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## On the nomenclature of two sibling species of the *Andrena tibialis* (Kirby, 1802) group (Hymenoptera, Apoidea)

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Two closely related species of *Andrena*, widely distributed in central and north-western Europe, have long been confused under the names *carbonaria* (a mis-identification of *Apis carbonaria* L., 1767) or *pilipes* (*Andrena pilipes* F., 1781). For immediate purposes they may be distinguished by a readily observable character of the males: species  $\alpha$  with the penis valves broad (Figs 1, 3–5), species  $\beta$  with the penis valves slender (Figs 2, 6–8). More recently, they have been recognized as distinct by such authors as Pittioni (1943: 13, 14), F. K. Stöckhert (1954: 23) and Kocourek (1966), under the names *nigrospina* (*Andrena nigrospina* Thomson, 1872) and *carbonaria*, and by Dylewska (1987: 397–398, 433–436) under the names *carbonaria* (application reversed) and *pilipes*. (E. Stöckhert (1930: 907–908, 957) had treated *nigrospina* simply as a variety of *carbonaria*.) Dylewska gave for the first time structural characters that went beyond the few, small, superficial differences noted by her predecessors (proportions of antennal segments in males, colour of vestiture), who had emphasized particularly the differences in flight periods of the generations. The characters given by Dylewska are adequate for distinguishing the males but less satisfactory for distinguishing the females, which in fact cannot always be separated with confidence. It is unfortunate, therefore, that of the available names for the two sibling species, seven are based on females and that, of these, type material of two is no longer extant, type material of one is in very bad condition, and types of two others are abnormal examples, one a considerably altered stylized specimen, the other a colour variant.

It has been known to the present author for many years that both species occur in southern England, where they are widely distributed and apparently not uncommon. They are probably represented in most larger collections, and it is strange that they were not distinguished either by Saunders (1882, 1896) or by Perkins (1919). While their distinctness at species level was readily apparent, the question which of the available names should properly be applied to them (if, indeed, names were available for both) remained undecided. Descriptions and drawings referred to correspondents on the Continent, if not entirely ignored, elicited no useful information.

The present preliminary note represents an attempt to assign names to the forms of the '*carbonaria*' group occurring in central and northern Europe by, chiefly, a process of elimination: it does not deal with other forms of this complex occurring in southern Europe and the Balkans (for example, Greek populations, possibly specifically distinct, in which the female scopa is entirely black and the third antennal segment in the male is longer than the fourth) for which more abundant material than is immediately available would be required. The following names, taken in chronological order, must be considered.

