoparasites of other bees, primarily *Andrena* species, but to a lesser extent *Melitta*, *Lasioglossum*, *Panurgus*, *Eucera* plus some non-British genera. Females enter the host’s nesting burrow and lay an egg in the wall of an unsealed nest cell. The first instar *Nomada* grub then destroys the host egg or grub with its large sickle-shaped mandibles and proceeds to feed on the foodstore. Female nomad bees can be quite easy to spot around host nesting areas. They can be very useful at revealing the precise location of host nests and are sometimes more apparent than the host species which will be away foraging much of the time. Both sexes visit flowers. Spring-flying species like early blossoming trees and shrubs, especially willows (notably the sallows such as Goat Willow and Grey Willow), Blackthorn, Wild Cherry, hawthorns and currants. They also use flowers such as dandelions, Daisy, Lesser Celandine, Cow Parsley, Alexanders, forget-me-nots, speedwells and stitchworts. Later-flying species use ragworts, thistles, ‘hawkish’ composites (e.g. Cat’s-ear, hawkweeds, hawkbits and hawks’s-beards), brambles, umbellifers (e.g. Hogweed and Wild Carrot), cinquefoils (including Tormentil), heathers and scabiouses. They can pick up prodigious amounts of pollen as they feed and are probably very effective pollinators of plants including cultivated fruit trees such as apples, plums, pears and cherries.

Some nomad bees have very specific hosts e.g. *N. armata* on *Andrena hattorfiana* and *N. argentata* on *A. marginata*. Others use several closely related species e.g. *N. panzeri* on *A. helvola*, *A. synadelpha*, *A. fucata*, *A. fulva* and *N. varians*, or *N. flavopicta* on *Melitta leporina*, *M. haemorrhoidalis* and *M. tricincta*. However, they may be achieving this using genetically distinct host ‘races’ especially given that host choice may require a consistently different flight peak or habitat. DNA sequencing is slowly revealing the true nature of such host races and the complex evolution that seems to be associated with host choices which can be quite plastic, opportunistic and geographically varied. In several instances, sequencing of the mitochondrial CO1 gene (mtCO1, also known as the universal barcoding

gene), has shown that some host races are actually distinct species e.g. *N. subcornuta* as distinct from *N. fulvicornis* and *N. glabella* as distinct from *N. panzeri*. Nomad bees are also revealing some of the limitations of mtCO1 sequencing because it sometimes fails to segregate taxa that are clearly not conspecific e.g. *N. glabella* and *N. leucophthalma*. So it is just possible that further undescribed cryptic species are present in the British fauna that will eventually be revealed through full genome sequencing (currently taking place through the Darwin Tree of Life Project <https://www.darwintreeoflife.org/>) rather than mtCO1 sequencing. A further element of intrigue presented by nomad bees is host sharing, whereby two *Nomada* species will share a single host species, sometimes at the same site. The two best examples in Britain are *Nomada flava* and *N. marshamella* on *Andrena scotica*, and *N. signata* and a particularly large and bright form of *N. panzeri* on *A. fulva*. How do they achieve this and can we detect any differences in their behaviour such as choice of nest site or timing?

Faunistics

Nomada is a near-cosmopolitan genus with about 850 described species, making it the largest genus of cleptoparasitic bees. Thirty-nine species are currently known from the British Isles including the Channel Islands. This includes *N. fusca* (or something very close to it), the presence of which is supported by a recent DNA study (Falk et al., 2022). Four of the species (*N. castellana*, *N. fuscicornis*, *N. similis* and *N. succincta*) are only known from the Channel Islands. The species added to the British list since Falk & Lewington (2015) are *N. alboguttata* (Kirby-Lambert, 2016, which also adds *N. zonata* to the British mainland list from the same Kent site), *N. bifasciata* (Falk & Earwaker, 2019), *N. facilis* (Notton & Norman, 2017), *N. glabella* and *N. fusca* (Falk, Johansson & Paxton, 2022). These new nomads represent nearly half of the new bees discovered in Britain over the last ten years. All these additional species are covered in this revised account.

Over 200 species occur in Europe (Smit, 2018) and new ones are still being discovered. From a British perspective, the fauna of the near continent is of most interest as it contains non-British species that may turn up here as climate change causes species to shift their range northwards. Fortunately, the nomad bee assemblages of the Netherlands and Belgium are fairly well studied (Peeters et al, 2012; Nieuwenhuijsen & Peeters, 2015 plus updates; Pauly et al. *Nomada Belgique* web pages). These two countries support most of the British species plus an additional seventeen species. Some of these attack non-British hosts so are unlikely to turn up here unless the nomad and its host are in an expansion phase. Others attack hosts that occur in Britain but are mostly nomads that are extremely rare, declined or extinct in the Netherlands and Belgium so again unlikely to turn up here. Further non-British species occur in northern France and could turn up in the Channel Islands though that large fauna is less well-documented than the Netherlands and Belgium ones. But bear in mind that Britain is not fully dependent on the near-continent for new species. Both *N. subcornuta* and *N. glabella* came to be recognised through domestic taxonomic studies that flushed out long-established cryptic species. Ongoing Darwin Tree of Life full genome sequencing within Britain could reveal more, perhaps most likely within the current concept of *Nomada panzeri* or *N. flavoguttata*, where several hosts and flight peaks are involved.

Sexing nomad bees, and their sexual dimorphism

Like most bees, males have thirteen antennal segments as opposed to the twelve of females, which means the antennae are usually a little longer. In the males of some species

(e.g. *N. argentata*, *N. castellana*, *N. facilis*, *N. integra* and *N. lathburiana*) there are projections such as tubercles or raised ridges (tyloidea) on the hind face of the flagellar segments. The antennae of males also tend to be darker than those of females. Males usually have a more conspicuous protruding pygidium at the tip of the gaster. In the females of most species, the pygidium protrudes much less, tergite 5 has a densely hairy hind margin, and a series of strong lateral setae and peg-like bristles arise from sternites 5 and 6 immediately below the pygidium. The lower face and mandibles are usually more extensively yellow in males than in the females (where the same parts will often be reddish), whilst the ‘mesosoma’ (thorax plus propodeum) is often darker, lacking the red scutum stripes you see in the females of some species and often also lacking scutellum spots or markings on the propodeum, pronotal collar and sides of the thorax. Males are also altogether hairier on the head, mesosoma and legs, and often have dense hairs patches at the bases of the hind legs below (particularly obvious in species such as *N. goodeniana* and *N. succincta*). There can also be considerable differences in the patterning of the tergites. Some tricoloured females such as *N. fulvicornis* and *N. zonata* have males that typically have just a black and yellow patterned gaster. Males can also have yellow tergite markings where the females lack these e.g. *N. similis* and *N. sheppardana* or yellow markings that are much more extensive than in the females e.g. *N. ferruginata* and *N. hirtipes*.

Identification of species

Identifying nomad bees is not always straightforward because i) females and males can look rather different as explained above (hence the use of separate female and male keys here and in other literature), ii) some species are quite variable in appearance and can produce strange aberrations, and iii) there are some astonishingly similar species in the British Isles that even experts can struggle to identify such as males (and sometimes females) of the quartet of *Nomada panzeri*, *N. flava*, *N. glabella* and *N. fusca*. However, with a little bit of experience, it is possible to confidently recognise some species in the field or from a reasonable photo e.g. females of species such as *N. fabriciana*, *N. goodeniana* and *N. lathburiana*. Even if you are struggling to put a name to a photo, it may be possible to get it verified by more experienced recorders on the Bees, Wasps and Ants Facebook Group, or iNaturalist, or using X (Twitter). More experienced recorders can often spot the subtle features that allow a determination and can adjust for location, time of year etc. But for some species microscopic examination of a dead specimen is the only way to produce an accurate record. If you want to records bees like nomads accurately and comprehensively, capturing a sample for critical identification is inescapable, and will often reveal the presence of species you had not anticipated at the time. Your specimens can either be stored ‘wet’ in alcohol or pinned. When pinning nomads, it is recommended that the jaws are forced open so that their tips are visible, and that the male genitalia is pulled out, as it contains subtle features that can be valuable (though the key below has not required their usage). You will need a dissection microscope to see certain features (notably the hind tibial comb spines which can be very useful), though some features such as bifid-tipped mandibles and hair patches below the hind legs can be seen with a strong hand lens.

Prior to this review, the standard literature for identifying the British species has been Falk (2015) and Else & Edwards (2018). These are now out of date and not all of their key couplets work well. The new keys provided here (supported by the author’s Flickr site) cover all the new species and have lots of improved and restructured couplets. The most comprehensive key to European species is Smit (2018). This does not recognise species such as *N. glabella* or *N. subcornuta* and some key couplets do not work using

the material I have to hand (e.g. those for *N. fusca*) and does not account for all the variation within a species you will encounter. Other useful identification literature includes Scheuchl (1995, 2000) covering Germany and Austria, Amiet et al. (2007) covering Switzerland and surrounding areas, and Nieuwenhuijsen & Peeters (2015) covering the Netherlands (though several species have been added to the Dutch list since).

Seeing nomad bees

Nomad bees can be seen and recorded from March to September. *N. leucophthalma* is usually the first to appear. *N. argentata*, *N. rufipes* will often fly well into September. Spring is undoubtedly the best time to see a good variety of species and up to ten nomads can be recorded at one site on a good day in southern and central England. They can even be the most obvious bees at a site, especially when the males of species such as *N. flava* and *N. panzeri* are swarming about sunlit foliage of woodland margins or hedges, or when the bright females of species such as *N. lathburiana* or *N. fucata* are swarming around host nesting aggregations. Good habitats for seeing a variety of species include dry woodland with plentiful rides and clearings, old quarries (especially sandpits), heathland (especially if there is plenty of sandy footpaths and banks), south-facing grazed hillsides (especially when there is Gorse and soil-slippage), coastal landslips and cliff-top grassland, chalk downland, flowery brownfield land, coastal flood banks, and even larger gardens and flowery urban greenspace.

A revised key to British and Channel Islands species

Rationale

This series of keys covers typical examples and main variants of all British *Nomada* species. Smaller ‘bite-sized’ keys based on reasonably well-defined morphological groups are used rather than one long key. This provides a safer and less overwhelming approach to what is a large and challenging genus. Some of the more variable species e.g. *N. flavoguttata*, *N. fulvicornis*, *N. panzeri* and *N. zonata* are keyed out more than once because to attempt to key such species out once would result in a far more complex key with greater risk of making mistakes. Be aware that it is still possible to find specimens that will fall outside of this key. *Nomada flava* and *N. fulvicornis* are particularly good at producing highly aberrant examples. These can either be carefully compared against reliably named material to see if this indicates a likely identity, or sent to an expert with a better understanding of species variation or potential new British species. Please note that female groups A-E do not correspond with male groups A-E. Also note that this key is designed for British nomads and will not always work for continental examples of British species that exhibit different patterning. Use the key alongside my Flickr resource

<https://www.flickr.com/photos/63075200@N07/collections/72157636934718926/>

This provides many photos of living and pinned nomads, with details of key features. In essence it acts like an online museum collection.

Female groups

- 1 Tergites red, brown or blackish without any yellow or whitish markings.....**Females Group A**
- Tergites with yellow or whitish markings, at least as small lateral spots on tergite 22
- 2 Tergites boldly patterned black and yellow (creamy-white in *errans*) without any obvious red/brown pigmented markings (inconspicuous brown markings may arise where translucent dark markings overlie yellow integument or very narrowly where black and yellow markings meet).....**Female Group B**
- Tergites with obvious red, orange or brown-pigmented markings i.e. either red/brown with yellow spots or black and yellow with some additional obvious red/brown pigmented markings.....3
- 3 Labrum entirely or predominantly dark.....**Female Group C**
- Labrum entirely or predominantly red, orange or yellow (any dark markings occupy less than half the surface area, a pair lateral dark spots in case of *ferruginata*).....4
- 4 Scutum entirely black.....**Female Group D**
- Scutum with red stripes, at least at the sides above the wing bases and usually a pair of longitudinal stripes (sometimes narrow and inconspicuous) on the top.....**Female Group E**

Nomada female Group A

- 1 Scutellum entirely black.....2
- Scutellum with red markings.....4
- 2 Mandible tips bifid. Scutum dull with densely packed punctures. Antennal flagella usually bright orange in basal section and at tip, with a broad black subapical band between.....***fabriciana* form without yellow spots**
- Mandibles tip pointed. Scutum clearly shining between the punctures. Antennal flagella at most obscurely reddish at base.....3

- 3 Scutellum fairly evenly convex. Antennae relatively short with segment 3 in top view about twice as long as wide, the flagella slightly reddish basally. Hind femora mostly black, the mid and hind tibiae extensively darkened. Sides of thorax evenly long-haired. Smaller and stockier (wing length 5.5-6mm).....*fuscicornis*
- Scutellum clearly depressed in the middle with bumps on either side. Antennae relatively long with segment 3 in top view about 2.5 times as long as wide, the flagella dark at base. Hind femora extensively red, the mid and hind tibiae mostly or entirely red. Sides of thorax densely haired below. Larger and slimmer (wing length 6.5-7mm).....*similis*
- 4 Labrum orange-red. Rear face of propodeum towards bottom with a discrete patch of dense silvery hairs on each side that mask the underlying surface Tiny (typical wing length 4mm) with antennal segments 3 and 4 of similar length on their upper side.....*sheppardana*
- Labrum dark. Wing length usually at least 5mm (but smaller *flavoguttata* not uncommon - these have antennal segment 3 clearly shorter than 4).....5
- 5 Head with orange markings that broadly occupy the lower part of the clypeus and often surround much of the eyes. Rear face of propodeum towards bottom with a discrete patch of dense silvery hairs on each side that mask the underlying surface. Antennal segment 3 clearly shorter than 4.....*flavoguttata* **form without yellow spots**
- Clypeus at most orange-red along extreme lower edge. Eyes mostly surrounded by black integument. Sides of propodeum with a more general covering of long silvery hairs. Antennal segment 3 at least as long as 4.....6
- 6 Scutum with relatively large punctures and smooth, shining interstices. Underside of hind femora without a well defined patch of dense puncture in basal third, at most with punctures gradually becoming denser towards base. Sides of thorax usually with a large red patch. Sides of tergites 2-4 with dense patches of silvery hairs (angle of light critical). Underside of antennal flagella brownish and only slightly paler than upperside. Head narrower in relation to thorax (appearing ‘small-headed’).....*argentata*
- Scutum duller with smaller, densely-packed punctures. Underside of hind femora with a well defined patch of dense small punctures on basal third, contrasting strongly with the shiny surface beyond. Sides of thorax without a red patch. Sides of tergites 2-4 without dense patches of silvery hairs. Underside of antennal flagella orange and contrasting strongly with the dark upperside. Head broader in relation to thorax (appearing bigger-headed).....7
- 7 Second and third submarginal cells less convergent above with the combined length of their anterior margin somewhat greater than the length of the third cell’s posterior margin. Apex of pygidium obtuse and relatively blunt. Hind and mid femora broadly red above, the hind face of the mid femora black for less than 50%. Head in strictly top view broader in relation to length, with the hind corners less inflated and more strongly angled inwards. Third antennal segment viewed strictly from above (at its greatest length) only about 1.25 times the length of the fourth.....*integra*
- Second and third submarginal cells more convergent above with the combined length of their anterior margin about equal to the length of the third cell’s posterior margin. Apex of pygidium acutely pointed. Hind and mid femora only narrowly and inconspicuously red above, the hind face of the mid femora usually more than 50% black. Head in strictly top view more subquadrate, with the hind corners more

inflated and less strongly angled inwards. Third antennal segment viewed strictly from above about 1.5 times the length of the fourth.....*facilis*

***Nomada* female Group B**

- 1 Scutellum with a single yellow/white mark. Tergite 1 always black. Yellow/white spots on tergite 2 separated by about their own width or more. Front coxae with an apical projection. Smaller (wing length to 7mm).....2
- Scutellum with a pair of yellow or orange spots (occasionally abutting). Tergite 1 usually yellow-marked (except some *marshamella*). Yellow spots of tergite 2 usually separated by less than their own width or fused into a band. Front coxae without an apical projection (except for *N. flavopicta*). Typically larger (wing length usually at least 7.5mm).....3
- 2 Antennae blackish from segment 4 onwards. Tergites yellow marked, tergite 4 with a complete yellow band or lateral streaks. Sides of thorax below wing bases with a yellow spot. Underside of gaster yellow-marked. Hind face of propodeum densely punctured at sides and bottom. Tergites 2 and 3 closely punctured.....***rufipes* form with black & yellow tergites**
- Antennal flagella orange. Tergites creamy-white-marked, tergite 4 with at most small lateral whitish spots. Underside of gaster black. Sides of thorax entirely black. Hind face of propodeum smooth and shining at sides and bottom, barely punctured. Tergites 2 and 3 shinier with punctures finer and sparser.....***errans***
- 3 Tergites 2-4 and often tergite 1 with complete yellow bands. Apex of hind tibiae with 2-3 very closely approximated and stout comb spines that curve towards the the apical prominence of the tibia.....4
- At least tergite 2 with lateral yellow spots or a distinctly broken yellow band. Apex of hind tibiae without such an arrangement of comb spines.....5
- 4 Tibiae orange, at most with limited yellow markings, the hind pair not black-marked posteriorly. Hind femora orange on dorsal and anterior surfaces. Face orange along lower edge of clypeus and narrowly yellow along the inner eye orbits. Labrum and antennal scapes usually entirely or mainly orange.....***goodeniana***
- Tibiae yellow, the hind pair usually with a dark mark posteriorly. Hind femora mainly black except for yellow tip. Face with large yellow patches at the side of the face and often a third on the clypeus. Labrum mostly dark. Antennal scapes entirely black above, contrasting with an orange or yellow underside.....***succincta***
- 5 Hind tibiae apically without comb spines. Antennal flagella mostly black dorsally. Thorax (including the ventral surface) with hairs for the most part minute and inconspicuous. Viewed from below, front coxae triangular with an apical projection.....***flavopicta***
- Hind tibiae apically with comb spines. Antennal flagella orange, at most darkened dorsally towards tip. Thorax hairier, with the hairs on the top and on the propodeum as long as the width of an antennal flagellum. Front coxae with a bluntly rounded apex.....6
- 6 Malar gap wide, about 0.75 times the width of an antennal flagella. Clypeus in front view projecting well below the lowest point of the eyes, in side view distinctly inflated. Labrum almost round. Hind femora usually only dark basally on the underside.....***sexfasciata***
- Malar gap narrow, about 0.3 times the width of an antennal flagella. Clypeus in front view barely projecting below the lowest point of the eyes, in side view not much inflated. Labrum clearly wider than long. Hind femora usually substantially darkened.....7

- 7 Sternites usually black and yellow (sometimes all-black) with any red very limited in extent. Labrum with a small, triangular central projection. Yellow markings of tergite 1 and 2 without red haloes, those of tergite 1 always well separated and sometimes tiny or missing. Tegulae brown. Pronotal collar often without yellow markings. Scutellum spots often orange. Sides of thorax below wing bases usually unmarked.....*marshamella*
- Sternites usually predominantly red or yellow and with any black markings limited in extent. Labrum with a large, triangular central projection. Yellow markings of tergite 1 and 2 with red haloes (sometimes hard to see with the naked eye), those of tergite 1 usually large and meeting or nearly meeting on the midline. Tegulae typically mostly yellow. Pronotal collar usually all-yellow. Scutellum spots yellow. Sides of thorax below wing bases often with large yellow or orange marking.....*fulvicornis* **form without obvious red on tergites**