### The names

- Apis riparia* Scopoli, 1763: 301, pl. 43, fig. 802; [♀]; in floribus *Erysimi barbareae*, prope litus fluvii Idriae [Slovenja, on the Idrijca, probably near Idrija, one of Scopoli's favoured localities]. Given by Rogenhofer & Dalla Torre (1881: 602) as a synonym of '*Andrena pilipes* (Fabr.) 1775 = *A. carbonaria* (Christ) 1791'. Both siblings occur in this area, both visit *Erysimum* (*Barbarea vulgaris*), Scopoli's description and figure are equivocal, and type material is lost: **nomen dubium**.
- Apis pilipes* F., 1781: 474; [♀]; in Italia. *D. Allioni*. Zimsen (1964: 412) recorded three specimens in the Kiel collection. Warncke (1970: 31) designated a lectotype, but the designation hardly met ICZN requirements ('Lectotypus (Kopenhagen) mit einem hand-geschriebenen Zettel "*pilipes*"'), nothing was said about the paralectotypes, and, further, this author did not recognize the composite nature of the species that he referred to as '*carbonaria*'. Through the courtesy of Dr Petersen it has been possible to examine the specimen labelled by Warncke as lectotype. It is a ♀ in very poor condition, extensively damaged by *Anthrenus* (eyes, part of the vertex, and all head appendages apart from the mandibles destroyed), and mould growth; leg I. II alone is intact. The wings ('*alis fuscus*') are only lightly clouded, probably owing to fading. It appears to be a spring generation specimen of the species treated by Dylewska as *pilipes*, i.e. β, but, given the state of preservation of the specimen, this cannot be certain. In the circumstances it may seem best to treat *pilipes* F., 1781, as a **nomen dubium**.
- Apis* (*Andrena*) *ciliata* Gmelin, 1790: 2792 [♀]; Italia. Referred to '*carbonaria*' by Warncke (1970: 29) but was a typographical error for [*Andrena*] *circulata* F., 1781, = *Amegilla circulata* (F.): cf. Dalla Torre, 1896: 263. **A chimaera**.
- [*Andrena carbonaria* (L.), F., 1793: 312; misidentification. Dylewska (1987: 435) treats *Andrena carbonaria* F. as a validly proposed name, but it is no more than a misidentification of the taxon '*Apis carbonaria atra alis coerulescenti fuscis*. Linn. Syst. nat. 2. 954. 7' (reference as given by Fabricius) and no more valid than other names, also of Linnaean species, similarly referenced by Fabricius in the same work, e.g., *Andrena heluola*, p. 310, *A. zonata*, p. 311.]
- Andrena aterrima* Panzer, 1799: (64) 19; [♀]; Austria. Type material lost, identity uncertain (both α and β occur in the area where Panzer's material, received from Megerle, was probably collected), and validity dependent on generic identity of *Apis aterrima* Christ, 1791. Identified by Peets (1910: 42) with '*Andrena carbonaria* L.' **Nomen dubium**.
- Nomada nigrita* Panzer, 1800: (78) 20; ♂; Germania. Junior secondary homonym of *Andrena nigrita* F., 1775. **Non-available name**.
- [*Andrena atra* Smith, 1847: 1734. This was not a newly described species but a (probable) misidentification of *Apis atra* Schrank, 1781, which, irrespective of identity, is a junior primary homonym of *Apis atra* Scopoli, 1763 (= ? *cineraria* L.) and of *Apis atra* Müller, 1776, identified by Warncke (1967: 253) with '*A. carbonaria* ssp. *praetexta* Sm.']
- Andrena spectabilis* Smith, 1853: 105; ♀; Albania. Described from several specimens ('legs usually black, or dark rufo-piceous'), and with virtual certainty

from a series collected by Sir Sidney Smith Saunders and preserved in his collection or that of his cousin W. W. Saunders (both collections now in University Museum, Oxford): cf., e.g., *Andrena nigrifrons* and *A. concinna* Smith, p. 106, from the same source. A ♀ in the Natural History Museum, London, labelled 'Andr. 326. ♀ (Alb<sup>mini</sup>)' (S. S. Saunders' hand) and '*spectabilis*. Type Sm' (Smith's hand), B.M. Type Hym. 17 a 1299, is here designated as LECTOTYPE of *spectabilis*. A second ♀ in the same collection, labelled 'St Thos nr Prev' (typeset; 'Prev' = Previsa, Albania, now Préveza (Greece: Ipiros), Sir Sidney Saunders' address at the time) and '*spectabilis*. Sm (Albania)', from Edward Saunders' collection, has been labelled as a paralectotype. The penis valves in *spectabilis* are slender as in β, and the taxon is treated by Dylewska (1987: 434) as a synonym of that species (under the name *pilipes*). *A. spectabilis* is a comparatively densely punctate form, with usually conspicuous metasomal fasciae (the dark hairs of the marginal areas increasingly replaced by white laterad), of south-east Europe, extending north-west through Hungary to southern Slovakia (Štúrovo (Kocourek, 1966: 820)) and eastern Austria (Niederösterreich: Oberweiden (Pittioni & Schmidt, 1943: 14)), and in the two last-named areas sympatric with 'normal' β (area of overlap or intergradation). **Available name.**

*Andrena elongata* Radoszkowsky, 1871: 197; ♀; Astrabad. Synonymized with *spectabilis* by Warncke (1967: 268), but its description does not apply to '*carbonaria*' and the taxon is in any event a junior primary homonym of *Andrena elongata* Imhof, 1834. **Non-available name.**

*Andrena praetexta* Smith, 1872: 106; ♀; South Devon, High Peak. Holotype ♀ UMO (Smith Collection). The holotype, labelled 'Sid', was taken by Smith at High Peak, near Sidmouth, in August 1871. Smith took at the same time a series of females of what he recorded as '*pilipes*'. Four of these, with identical labels 'Sid', survive in his collection. Apart from the colour of the pubescence, the type of *praetexta* does not differ from the other females; all were in similar, fresh, condition when collected, and the colours of *praetexta* (not as striking as Smith's description suggests) were not, therefore, a result of fading, although all the specimens are now somewhat faded. All five females may, in the writer's opinion, be referred to species β (males with penis valves narrow). **Available name.**

*Andrena nigrospina* Thomson, 1872: 80; ♀; Sällsynt; funen på Gualöfs sandfält i Skåne. Through the courtesy of Dr Danielssen it has been possible to examine the holotype. It is, as Aurivillius suggested (1903: 203), and as Valkeila confirmed (*in litt.*, 8 April 1960), a stylopized specimen: typical hollows of *Stylops* females are evident between terga 3 and 4 (right side) and 4 and 5 (left side), partly filled with fine sand. In addition to the holotype, a short series of quasi-topotypical specimens, including two males, one unfortunately lacking the metasoma, has been examined. The intact male labelled 'OG<sub>N</sub>' [Östergötland, N... ?] and 'En[igt]. Aurivill. i bref = *carbonaria*', has been dissected. All specimens may be referred to species α. **Available name.**

*Andrena carbonaria* var. *claripennis* Friese, 1922: 210; ♂♀; Jena, Weissenfels. Mecklenburg, Siders. Type material not examined (MNHUB). **Available name.**

*Andrena carbonaria* var. *autumnalis* [sic, for *autumnalis*] Friese, 1922: 210; ♀; Schwerin. Type material not examined (MNHUB). Available name.

*Andrena carbonaria iliensis* Alfken, 1938: 108; ♀♂; holotype ♀ [Sardegna:] Belvi. Type material not examined: holotype probably extant in MNHUB (Alfken Collection), paratypes Bremen (possibly now in MNHUB), Genova and Hedicke Collection (MNHUB?). Name available if Sardinian populations separable, but specific identity not yet resolved. Grünwaldt (1976: 268–269) applies the name to specimens of '*carbonaria*', with a black scopa, from Nauplion and Monemvasia, 'extrem warme Biotope' (4 ♀, 165 other ♀ from 23 localities throughout Greece having the scopa normally coloured), and to similarly coloured females from Corsica, Sicily and Morocco (Oukaimeden). Grünwaldt's implied suggestion that *iliensis* (while employed by him as a subspecific name) is a temperature-induced form of southern localities may be correct, but the small size of Alfken's specimens (♀ 11.5 mm, ♂ 9.5–11.0 mm) suggests rather that *iliensis* is an insular form of restricted habitat. Series of females with black scopa from Messinia (Methone, within fortifications of old town; N. shore of Ormos Navarinou, on beach near Palaiokastron; all 13.vii.1976 (Cambridge Morea Exped.) and Kriti (Iraklion, Mallia, beach 1 km N. of town, at *Eryngium* aff. *maritimum*, 30.vi.1976 (CME)) are all of normal size. Males associated with these (at Methone) have the penis valves slender as in β (Fig. 8) but antennal segment 3 as long as or longer than 4 (Fig. 20): the status of this population remains uncertain.