***Nomada* female Group C**

- 1 Scutum with longitudinal red stripes, at least at sides above wing bases, often a pair centrally too. Eyes usually completely surrounded by orange integument.....2
- Scutum entirely black. Eyes mostly surrounded by black integument.....3
- 2 Hind face of propodeum with a discrete patch of dense silvery hairs on each side. Sides of thorax below wing bases usually with one large but irregularly shaped patch of red. Smaller and stockier (typical wing length 5mm)....**typical *flavoguttata***
- Hind face of propodeum without discrete patches of dense silvery hairs on each side. Sides of thorax below wing bases usually with two discrete red patches. Larger and slimmer (typical wing length 6.5mm).....*conjungens*
- 3 Ridge between antennal bases broad and flat on top. Antennal flagella with dorsal surface entirely dark. Tergite 5 mostly whitish. Small (typical wing length 5mm).....*obtusifrons*
- Area between antennal bases with a sharp median crest. Antennal flagella bright orange in basal section and at tip, with a broad black subapical band. Tergite 5 at most with a yellow patch.. Larger (wing length usually at least 6mm).....4
- 4 Mandible tips bifid. Labrum with at most a small central projection. Scutellum black. Hind face of propodeum, outer face of hind coxae, and sides of thorax without conspicuous patches of silver hairs. Tergites 4 and 5 without yellow marks. Smaller (wing length to 7.5mm).....**typical *fabriciana***
- Mandible tips bluntly pointed. Labrum with a large triangular projection close to the lower edge centrally. Scutellum with a pair of red spots. Hind face of propodeum at sides, outer face of hind coxae, and sides of thorax below with dense and conspicuous patches of silver hairs. Tergites 4 and 5 with yellow marks. Larger (typical wing length 9mm).....*armata*

***Nomada* female Group D**

- 1 Scutellum with a single bright yellow mark.....2
- Scutellum with either a pair of yellow or reddish spots or a single reddish mark....4
- 2 Antennal flagella black except for first segment. Front coxa with an apical projection. Thorax and propodeum with short inconspicuous hairs. Scutum shinier with discrete punctures. Sides of thorax usually with a conspicuous yellow spot. Tergite 2 with triangular yellow spots separated by their width or slightly more.....***rufipes* tricoloured form**
- Antennal flagella either entirely orange or reddish, at most with dorsal side darkened. Front coxa without an apical projection. Thorax and propodeum (at least

- at sides) with obvious hairs. Scutum dull with densely packed punctures. Sides of thorax entirely black. Tergite 2 either with roundish lateral spots separated by about twice their width or a yellow band at most by a yellow bands of less than their width.....4
- 3 Tergite 2 extensively yellow, either with a continuous yellow band or a pair of yellow spots separated by less than their own width by red. Tegulae, lower face and front of scape bright yellow. Thorax, head and propodeum with less conspicuous hairs. Antennal flagella orange, not becoming darker above apically. Antennal segment 3 viewed on its ventral side about 1.5x as long as its apical width. Sternites marked yellow. Smaller (wing typically 7-7.5mm)..... ***fulcata***
- Tergite 2 extensively red with the yellow lateral spots separated by about twice their width. Tegulae completely or predominantly reddish-orange. Thorax, head and propodeum with conspicuous black hairs. Antennal flagella noticeably darker above in the distal half or more. Antennal segment 3 viewed on its ventral side about twice as long as its apical width. Sternites entirely reddish. Larger (wing length typically 8.5mm)..... ***bifasciata***
- 4 Scutellum with a pair of bright yellow spots that are not haloed by red. Wing tegulae mostly yellow (thorax never has reddish hairs above and hind tibiae never black marked).....5
- Scutellum either with one or two red spots, or if spots yellow, they are haloed by red and either the thorax has bright reddish hairs above or the hind tibiae are extensively black.....6
- 5 Tergite 1 with a pair of yellow spots (often fused) haloed by red. Tergite 2 with yellow spots narrowly separated. Sternites often extensively yellow. Labrum usually with a larger median projection. Typically smaller (typical wing length 8.5mm)..... **typical *fulvicornis***
- Tergite 1 red-marked (either one large patch or two narrowly separated patches) without any yellow. Tergite 2 with yellow spots usually more widely separated. Sternites predominantly red. Labrum with a smaller median projection. Typically larger (typical wing length 9.5mm)..... ***subcornuta***
- 6 Antennal scapes entirely or partially black beneath so that the orange underside is never continuous.....7
- Antennal scapes orange on the underside without any interruption.....9
- 7 Pronotal tubercles bright yellow. Scutellum typically with a pair of well-separated round red spots. Scape entirely black. Gaster mostly red with a pair of small lateral yellow spots on tergite 2 and sometimes a yellow patch on tergite 5. Labrum with a pair of dark spots..... ***ferruginata***
- Pronotal tubercle red. Scutellum often with red spots barely separated or fused into one large patch. Underside of scape often partially red. Labrum without a pair of dark spots.....8
- 8 Tergites 2-5 with conspicuous yellow markings. Head and thorax with a longer and more conspicuous hair pile, the hairs above about as long as the width of an antennal flagellum. Underside of mid femora with numerous curved bristly hairs that are as long as half the femoral width. Sides of thorax entirely dark. Larger and more robust (typical wing length 8.5mm)..... ***leucophthalma***
- Tergites red except for yellow lateral spots on tergite 2 and a yellow patch on tergite 4. Head, thorax and underside of mid femora with shorter hairs. Sides of thorax with a small red patch. Smaller and slimmer (wing length 5.5mm but may be an undersized example)..... ***fusca* (Gentleshaw Common specimen)**

- 9 Posterior face of hind tibiae extensively black. Tergite 2 with a pair of large yellow spots that are usually divided by a black stripe as well as haloed by red. Propodeum with patches of silvery hairs at the sides. Top of last antennal segment paler than the preceding segment.....*zonata*
- Posterior face of hind tibiae usually entirely reddish. Tergite 2 without a black median stripe. Propodeum without patches of silvery hairs. Top of last antennal segment not conspicuously paler than the preceding segments.....10
- 10 Head, thorax and propodeum with a conspicuous pile of long reddish hairs (faded in older individuals). Scutum dull with densely packed punctures. Scutellum typically with two yellow spots haloed by red. Metanotum black. Tergites 2-5 with complete yellow, or yellow and red, bands. Larger (typical wing length 9mm)..... *lathburiana*
- Head, thorax and propodeum with short inconspicuous hairs. Scutum shinier with smaller, discrete punctures. Scutellum with a large rectangular reddish mark and metanotum partly red too. Tergite 2 and 3 small creamy-white lateral spots (with no black median stripe on tergite 2) and a large creamy white mark on tergite 5. Tergite 4 often entirely dark. Smaller (wing length typically 5.5mm).....*roberjeotiana*

***Nomada* female Group E**

- 1 Mandible tips bifid.....*ruficornis*
- Mandible tips pointed or squared-off.....2
- 2 Tergite 2 with a complete yellow band or large yellow spots that are separated by less than their own width. Comb spines at apex of hind tibiae never ‘bear-clawed’.....3
- Tergite 2 with smaller yellow spots that are separated by at least their own width. If in doubt (some *baccata*), a small species with tergite markings cream-coloured rather than yellow and hind tibiae ‘bear-clawed’ at apex.....5
- 3 Tergites 2 and 3 with very broad, continuous and almost straight-sided bands. Hind face of propodeum with conspicuous yellow marks. Sternites 2-4 extensively yellow.....*signata*
- Tergites 2 and 3 either with narrowly separated yellow spots or if a continuous yellow band is present this narrows in the middle. Hind face of propodeum with any marks reddish. Sternites 2-4 mainly red.....4
- 4 Clypeus and labrum with the long, erect hairs yellowish. Lower part of propodeum, sides of thorax and hind coxae with yellow-tinted hairs. Hind face of propodeum at most with small reddish marks. Antennal flagella as pale above as below. Wing margins usually paler. Averaging larger (typical wing length 9.5mm) and paler-looking.....*flava*
- Clypeus and labrum with the long, erect hairs blackish. Lower part of propodeum, sides of thorax and hind coxae with silvery hairs. Hind face of propodeum often extensively red-marked. Antennal flagella usually slightly darker above. Wing margins usually darker. Averaging smaller (typical wing length 8.5mm) and darker-looking.....**typical *panzeri***
- 5 Tip of hind tibiae with 4-5 more or less equally long, black, curved comb spines that look like bear claws and are somewhat longer than the diameter of an ocellus.....6
- Tip of hind tibiae without such an arrangement of comb spines (spines either shorter, straighter, paler, or less equal in length).....7
- 6 Head and thorax extensively orange, the orange stripes on the scutum as wide or wider than the black stripes separating them, the propodeum orange laterally with a

- broad black median stripe. Legs, antennal scapes and scutum pale-haired. Paler-looking and averaging smaller (wing length to 5.5mm).....*baccata*
- Head and thorax more extensively black with reddish rather than orange markings, the stripes on the scutum narrower than the black intervening areas, the propodeum predominantly black with small lateral red spots. Legs, scutum and antennal scapes black haired. Darker-looking and averaging larger (wing length 6-7mm).....*alboguttata*
 - 7 Mandible tips squared off or very bluntly truncate (if in doubt the tip of the hind tibiae with 3-4 very short blunt black comb spines that are touching and give the impression of a single black appendage).....8
 - Mandible tips sharply pointed.....9
 - 8 Apex of hind tibiae with 3-4 very short blunt black comb spines that are touching and give the impression of a single black appendage (unique to this species). Antennal scapes predominantly black. Lateral spots on tergite 2 usually smaller. Smaller (typical wing length 5.5mm).....*guttulata*
 - Apex of hind tibiae with several longer and clearly separated comb spines. Antennal scapes entirely or predominantly red below. Lateral spots on tergite 2 usually larger. Larger (typical wing length 6.5-7mm).....*striata*
 - 9 Small (wing length up to 5.5mm), resembling *flavoguttata*, with very small, ill-defined yellow lateral spots on tergite 2, and tergite 5 reddish.....*castellana*
 - Larger (wing length usually at least 7mm) with larger, sharply-defined yellow spots on the sides of tergite 2, and tergite 5 mainly yellow.....10
 - 10 Antennal flagella relatively long with an orange dorsal surface that is barely darker than the ventral surface and with hairs on the dorsal and posterior surfaces that are about half as long as the diameter of an ocellus and clearly sparser and more outstanding than those of the anterior and ventral surfaces. Legs longer and slimmer, the second segment of the hind tarsi about 4 times as long as wide when viewed from above. Lateral yellow spots of tergite 2 roundish and without an obviously pointed inner margin.....*hirtipes*
 - Antennal flagella relatively shorter with the upper surface often darkened and with microscopically small hairs on all surfaces. Legs shorter and thicker, the second segment of the hind tarsi about 3 times as long as wide when viewed from above. Lateral yellow spots of tergite 2 typically triangular with a pointed inner margin..11
 - 11 Sternites 1-3 with submarginal setae short and weak, emerging from inconspicuous punctures. Clypeus usually with the punctures above noticeably large than those towards the labrum. Tergite 3 often with well-formed lateral spots that can be as broad as those on tergite 2.....*dark panzeri*
 - Sternites 1-3 with longer, stronger submarginal setae that are as long as the width of a hind basitarsus in top view. Clypeus with evenly-sized, small and dense punctures throughout. Tergite 3 with yellow marking usually small or missing.....12
 - 12 Pygidium with a dense covering of silvery hairs that almost extend to the margins. Terminal hair fringe of tergite 5 relatively broad, long-haired and poorly defined basally. Antennal flagella darkened above and longer (about 0.9 times the costal length measured between the outer edge of the tegula and the start of the forewing stigma). Scape darkened above. Sides of thorax with a single red spot placed low. Tergites 1-3 with black bands across the base and hind margin, leaving red restricted to a band in between, creating a much darker appearance. Red stripes on scutum generally poorly formed or missing, though a weak stripe normally remains at each side. Head viewed from above with hind corners less inflated and more

strongly angled inwards creating a smaller-headed

appearance.....*fusca* (Swedish material)

- Pygidium with hair covering less dense and less silvery, stopping well short of the margins. Terminal hair fringe of tergite 5 relatively narrow, short-haired and well defined basally. Antennal flagella orange and barely darker above than below, also shorter (about 0.8 times the costal length measured as above). Scape often entirely orange. Sides of thorax typically with two spots. Gaster extensively reddish, with black bands missing from base of tergites 2 and 3, and weak or missing along hind margins of tergites 1-3. Red stripes on scutum well formed. Head viewed from above with more inflated hind corners producing a bigger-headed

appearance.....*glabella*

Male groups

- 1 At least tergites 1-3 with black and yellow (creamy-white in *errans*) markings without any obvious red/brown (though the black markings can appear brown where they overlie any bright yellow integument).....**Male Group A**
- At least tergite 1 with some obvious red or brown pigmented markings that are not due to translucency. Tergites often substantially red/brown or a mix of red/brown and yellow.....2
- 2 Labrum entirely or extensively darkened.....**Male Group B**
- Labrum entirely yellow.....3
- 3 Antennal scapes entirely or partially black below (without a continuous red or orange strip).....**Male Group C**
- Antennal scapes entirely yellow or orange below.....4
- 4 Scutellum with one or two bright yellow spots. If missing or highly reduced (the occasional *bifasciata* and *fucata*) then antennal flagella with a dark posterior patch about half way along.....**Male Group D**
- Scutellum with any spots reddish and if missing, the antennae are never darkened as above.....**Male Group E**

***Nomada* male Group A**

- 1 Underside of hind femora with a dense discrete patch of adpressed golden hairs in basal quarter contrasting strongly with the bare surface beyond, the adjacent trochanters also densely hairy. Tergite 2 with a complete yellow band.....2
- Underside of hind femora without such a discrete patch, though there may be long hairs at the base that continue to the tip. Tergite 2 with divided spots.....3
- 2 Hind tibiae orange, sometimes partially yellow but without a dark marking on the posterior face. Yellow bands of tergites 1-5 narrower, those of tergite 1 usually strongly constricted or divided medially.....*goodeniana*
- Hind tibiae entirely yellow except for a dark marking on the posterior face. Yellow bands of tergites 1-5 broader, those of tergite 1 often broad throughout.....*succincta*
- 3 Scutellum with a single large yellow or cream-white spot. Tergite 2 with yellow spots separated by at least half their width. Front coxae with an apical projection...4
- Scutellum with either two yellow spots (occasionally abutting in *N. flavopicta*) or completely black. Front coxae without an apical projection (except for *N. flavopicta*).....5
- 4 Sternites 3-6 with yellow bands. Tergite 4 usually with a complete yellow band. Pale body markings custard-yellow. Hind face of propodeum densely punctured at sides and bottom. Larger (wing length usually 6-7mm)..... ***rufipes* form with black & yellow tergites**
- All sternites black. Tergite 4 with well separated lateral streaks. Pale body markings creamy-white. Hind face of propodeum smooth and shining at sides and bottom, barely punctured. Smaller (wing length to 5mm).....*errans*
- 5 Head viewed from side with malar gap as broad as the width of an antennal flagellum and with the lower face much inflated. Antennae viewed from the front with segment 3 about as long as 4. Hind tibiae apically without obvious apical comb spines but with many even-lengthed hairs. Thorax furrier, the hairs of the top and sides mostly twice as long as the width of an antennal flagellum. Large (wing length 9-9.5mm).....*sexfasciata*
- Malar gap only about half the width of an antennal flagellum, the lower face less inflated. Antennae viewed from the front with segment 3 clearly shorter than 4. Hind tibiae apically with several apical comb spines at apex (except in *flavopicta*)

- where apical margin bare). Thorax with hairs of the top and sides no more than 1.5x as long as the width of an antennal flagellum (often much shorter) and body size often much smaller.....6
- 6 Mid femora without an obvious hair fringe below, any hairs less than one-half the width of an ocellus.....7
- Mid femora with an obvious hair fringe below with longest hairs much longer than the width of an ocellus.....8
- 7 All tibiae with conspicuous black markings, those of hind tibiae occupying most of posterior face. Outer face of hind coxae with semi-erect, white or yellowish hairs. Front coxae without an apical projection.....**typical zonata**
- Tibiae without black markings. Outer face of hind coxae with a dense covering of adpressed silvery hairs. Front coxae with an apical projection.....**flavopicta**
- 8 Boldly black and yellow patterned bees with yellow pronotal tubercles, a yellow pronotal collar, partially yellow tegulae, a yellow underside to the scapes and often yellow scutellum spots. Sternites extensively yellow. Tergite 1 usually with yellow markings. Larger (wing length typically over 7mm).....9
- Drabber species with tergite 1 and scutellum never yellow marked. Underside of antennal scape black or reddish. Sternites mostly or entirely dark. Wing length often less than 7mm.....10
- 9 Yellow markings of the lower face not extending above the lower third of the inner eye orbits and stopping well below the level of the antennal insertions. Tergite 1 usually either entirely black or with a pair of small yellow spots. Tegulae partially or entirely brown or orange. Antennal segment 3 viewed from below slightly more than half the length of segment 4.....**marshamella**
- Yellow markings of the lower face extending half way up the inner eye orbits and attaining the level of the antennal insertions Tergite 1 usually with a pair of large yellow spots that often fuse. Tegulae, aside from the black basal part, entirely yellow with a transparent margin. Antennal segment 3 viewed from below less than half the length of segment 4.....**fulvicornis**
- 10 Antennal segment 3 somewhat longer than 4 on its upper (longest) side. Hind face of propodeum with a discrete patch of dense silvery hairs on each side. Hind femora beneath with denser, longer hairs in basal half. Front tibiae black and yellow. Sides of labrum yellow. Tergites with small lateral yellow spots (often divided) on tergite 2-4. Tiny (wing length 3.5-4mm).....**dark sheppardana**
- Antennal segment 3 shorter than 4. Hind face of propodeum without discrete patches of dense silvery hairs. Hind femora beneath without denser, longer hairs in basal half. Front tibiae orange and black. Labrum entirely yellow. Tergites more extensively yellow, often with bands across tergites 2-6. Wing length at least 5mm).....
- Small, dark specimens of *leucophthalma*, *signata* etc. (go to Male Groups B- E)**

***Nomada* male Group B**

- 1 Mandibles tips bifid.....**fabriciana**
- Mandibles tips pointed or bluntly rounded.....2
- 2 Labrum with a large, triangular projection close to the lower edge centrally. Antennal flagella almost entirely orange. Front femora dilated at base. Large (wing length usually over 8.5mm).....**armata**
- Labrum without a large central projection. Antennal flagella dark above. Front femora not dilated at base. Smaller (wing length to 7mm).....3