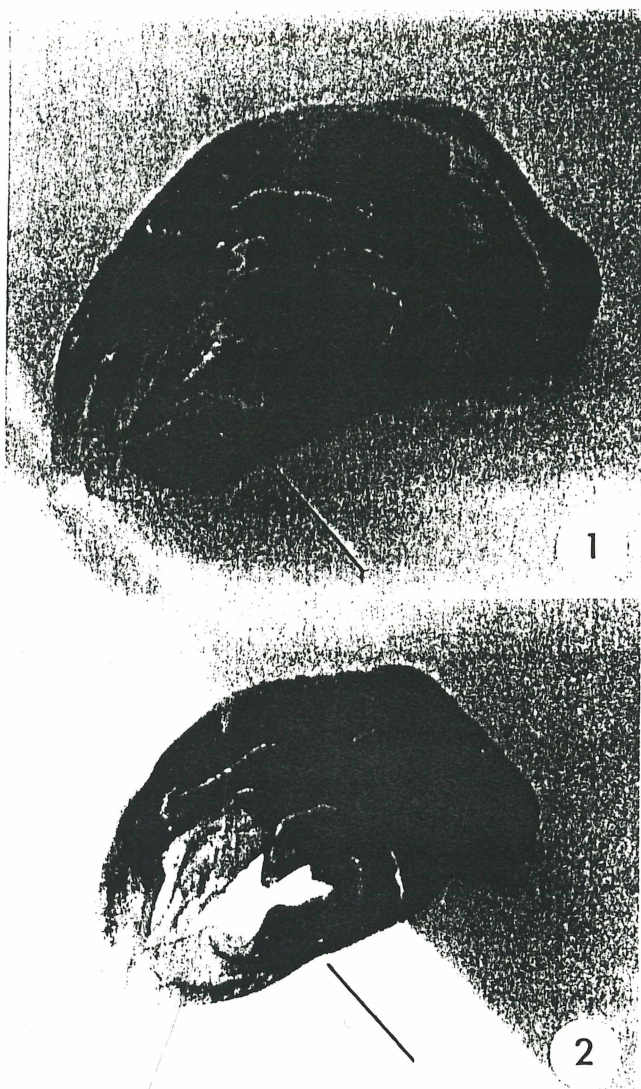
It is clear that, ignoring for the present the later names proposed by Alfken and Friese, and following Dylewska in regarding *spectabilis* as conspecific with '*pilipes*', the names *nigrospina* (= α) and *spectabilis* (= β) may provisionally be used for the two forms occurring in Britain and much of NW. Europe.

### Separation of the species

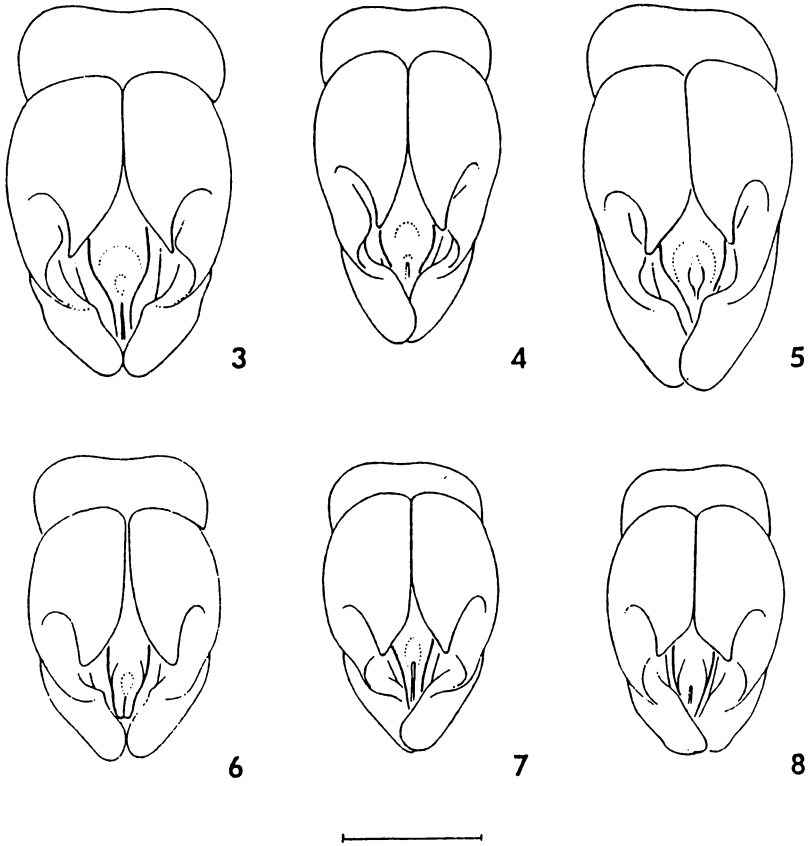
♂. 3rd antennal segment usually shorter in proportion to 4th (Figs 9–11, 15, 16), middle segments longer in proportion to their breadth. Genital capsule (Figs 3–5) relatively large, penis valves as broad as or broader than distal lamina of gonocoxite, dorsal lobe of gonocoxite more acuminate, ventro-lateral inflexure of gonocoxite about level of distal expansion of gonocoxite (Fig. 1). Mesosoma usually extensively grey-haired. ♀. Mesosomal pubescence, especially in I. generation, longer, frequently, especially posteriorly, more or less extensively grey. West Palaearctic, predominantly northern, north to Sweden, east to Iran (central Alborz at 2200 m); southern limits uncertain ..... *nigrospina* Thomson, 1870