- 3 Tergite 2 reddish or dark with no hint of lateral yellow or whitish spots. Antennae with underside of mid flagellar segments either strongly bulbous or with small, sharp projections.....4
- Tergite 2 with lateral yellow or whitish spots; if rather faint or small (*fuscicornis* and *similis*), the underside of mid flagellar segments are not especially bulbous and lack small, sharp projections.....6
- 4 Underside of hind femora with basal half shining with sparse punctures and sparse hairs. Antennal flagella dark brown below (barely contrasting with the upper surface), antennal segments 5-8 with angulated projections on the hind face. Propodeum with densely silver-haired sides to the hind face. Tergites darker, often entirely black, at most with red across hind margin of tergite 1 and the bases of tergites 2 and 3, and with patches of silver hairs on the side of tergite 2 and 3. Scutum shinier.....*argentata*
- Underside of hind femora dulled in basal half by dense punctures plus dense long hairs. Antennal flagella much paler below than above and with sharp projections on the hind face of antennal segments 6-10. Propodeum with less dense and conspicuous hairs laterally. Tergites predominantly red with only base of tergite 1 black, small lateral spots on tergites 2 and 3, and apparent black hind margins on tergites 3 and 4 (created by the underlying black bases of tergites 4 and 5).....5
- 5 Lower margin of mandibles with a projection just beyond middle. Pygidium with sides straight. Second and third submarginal cells less convergent above with the combined length of their anterior margin somewhat greater than the length of the third cell's posterior margin. Hind femora above with red markings more extensive and conspicuous.....*integra*
- Lower margins of mandibles smoothly curved without a projection. Pygidium with sides slightly concave. Second and third submarginal cells more convergent above with the combined length of their anterior margin about equal to the length of the third cell's posterior margin. Hind femora above with red markings less extensive and less conspicuous.....*facilis*
- 6 Antennal segment 3 viewed from above clearly shorter than segment 4.....*typical flavoguttata*
- Antennal segment 3 at least as long as segment 4, often longer.....6
- 7 Underside of hind femora with short sparse hairs that do not get longer or denser towards the base. Area between antennal bases with a broad, flat-topped ridge. Lower edge of clypeus yellow-marked.....*obtusifrons*
- Underside of hind femora with longer, denser hairs at the base. Area between antennal bases with a sharp median crest. Lower edge of clypeus dark.....7
- 8 Hind face of propodeum with a discrete patch of dense silvery hairs on each side. Tergites mostly black with lateral yellow spots (sometimes divided) on tergites 2-4. Tiny (wing length 3.5-4mm).....*sheppardana*
- Hind face of propodeum without discrete patches of silvery hairs. Tergites mostly reddish with weakly formed lateral yellow spots. Wing length at least 5mm.....8
- 9 Scutellum fairly evenly convex. Mid and hind tibiae black dorsally. Smaller (typical wing length 5mm).....*fuscicornis*
- Scutellum clearly depressed in the middle with bumps on either side. Mid and hind tibiae orange dorsally. Larger (typical wing length 6.5mm).....*similis*

***Nomada* male Group C**

- 1 Pronotal tubercles partially yellow (at least along hind part). Gaster usually extensively red with conspicuous yellow spots or bands on tergites 1-6, tergite 2

- typically with narrowly separated yellow spots. Yellow of lower face extending narrowly up the inner eye orbits as high as the antennal insertion points.....*ferruginata*
- Pronotal tubercles reddish, brownish or black without any yellow. Gaster either red with small lateral spots on tergite 2 or if with extensive yellow marks (*leucophthalma*), the yellow lower face markings do not extend far up the inner eye orbits.....2
 - 2 Scutellum with red spots or a single red mark. Mandibles with a squared off or very bluntly rounded tip.....3
 - Scutellum entirely black. Mandibles more obviously pointed at tip.....4
 - 3 Top of antennal segment 3 about as long as 4. Fringe beneath mid femora dense with hairs about as half as long as the femoral width. Yellow markings of lower face only extending up the lower third of the inner eye orbits. Hind femora with the top usually only reddish apically; the underside with the shiny, hair and puncture-free zone only occupying the apical third. Antennal scapes usually entirely black below.....*guttulata*
 - Antennae segment 3 clearly shorter than 4 in top view. Fringe beneath mid femora sparser with hairs about one quarter as long as the femoral width. Yellow markings of lower face extending up the inner eye orbits to the mid point of the eye. Hind femora usually reddish along the entire length of the top; the underside with a large shiny, hair and puncture-free zone occupying the apical half. Antennal scapes often partially red below.....*striata with dark scapes*
 - 4 Tergites 2-6 with conspicuous yellow bands or narrowly separated spots. Middle femora with a long fringe below (equal to the femoral width). Hind face of propodeum with long hairs throughout. Large (typical wing length 8.5mm).....*leucophthalma*
 - Gaster darker, usually with small yellow spots on the sides of tergites 2 and 3. Middle femora with a short fringe below (half the diameter of an ocellus). Hind face of propodeum largely bare except for side margins. Small (typical wing length 5mm).....*flavoguttata form with yellow labrum*

***Nomada* male Group D**

- 1 Scutellum with two, well-separated round spots. Tergite 1 with a pair of large yellow spots (haloed by red markings). Hind femora with a dense covering of short hairs over entire length, but not concealing the underlying surface. Larger (wing length usually at least 8mm).....*subcornuta*
- Scutellum with a single yellow spot (occasionally missing or fragmented). Tergite 1 without yellow markings. Underside of hind femora otherwise (see below). Smaller (wing length rarely more than 8mm).....2
- 2 Antennal flagella blackish. Underside of hind femora with sparse, short hairs that are in no place dense. Tergite 2 with triangular yellow spots separated by their width or slightly more.....*rufipes tricoloured form*
- Antennal flagella orange apart from some darkening of 2-5 segments midway along hind face. Underside of hind femora with a patch of very dense golden hairs basally that obscure the underlying surface, the adjacent trochantères also long-haired.....3
- 3a Hind tibiae usually entirely or mostly yellow on anterior face. Sternite 2 extensively yellow. Antennal flagella usually with only 2-3 segments strongly darkened on hind face. Tergite 2 rarely with the yellow band broken.....*fucata*

- Hind tibiae usually entirely or mostly orange on anterior face. Sternite 2 usually entirely red. Antennal flagella usually with 4 segments strongly darkened on hind face. Tergite 2 more frequently with the yellow band broken.....*bifasciata*

***Nomada* male Group E**

- 1 Mandible tips bifid.....*ruficornis*
 - Mandible tips pointed or squared-off.....2
- 2 Antennae with tubercles on the hind face of segments 4-13.....3
 - Antennae without tubercles on the hind face of any segment.....4
- 3 Antennal segments 4-13 bearing pointed tubercles on the hind face, those tubercles located half way along each segment. Tergites 2-5 with broad yellow bands. Larger (wing length 7-9mm).....*lathburiana*
 - Antennal segments 4-13 with rounded tubercles on the hind face, those tubercles located in the distal half of each segment. Tergites with widely divided lateral spots. Small and closely resembling *N. flavoguttata* (wing length up to 5.5mm).....*castellana*
- 4 Mid femora with hairs beneath extremely short, less than one-third the diameter of an ocellus.....5
 - Mid femora with hairs beneath longer, at least the diameter of an ocellus and forming a definite fringe, even if short.....6
- 5 Scutellum almost entirely reddish. Pronotal collar, pronotal tubercles, tegulae, and much of face (including all of clypeus) creamy-yellow. Lateral spots of tegites creamy-white. Scutum shiny with distinct punctures. Antennal segments 3 and 4 of similar length. A dumber species with shorter legs and antennae.....*roberjeotiana*
 - Scutellum black or with a pair of small red spots. Pronotal collar dark, pronotal tubercles and tegula reddish. Only lower face yellow, the top of the clypeus broadly black. Tergite spots yellow. Scutum dull with closely packed punctures. Antennal segment 3 much shorter than 4. A more gracile species with longer legs and antennae.....*conjungens*
- 6 Hind tibiae with posterior face extensively black (if any doubt surrounds *N. hirtipes*, this has sparse semi-erect hairs on the hind face of the antennal flagella).....7
 - Hind tibiae with posterior face orange, reddish or brownish but without any defined black patch.....8
- 7 Tergites mostly red and yellow, with tergite 1 black in basal half. Hind tibiae with anterior face reddish.....*hirtipes*
 - Tergites mostly black and yellow with obscure reddening of tergite 1 in distal half. Hind tibiae extensively black on anterior face.....*zonata tricoloured form*
- 8 Mid femora with ventral fringe shorter, longest hairs not more than one-third the femoral width.....9
 - Mid femora ventral fringe with hairs at least two-thirds the femoral width.....12
- 9 Tergite 2 with the yellow spots fused or only narrowly separated (usually by less than the width of a hind tarsus). Tergites 3 and 4 with broad yellow bands. Thoracic hairs rich-brown in fresh individuals. Often large (wing length up to 10mm)....*flava*
 - Tergite 2 with lateral yellow spots separated by more than the width of a hind tarsus, often much more than their own width. Tergites 3 and 4 without broad yellow bands. Averaging smaller (wing length no greater than 7.5mm).....10
- 10 Mandible tips truncate. Viewed dorsally, antennal segment 3 much shorter than 4. Underside of scape usually only narrowly red. Scutellum always with two red spots

- (sometimes fused). Larger (wing length usually over 6mm).....*striata* with paler scape
- Mandible tips pointed. Underside of scape broadly yellow. Scutellum often without spots. Smaller (wing length up to 6mm).....11
 - 11 Tergites with yellow markings more extensive, the lateral spots of tergite 2 separated by much less than their width. Hind femora predominantly orange, broadly so above. Hair fringe behind front femora shorter than the femoral width. A paler-looking nomad.....*baccata*
 - Tergites with yellow markings less extensive, the lateral spots of tergite 2 separated by about twice their width. Hind femora predominantly black, only obscurely reddish above. Hair fringe behind front femora at least as long as than the femoral width. A darker looking nomad.....*alboguttata*
 - 12 Tergites 2-5 with very broad yellow bands that are neither interrupted or constricted in the middle, contrasting strongly with the sharply defined blackish hind margins to tergites 2-4. Median axillary sclerite of wing base (immediately beyond the tegula) always blackish. Averaging larger (wing length to 9.5mm).....*signata*
 - Tergites 2-5 with bands either divided into spots, or constricted in the middle, the hind margin of tergites 2-4 either reddish, or if blackish, not usually sharply defined (often haloed with red). Median axillary sclerite of wing base (immediately beyond the tegula) often reddish or brownish. Smaller (wing length rarely more than 8mm).....13
 - 13 Tergite 2 usually with a complete yellow band but if divided it is usually by less than the width of a hind tarsus. Sternites 2-4 with submarginal setae relatively short and weak. Tergites 2-3 with any basal black bands usually hidden beneath the preceding segment. Hind margin of tergites 2-4 usually partially or entirely reddish. Scutellum often without red spots. Antennae relatively longer.....**typical** *panzeri*
 - Tergite 2 with lateral yellow spots usually separated by much more than the width of a hind tarsus. Sternites 2-4 with relatively long and strong submarginal setae. Tergites 2-3 with basal bands more prominent and extending well beyond the hind margin of the preceding segment. Scutellum nearly always with a pair of red spots (very limited material seen).....14
 - 14 Tergites 1-3 with obvious red markings , the lateral yellow spots of tergite 2 with red between.....*glabella*
 - Tergites 1-3 mostly black and yellow with ill-defined reddish/brownish haloes to the yellow markings, broadly black across the base, with the two lateral yellow spots of tergite 2 separated by black (a much darker-looking nomad).....*fusca* (Swedish male)

Species accounts

Nomada alboguttata Herrich-Schäffer, 1839 **Dark Bear-clawed Nomad Bee**

Description & similar species FW 6mm (sexes similar). A small nomad with females that share with *N. baccata* the presence of several long black curved comb spines at the tips of the hind tibiae (resembling the claws of a bear paw). However, this is a much darker species with red rather than orange body markings, reduced pale markings on the tergites, and black rather than pale hairs on the scutum, legs and labrum. The scutum is red striped and the tegulae, pronotal collar and pronotal tubercles are red. Two red patches (sometimes fused) are present on the sides of the thorax. The propodeum has red marks plus lateral patches of long silvery hairs. The lower face is red with the markings extending around the eyes. The antennae (including scape) are entirely orange. The legs are unusually bristly. In the field it could easily be mistaken for *N. guttulata* but that species has very different comb spines on the hind tibiae, bluntly rounded rather than pointed mandibles, a black scape and non-bristly legs. Small individuals of *N. striata* can be separated by their squared off mandible tips and shorter, straighter hind tibial comb spines. Males have a dark scutum and weaker, paler comb spines than in the females. They resemble dark versions of *N. baccata* with smaller markings on the tergites, darker hind femora, and a longer fringe behind the front femora. They also resemble males of *N. conjungens* (which have much shorter hairs beneath the mid femora). Both male specimens seen have an entirely black scutellum.

Variation Little noted but few specimens seen.

Flight season A partly bivoltine species that flies from April to June but producing a smaller second generation from late July to September on the near continent.

Habitat Sandy habitats including heathland and sandy coastal areas.

Flowers visited Willows, dandelions, hawkweeds, Alder Buckthorn, Sheep's-bit and Devil's-bit Scabious are noted on the continent.

Status and distribution Discovered in Britain at a sandy brownfield site (Lodge Hill) in North Kent in June 2016 (Kirby-Lambert, 2016). A slightly older North Kent specimen has since come to light and it has also been found at two sites in Sussex. Further expansion is anticipated though it is clearly not spreading at the rate of *N. zonata* which was also added to the mainland British list from Lodge Hill in 2016. It is a relatively common bee in the Netherlands and Belgium.

Host(s) Primarily *Andrena barbilabris* (which it shares with *Sphecodes pellucidus*) but thought to use *A. ventralis* and possibly *A. argentatus* on the continent.



Nomada alboguttata female and male

***Nomada argentata* Herrich-Schäffer, 1839 Silver-sided Nomad Bee**

Description & similar species FW 6-6.5mm female, 6mm male. A rather small, dark nomad, one of the few lacking any yellow or whitish markings on the tergites. Females have a broad red band across the middle of the gaster, red spots on the scutellum, metanotum and sides of the thorax, also red tegulae, pronotal collar, mandibles, malar gap and lower edge of the clypeus. The legs are red and black. The sides of the gaster have dense patches of silvery hairs. The antennae are blackish the flagella only slightly paler beneath. Confusion is most likely with females of *N. facilis* and *N. integra* but these have a bright orange underside to the flagella and lack a red patch on the sides of the thorax. Males are darker than females and have the face and labrum almost entirely black in contrast to most male nomads. The antennae are relatively short for a male nomad and the middle segments of the flagella have angulated projections on their hind face.

Variation Most pronounced in males. These can have a gaster that ranges from almost completely black to broadly red-banded, and some have red scutellum spots. The amount of black on their legs also varies considerably though the hind femora are usually entirely black except for the extreme apex. They can have the clypeus entirely dark or narrowly yellow along the lower edge.

Flight season Univoltine, flying from mid July to mid September, peaking later where the host forages on Devil's-bit Scabious.

Habitat Typically dry chalk grassland, but also coastal grassland, heathland/acid grassland, moorland edge, coastal dunes and woodland rides. Plentiful scabiouses (Field, Small or Devil's-bit) are a requirement of the host.

Flowers visited Typically scabiouses, though they will visit thistles before scabiouses are in flower.

Host(s) *Andrena marginata*.

Status & distribution A rare species mostly recorded from southern England north to Oxfordshire and the north Norfolk coast, also a site near Newport in Gwent. Greatly declined (especially in south west England) with most modern locations within Dorset, Salisbury Plain, Surrey and the Brecks. Very rare in Ireland. Not recorded from Scotland (where the host is present) or the Channel Islands.



Nomada argenatata female (J. Early) and male (a dark example)

***Nomada armata* Herrich-Schäffer, 1839 Armed Nomad Bee**

Description & similar species FW 8.5-9.5mm (sexes similar). The largest of our reddish nomads (*N. flava*-sized), easily distinguished from all others by the large

triangular projection of the labrum. Females have small yellow lateral spots on tergites 2-4 and a more vague orange patch on 5. The scutellum has a pair of red spots and the antennal flagella are reddish with a broad dark subterminal band and orange tip, reminiscent of *N. fabriciana*. Dense patches of silvery hairs occur along the sides of the propodeum, on the hind coxae and along the sides of the thorax. Males are similar but slimmer with a furrer thorax, entirely orange antennal flagella, and no red spots on the scutellum. The front femora are strangely flattened and broadened.

Variation Little noted.

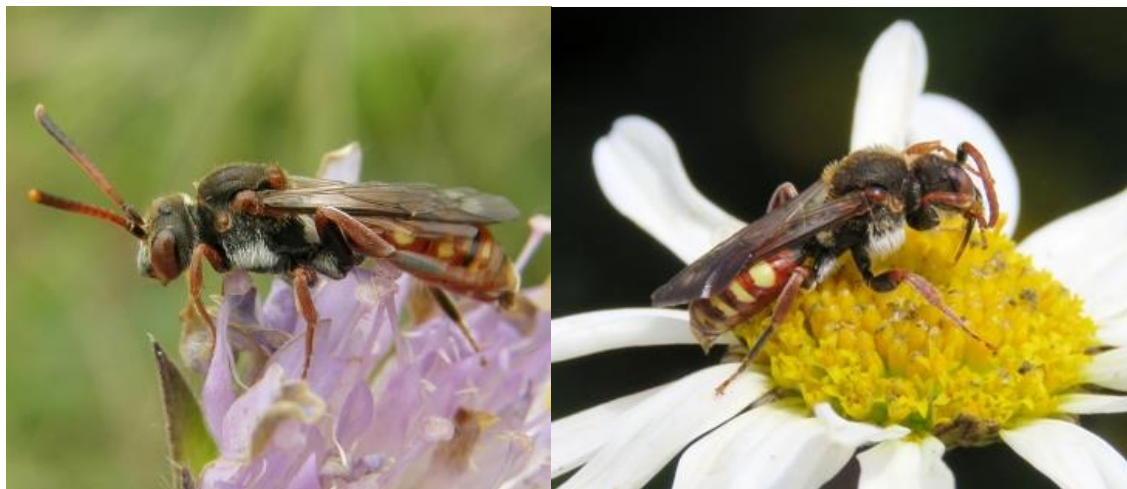
Flight season Univoltine, flying from mid June to early August.

Habitat Mostly chalk and limestone grassland today but previously also found on coastal grassland, moorland edge and soft rock cliffs. Plentiful Field Scabious is a requirement of the host.

Flowers visited Mostly Field Scabious and Small Scabious but also Oxeye Daisy knapweed and Smooth Hawksbeard.

Status & distribution Rare and declined with modern records mostly from Salisbury Plain, plus outliers in Dorset and Oxfordshire (with some signs of recovery in the last county). Older records are scattered across southern England from Cornwall to Kent north to Norfolk, also South Wales (Glamorganshire). Not recorded from Scotland, Ireland or the Channel Islands. It has always been much rarer and more geographically restricted than its host with few records (and none recent) from East Anglia, south east England, or south west England which represent hotspots for the host.

Host(s) *Andrena hattorfiana*.



Nomada armata female and male

***Nomada baccata* Smith, 1844 Bear-clawed Nomad Bee**

Description & similar species FW 4.5-5.5mm female, 5mm male. A smallish nomad with very distinctive females that have extensively orange-red bodies and legs, with rather limited black markings on the head and thorax, and creamy-white rather than yellow markings on the tergites. The reddish stripes of the scutum are often much broader than the intervening black ones. The scutellum and metanotum are almost entirely reddish. The propodeum is mostly reddish with a black median stripe. The antennae are completely orange. The tergites the lateral spots on tergite 2 usually separated by much less than their width. Several particularly long black curved comb spines are present at the tips of the hind tibiae (resembling the claws of a bear paw). The body and leg hairs are entirely pale. Females often appear pinkish-orange in the field. The only other nomad with 'bear-clawed' female hind tibiae is *N. alboguttata* but this is

a much darker species with narrower red stripes on the scutum, a mostly black propodeum, and black hairs on the legs, scutum and antennal scapes. Males have the thorax and top of the head black, and the antennae extensively darkened above. The lower face and front of the antennal scapes are creamy-white. The orange pygidium often lacks a notch at its tip. The hind tibial comb spines are weaker and paler than in females. Compared with males of *N. alboguttata* they have larger lateral spots on tergite 2, more extensively orange hind femora, and a shorter hair fringe behind the front femora.

Variation Some variation in the extent of red or orange markings on the female head, thorax and propodeum. The palest males can have creamy-white spots on tergite 1, creamy-white tegulae, pronotal collar and pronotal tubercles, and a pair of red spots on the scutellum but all these parts are dark in the darkest males.

Flight season Univoltine, flying from mid July to early September.