(*nigrospina* sensu Stöckhert, Pittioni, Kocourek; *carbonaria* auctt. p.p. (incl. Dylewska), nec L.)

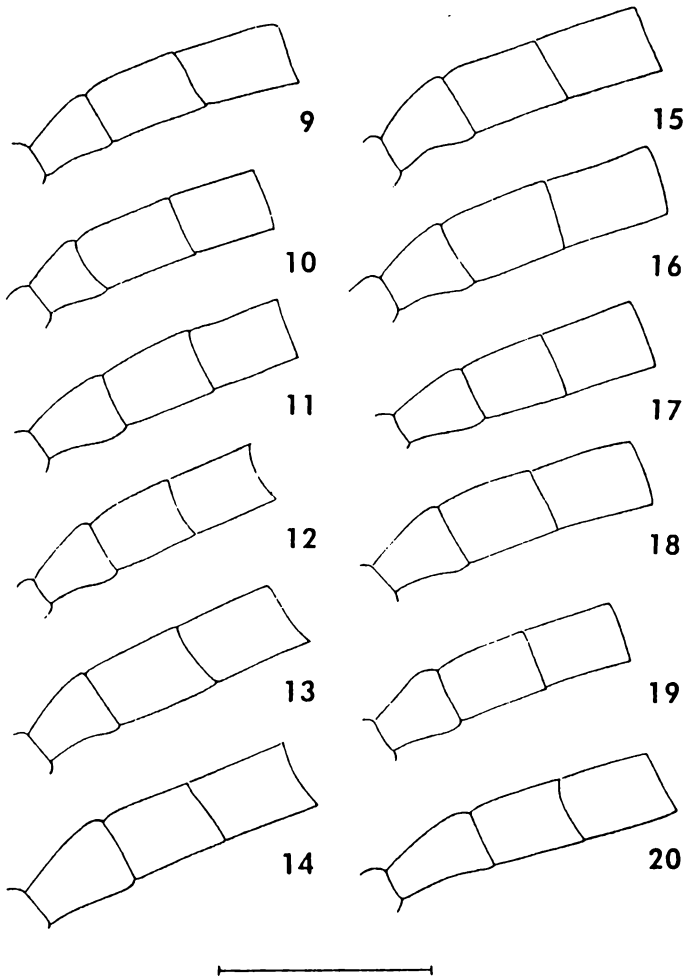
♂. 3rd antennal segment usually longer in proportion to 4th (Figs 12–14, 17–19); middle flagellar segments shorter in proportion to their breadth. Genital capsule (Figs 6–8) relatively small (smaller in absolute size), penis valves



Figs 1, 2. Male genitalia of (1) *Andrena nigrospina* Thomson; (2) *A. spectabilis* Smith. (1, Czech Republic: Bohemia, Celákovice env., 19–21.v.1952 (Balthasar & Růžička); 2, Austria: Niederösterreich, Marchfeld (L. Mader), *Andrena* ♂ aff. *carbonaria* L. det. E. Stöckhert, *nigrospina* Thoms. II. Gen. ♂ det. Pittioni.)



Figs 3–8. Male genitalia of (3–5) *Andrena nigrospina* Thomson and (6–8) *A. spectabilis* Smith. Scale line represents 1 mm. The genitalia are represented as preserved: no attempt has been made to give them a conventional, artificially symmetrical, appearance. These structures are frequently not perfectly symmetrical and still more frequently more or less contorted as a result of post-mortem changes. 3, Czech Republic: Bohemía, Čelákovice env., 19–21.v.1952 (*Balthasar & Ržička*); 4, England: Norfolk, Mundford, clear-felled area in pine forest; 6.vii.1977 (*D. B. Baker*); 5, Iran, central Alborz, Kandavan Pass near Pol-e-Zanguleh, 2200 m [Stn 48], 10.vi.1967 (*D. B. Baker*); 6, Austria: Niederösterreich, Marchfeld (*L. Mader*), *Andrena* ♂ *aff. carbonaria* L. det. E. Stöckert, *nigrospina* Thoms. II. Gen. ♂ det. Pittioni; 7, Austria: Niederösterreich, Bisamberg, 16.iv.1949 (*M. Kocourek*); 8, Greece: Lontra (Saloniki), 26.iv.1942 (*P. P. G. Bahiy*), *prope carbonaria* L. ♂ det. Pittioni, *spectabilis* Sm. ♂ det. Pittioni.)



**Figs 9–20.** Segments 3–5 of left male antenna of (9–11, 15, 16) *Andrena nigrospina* Thomson, (12–14, 17–19) *A. spectabilis* Smith, (20) *A. sp.* Messinia. Scale line represents 1 mm. 9–11, data as for Figs 3–5 (same specimens); 15, Austria: Niederösterreich, Stammersdorf, 26.v.1946 (*Pittioni*), at *Stachys recta* L.; 16, Czech Republic: Bohemia, Člčákovice env., 19–21.v.1952 (*Balthasar & Ržička*); 12–14, data as for Figs 6–8 (same specimens); 17, Slovakia: Štúrovo, 28–30.vii.1955 (*V. Balthasar*) (*spectabilis* Sm. det. Balthasar); 18, England: Devon, Putsborough, Vention Sands, 8.viii.1952 (*D. B. Baker*); 19, Iran: W. Alborz, Rud-e-Molla 'Ali, 18 km S. of Loshan, 700 m [Stn 45], 25.iv.1967 (*D. B. Baker*), at yellow crucifer; 20, Greece: Messinia, Methone, within fortifications of old town (from colony in passage in walls), 13.vii.1976 (Cambridge Morea Expedition, 1976.)



slender, narrower than distal lamina of gonocoxite, dorsal lobe of gonocoxite less acuminate, ventro-lateral inflexure of gonocoxite well basad of distal expansion of gonocoxite (Fig. 2). Both sexes rarely with conspicuous grey hair, pubescence in ♀ shorter, in II. generation especially the hairs of mesoscutum antero-laterally more evidently plumose, short, subdecumbent. In topotypical form (Albania) and other SE. European populations marginal areas of metasomal terga with more or less distinct, interrupted, pale fasciae. West Palaearctic, predominantly southern, south to NW. Africa, east to Anatolia, Caucasus and northern Iran (at lower altitudes than *nigrospina*); apparently absent from Cyprus. In Britain apparently predominantly coastal (G. R. Else, pers. comm.). (Females from Mediterranean localities with scopa entirely black may not be specifically identical.) ..... *spectabilis* Smith, 1853

(? *aterrima* Panzer, ? *riparia* Scopoli, *carbonaria* auctt. p.p. nec L., *praetexta* Smith (*pilipes* (F.) Dylewska))

Further characters, including numerical data for separating the two taxa in both sexes (ratios facial length/facial width, facial fovea length/facial fovea width, fovea width/face width, etc) are given by Dylewska (1987: 434–436). As to the males, it may be noted that the mean ratio length antennal segment 3 : length antennal segment 4, in the material immediately available, from all areas (including, for example, the extreme forms of *nigrospina* illustrated in Figs 10, 11), is, for *nigrospina*, 0.746, and for *spectabilis*, 0.868 (Dylewska, 0.742, 0.830). The proportional lengths of the basal flagellar segments have been much used in keys to *Andrena* species, but are as liable to variation as other characters and may not be wholly dependable where only limited material is available.

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