Habitat Dry sandy heathland, especially where pits and cuttings are present. Loose soft sand is a requirement of the host.

Flowers visited British records include heathers, brambles, Common Ragwort, Creeping Thistle and Thyme.

Status & distribution Almost entirely confined to the southern heaths of Dorset, Hampshire, Surrey and Sussex with small outlying populations in Suffolk and Norfolk. Often abundant around host nesting areas. Also recorded from the Channel Islands (Jersey).

Host(s) *Andrena argentata*.



Nomada baccata female (P. Brock) and male

***Nomada bifasciata* Olivier, 1811 Dusky-horned Nomad Bee**

Description & similar species FW 8-8.5mm female, 7-8.5mm male. One of three tricoloured nomad bees with a single bright yellow spot on the scutellum. Females are readily distinguished from those of the other two (*N. fucata* and the tricoloured form of *N. rufipes*) by the small smaller lateral spots on tergite 2. The thorax and propodeum has particularly dense black hairs. The legs, tegulae, sternites and antennal scapes are entirely reddish without the yellow markings seen in *N. fucata*. The antennal flagella are progressively darker above towards the tip but not blackish above and below like *N. rufipes* and not entirely orange as in *N. fucata*. It averages slightly larger than *N. fucata* and much larger than *N. rufipes*. Males are much more similar to *N. fucata* but have very little if any yellow on the hind tibiae (the legs appearing darker in the field), sternite 2 mostly red, a larger patch of black on the antennal flagella (usually occupying 4 segments), and a greater tendency for the yellow band on tergite 2 to be broken

centrally. However, it is possible to find males that have characteristics of both species and are hard to assign (especially as the two species often fly alongside one-another).

Variation Minor variation in the abdominal markings of both sexes (some males have a complete yellow band across tegite 2, others have it broken medially) and the shape of the yellow scutellum spot, which can be dumbbell-shaped in some females and sometimes reduced or missing in males.

Flight season April and May with a small second generation peaking in August on the near continent where the host is more regularly bivoltine.

Habitat Assorted open habitats including urban parks, grassy sea banks, and the stabilised parts of coastal dunes, typically where spring-blossoming shrubs such as willows and Blackthorn are abundant.

Flowers visited British records include Oxford Ragwort, dandelions and willows.

Status & distribution Discovered at two sites in Kent in 2018 (Falk & Earwaker, 2019) but now known from various locations in the county.

Host(s) *Andrena gravida*.



Nomada bifasciata female and male

***Nomada castellana* Dusmet, 1913 Castell's Nomad Bee**

Description & similar species FW 4.5-5.5mm (sexes similar). Extremely similar to *N. flavoguttata* though both sexes have a yellow rather than dark labrum. Foreign literature cites differences in the hind tibial comb spines of the females of these two species but this appears to be overstated and this character varies somewhat in *N. flavoguttata*. Else & Edwards (2018) mention the presence of a shallow apical impression bounded by three short tubercles in the shape of a triangle. In the few female specimens seen, the lateral patches of silvery hairs on the hind face of the propodeum are less conspicuous than in *N. flavoguttata*. Males have distinct subapical tubercles on the hind face of antennal segments 4-12 (such tubercles barely if at all present in *N. flavoguttata*) and the pygidium has a rounded tip with at most a slight apical notch (tip distinctly notched in *N. flavoguttata*). In the limited male material seen, small red markings are present on the sides of the thorax beneath the wings, and the front of the scape is entirely yellow (usually dark in *N. flavoguttata*). Beware the occasional male of *N. flavoguttata* with a pale labrum.

Variation Moderate variation in the extent of red and yellow markings in both sexes. Some males (including the Jersey specimen) have a pair of yellow spots on the scutellum; in others red spots are present.

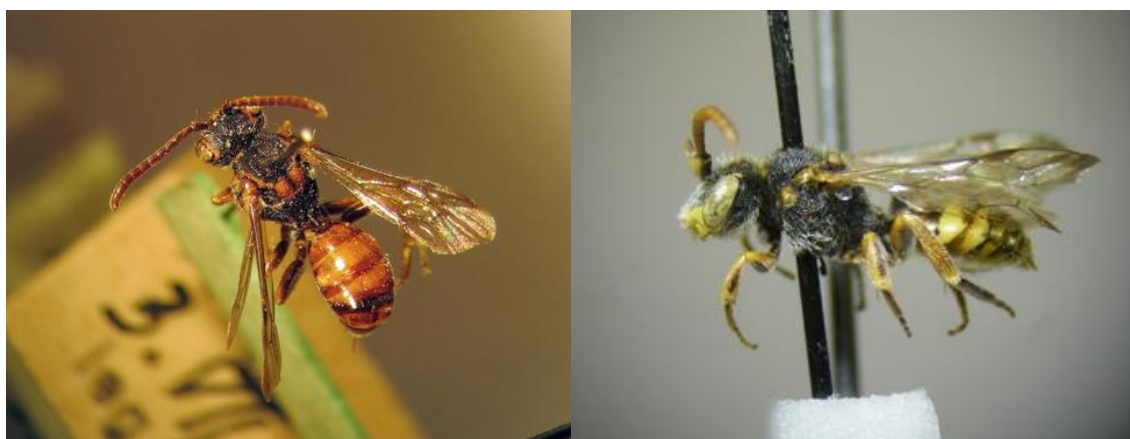
Flight season Regarded as univoltine on the continent, flying from late April to mid July.

Habitat Preferences unclear.

Flowers visited Unknown.

Status & distribution The only British record is for a male found on Jersey in June 1991.

Host(s) *Andrena* species of the subgenus *Micrandrena* ('mini-miners') with *A. alfkenella* and the non-British *A. anthrisci* cited in literature.



Nomada castellana female and male

***Nomada conjungens* Herrich-Schäffer, 1839 Fringeless Nomad Bee**

Description & similar species FW 5-6.5mm (sexes similar). A medium-sized reddish nomad. Females have a dark labrum and resemble a large, slim, long-legged *N. flavoguttata* but lack patches of silvery hairs on the sides of the propodeum and have two discrete patches of red on each side of the thorax as opposed to one large one. The tips of the hind tibiae have several comb spines with one of these much longer than the others. The gaster is red with small lateral yellow spots on tergites 2, 3 and sometimes 4, and a black base to tergite 1. The scutum has two longitudinal red stripes down the middle and red side margins. Red markings from the lower face extend completely around the eyes. The antennae are unusually long for a female nomad and can be almost completely orange except for some darkening of the back of the scape. Males have the thorax completely black and darker antennae than females. The labrum is yellow and they are more likely to be confused with species such as *N. hirtipes* rather than *N. flavoguttata* but can be easily separated by the presence of only tiny hairs on the underside of the mid femora as opposed to an obvious hair fringe.

Variation Minor variation in the shape of the body markings. No consistent differences have yet been noted between population attacking *N. ampla* and those using *A. proxima*.

Flight season Univoltine, flying in May and June.

Habitat Chalk downland, soft rock cliffs, coastal grasslands, wetlands and heathland. Both hosts require plentiful umbellifers but Hemlock Water-dropwort is especially important in south west England where *Andrena ampla* is the host.

Flowers visited British records include various umbellifers and a spurge.

Status & distribution A rare species with records scattered across southern England from Cornwall to Kent and north to Herefordshire and Norfolk. Some indication of a recent increase in East Anglia. Also recorded from the Channel Islands (Guernsey). Not recorded from Wales, Scotland or Ireland.

Host(s) *Andrena ampla* and *A. proxima*.



Nomada conjungens female and male

***Nomada errans* Lepeletier, 1841 Purbeck Nomad Bee**

Description & similar species FW 5mm female, 4.5mm male. Both sexes resemble small examples of the black and yellow form of *N. rufipes* but can be distinguished by the shiny, puncture-free lower propodeum, the black sternites, and more extensively black tergite 4 (with pale marks restricted to the sides). The body markings are creamy-white coloured rather than yellow. Females have reddish antennae (mostly black in *N. rufipes*).

Variation Little noted.

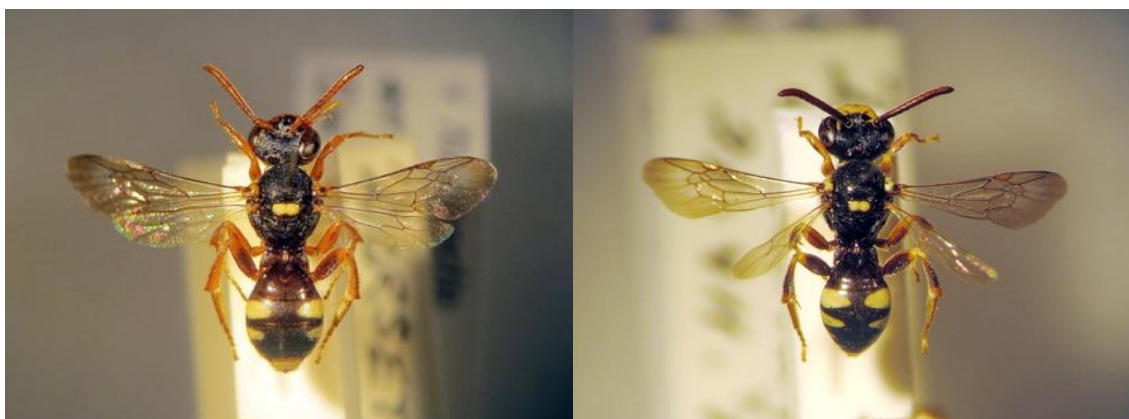
Flight season Univoltine, flying in July and August.

Habitat Cliff-top limestone grassland and clay-rich soft rock cliffs. The host requires plentiful umbellifers, especially Wild Carrot.

Flowers visited Wild Carrot, Common Ragwort and Yarrow.

Status & distribution Only ever known in Britain from Durlston Head, Dorset. The last British record appears to be 1982 and it may be extinct.

Host(s) *Andrena nitidiuscula*.



Nomada errans female and male

***Nomada fabriciana* (Linnaeus, 1767) Fabricius' Nomad Bee**

Description & similar species FW 5.5-8mm female, 5-7mm male. A small to medium-sized reddish nomad usually with small yellow spots on the sides of tergite 2 and 3, and an almost entirely black face (including labrum) and thorax. Easily distinguished from all other nomads by the unique combination of a black labrum and bifid tips to the mandibles. Females typically have antennal segments 4-7 reddish, 12 orange or red with

a dark band between. Of the other reddish nomads only *N. armata* shows this character so strongly. The scape is entirely black. Males resemble females but have the antennae almost entirely dark above (but redder below), the tegulae entirely dark, and longer hairs on the head and thorax.

Variation Substantial size variation that can result in a superficial resemblance to *N. flavoguttata* in small examples but an appearance approaching *N. ferruginata* in the largest females (possibly individuals that have developed in the nests of larger host species such as *Andrena nigroaenea* or *A. rosae*). Females not infrequently lack any yellow spots on the tergites, and both sexes can have black bands of variable intensity across the tergites, though these can be entirely missing in some. The female mandibles and malar gap can be partially red or entirely black, and the lower clypeus can be reddish along its bottom edge. The mid and hind legs are usually predominantly dark, but the tibiae can occasionally be mainly orange. Very dark females can have the antennae and legs entirely black and this form seems to be frequent on the Channel Islands. Very rarely females can be found with the flagella almost entirely orange except for a slight dorsal darkening half way along. These can also have a pair of reddish scutellum spots and reddish lower edge to the labrum. Males associated with



Nomada fabriciana typical female and male (top left and right), a dark-legged and dark-horned female from Jersey (bottom left, T. Ransom) and an unusual pale-horned, pale-legged female from Wytham Woods, Oxfordshire (bottom right).

Andrena ruficrus nests in Cumbria are small and slim with pale red tergites lacking distinct yellow lateral spots or dark markings.

Flight season Mostly bivoltine, flying from March to June and June to August. Possibly univoltine in some places e.g. in Ireland and where species such as *Andrena nigroaenea* are being used.

Habitat Like the main host, a wide variety of habitats are used, both open and wooded, coastal and inland.

Flowers visited Assorted flowers, including spring-blossoming shrubs, dandelions, Daisy, buttercups, Garlic Mustard, Primrose, sitchworts, speedwells, and spurges in spring; ragworts, thistles and scabioues in summer.

Status & distribution Locally common in southern Britain but scarcer in the north, with a few records for Scotland. Widespread but local in Ireland. Recorded from several of the Channel Islands.

Host(s) Primarily *Andrena bicolor* but possibly also *A. angustior*, *A. ruficrus*, *A. nigroaenea*, *A. flavipes*, *A. varians*, *A. chrysocele* and *A. rosae*.

***Nomada facilis* Schwarz, 1967 Hawk's-beard Nomad Bee**

Description & similar species FW 6.5mm (sexes similar). One of a small number of nomads with a complete lack of yellow or white markings on the tergites. Extremely similar to *N. integra* but females can be distinguished by the more extensively black mid and hind femora, shapes of the submarginal cells, more pointed tip of the pygidium, and more subquadrate head. Males share the submarginal cells character, and also differ from *N. integra* in lacking a tooth along the lower edge of the mandibles, and having the sides of the pygidium slightly concave rather than straight.

Variation Little noted though few specimens seen.

Flight season Univoltine, May and June.

Habitat Assorted habitats where yellow hawkish composites such as hawk's-beards, Mouse-ear Hawkweed, hawkbits and Catsear are present. This includes grasslands, old quarries, and in one instance a London garden. More likely to be encountered in calcareous areas than the acid grasslands and heathland sites favoured by *N. integra*.

Flowers visited Greater Celandine noted in Britain.

Status & distribution Added to the British list by Notton & Norman (2017). A male captured in south east London in May 2017 resulted in the checking of several major museum collections revealing scattered old records in southern England north to Gloucestershire, showing it was not a recent colonist. Modern records are few but widespread and also include sites in Oxfordshire and Cambridgeshire.

Host(s) *Andrena fulvago*.



Nomada facilis female and male

***Nomada ferruginata* (Linnaeus, 1767) Yellow-shouldered Nomad Bee**

Description & similar species FW 6.5-8.5mm female, 6-7.5mm male. A medium-sized reddish nomad with females that superficially resemble a large *N. fabriciana* but have bright yellow pronotal tubercles, unbanded antennae and a pair of yellow or orange scutellum spots. The lower face is orange and the labrum usually has a pair of dark spots. The antennae are orange below but brownish above. The sides of tergite 2 and occasionally 3 have small, round yellow spots. Tergite 5 can be partially yellow. Males have considerably more yellow on the tergites than females. The combination of partially yellow pronotal tubercles and entirely black antennal scapes will separate them from other nomads with red and yellow tergites.

Variation In females, the scutellum spots can be yellow or reddish and the yellow mark on tergite 5 can be weak or absent. The orange or yellow markings of the lower face can extend completely around the eyes in some individuals or not at all in others. The dark spots on the labrum can be missing. The pronotal collar can be dark or have small yellow spots. Some males can have black bands across tergites 1-5, in others these bands may be restricted to tergites 4 and 5.

Flight season Univoltine, flying from late March to mid May, peaking with the flowering of sallows and willows.

Habitat A variety of willow-rich habitats, including old quarries, river corridors, woodland rides and heathland.

Flowers visited Grey and Goat Willow, dandelions, Lesser Celandine and Blackcurrant.

Status & distribution Widespread but localised across southern Britain (including Wales) north to the North Norfolk Coast and Lincolnshire side of The Wash. Formerly a rare species (there seem to be no records for it between 1949 and 1987), it has shown a substantial increase this century and is now relatively frequent in East Anglia and Central England though it remains much scarcer than the host. Not recorded from Scotland, Ireland or the Channel Islands.

Host(s) *Andrena praecox*.



Nomada ferruginata female and male

***Nomada flava* Panzer, 1798 Flavous Nomad Bee**

Description & similar species FW 6.5-10mm (sexes similar). Usually the commonest of the large tricoloured nomads (at least in the southern half of Britain), so a useful yardstick for comparing others. In females, the tergites are extensively yellow, usually with the yellow spots of tergite 2 only narrowly separated by red. Tergite 1 has a broad red band but usually lacks any yellow. The scutum is usually obviously red striped, the

scutellum entirely red, and sides of the thorax have a red patch that is sometimes divided into two. The propodeum can be all-black or have small red markings. The hairs on the propodeum, hind coxae and sides of the thorax have a yellowish tint. The lower face is extensively red with markings extending completely around the eyes. The antennal flagella are completely orange usually without any darkening above. The erect hairs of the clypeus and labrum are yellowish without any black ones. Females of *N. panzeri* and *N. glabella* have the erect hairs on the clypeus and labrum black, and silvery hairs on the propodeum, hind coxae and sides of the thorax. They also tend to be smaller, darker and more purple looking. Some forms of *panzeri* can have extensive red markings on the propodeum and the antennal flagella darkened above. Males of *N. flava* average smaller than females with an almost completely black thorax that bears longer reddish-brown hairs (when fresh), and a pair of red scutellum spots can be present. They are often stated to be indistinguishable from *N. panzeri* but large, robust males with a short hair fringe beneath the mid femora (about one-third the width of the femora or less) and dense reddish-brown thoracic hairs will almost certainly be *N. flava*. However, some males cannot be confidently assigned to either *N. flava* or *N. panzeri*.

Variation A notoriously variable species that regularly produces extremes that fall outside of what standard keys can deal with. This includes considerable size variation (undersized example of both sexes are not uncommon), variation in the extent of yellow on the tergites of both sexes, and variation in the extent of red on the female thorax and head. Females with dark scutums (red stripes weak or missing) and much reduced yellow markings on the tergites can occasionally be encountered and are generally undersized. There are also occasional females with a pair of yellow spots on the propodeum (as in *N. signata*) and it would be interesting to sequence such specimens to investigate if any hybridisation with *N. signata* has occurred. Males vary considerably in size, some matching the largest females. They can have the scutellum black or red-spotted, and the pronotal collar can be red or yellow marked (though rarely conspicuously so). Some males are remarkably similar to those of *N. signata* in having very broad, uninterrupted bands on tergites 2-5 but they generally have reddish or brownish (rather than blackish) hind margins to tergites 2 and 3, brownish rather than blackish median axillary sclerite of each wing (the small sclerite immediately beyond the tegula), the yellow markings of the lower face extending further up the inner eye orbits, and a shorter hair fringe below the mid femora (up to about one-third the width of a femur as opposed to the full width of the femur in *N. signata*). Occasionally males with this fringe about half the femoral width are encountered and cannot easily be assigned to either *flava* or *panzeri*.

Flight season Univoltine, typically flying from late March to June, peaking in late spring. Occasionally reported in autumn, possible as a result of soil disturbance e.g. Badger digging.

Habitat Varied, including open and wooded habitats, coastal and inland. It is one of the commoner nomads of farmland, urban settings and woods.

Flowers visited A variety of spring-blossoming shrubs and smaller flowers such as dandelions, Greater Stitchwort, Garlic Mustard, Wood Spurge, Rape, Bluebell, Daisy, forget-me-nots, Green Alkanet and Cow Parsley.

Status & distribution One of the commonest large nomads over much of England and Wales. Recorded from several of the Channel Islands. Added to the Scottish list in 2010 and expected to spread here. Not yet recorded from Ireland.

Host(s) Primarily *Andrena scotica* but possibly also *A. nigroaenea*, *A. pubescens* and *A. ferox*.



Nomada flava female and male

***Nomada flavoguttata* (Kirby, 1802) Little Nomad Bee**

Description & similar species FW 3.5-5.5mm (sexes similar). A small nomad typically with a dark labrum. Females have the tergites extensively red, usually with small yellow spots at the sides of tergites 2 and 3. The scutellum has two red spots, the metanotum is red, and the sides of the thorax have a large red patch that is sometimes divided into two. The scutum has red side margins and often a pair of longitudinal stripes down the middle. The tegulae, pronotal collar and pronotal tubercles are reddish. The propodeum is usually black and has a conspicuous pair of silvery lateral hair patches on the hind face. The lower face is reddish with the markings often extending completely around the eyes. The antennae are orange below but brownish above. Females of *N. conjungens* are similar but larger and slimmer, without patches of silver hairs on the propodeum, and proportionately longer antennae. *N. castellana* is very similar but apparently never has a dark labrum (see that species for more details). Males of *N. flavoguttata* usually have the thorax entirely dark, the lower face yellow, and the tops of the antennal flagella blackish. Tergites 1-3 are often black and red-banded with conspicuous yellow lateral spots on tergites 2 and 3, and smaller ones on tergite 4 and sometimes 5. The legs are more extensively black than females. The mid femora have a short but distinct ventral hair fringe (about one-third the width of the femur). Antennal segment 3 is very short and less than half as long as 4 when viewed from below in contrast to similar looking males of *N. sheppardana* where segments 3 and 4 are of similar length. Males of *N. conjungens* can also look similar but have a yellow labrum, and the hairs below the mid femora are extremely short (about one-quarter the width of an ocellus).

Variation A highly variable species, both in respect of size and pattern. The yellow spots at the sides of tergites 2 and 3 are occasionally missing in females. The extent of red on the the female head and thorax is variable, with red markings completely surrounding the eyes in some individuals but barely in others. A pair of well formed longitudinal stripes can run down the middle of the scutum but are often absent, though a red stripe remains above each wing base. At the other extreme, the reddish scutum stripes can be broader than the intervening black stripes (resembling *N. baccata*), and the propodeum conspicuously red-marked. Both sexes have variable amounts of black on the tergites, and at one extreme well-formed black bands are present on the intermediate tergites, whilst at the other the tergites are almost entirely red except for the yellow spots. Males sometimes have the labrum yellow and could be mistaken for *N. castellana* but lack tubercles on the antennal segments, have a more deeply notched

pygidium, and the scape is usually dark. Males occasionally have a pair of small red scutellum spots. Differences from males of *N. conjungens* have already been outlined above. Size variation in both sexes is substantial with the smallest examples matching (and resembling) *N. sheppardana* whilst the largest ones match typical *N. conjungens*. **Flight season** Bivoltine in many southern areas (like the main host *Andrena minutula*) with a spring generation flying from late March to June and a summer one from late June to September. Almost certainly univoltine in northern and upland areas where *A. subopaca* is being used. At some sites it is suspected that both bivoltine and univoltine populations coexist, and it would be interesting to sequence material of both to see if there is any genetic differences.

Habitat Highly varied, reflecting the various hosts being used but extending to higher altitudes than many nomads when using *A. subopaca*.

Flowers visited Assorted species, including spring-flowering shrubs, composites such as Daisy, dandelions and Cat's-ear, also umbellifers, crucifers, forget-me-nots, speedwells, Wood Spurge, Sheep's-bit and Tormentil.

Status & distribution Common over much of much of Britain including Ireland. Only known on the Channel Islands from an old Jersey record.

Host(s) *Andrena* species of the subgenus *Micrandrena* ('mini-miners') including *Andrena minutula*, *A. semilaevis*, *A. subopaca* and *A. falsifica*.



Nomada flavoguttata female and male

***Nomada flavopicta* (Kirby, 1802) Blunthorn Nomad Bee**

Description & similar species FW 6.5-7.5mm female, 7-8mm male. A medium-sized, boldly black and yellow-marked nomad with antennal flagella almost completely black dorsally (redder below) and two yellow spots on the scutellum. The tegulae, pronotal collar and pronotal tubercles are also bright yellow. The yellow spots on tergites 2 and 3 are widely separated but those on tergite 1 almost touch or narrowly fuse. The hind tibiae lack any apical comb spines. Females have an almost hairless thorax (even the underside), orange legs and an orange lower face. The front coxae are triangular with an apical projection (a feature only otherwise seen in *N. rufipes* and *N. errans*). Males are very similar to females (more so than most nomads) but with a yellow lower face, black bases to the hind and mid femora, and longer hairs on the thorax. The black and yellow form of *N. rufipes* can look similar but averages smaller with a single yellow spot on the scutellum and an entirely black tergite 1. Males of *N. fulvicornis*, *N. subcornuta* and *N. zonata* have a hairier thorax, paler antennae (especially the undersides) and a less pronounced yellow pronotal collar. *N. zonata* also has extensively black hind tibiae.

Variation Minor variation in the extent of the yellow tergite markings.

Flight season Univoltine, flying from late June to mid September.

Habitat Varied, reflecting the preferences of its hosts, though often using *Melitta tricincta* on chalk downland, *M. leporina* on more neutral grasslands and dunes, and *M. haemorrhoidalis* on heathland.

Flowers visited British records include ragworts, thistles, knapweeds, brambles, heathers, scabiouses, Fleabane and umbellifers such as Upright Hedge-parsley.

Status & distribution Patchily distributed in England north to Yorkshire with hotspots of abundance in heathland and downland districts. Rare in Wales where it mostly occurs on dunes, and with one record from southern Scotland. Recorded from Jersey, Guernsey and Alderney on the Channel Islands.

Host(s) The 'blunthorns' *Melitta leporina*, *M. tricincta* and *M. haemorrhoidalis*. There are additional claims for assorted *Andrena* species and *Dasypoda hirtipes* being used but these remain unconfirmed,



Nomada flavopicta female and male

***Nomada fucata* Panzer, 1798 Painted Nomad Bee**

Description & similar species FW 6.5-8mm (sexes similar). A medium-sized, tricoloured species with a black and red banded tergite 1, tergite 2 with a yellow band that is often narrowly interrupted by red or black medially, and more or less complete yellow bands on tergites 3-5. The scutellum of females and most males has a single yellow spot and the scutum and propodeum are black. The tegulae, pronotal tubercles and often the pronotal collar are yellow. Females have the lower face, antennae and most parts of the legs orange though the tibiae are partially yellow (notably the dorsal face of the front tibiae). In males the lower face is yellow, the femora more extensively black and the tibiae and tarsi extensively yellow. They can also have a small yellow patch on the sides of the thorax behind the front coxae, and their antennal flagella usually have a black patch occupying 2-3 segments halfway along the posterior face. The only other tricoloured nomads with a single spot on the scutellum are *N. bifasciata* and the red-marked form of *N. rufipes*. *N. rufipes* has widely separated yellow spots on tergite 2 and mostly dark antennae. *N. bifasciata* females are much darker than those of *fucata* with well separated yellow spots on tergite 2, a dense black hair pile on the head, thorax and propodeum, darker antennae, reddish legs and reddish tegulae. *N. bifasciata* males are very similar but have the hind tibiae almost completely orange (anterior face yellow in *fucata*), sternite 2 reddish (largely yellow in *fucata*), the yellow bands on tergite 2 often broken (rarely so in *fucata*) and the black patch on the antennal flagella larger and usually occupying 4 segments).

Variation Both sexes can have variable amounts of red on tergite 1, and the yellow band of tergite 2 can be interrupted by red in the middle, occasionally widely enough to create a pattern more like tricoloured *N. rufipes*. The summer generation is shorter-haired than the spring one with a greater tendency to have a yellow pronotal collar (both sexes) and a yellow patch on the side of the thorax (males). Summer males occasionally have some yellow on tergite 1 and the antennal flagella entirely orange. Males of both generation can have the yellow scutellum spot reduced or missing. Some spring females have a rather conspicuous black hair pile approaching the state of *N. bifasciata*.

Flight season Bivoltine as per the host, with a spring generation that flies from April to June and a summer one in July and August.

Habitat Various, as for the host but particularly frequent on soft rock cliffs, chalk downland and brownfield sites such as quarries and sandpits.

Flowers visited Records include spring-blossoming shrubs, composites of various sorts, umbellifers (e.g. Wild Carrot), buttercups, Cuckooflower and cinquefoils.

Status & distribution Widespread and locally common in southern England with a recent expansion into the Midlands following a similar expansion of the host. It had reached Yorkshire by 2024. In Wales, most records are for the south coast but it was recently discovered in Denbighshire. Not recorded in Scotland and Ireland. Recorded from several of the Channel Islands and added to the Isles of Scilly list in 2008. It was considered a scarce bee in the last century even in the south but has been one of our most rapidly increasing bees since the turn of the century.

Host(s) *Andrena flavipes*.



Nomada fucata typical female, redder female and male

***Nomada fulvicornis* Fabricius, 1793 Orange-horned Nomad Bee**

Description & similar species FW 7.5-9.5mm female, 7-9mm male. Females sit on the cusp of bicolored (black and yellow) and tricoloured species. They most resemble *N. marshamella* in the field but can usually be distinguished by the reddish haloes to the yellow markings of tergites 1, 2 and sometimes 3 plus the extensively reddish sternites (characteristics shared with the much smaller *N. zonata*). The scutum is entirely black and the scutellum has a pair of bright yellow spots. The pronotal collar and tubercles are yellow and the tegulae are mainly yellow. They differ from the closely related *N. subcornuta* (only recently treated as a separate species) by the presence of yellow markings on tergite 1 (entirely red in *subcornuta*), the more narrowly separated yellow spots on tergite 2, plus various other features (see *N. subcornuta*). Males tend to lack any obvious red on the tergites and closely resemble those of *N. subcornuta* but the

yellow spots on tergite 2 tend to be more narrowly separated and *N. subcornuta* males usually have some red adjacent to the yellow spots on tergite 1. They can also be overlooked as *N. marshamella* but the yellow markings of tergite 1 and the inner eye orbits are more extensive, the tegulae are mainly yellow without any brown markings, and the antennae have a shorter third segment.

Variation Considerable, particularly within females. Those of the spring generation generally have less extensive yellow markings, with the propodeum and sides of the thorax usually completely black. The tibiae and tarsi are entirely orange (the tibiae occasionally yellow at the extreme base), and the tegulae often have some brown in addition to black and yellow. Second generation females often have a pair of yellow marks on the propodeum, yellow and orange patches on the sides of the thorax, larger scutellum and tergite spots (tergite 1 with its spots more frequently fused), yellower tegulae, and more substantially yellow tibiae and sternites. Some subtle variation also exists between populations attacking *Andrena bimaculata* versus those attacking *A. pilipes* but this is not consistent and may be driven by geographic location (and associated climate) rather than host. Females occasionally have the tops of the antennae considerably darkened. Very rarely tergite 1 is red banded without yellow (as in *subcornuta*) and the scutellum has a pair of reddish spots. It is also possible to find females without red haloes on the tergites and these could easily be misidentified as *N. marshamella*. In males, the extent of yellow on the tergites, pronotal collar and scutellum can all vary (scutellum spots can be present or absent) and a yellow spot is occasionally present on the sides of the thorax. Males vary considerably in size and the smallest ones can almost overlap with species such as *N. zonata*. In both sexes, the spring generation has longer hairs on the head and thorax.

Flight season Bivoltine in most parts of its range, with a spring generation that flies from March to May and a second one that usually appears in July and flies until late August. Populations associated with the univoltine *A. tibialis* appear to abandon the second generation but still fly earlier than *N. subcornuta*. It would be interesting to compare the DNA sequences of univoltine and bivoltine populations.

Habitat Heathland and sandy brownfield sites (especially populations associated with *A. bimaculata*), also coastal cliffs (mostly populations associated with *A. pilipes*) and grassy sea banks (especially populations associated with *A. tibialis* on the east coast). Occasionally on chalk grassland and at saltmarsh edge.



Nomada fulvicornis female and male

Flowers visited The spring generation visits willows/sallows, Wild Cherry, spurges, Brassicas, Thrift and Daisy. The summer one uses brambles, thistles, Rosebay Willowherb, Common Ragwort and Goldenrod.

Status & distribution Widespread but very localised in England north to Yorkshire and with a few records for South Wales. Not recorded from Scotland or Ireland. Present on the Channel Island though records need to be checked for *N. subcornuta*.

Host(s) *Andrena bimaculata*, *A. pilipes* and *A. tibialis*.

***Nomada fusca* Schwarz, 1986 Fuscous Nomad Bee**

Description & similar species FW 5.5-7.5mm (limited material see). A member of the challenging *flava-panzeri* complex of species and one of the most difficult British bees to identify. Swedish females (two seen) closely resemble those of *N. glabella* and the darkest examples of *N. panzeri*. The two middle red stripes on the scutum are weak or missing (though weak red stripes usually remain at the sides). The scutellum bears a large red spot. The propodeum is entirely black or with small and inconspicuous red markings. The sides of the thorax have a single red patch placed low. The tegulae, pronotal collar and pronotal tubercles are reddish. The lower face is red with red markings semi-continuously surrounding the eyes. The clypeus and labrum have black outstanding hairs. Tergite 2 has a pair of yellow spots that are separated by about their own width, plus a yellow band across tergite 4 and a mostly yellow tergite 5. Tergite 3 has yellow spots small or missing (as in typical *N. glabella*). Tergites 1-3 have broad black bands across the base and hind margin, with a red band inbetween (allowing for any lateral yellow spots). The sternites are reddish with fairly strong black submarginal setae arising from pits (as in *N. glabella*). The legs are dark red with black bases to the femora. The antennal flagella are brownish and darker than *N. glabella* and *N. panzeri*. The flagella are noticeably longer than *N. glabella* and it has a smaller-headed look due to the less inflated hind corners of the head (when viewed from above). The overall appearance is very dark even compared against *N. glabella* and the darkest *N. panzeri* both of which tend to lack obvious black hind margins to tergites 1-3 or black basal bands on tergites 2 and 3. The other physical differences from both *N. glabella* and *N. panzeri* relate to the tip of the gaster. The pygidium of Swedish females has a dense covering of silvery hairs that extend almost to the margins. In *N. glabella* and *N. panzeri* the hairs are less dense, less silvery, and stop well short of the margins. Additionally, in Swedish *fusca*, the dense hair fringe along the hind margin of tergite 5 is much broader and less defined basally than in *N. glabella* or *N. panzeri*. The complication is that the British female differs from the Swedish material in a number of respects. It is much smaller and slimmer (but may be an undersized example as can occur in many nomads). It lacks any yellow markings on tergites 3 and 4, lacks obvious black bands across the hind margins of tergites 1-3 and lacks an obviously broad hair fringe across the hind margin of tergite 5. The pygidium is largely hidden by tergite 5 so cannot be assessed. Only one male (from Sweden) has been checked and is darker than any male *glabella* or *panzeri* seen to date, with tergites 3 and 4 broadly black along both the fore and hind margins, tergite 1 entirely dark (slightly browner in posterior half), and only obscure reddish markings on tergites 2 and 3. However, some very small and dark *N. leucophthalma* are strikingly similar but have entirely dark scapes (scapes red below in *fusca*), lack scutellum spots and have longer-haired legs. Smit (2018) splits female *fusca* from *flava* and *panzeri* on the basis of antennal segment 3 not being significantly shorter than 4 but this is not reliable. For males, Smit also cites a shorter hair fringe beneath the

hind femora, and longer antennal segments as a distinction from *panzeri* (in addition to darker colour of the tergites) but these also fail using material to hand.

Variation The median pair of red stripes on the female scutum vary from narrow but readily discernible to absent and the propodeum can be black or have some red marks.

Flight period In Sweden males tend to fly in early June for perhaps two weeks whilst females fly through June and July (A. Nilsson – pers. comm.). The peak is thus much later than *N. glabella* or *N. panzeri*, reflecting the later flying host.

Habitat In Sweden it likes the marginal zones and clearings of mixed woodland, often close to settlements, quarries, roads, power lines etc. where spring blossoming shrubs are present, and it avoids the Bilberry-rich forest areas where *N. glabella* occurs (A. Nilsson – pers. comm.). The British site is heathland with abundant Bilberry in some areas (supporting *N. glabella*) but blossoming scrub, brambles and acid grassland in others. *A. fucata* is recorded from this site.

Flowers visited In Sweden, both sexes visit brambles, Raspberry and Alder Buckthorn. Later in the flight period, females will use Mouse-ear Hawkweed, Goldenrod, Wall Lettuce and White Melilot.

Status & distribution Provisionally added to the British list on the basis of a DNA-sequenced female (using mtCO1) taken at Gentleshaw Common, Staffordshire on 3 June 2019 during a study of the *N. panzeri*-*glabella* complex (Falk, Johansson & Paxton, 2022). The Gentleshaw female's sequence was indistinguishable from Fennoscandian *fuscata*, but well outside the ranges of *N. glabella* (which has an identical sequence to *N. leucophthalma*) and *N. panzeri*. Scrutiny of museum collections is required to see if any further evidence of the species in Britain can be found, though to date, all the dark, late flying *panzeri*'s checked seem not to be conspecific with Swedish *glabella* (see below).

Host(s) *Andrena fucata* which, somewhat confusingly, is also attacked in Britain by a dark, late-flying form of *N. panzeri* that rather resembles *fuscata* but varies in various respects such as weaker sternite setae, less even clypeal punctures, and the features of the pygidium and terminal fringe of tergite 5 mentioned above.



Nomada fuscata female and male (Swedish specimens)

Nomada fuscicornis Nylander, 1848 Small Guernsey Nomad Bee

Description & similar species FW 5.5-6mm female, 5-5.5mm male. Females, which are about the size of *N. flavoguttata*, are one of several reddish species lacking yellow markings on the tergites and without any red or yellow spots on the scutellum. They can be separated from the form of *N. fabriciana* without yellow spots on the tergites by the darker antennae and the bluntly-pointed rather than bifid mandible tips. *N. similis* is a larger, redder species with the scutellum clearly depressed in the middle, longer

antennae, redder legs and a discrete patch of silvery hairs on the sides of the thorax. Males resemble females but have ill-defined yellow spots on the sides of tergite 2 and a tuft of long white hairs on the underside of the hind femora at the base.

Variation Not noted.

Flight season Univoltine, flying from July to September.

Habitat On the Channel Islands, coastal heathland, dunes and dry sandy grassland with plentiful hawkish composites for the host.

Flowers visited Foreign records include yellow-flowered hawkish composites (e.g. Autumn Hawkbit), thistles, Common Ragwort, Yarrow and Sheep's-bit.

Status & distribution Only recorded from Jersey and Sark on the Channel Islands but possibly extinct at the former.

Host(s) *Panurgus calcaratus*.



Nomada fuscicornis female and male

***Nomada glabella* sensu Stöckert nec Thomson 1870 Bilberry Nomad Bee**

Description & similar species FW 7.5-8mm female, 5.5-7.5 male. Females are similar to *N. panzeri* but are typically darker with the lateral yellow spots on tergite 2 separated by their own width or more, and any yellow markings on tergite 3 small or missing. The scutum has obvious red stripes and sides. The propodeum usually has small red spots. The sides of the thorax have a large lower spot and smaller upper one. The lower face is reddish and red marks usually surround the eyes. The three best physical characters for separating female *N. glabella* from *N. panzeri* are the relatively shorter antennae, the longer submarginal setae of sternites 2-4 (which arise from obvious pits), and the covering of even-sized punctures on the clypeus. Female material of *N. fusca* from Sweden is similar but even darker with a dense covering of silvery hairs on the pygidium, a broader and less defined fringe of hairs along the hind margin of tergite 5, slightly longer antennal flagella, and one rather than two red spots on the sides of the thorax. Males resemble those of *N. panzeri* but usually have the yellow spots well separated, a pair of red scutellum spots (often missing in *panzeri*), and longer submarginal setae on sternites 2-4). Males of *N. fusca* are much darker with very little red on the tergites. However, very little male material of either male *glabella* or *fusca* has been seen so the limits of their variation are poorly understood.

Variation This mainly relates to the extent of red and yellow markings. Individuals with more extensive yellow on the tergites (more like typical *panzeri*) can occasionally be encountered. One such Dartmoor female also has particularly broad red scutum stripes, unusually large red markings on the propodeum, and very extensive red

markings on the head but features the strong sternite setae of typical *glabella* and was taken in association with *Andrena lapponica*.

Flight season Univoltine, flying from late April to late June, peaking in May in the south and June in the north.

Habitat Bilberry-rich woods and heaths, including Caledonian pine forest in the Highlands.

Flowers visited None noted (Greater Stitchwort, dandelions, willows, Bird Cherry and Rowan almost certainly used in places such as the Cairngorms).

Status & distribution Added to the British list by (Falk, Johansson & Paxton, 2022) following a study of the *panzeri-glabella* complex which showed that it has a sequence that is indistinguishable from *N. leucophthalma* (which also features relatively short antennae and strong sternite setae) but well outside the genetic ranges of *N. panzeri* and *N. fusca*. It occurs widely in the north and west of Britain, also several heathlands in the West Midlands and a site in the West Sussex Weald. It is one of the most frequent nomads of the Cairngorms. The name *glabella* (adopted by Stöckert in Schmiedeknecht 1930 using an 1870 Thomson name) is invalid because the type series of *glabella* at Lund Museum is comprised of several species, and the lectotype selected by by Max Schwarz in 1986 is a typical female *panzeri*. It is probably an undescribed species requiring a new name but this is best done as part of a proper review of the *panzeri* complex across its European or Palaearctic range.

Host(s) *Andrena lapponica*.



Nomada glabella typical female, pale female (both from same nesting aggregation), male

***Nomada goodeniana* (Kirby, 1802) Gooden's Nomad Bee**

Description & similar species FW 7.5-10mm female, 7.5-8.5mm male. A large, boldly-marked, black and yellow nomad with complete yellow bands on tergites 2-5 and often also 1. The scutellum has a pair of yellow spots and the tegulae, pronotal collar and pronotal tubercles are yellow. A pair of yellow spots can also be present on the propodeum and a yellow mark on the metanotum. Females have the lower edge of the clypeus orange and narrow yellow markings alongside the inner eye orbits. The antennae (including the scapes) are usually completely orange. The legs are orange with the femora variably black at the base. The tip of the hind tibiae have two rather stout comb spines that curve towards the tibial prominence, a feature only otherwise seen in *N. fucata*, *N. bifasciata* and *N. succincta*. Males have the lower face and inner eye orbits more broadly yellow than females and the hind face of antennal segments 1-7 blackish. A small yellow mark is usually present at the side of the thorax near the front coxae.

The base of the hind femora beneath and adjacent trochanters have patches of dense adpressed hairs. Over much of Britain, confusion in the field is most likely with *N. marshamella* which has well-separated spots on tergite 2, the spots on tergite 1 small or absent, brownish female tegulae, and no dense patches of golden hairs at the base of the male hind legs below. On the Channel Islands care is required to distinguish it from the very similar *N. succincta* which has more extensive yellow (as opposed to orange) legs, broader yellow bands on the tergites, and a more extensively yellow female face.

Variation Moderate variation in the extent of pale markings on the face, scutellum propodeum, pronotal collar, tergites and sternites. Tergite 1 and more rarely 2 can have narrowly interrupted bands. The yellow propodeal spots can be quite large in the second generation (both male and female) but are typically small or absent in the spring generation. The antennal scape of the female is occasionally black behind, as in *N. succincta*. The labrum is occasionally partially darkened.

Flight season Typically univoltine, flying from April to June but regularly bivoltine in some coastal districts, most probably where it uses *Andrena thoracica*.

Habitat Assorted habitats, both open and wooded, coastal and inland. One of the more frequent nomads of urban and farmland.

Flowers visited Records include various spring-flowering blossoms, yellow composites such as dandelions, also Cow Parsley, Rape, forget-me-nots, Green Alkanet, buttercups, Lesser Celandine, Greater Stitchwort, Bloody Cranesbill, Wood Spurge, White Dead-nettle, Bluebell and Ramsons.

Status & distribution Common throughout much of southern Britain but more localised in Scotland and Ireland. Recorded from most of the Channel Islands.

Host(s) *Andrena nigroaenea*, *A. pubescens* and *A. thoracica*; possibly also *A. scotica* to a small extent.



Nomada goodeniana female and male

Nomada guttulata Schenck, 1861 Short-spined Nomad Bee

Description & similar species FW 5.5-6mm (sexes similar). Females are rather small and reddish with small lateral creamy-yellow spots on tergites 2-4, a red-striped scutum, and red markings on the lower face that extend around the eyes. The relatively short mandibles have bluntly rounded or even squared-off tips like *N. striata*. Indeed, they are very easily overlooked as small *N. striata* but the 3-4 comb spines at the end of the hind tibiae take the form of tiny black blunt projections arranged in such a tight row that they look almost like a single black appendage (unique to this species). There are also two patches of rather conspicuous long silvery hairs on the hind face of the propodeum (*N. striata* has only short hairs here). Females of *N. alboguttata* also look very similar but

have pointed mandibles, orange antennal scapes and more bristly legs. Males closely resemble small individuals of *N. striata* but have a longer third antennal segment, more extensively black hind femora, and yellow markings of the lower face not extending so far up the inner eye orbits.

Variation Minor variation in the extent of yellow and red body markings.

Flight season Univoltine, flying in May and June.

Habitat Quite varied as per the host, including open woodland, unimproved grassland, vegetated shingle, gardens and churchyards (especially where flowers such as Germander Speedwell, forget-me-nots and Daisy are present).

Flowers visited Germander Speedwell, Daisy, dandelions, buttercups and Silverweed.

Status & distribution Scattered records across southern and central England north to Shropshire and north Norfolk. Recently discovered in South Wales. It seems to be increasing in areas such as the Midlands, though like the host, it seems to exist at very low population levels and can be hard to detect. Not recorded from Scotland or Ireland.

Host(s) *Andrena labiata*.



Nomada guttulata female and male

***Nomada hirtipes* Pérez, 1884 Long-horned Nomad Bee**

Description & similar species FW 6.5-8mm (sexes similar). Females are one of several medium-sized reddish nomads with a red-striped scutum, red markings on the lower face that extend around the eyes, and well separated yellow spots on the sides of tergite 2. Those spots are especially round and often longer than broad. The build is also relatively slim and long-legged and the antennae unusually long for a female nomad. Under a microscope, the antennal flagella will be seen to have outstanding hairs on the dorsal and posterior surfaces that are much longer and sparser than the tiny ones of the anterior and ventral surfaces (a feature unique to both sexes of this nomad but requiring a good microscope to discern). *N. glabella* and darker *N. panzeri* can look similar but have shorter legs and antennae, the lateral spots of tergite 2 wider and more triangular, and there are no outstanding hairs on the antennae; *N. striata* females have squared off mandible tips and a stockier, shorter-legged build. Males of *N. hirtipes* have a dark, rather furry thorax, more extensive yellow markings on the tergites than females, a yellow lower face and darker antennae. The antennal scapes are yellow below and the flagella unusually long. The hair fringe beneath the mid femora is shorter than *N. panzeri* but much longer than *N. conjungens*. Males of *N. ferruginata* can look similar but have partially yellow pronotal tubercles, entirely black antennal scapes, no outstanding hairs on the antennal flagella, and a longer hair fringe below the mid femora.

Variation Minor variation in the extent of red and yellow markings in both sexes.

Flight season Univoltine, flying from late April to mid June.

Habitat Quite varied, like the host but including south-facing scrubby grassland slopes, old cuttings and quarries, even churchyards. The host forages heavily on Hawthorn.

Flowers visited Field Maple, Cow Parsley, dandelions, Wild Strawberry, Cypress Spurge and Cuckooflower.

Status & distribution A patchy distribution across southern and central England from Devon to Kent and north to Derbyshire with hotspots in areas such as the Cotswolds, West Midlands and Avon, but unrecorded from East Anglia and rare in the East Midlands. Scarce in Wales. Not recorded from Scotland, Ireland or the Channel Islands.

Host(s) *Andrena bucephala*.



Nomada hirtipes female and male

***Nomada integra* Brullé, 1832 Catsear Nomad Bee**

Description & similar species FW 6-7mm (sexes similar). One of several nomads with a complete lack of yellow or white markings on the tergites. Females have the tergites extensively red with a black base to tergite 1, black patches at the sides of tergites 2 and 3, and a black band around the base of 4 which tends to show through the translucent apical margin of 3. The thorax is black apart from a pair of red spots on the scutellum, reddish tegulae, pronotal collar and pronotal tubercles. The face is black except for the mandibles and lower edge of the clypeus, and the antennal flagella are reddish with some darkening above. The mandibles are bluntly rounded. *N. facilis*, which was only recently discovered in Britain, is extremely similar but has the second and third submarginal cells of the wings more triangular, darker femora, a more pointed tip to the pygidium, and a more subquadrate head (with the hind corners more inflated) when viewed from above. Females of *N. argentata* have a red patch on the sides of the thorax, patches of silvery hairs on the sides of the gaster, hind femora less densely punctate below at their base, and a shinier scutum with more discrete punctures. Females of the two Channel Island species *N. fuscicornis* and *N. similis* have the scutellum entirely black. Males resemble females (more so than most nomads) but have sharp projections on the hind face of antennal segments 6-10 and a hairier thorax. The hind femora have the undersides densely white-haired. They are very similar to the males of *N. facilis* but the mandibles have a small tooth on the lower surface just beyond the middle, the hind femora are more extensively red, and the pygidium has the side edges straight rather than concave.

Variation Both sexes show variation in the amount of black on the tergites, legs antennal scapes and also the size of the scutellum spots, which can be missing in some males. The female labrum can be black or partly red.

Flight season Univoltine, flying from May to July.

Habitat Typically heathland, acid grassland and coastal cliff-top grassland. The host requires plentiful yellow-flowered composites such as Catsear and Mouse-ear Hawkweed.

Flowers visited Yellow-flowered composites such as Catsear, hawk's-beards and dandelions, also buttercups and mouse-ears.

Status & distribution Widespread but localised in England north to Yorkshire. Rare in Wales and not recorded from Scotland and Ireland. Only recorded from Sark on the Channel Islands.

Host(s) *Andrena humilis*.



Nomada integra female and male

***Nomada lathburiana* (Kirby, 1802) Lathbury's Nomad Bee**

Description & similar species FW 7-9mm female, 7.5-9mm male. A large and robust, tricoloured nomad. Fresh females are readily recognised by the reddish pile on top of the thorax (this can fade in old individuals) and the red-haloed yellow spots on the scutellum. The scutum, propodeum and sides of the thorax are black. The lower face is broadly reddish with markings extending thinly to the top of the eyes but not normally extending further around the eyes. The pronotal tubercles are yellow and a red mark is present on the sides of the thorax immediately behind the front coxae. Tergite 1 has a broad red band between the black base and black hind margin. Tergites 2 and 3 have yellow bands which can be interrupted by red in the middle. Males have yellow face markings, darker antennae, and can have small scutellum spots. The tergite markings can resemble those of *N. signata*. Fortunately, they are easily distinguished from other tricoloured nomads by the presence of a sharp projection on the hind face of antennal segments 4-13.

Variation Both sexes show variation in the extent of the scutellum and head markings. Females can have variable amounts of red on tergites 2 and 3. Dwarf females with wing lengths as short as 6.5mm are occasionally encountered. The scutellum spots are occasionally entirely red. Males can have the scutellum spots orange, entirely yellow or missing but they are never particularly conspicuous. The palest males can have a yellow band across tergite 1, a yellow pronotal collar, fully yellow tegulae (brown in darker males), paler antennal tips, and more extensive yellow on the tibiae.

Flight season Univoltine, flying from April to July (occasionally into August), peaking in late spring.

Habitat Usually associated with large host colonies on gorse-clad hillsides, sandy heathland paths, cliff-top grassland, and sandpits. Occasionally found in urban greenspace (e.g. municipal parks) and gardens.

Flowers visited Various spring-blossoming shrubs and flowers such as dandelions, Germander Speedwell, forget-me-nots, Wood Spurge, Gooseberry and Marsh Marigold.

Status & distribution Widespread but patchily distributed in Britain north to Co. Durham and locally common some districts e.g. the Cotswolds and West Midlands with substantial increases in some areas. It was regarded as a great rarity in Victorian times. Not recorded from Scotland or Ireland. Recorded from several of the Channel Islands.

Host(s) *Andrena cineraria* and *A. vaga*.



Nomada lathburiana female and male

***Nomada leucophthalma* (Kirby, 1802) Early Nomad Bee**

Description & similar species FW 7-9mm female, 6.5-8.5mm male. A tricoloured nomad resembling a dark *N. flava* or *N. panzeri* with the scutum, propodeum and sides of thorax completely black. Females have a reddish band across tergite 1, yellow spots on the sides of tergites 2 (usually separated by much less than their own width), and yellow bands across tergites 3- 5 (those on tergite 3 often divided into spots by red). Black bands occur across the bases of tergites 2-5 which show through the translucent hind margins of the previous segment giving the impression of dark hind margins. The scutellum has a pair of reddish spots (often fused) and the tegulae, pronotal tubercles, extreme lower face and sometimes the pronotal collar are also reddish. A small red spot is present adjacent to the top of each eye. The antennal flagella are noticeably shorter and darker than species such as *N. flava* and *N. panzeri* (but like *N. glabella*). The scapes are mainly black but usually with limited red markings below. The thorax has a rather dense pile of dark brown hairs. The legs are rather dark with distinct black bristly hairs. Sternites 2-4 have relatively strong black submarginal setae (as in *N. glabella*). *N. fusca* (Swedish material) resembles *N. leucophthalma* in many respects but has less yellow on the tergites, a red spot on the sides of the thorax, longer antennae and less hairy legs (both sexes of *leucophthalma* have the legs longer-haired than other similar tricoloured species). Males of *N. leucophthalma* typically have more extensive yellow on the tergites than females (often complete bands on tergites 2 and 3) with brown and yellow marks on tergite 1 and brownish-black bands across the hind margins of tergites 2-4. The thorax has a rather dense greyish pile. The scutellum is entirely black. The

antennae are blackish above but reddish beneath. They can resemble small dark males of *N. signata* but these have an orange underside to the scapes and shorter haired legs.

Variation Some variation in the extent of yellow, black and red/brown markings on the tergites, whether the female scutellum spots are separate or fused, also the extent of black on the antennal scape of the female. The palest males can have tergite markings approaching those seen in *N. signata*. The darkest look more like *N. fusca* but lack scutellum spots and have hairier legs. Else & Edwards (2018) mention Scottish females with red-striped scutums. These may represent *N. glabella*.

Flight season Early March to late May, peaking later in the north. The first nomad to appear in many districts.

Habitat Various, including open woodland, brownfield sites of various sorts (especially old sandpits), heathland, and moorland edge. The host bees require plentiful sallows.

Flowers visited Sallows and other willows, dandelions, Coltsfoot, forget-me-nots, Bilberry and Barren Strawberry.

Status & distribution Widespread and locally common but rather patchily distributed in southern Britain (inexplicably scarce in counties such as Avon, Wiltshire, Essex and Cambridgeshire). Less frequent in the north but with records extending to East Ross. Scarce in Ireland. Only recorded from Jersey on the Channel Islands.

Host(s) *Andrena clarkella* and *A. apicata*.



Nomada leucophthalma female and male

Nomada marshamella (Kirby, 1802) Marsham's Nomad Bee

Description & similar species FW 7-9.5mm (sexes similar). Typically a large boldly black and yellow patterned species with the spots on tergite 2 clearly but narrowly separated with rather squared off inner edges. Females usually have a pair of yellow spots on the scutellum, orange tegulae, a yellow pronotal collar and yellow pronotal tubercles. The lower face is reddish but the inner eye orbits black. The antennae are completely orange. The legs are mostly orange with partially black femora. Tergite 1 usually has a pair of small yellow spots. Males are similar but have a yellow lower face, often partially yellow tegulae, partially black antennal scapes and the antennal flagella variably darkened on top. They often lack scutellum spots. The fringe beneath the mid femora is almost as long as the femoral width. In the field, *N. marshamella* could be confused with a number of other boldly marked species, so vigilance is needed. Both sexes resemble *N. goodeniana* but this has a complete yellow band on tergite 2, larger yellow markings on tergite 1 and, in females, mostly yellow tegulae. Females of *N. fulvicornis* have larger red-haloed markings on tergites 1 (and red-haloed spots on tergite 2) plus mostly yellow tegulae. Males of *N. fulvicornis* have the yellow markings

of tergite 1 and along the inner eye orbits more extensive, the tegulae yellow without any brown markings, and the antennae have a shorter third segment. Males of *N. zonata* resemble small *marshamella* males but have extensively black hind tibiae and a very short fringe under the mid femora (hairs only about half the width of an ocellus).

Variation The extent of yellow on the tergites varies. Tergite 2 can have the spots partially fused and the spots on tergite 1 are often tiny or missing. Some females have orange scutellum spots. The second generation has shorter hairs on the thorax than the first. Males can have the tegulae entirely brown or partially yellow. The darkening on the dorsal face of their antennal flagella may be restricted to the first few segments or extend the full length. They can occasionally have extensively darkened hind tibiae which could result in confusion with *N. zonata*, but the much longer hair fringe beneath the mid femora of *marshamella* provides a ready distinction.

Flight season Univoltine in most areas, flying from April to June (peaking later in the north) but with a second generation in some southern areas that flies in July and August. This seems to mostly coincide with sites where the bivoltine *Andrena trimmerana* is common. There are also occasional autumn sightings.

Habitat Assorted habitats, both open and wooded, coastal and inland. One of the more frequent nomads of urban settings and farmland.

Flowers visited A wide variety of spring and early summer-flowering shrubs plus flowers such as dandelions, Daisy, ragworts, thistles, Hemp-agrimony, umbellifers (e.g. Cow Parsley and Hogweed), Rape, Cuckooflower, forget-me-nots, Bloody Cranesbill, Bluebell and Three-cornered Garlic.

Status & distribution Widespread and common over much of Britain extending north to Ross and Cromarty and the Inner Hebrides. Probably the commonest nomad in Ireland. Not recorded from the Channel Islands.

Host(s) *Andrena scotica*, *A. trimmerana* and possibly *A. rosae* and *A. ferox*.



Nomada marshamella female and male

***Nomada obtusifrons* Nylander, 1848 Flat-ridged Nomad Bee**

Description & similar species FW 5.5mm (sexes similar). A small, dumpy species easily recognised in both sexes by the large, flat-topped ridge between the antennae (unique to this species). Females have the head and thorax almost entirely black and brownish antennae with redder undersides. The scutum is rather shiny with distinct punctures. The gaster is predominantly red with a black subterminal band and a creamy-white tergite 5. Small lateral creamy-white spots are present on tergites 2-4. Males are generally much darker with wedge-shaped creamy-white markings on the sides of

tergites 2 and 3 and usually cream-coloured pronotal tubercles and sometimes collar. The labrum is dark and they could be overlooked as *N. flavoguttata* but have a shinier scutum and rather shorter antennae with segment 3 longer than 4.

Variation Females are fairly constant but males have very variable amounts of red on the tergites and can resemble females at one extreme or be almost entirely black with cream tergite spots at the other. The darkest ones tend to have a black pronotal collar.

Flight season Univoltine, flying from late June to late August and occasionally September.

Habitat Usually open woodland, scrubby grassland and heathland edge in base-poor districts.

Flowers visited Tormentil, brambles, thistles, Sheep's-bit, Oxeye Daisy, Common Ragwort, Goldenrod, Nipplewort, Smooth Hawksbeard and Wild Angelica.

Status & distribution A scarce species with scattered records across England, Wales, Scotland and Ireland, though relatively few of these are modern suggesting a serious decline particularly within England. It seems to occur at very low population levels at a site. Not recorded from the Channel Islands.

Host(s) Typically *Andrena coitana* but possibly *A. tarsata* at some Scottish sites.



Nomada obtusifrons female (P. Saunders) and male

***Nomada panzeri* Lepelletier, 1841 Panzer's Nomad Bee**

Description & similar species FW 6.5-9mm female, 6-8mm male. Separating this from related species such as *N. flava*, *N. glabella* and *N. fusca* can be one of the biggest challenges in British bee identification, and is not helped by the considerable variation within some of these species. Females typically resemble a small, dark *N. flava* with less extensive yellow markings on the tergites and darker wing margins. The hairs on propodeum, hind coxae and sides of the thorax are silvery without a hint of yellow. The long, erect hairs of the clypeus and labrum are black rather than yellow. The antennae have the apical segments slightly infuscated above (entirely orange in *N. flava*). The propodeum can have extensive red markings in many (rarely extensive in *N. flava*). In the field, they tend to look darker and more purple than *N. flava* with the exception of the large, bright form attacking *Andrena fulva* (see under variation). Males are often stated to be indistinguishable from *N. flava* but small, slim *flava/panzeri* males with a long hair fringe beneath the hind femora (hairs as long as the femoral width or more) will almost certainly be *N. panzeri* (but beware *glabella* males in habitats with Bilberry) However, a small proportion of males are impossible to confidently assign to *flava* or *panzeri*. *N. ruficornis* can look superficially similar in the field but its bifid mandibles

allow easy separation and females have much longer hairs on the propodeum and sides of the thorax. Females of *N. panzeri* can be separated from those of *N. glabella* by the longer antennae, much weaker submarginal setae of sternites 1-4 (which do not arise from obvious pits), and the less evenly sized punctures on the clypeus (the punctures becoming larger towards the top). Most *panzeri* females tend to have more yellow on the tergites than *glabella* (notably on tergite 3) but there is some overlap between the two so this must not be used as a basis for a record. *N. fusca* is darker than even the darkest *panzeri* but there is still more to learn about the limits of that species, though Swedish *fusca* females have a dense covering of silvery hairs on the pygidium, a much broader and less well defined fringe of short white hairs along the hind margin of tergite 5, longer submarginal setae on the sternites, and more evenly-sized punctures on the clypeus. Females of *N. hirtipes* resemble a slim dark *panzeri* but have longer antennal flagella (featuring sparse semi-erect hairs on the dorsal and posterior surfaces), rounder spots on tergite 2, and longer legs with narrower tarsal segments.

Variation Considerable variation in the extent of the yellow markings on the tergites, also the amount of red on the female thorax, scutum and head. Some of this variation can be assigned to what appear to be several host races that were first described by Richards (1946). The propodeum can be completely black in some females but with extensive red markings (occupying about 50% of the propodeum hind surface) in others. Population attacking *Andrena helvola* and *A. synadelpha* are regarded as most typical



Nomada panzeri typical female (top left), typical male (top right), dark *Andrena fucata*-associated form (bottom left) and large redder *Andrena fulva*-associated form (bottom right)

and mid-range in appearance. They average smaller and darker than *N. flava* with more red on the tergites. The form of attacking *Andrena fulva* averages almost as large as *N. flava*, has the broadest scutum stripes, the most red on the head, sides of the thorax and propodeum, and the most extensive yellow (and least black) on the tergites. A late-peaking form associated with *A. fucata* averages the darkest, with scutum stripes generally weak (the middle pair sometimes missing), the propodeum entirely black, just a single low-placed red spot on the sides of the thorax, and markings on the tergites often resembling *glabella*. These had been considered possible *fusca* specimens but differ in having weaker submarginal setae on the sternites plus differences relating to the pygidium and tergite 5 as described earlier. Males vary considerably in size and the amount of yellow on the tergites (and the extent to which yellow tergite bands become divided into spots). They can have the scutellum black or red-spotted, and the pronotal collar can have red or yellow marks (though rarely conspicuously so). More information on the various forms of *N. panzeri* and the distinctions of *N. glabella* are provided by Falk, Johansson, & Paxton (1922). The ‘dark form’ of *panzeri* discussed in Falk & Lewington (2015) and featured as a photo on page 343 represents *N. glabella*.

Flight season Univoltine, flying from late March into June and occasionally July, peaking later in the north and where *A. fucata* is the host.

Habitat Various habitats are exploited but it is much more frequent in woods than *N. flava*, often thriving in woodland (using *A. helvola* and *A. synadelpha*). On heathland it tends to be associated with *A. synadelpha* or *A. fulva*. On southern chalk downland it seems to be associated largely with *A. varians*.

Flowers visited Various, including spring-blossoming shrubs, Greater Stitchwort, dandelions, forget-me-nots, Wood Spurge and Cow Parsley.

Status & distribution Frequent throughout much of Britain and Ireland (often the commonest woodland nomad) and recorded from several of the Channel Islands.

Host(s) Various spring-flying mining bees of the subgenus *Andrena*, namely *A. fucata*, *A. fulva*, *A. helvola*, *A. synadelpha* and *A. varians*. Formerly regarded as using *A. lapponica* but that seems to be attacked solely by *N. glabella*.

***Nomada roberjeotiana* Panzer, 1799 Tormentil Nomad Bee**

Description & similar species FW 5.5-6.5mm (sexes similar). A small, dumpy species with a unique pattern of black, red and creamy-white markings. In females, the scutellum, metanotum, tegulae, pronotal collar, pronotal tubercles and lower face are red. The antennae are reddish with a darker upperside to the flagella, and segments 3 and 4 are of a similar length. A red band crosses the base of the gaster and creamy-white spots are present on the sides of tergite 2-4 and covering much of 5. The scutum and propodeum are entirely black and the body hairs mostly minute. Males have the tegulae, pronotal collar, pronotal tubercles, greater part of the face and underside of the antennal scapes creamy-yellow. Tergites 4 and 5 have creamy-white lateral streaks. The antennae are unusually short for a male nomad.

Variation Some variation in the cream spots of the tergites which may be missing or highly reduced on tergite 4, and paired or fused on tergite 5.

Flight season Univoltine, flying from late June to late August.

Habitat Various tormentil-rich habitats, including woodland rides, heathland and moorland edge.

Flowers visited Tormentil and occasionally ragworts.

Status & distribution Old records are scattered thinly across moorland and heathland districts of England, Wales and south west Scotland, but modern records are very few

and mostly from the west of England, Wales and Scotland. Not recorded from Ireland or the Channel Islands. There is some dispute over the name of this taxon, with populations attacking *A. tarsata* increasingly considered to represent *N. tormentillae* which was formerly treated as a subspecies of *roberjeotiana* but is treated as a full species in the recent European checklist (Ghisbain et al, 2023). The true *roberjeotiana* apparently attacks *A. denticulata*.

Host(s) *Andrena tarsata*.



Nomada roberjeotiana female (P. Saunders) and male

***Nomada ruficornis* (Linnaeus, 1758) Fork-jawed Nomad Bee**

Description & similar species FW 7-8.5mm female, 6.5-8mm male. A medium-sized, tricoloured nomad that is not easily distinguishable from *N. panzeri* or *N. flava* in the field but can be readily separated under magnification (including a hand lens in the field) by the bifid tips to the mandibles, a feature only otherwise seen in the much darker *N. fabriciana*. The details of the female body markings are much as for *N. panzeri* (with the yellow tergite markings usually less extensive than *N. flava*), though females have longer hairs on the sides of the thorax and propodeum plus a slightly stockier build. Males are patterned much as in *N. flava* and *N. panzeri*.

Variation Some variation in the extent of yellow markings on the tergites, which are sometimes missing from tergite 3 of the female, also the extent of red markings on the head and thorax of the female. Males can have a complete band on tergite 2 or one that is narrowly broken medially. They sometimes have yellow markings on tergite 1, and the scape can be red below or occasionally entirely black.

Flight season Univoltine, flying from April to June and occasionally July.

Habitat Like the host, a variety of habitats are used including open woodland, heathland, scrubby grasslands, brownfield sites, farmland and occasionally gardens.

Flowers visited A variety of spring-blossoming shrubs plus flowers such as dandelions, Daisy, Greater Stitchwort, Hogweed, Green Alkanet and forget-me-nots.

Status & distribution Common throughout much of southern Britain. Widespread but scarcer in Scotland and Ireland. Recorded from Jersey and Sark on the Channel Islands.

Host(s) *Andrena haemorrhoea*.



Nomada ruficornis female and male

***Nomada rufipes* Fabricius, 1793 Black-horned Nomad Bee**

Description & similar species FW 5-7mm (sexes similar). A medium-small nomad, the only one with a single yellow spot on the scutellum combined with almost entirely black antennal flagella. It can have a bold black and creamy-yellow pattern or a tricoloured pattern with much of the black of the tergites replaced by red (the tricoloured form apparently unique to the British Isles). Tergites 2 and 3 have well-separated, rather triangular yellow spots. The tegulae, pronotal collar and pronotal tubercles are yellow, and a yellow spot is present on the sides of the thorax. Females usually have the lower face and often the first three antennal segments orange. The legs are mostly orange with black femoral bases. The pygidium is dark. Males have the lower face yellow and more yellow on the legs. The base of the hind femora beneath and adjacent trochanters have patches of dense adpressed hairs. The front coxae have an apical projection (a feature only otherwise seen in *N. flavopicta* and *N. errans*). The pygidium is dark with a rounded or truncate tip. *N. errans* closely resembles a small example of the black and yellow form of *rufipes* but has paler antennae, tergite 4 mostly black, and creamy-white body markings. Some females of *N. fucata* can also approach the tricoloured form of *N. rufipes* in appearance but have orange antennae.

Variation The main variation is the replacement of black markings on the tergites by red (especially in females), and this shows a gradation that at its extreme results in a mostly red and yellow gaster. Further variation can affect the markings of the face (some females can have an almost entirely black face) and the amount of black or yellow on the legs. The 3rd antennal segment of both sexes can be red or dark. The pygidium is usually dark but is occasionally partially red. Dwarfs with wing lengths as short as 4mm are occasionally encountered.

Flight season Univoltine, flying from July to September, with heathland populations peaking with the blossoming of Ling.

Habitat Most frequent on heathland in association with *Andrena fuscipes*, though it can occur in other habitats such as chalk downland and brownfield sites in association with *A. denticulata* and *A. nigriceps*.

Flowers visited Common Ragwort, heathers, thistles, Thyme, Wild Parsnip, Sheep's-bit, thistles, Yarrow, hawkbits and Common Fleabane.

Status & distribution Frequent in southern heathland districts of England and Wales, becoming scarcer in the north, with only a few Scottish records. Widespread but scarce in Ireland. Recorded from several of the Channel Islands.

Host(s) Primarily members of the subgenus *Cnemiandrena* i.e. *Andrena fuscipes* (clearly the main British host), *A. denticulata*, *A. nigriceps* and *A. simillima*; possibly also *A. nitidiuscula* in places such as Salisbury Plain.



Nomada rufipes female (tricoloured example) and male (black and yellow example)

***Nomada sexfasciata* Panzer, 1799 Six-banded Nomad Bee**

Description & similar species FW 9-10mm (sexes similar). A large and robust, black and yellow nomad with well separated paired spots on tergites 1-3 and a pair of yellow scutellum spots (obvious in females but often smaller or missing in males). The scutum, propodeum and pronotal collar are always black. The most unusual feature of this species is the inflated and produced lower face and relatively wide malar gap between the bottom of the eyes and mandible bases. Females have the antennal flagella mostly orange, at most slightly darkened above apically, and with the orange scapes variably darkened above. The thorax and entire propodeum is covered with a particularly long and dense pile of straw coloured hairs. The apex of the hind tibiae has a dense brush of many yellowish hairs instead of the usual comb spines. Males resemble females and can match their size but have the lower face more extensively yellow, black markings on the dorsal face of antennal segments 3-8, and the scapes black and yellow.

Variation Minor variation in the extent of the yellow markings (some males lack scutellum spots); also size with the largest females qualifying as our biggest nomads, though many are no larger than typical *N. goodeniana* or *N. marshamella*.

Flight season Univoltine, flying from late May to July and occasionally early August.



Nomada sexfasciata female and male

Habitat Historical records include heathland and woodland rides though today it is confined to soft rock cliffs. Legume-rich habitats are vital for the host.

Flowers visited Bloody Cranesbill, sowthistles and Kidney Vetch.

Status & distribution Always a rarity but with old records scattered across southern England and South Wales north to Somerset and Norfolk. Today it is seemingly confined to a short stretch of South Devon coastline. Not recorded from Scotland, Ireland or the Channel Islands.

Host(s) *Eucera longicornis* and on the continent *E. nigrescens*.

***Nomada sheppardana* (Kirby, 1802) Sheppard's Nomad Bee**

Description & similar species FW 3.5-4mm (sexes similar). Britain's smallest nomad bee (only the smallest *N. flavoguttata* can match it). Females are one of a small number of species lacking any yellow markings on the tergites. They have a pair of red spots on the scutellum, a large red patch on the sides of the thorax, red tegulae, pronotal collar, pronotal tubercles and metanotum. The lower face (including labrum) is red with markings usually extending semi-continuously around the eyes. The antennae are largely brownish with redder undersides and a pale final segment. The scutum and propodeum are black but the latter has conspicuous lateral patches of silvery hairs, as do the sides of the thorax. The gaster is blackish with ill-defined reddish bands across tergites 1 and 2. Males are generally very blackish with small yellow spots (sometimes divided) on the sides of tergite 2-4, and often weak brownish bands across tergite 1 and 2. The labrum is usually yellow or orange at the sides and black down the middle. The undersides of the hind femora have a patch of very dense whitish hairs in the basal half. In both sexes, to be certain you have not got a dwarf *N. flavoguttatata*, check that antennal segments 3 and 4 are about the same length in top view (segment 3 much shorter than 4 in *N. flavoguttata*).

Variation Very dark males are almost entirely black except for small yellow markings on the tergites.

Flight season Univoltine, flying between late April and late July.

Habitat Often the edge of woodland and scrub in the vicinity of host nesting areas along banks and footpaths.

Flowers visited British records include Catsear, Daisy, Barren Strawberry and a spurge.

Status & distribution Recorded widely in the southern half of Britain, including Wales, as far north as Shropshire and Lincolnshire and with one isolated record in



Nomada sheppardana female and male (both images K. McGee)

Yorkshire. Rarely seen in any numbers and seemingly much declined. Only one old Irish record. Not recorded from Scotland. Old records from the Channel Islands.

Host(s) *Lasioglossum* species, possibly including *L. morio*, *L. parvulum*, *L. nitidiusculum* and *L. villosulum*.

***Nomada signata* Jurine, 1807 Broad-banded Nomad Bee**

Description & similar species FW 8-9.5mm female, 7.5-9.5mm male. The *N. flava*-sized females have exceptionally broad and straight-sided yellow bands on tergites 2-4 and a pair of conspicuous yellow patches (sometimes divided) on the propodeum, a unique combination within the large tricoloured nomads with red-striped scutums. The scutellum is usually entirely red. A pair of red patches are present on the sides of the thorax. Tergite 1 has black base and hind margin with a red band inbetween containing a pair of yellow spots that are sometimes fused. The red markings of the lower face usually extend around the eyes. The antennae are completely orange. The pronotal tubercles are largely yellow. Males also have straight-sided yellow bands on tergites 2-4 but the thorax is black except for two reddish scutellum spots. Their antennae are darkened on top and the yellow markings of the lower face barely extend up the inner eye orbits (in contrast to male *N. flava*). The antennal scapes are reddish below. Some males of *N. leucophthalma* can look very similar but have the antennal scapes completely black and the legs are longer-haired than in *signata*. Similar-looking *N. flava* males have the yellow markings of the lower face extending halfway up the inner orbits, the dark hind margins of tergites 3 and 4 brown rather than black, and a reddish rather than blackish median axillary sclerite immediately beyond the wing tegula. Males of *N. lathburiana* can also have almost identical tergite markings but have sharp projection on the rear face of the antennal flagella.

Variation In females, the yellow marks of the propodeum and red markings of the head and thorax can vary in extent. The two middle scutum stripes are occasionally missing. Males can have tergite 1 entirely dark brown or with yellow and reddish markings and a pair of black spots. Small males can lack scutellum spots.

Flight season Univoltine, flying from early April to late May.

Habitat Assorted open habitats as per the host.

Flowers visited Dandelions, sallow and Wood Spurge.



Nomada signata female and male

Status & distribution A scarce bee with records scattered widely across southern Britain (including Wales) north to Shropshire. Not recorded from Scotland or Ireland. Old records from the Channel Islands. Much declined in some areas but showing local recovery and expansion in others. It has always been much rarer than its host.

Host(s) *Andrena fulva*, which it shares with a large form of *N. panzeri*, the two nomads sometimes occurring together at a site.

***Nomada similis* Morawitz, 1872 Guernsey Nomad Bee**

Description & similar species FW 6.5-7mm female, 6-6.5mm male. Females, which are about the size of *N. fabriciana*, are one of several reddish species lacking yellow markings on the tergites and without any red or yellow spots on the scutellum. They can be separated from the form of *N. fabriciana* without yellow spots on the tergites by the dark antennal flagella and the bluntly-pointed rather than bifid mandible tips. *N. fuscicornis* is a smaller, darker species with the scutellum evenly convex (depressed centrally in *N. similis*), shorter antennae, darker legs and sparser punctures on the top of the thorax. *N. similis* also has patch of dense silvery hairs placed low on the sides of the thorax. Males resemble females but have ill-defined yellow spots on the sides of tergite 2 and a tuft of long white hairs on the underside of the hind femora at the base.

Variation Not noted.

Flight season Univoltine, flying from late June to September.

Habitat On the Channel Islands, coastal heathland, dunes and dry sandy grassland with plentiful hawkish composites (e.g. Cat's-ear and Mouse-ear Hawkweed) for the host.

Flowers visited Foreign records include yellow-flowered hawkish composites, thistles, Tormentil and Sheep's-bit.

Status & distribution Only recorded from Jersey, Guernsey and Sark on the Channel Islands but possibly extinct at the first. Unknown from the British mainland or Ireland.

Host(s) *Panurgus banksianus*.



Nomada similis female and male

***Nomada striata* Fabricius, 1793 Blunt-jawed Nomad Bee**

Description & similar species FW 6-7.5mm female, 5.5-7.5mm male. Females are one of several medium-sized, reddish nomads with a red-striped scutum, red markings on the lower face that extend around the eyes, and well separated yellow spots on the sides of tergite 2. The mandibles have squared-off tips which allows separation from all species except *N. guttulata*, but the comb spines at the tip of the hind tibiae are much longer and more widely spaced in *N. striata* and it averages larger. Female *N.*

alboguttata looks similar to a small *N. striata* in the field but has pointed mandibles and 'bear-clawed' hind tibial comb spines. Males also have the unusual mandible shape and can be separated from *N. guttulata* males by the shorter third antennal segment, more extensive yellow markings along the inner eye orbits, a much larger apical shiny zone on the underside of the hind femora, and tendency to have partially red antennal scapes. **Variation** Both sexes show variation in the precise extent of the red or yellow markings on the head and thorax and the extent of black and yellow on the tergites. The extent of red on the male antennal scapes is variable and they can be narrowly but continuously red below to entirely black. The male scutellum can have the two red scutellum spots fused into one.

Flight season Univoltine, flying from mid May to July (occasionally August), peaking in June.

Habitat Legume-rich grasslands, heathland and open woodland. The host particularly likes sites with plentiful bird's-foot-trefoils and clovers.

Flowers visited Buttercups, various yellow composites, heathers, White Bryony, Wood Spurge, Germander Speedwell, Bogbean, Raspberry, Wood Avens and bird's-foot-trefoils.

Status & distribution Widespread but local throughout England, scarcer in Wales, Scotland and Ireland. Only recorded from Sark on the Channel Islands.

Host(s) *Andrena wilkella*.



Nomada striata female and male

***Nomada subcornuta* (Kirby, 1802) Kirby's Nomad Bee**

Description & similar species FW 9-10mm female, 8.5-9.5mm male. Closely related to *N. fulvicornis* and regarded as just a variant of it until recently. However, females of *N. subcornuta* are typically larger, have a pair of red patches (often fused) but no yellow on tergite 1, and the yellow spots of tergites 2 and 3 are more widely separated. The central projection of the labrum is usually smaller and the sternites are mostly red with little if any yellow. Males are also typically larger than *N. fulvicornis*, have the yellow spots on tergite 1 haloed by red, and the spots on tergites 2 and 3 are more widely separated (creating a pattern not unlike the smaller, shorter-haired *N. flavopicta*). DNA finally confirmed that *subcornuta* and *fulvicornis* are distinct species (Falk, Jukes & Paxton, 2017) following a period of conjecture.

Variation The female propodeum usually has a pair of red spots but these can be missing in some or replaced by larger yellow spots in others. Females from Jersey show the latter state and also have the yellow spots of tergite 2 less widely separated than the

mainland form. Males show minor variation in the extent of the yellow markings on tergites 1-4 and the scutellum.

Flight season Univoltine, flying from mid April (but usually May) until mid July (females persisting later than males), peaking between the two generation of *N. fulvicornis* which is typically a bivoltine species.

Habitat Sandy habitats such as heathland, sandy arable margins and sandy brownfield sites; also soft rock cliffs in Jersey but rarely at coastal sites on the mainland.

Flowers visited Bramble is the only species noted.

Status & distribution Scattered records in southern England north to Staffordshire and an old record for Gwynedd, Wales; also Jersey and Guernsey on the Channel Islands. Not recorded from Scotland or Ireland.

Host(s) *Andrena nigrospina* on mainland Britain but possibly *A. agilissima* on Jersey (a purported host for '*fulvicornis*' on the continent).



Nomada subcornuta female and male

***Nomada succincta* Panzer, 1798 Yellow-legged Nomad Bee**

Description & similar species FW 8-10mm female, 8-9mm male. Closely resembling *N. goodeniana* but females have two or three large yellow patches on the face (depending on whether the clypeus is yellow marked), the femora more extensively black, and the tibiae and tarsi mostly yellow (where they would be orange in *N. goodeniana*). The antennal scapes are black above (entirely or mainly orange in most *N. goodeniana*). The yellow bands on the tergites are broader, making for a paler-looking nomad in the field. A pair of large yellow spots can be present on the propodeum. Males are even more similar to *N. goodeniana* but have the tibiae and tarsi almost completely yellow, and a dark mark on the posterior face of the hind tibiae, and the hind femora more extensively black, and slightly broader yellow bands on the tergites, with that of tergite 1 often broad throughout with little narrowing medially.

Variation Some variation in the extent of yellow markings on the tergites, thorax, propodeum and face.

Flight season Univoltine, flying from April to June.

Habitat In Jersey found on a soft rock cliff.

Flowers visited On the Channel Islands it has been recorded on Cat's-ear, Smooth Sowthistle and Sea Campion.

Status & distribution Only recorded from the Channel Islands (Jersey and Guernsey). Quite common in the Netherlands and Belgium so a species with a strong likelihood of turning up in south east England.

Host(s) Probably *Andrena nigroaenea* on the Channel Islands, though *A. nitida* is apparently also attacked on the continent.



Nomada succincta female and male

***Nomada zonata* Panzer, 1798 Variable Nomad Bee**

Description & similar species FW 5.5-7mm female, 5.5-6.5mm male. A medium-small nomad (about the same size as *N. rufipes*) with tricoloured females that are remarkably variable. They have a black scutum, two reddish or yellow (haloed by red) spots on the scutellum (sometimes fused into one), brown or orange tegulae, and yellow or reddish pronotal tubercles. The propodeum can be dark or have small red or yellow markings. Tergite 1 has a black base and hind margin with a red band between, sometimes with two yellow spots within the red band. Tergites 2-4 are black with lateral yellow spots, those on 2 usually haloed with red at their inner ends which may be divided by black in the middle. The yellow spots on tergite 3 are usually more widely separated than those on 2 and 4 and again have red haloes at their inner end. The lower face and inner eye orbits are broadly red, and red or orange markings can completely surround the eyes. The tops of the antennal flagella are typically reddish on segments 2-6 and dark on 7-11 with the last segment conspicuously yellowish, rather reminiscent of *N. fabriciana* or *N. armata*. The legs are dark red with partially black femora. The posterior face of the hind tibiae are partially or extensively black. The sternites are usually entirely reddish. The only other female nomads with large yellow tergite markings haloed by red are *N. fulvicornis* and *N. subcornuta* but these average much larger, lack black markings on the hind tibiae, lack a yellowish final antennal segment, and typically have two clearly defined yellow scutellum spots. Males have a yellow lower face, tegulae and pronotal tubercles. The yellow tibiae are all conspicuously black-marked, with the posterior and anterior faces of the hind pair extensively black. The antennal flagella are blackish above and antennal segment 3 is clearly shorter than 5 in front view. The scutellum and pronotal collar are usually black. They typically lack any red on the tergites and can resemble male *N. rufipes* (which has a single bright yellow scutellum spot) or a very small *N. marshamella* (which has antennal segment 3 about as long as 4 in front view and orange hind tibiae that have any dark markings poorly formed and diffuse). Where a pair of yellow spots is present on tergite 1 of male *zonata*, these tend to be very closely approximated along the midline in contrast to the more separated spots of *marshamella*. **Variation** A highly variable species as indicated above. Females can have one or two scutellum spots and these can be yellow, orange or reddish. A pair of red or yellow spots can be present on the propodeum or absent. The pronotal tubercles vary from yellow to orange and the antennal flagella are variably darkened. There is also

considerable variation in the extent of yellow and red markings on the tergites and head, with tergite 1 with two bold yellow spots at one extreme and red-banded with no yellow spots at the other. Most males have a black and yellow gaster but a few have more obvious brownish markings on tergite 1, either towards the hind margin or at the sides. The scutellum can have two yellow spots or none. The pair of yellow spots on tergite 1 can be fused into a single large patch. The summer generation is more prone than the spring generation to produce individuals with yellow scutellum spots, oversized yellow markings on tergite 1, and females with some yellow on the sternites.

Flight season Bivoltine, the first generation flying mostly in April and May and the second from late June to August.

Habitat No strong preferences with records for assorted grasslands, woodland, heathland, brownfield sites and urban greenspace.

Flowers visited Recorded on brambles and ragworts in Britain but it will use flowers from a variety of families on the continent.

Status & distribution Discovered on Jersey in 2011 (T. Ransom) and in Kent in 2016 (Kirby-Lambert, 2016). It has since shown a remarkable rate of expansion, reaching Warwickshire by 2021 and Lancashire by 2023.

Host(s) *Andrena dorsata*.



Nomada zonata darker female, paler female and male

Horizon scanning – the potential next additions

This section lists additional Netherland (N) and Belgium (B) species from Nieuwenhuijsen & Peeters (2015) plus updates and Drossart et. al. (2019). They can be keyed out using the former publication plus Smit (2018). Some of the main distinctions from similar British species are described below. Species prefixed with an asterisk have non-British hosts and are unlikely to be found in Britain unless their hosts colonise. Images and more information for these species can be obtained from websites such as *Nomada Belgique* (Atlas Hymenoptera), the BOLD website, the GBIF website, Flickr (being careful to screen for inaccurate identifications) and iNaturalist (ditto). Fairly detailed descriptions are furnished by Smit (2018) though these rarely describe intraspecific variation (which can be considerable even within a single country) or highlight differences between very similar species.

**Nomada atroscutellaris* (N, discovered 2021). Female Group A, Male Group C?. Females resemble *N. flavoguttata* but with antennal segment 3 only slightly shorter than 4. Gaster is reddish without yellow markings. Labrum is black with a red margin, impunctate basally. Tip of hind tibiae with two short spines in addition to a long bristle. Males are similar with longer hairs on the thorax and legs almost black. The hind femora are slightly excavated with a thin hair tuft. Host(s) *Andrena viridescens*.

**Nomada braunsiana* (N, discovered 2019, B - extinct). Female Group E, Male Group E. A *ruficornis*-sized species. Females have narrow red stripes on the scutum, an entirely red scutellum, red tegulae, pronotal collar and pronotal tubercles. Red spots are present on the sides of the thorax. The tergites are red with a black base to tergite 1 and small lateral yellow spots on tergites 2-4 (largest on 2, sometimes missing on others?). The best distinguishing feature is the very shiny scutellum with widely spaced punctures. The lower face is red with markings not fully surrounding the eyes. The labrum has a large triangular tooth towards the apex. The mandibles are blunt but not truncate. Antennal segment 3 is as long as 4. The tip of the hind tibiae have a rounded, disc-shaped knob with 4-5 short, straight, reddish comb spines. Males are similar but have a darker, hairier thorax, antennal segments 5-10 with tubercles below, and labrum with a large tooth as per the female. Host(s): Possibly *Andrena pandellei* and *A. curvungula*.

Nomada distinguenda (N – rare with few recent records, B – endangered). Female Group A, Male Group B? Resembling *N. sheppardana* (small with no yellow markings on the female tergites) but with antennal segment 3 about 1.5 times as long as 4. Females have a smooth shiny median area on sternite 5. Males have small yellow lateral markings on tergites 2-6. The pygidium is deeply notched. Host(s): *Lasioglossum villosulum*.

Nomada emarginata (N – very rare, B - extinct). Female Group B/D, Male Group A/D. A short-haired, rather stocky nomad closely resembling *N. flavopicta* in size and appearance and sharing with it the presence of a projection at the tip of the front coxae, and a lack of comb spines at the tip of the hind tibiae. However, the projection of the front coxae is shorter than in *flavopicta*, and the tip of the hind tibiae is rounded without the shallow indentation seen in *flavopicta*. The pronotal collar is more deeply pinched medially and the antennal flagella are paler on the undersides and the basal segments of the upperside. In both sexes there is a tendency for some of the black markings on the

tergites to become replaced by reddish ones or for reddish markings to halve the black ones (like *N. zonata* and *N. flavopicta*). Host(s): *Melitta haemorrhoidalis*. Very rare and declined on the near continent.

Nomada femoralis (N - rare, B - vulnerable). Female Group A, Male Group C. Resembling a large *N. facilis* and *N. integra* but averaging as large as *N. ruficornis/pleurosticta*. The base of the labrum of both sexes is broadly shining and lacking punctures (all the others have the labrum entirely punctured) and with a large median tooth towards apex. Tergite 1 is broadly black basally. Black spots can be present at the sides of tergite 2 and 3. Tergites 4 and 5 can have black bases that create the impression of a black hind margin to the preceding tergite. The antennal flagella are reddish, becoming darker towards tip but with a paler final segment, and the scape is completely black and contrasting strongly with the orange base of the flagella. The hind basitarsi are black and contrast with the red tibiae and subsequent tarsal segments. Males have the front femora uniquely broadened into a ventral flange that bears an angulated projection basally. Host(s): *Andrena humilis* and possibly *A. fulvago*.

Nomada furva (N – extinct? B - endangered). Female Group A, Male Group E. Closely resembling *N. sheppardana* but with antennal segment 4 slightly longer than 3 (segment 3 no longer than 4 in *sheppardana*) and the tip of the hind tibiae with two spines in addition to a long bristle (*sheppardana* only has one spine). Host(s): *Lasioglossum morio*, *L. leucopus*, *L. punctatissimum*.

Nomada melathoracica (N - rare, B - extinct). Female Group B, Male Group A. Closely allied to *N. fulvicornis* but with yellow markings on the tergites more extensive (the spots on tergite 2 sometimes fused) and without any red haloes, and the third antennal segment almost as long as the fourth. The female propodeum has a large yellow rectangular patch on each side of the hind face (as in *N. mutica* and some *N. fulvicornis*). Males resemble females but have a hairier thorax and often lack spots on the propodeum and side of the thorax. Host(s): *Andrena agilissima*. An outside chance of turning up on the Channel Islands (where *N. subcornuta* currently appears to be attacking *A. agilissima*) but seemingly rare in northern France.

Nomada moeschieri (N – very rare). Female Group E, Males Group E. Both sexes have bifid mandible tips and resemble *N. ruficornis* though the yellow markings on tergites typically are less extensive. The best character is the hind tibial comb spines. Each tibia has one thick, dark, peg-like comb spine angled outwards (*N. ruficornis* has several even-sized, straight comb spines). The outward appearance is also similar to *N. striata* and the sternites are red without yellow markings. Some good images are available from iNaturalist. Host(s): possibly *Andrena haemorrhoa*.

****Nomada mutabilis*** (N - extinct, B - extinct). Female Group A, Male Group C. Size of *N. ruficornis*. Females have a deep red gaster lacking yellow marks, a dark scutum (but sometimes bearing inconspicuous red stripes), red legs, tegulae, pronotal tubercles and pronotal collar. The scutellum can have two red spots but these are often fused into one. The labrum is dark and has a median tooth beyond the middle. The antennae have a dark scape and a flagellum that is reddish basally, becoming progressively darker on the dorsal side, with an orange final segment (as in species such as *zonata*). Antennal segments 5-8 are longer than wide and segment 3 is about the same length as 4. The propodeum is dark with dense patches of silvery hairs on each side of the hind face. The

tip of the hind tibiae have two short, stout comb spines at (often hard to spot amongst the dense hairs). The labrum has a tooth near the bottom rather than in the middle. The underside of the male hind femora has a concavity in the basal third covered with dense golden hairs that becomes longer towards the base. Males can have yellow lateral spots on tergites 2-5, and tergite 6 can have a large yellow patch but this seems to depend on the part of the range, and some males do not feature such markings. Host(s): *Andrena chrysopyga*.

Nomada mutica (N – very rare, B – critically endangered). Female Group B, Male Group A. A very distinctive *ruficornis*-sized nomad with yellow tergites bearing a narrow black hind margin, also a dark base to tergite 1. Females have a single large yellow spot on the scutellum. The propodeum has a pair of large yellow patches on either side of the midline and two yellow patches are present on the sides of the thorax. The head has the lower face and inner eye orbits yellow and a separate bold yellow stripe on the occiput behind the eyes. The legs are entirely reddish. The yellow markings on tergite 1 can be divided along the midline and haloed with red. The antennae are unusually long for a female nomad (as in *conjungens* or *hirtipes*) with a flagella that is reddish basally but progressively darker above towards the tip. Males are similar but have a much hairier thorax and often lack yellow markings on the scutellum, propodeum, sides of the thorax and pronotal collar. Their pygidium is deeply incised apically. Host(s): *Andrena ferox*. It would be difficult to overlook this striking nomad.

Nomada obscura (N – rare, highlands, B – least concern). Female Group C/D, Male Group A. Females are *fabriciana/zonata*-sized with a black scutum, reddish tegulae, propodeal tubercles, legs (except black femoral bases) and paired scutellum spots. The tergites are black with well-separated creamy-white spots on tergites 2 and 3, often with narrow bands of red between. Tergite 4 usually has a pair of narrowly separated creamy-white bars, and tergite 5 is almost completely creamy-white. A pair of red spots can be present on tergite 1. The mandibles are dark and bifid. The labrum is partly darkened. The overall appearance is best described as resembling a rather dark *N. leucophthalma* with white rather than yellow tergite spots. Males differ from all other species with bifid mandibles by having whitish lateral spots on otherwise dark tergites. Some good images are available on Flickr (e.g. Bernhard Jacobi). Host(s): *Andrena ruficrus*. Not so rare on the near continent but the British host populations are so distant from those on the continent that the chances of colonisation here are remote.

****Nomada opaca*** (N – scarce but widespread, B - endangered). Female Group E, Male Group E. Females have bifid mandibles and would be difficult to distinguish from *N. ruficornis* (or *N. glabella*) in the field but sternite 5 lacks the deep median trough of *N. ruficornis* and there are only 2-4 comb spines (and few accompanying long hairs) at the tip of the hind tibiae (*N. ruficornis* has many long hairs amongst which there are about 4 thin comb spines). Males can distinguished from those of *ruficornis* using the same comb spine character. Host(s): *Nomada fulvida* (non-British).

****Nomada piccioliana*** (N - extinct, B – critically endangered). Female Group E, Male Group A/E? A *zonata*-sized species with narrow red scutum stripes, red spots on the scutellum (sometimes fused), red tegulae, pronotal tubercles and pronotal collar, a red-marked metanotum and a large red patch on each side of the thorax. The tergites are mostly red with a black base to tergite 1 and to a variable extent on the other tergites where they tend to underly the hind margins of the preceding tergite creating the

impression of a dark hind margin. Small lateral yellow spots are present on tergites 2 and 3, two yellow bars on tergite 4, and tergite 5 mostly yellow. The thorax is relatively short-haired like *zonata*. There are two patches of silvery hairs on the hind face of the propodeum. Males have two yellow scutellum spots, antennal segment 3 only about one-third the length of 4, and a pygidium that is barely if at all notched apically. The tergites are more extensively yellow than the females (more like *zonata*). Host(s): *Andrena combinata* (non-British)

Nomada pleurosticta (N – rare, B - extinct). Female Group A, Male Group B. Closely resembling *N. integra* (which is named *N. pleurosticta* in older British literature) and *N. facilis* but averaging much larger (about the size of *N. ruficornis*) and with straighter comb spines at the tip of the hind tibiae. The mandibles have a tooth along the lower edge (like *N. integra*) and males have pointed projections below antennal segments 5-10. The hind femora of the males are densely hairy beneath in the basal half. Their antennae are relatively long compared with *N. integra* and *N. facilis*. Host(s): *Nomada polita* so worth looking out for in Kent but extremely rare on the near continent.

Nomada rhenana (N – extinct, B - extinct). Female Group A, Male Group E? A *fabriciana/zonata*-sized nomad with mainly red tergites lacking any yellow markings. The labrum is entirely red (in contrast to *N. integra* and *N. facilis*) and punctured throughout. Males are tricoloured but with red dominant over yellow. Host(s): *Andrena ovatula*. Very rare on the near continent.

Nomada stigma (N – rare, B – fairly widespread). Female Group A, Male Group C. Another nomad with red tergites lacking yellow markings. Females are about the size of *N. ruficornis* and have an unusually broad fringe of hairs along the hind margin of tergite 5. The scutum is dark but can have inconspicuous red stripes. The top of the scutellum is relatively flat and shiny with sparse large punctures unlike other similar species where there are two pronounced humps and the surface is usually much duller. The tip of the hind tibiae have several long fine comb spines. The labrum can be entirely red or partly dark. Males have relatively short antennae with pointed projections beneath the flagellar segments 5-8 or 5-9. Antennal segment 3 is much shorter than 4 in males but segments 3 and 4 are of a similar length in females (Smit, 2018). Host(s): *Andrena labialis* and the non-British *A. schencki*.

Nomada villosa (N - rare, B - Endangered). Female Group E, Male Group C. Closely allied to *N. striata* and with the same squared-off mandible tips but averaging slightly larger. Females have much denser punctures on the scutellum and more restricted red markings on the head and thorax (with narrower red patches around the eyes, and narrower stripes on the scutum). The propodeum has longer hairs on the sides of the hind face. Males have a more densely punctate scutum and scutellum than *striata*. The scape is entirely black. Host(s): *Andrena lathyri* which is probably extinct in Britain.

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