

Revision of the historical type collections of long-horn bees (Hymenoptera: Apidae: Eucerini) preserved in the Muséum national d'Histoire naturelle, Paris

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Summary. This work presents a first taxonomic revision of the historical type collections of West Palaearctic bees in the tribe Eucerini (Apidae) that are preserved in the Muséum national d'Histoire naturelle, Paris. A total of 72 species names are revised, 147 type specimens are recognised, and 33 synonyms are newly proposed. Unexpectedly, some of the oldest bee names were found to be misinterpreted and have been incorrectly used for a period of nearly 200 years, demonstrating a substantial lack of knowledge. Actions are taken to settle the taxonomy of these and many other species, the names of which are continuously being used in biodiversity studies and databases. The following taxonomic changes are proposed: *Tetralonia* Spinola, 1838 is reestablished as a valid genus and not as a subgenus of *Eucera* Scopoli, 1770 (based on F. Freitas, in litt.) (**stat. rev.**); *Eucera speculifera* Pérez, 1910 **n. syn.** of *Eucera aeolopus* Pérez, 1910; *Eucera conspersa* Pérez, 1895 **n. syn.** of *Eucera algira* Lepeletier, 1841; *Eucera dentipes* Saunders, 1908 **n. syn.** of *Eucera algira* Lepeletier, 1841; *Tetralonia atroalba* Pérez, 1895 **n. syn.** of *Tetralonia brachycera* Gribodo, 1893 [*Eucera* (*Synhalonia*) *brachycera* (Gribodo)]; *Eucera wahrmani* Benoist, 1950 **n. syn.** of *Eucera cinnamomea* Alfken, 1935; *Eucera fasciatella* Lepeletier, 1841 **n. syn.** of *Eucera clypeata* Erichson, 1835; *Eucera decolorata* Gribodo, 1924 **n. syn.** of *Eucera confinis* Pérez, 1895; *Eucera bolivari* Dusmet y Alonso, 1926 **n. syn.** of *Eucera confinis* Pérez, 1895; *Tetralonia mucida* Pérez, 1895 **n. syn.** of *Eucera* (*Synhalonia*) *cuniculina* Klug, 1845; *Eucera fulvescens* Walker, 1871 (and its replacement name *E. aegyptiaca* Dalla Torre, 1896) **n. syn.** of *Eucera dimidiata* Brullé, 1832; *Eucera gracilipes* Pérez, 1910 (and its replacement name *E. duplicata* Dusmet y Alonso, 1926) **n. syn.** of *Eucera furfurea* Vachal, 1907; *Eucera bicolor* Lepeletier, 1841 (as well as its replacement name *E. algeriensis* Dalla Torre, 1896) **n. syn.** of *Eucera hispana* Lepeletier, 1841; *Eucera ephippia* Dours, 1873 **n. syn.** of *Eucera hispana* Lepeletier, 1841; *Eucera hispaliensis* Pérez, 1902 **n. syn.** of *Apis longicornis* Linnaeus, 1758 [*Eucera longicornis* (Linnaeus)]; *Eucera fallax* Dusmet y Alonso, 1926 **n. syn.** of *Apis longicornis* Linnaeus, 1758 [*Eucera longicornis* (Linnaeus)]; *Eucera subvillosa* Lepeletier, 1841 **n. syn.** of *Eucera nigra* Lepeletier, 1841; *Eucera contigua* Dusmet y Alonso, 1928 **n. syn.** of *Eucera nigrifacies* Lepeletier, 1841; *Tetralonia lucasi* Gribodo, 1893 [*Eucera* (*Synhalonia*) *lucasi* (Gribodo)] **n. syn.** of *Macrocera obscura* Brullé, 1832 [*Eucera* (*Synhalonia*) *obscura* (Brullé)]; *Eucera grisea* var. *effasciata* Alfken 1926 **n. syn.** of *Eucera oraniensis* Lepeletier, 1841; *Eucera aciculata* Pérez, 1910 **n. syn.** of *Eucera polita* Pérez, 1895; *Eucera bipartita* Pérez, 1910 **n. syn.** of *Eucera proxima* Morawitz, 1875; *Eucera sulamita* Vachal, 1907 **n. syn.** of *Eucera syriaca* Dalla Torre, 1896; *Eucera kervillei* Pérez, 1910 **n. syn.** of *Eucera syriaca* Dalla Torre, 1896; *Eucera maxima* Tkalčú, 1987 **n. syn.** of *Eucera taurea* Vachal, 1907; *Eucera obsoleta* Pérez, 1910 **n. syn.** of *Eucera terminata* Pérez, 1895 (as also the latter's replacement name *E. xanthura* Pérez, 1895); *Eucera uncinata* Lepeletier, 1841 **n. syn.** of *Eucera vidua* Lepeletier, 1841; *Tetralonia carbonaria* Pérez, 1895 **n. syn.** of *Eucera atrata* Klug, 1845 [*Tetralonia atrata* (Klug)]. In addition, *Eucera eucnemidea* Dours, 1873 is confirmed as a synonym, and formally synonymised with *Eucera grisea* Fabricius, 1793 (**n. syn.**). The following species-group names are synonymised, despite having precedence, under the principle of name stability: *Eucera trivittata* Brullé, 1832 **n. syn.** of *Eucera bidentata* Pérez, 1887; *Eucera distincta* Lepeletier, 1841 **n. syn.** of *Eucera pollinosa* Smith, 1854; *Macrocera alternans* Brullé, 1832 [*Eucera* (*Synhalonia*) *alternans* (Brullé)] **n. syn.** of *Macrocera rufa* Lepeletier, 1841 [*Eucera* (*Synhalonia*) *rufa* (Lepeletier)]; and *Eucera subfasciata* Lepeletier, 1841 **n. syn.** of *Eucera taurica* Morawitz, 1871. *Eucera impressiventris* Pérez, 1895 **stat. rev.** is resurrected from synonymy with *Eucera punctatissima* Pérez, 1895, and reestablished as a valid species. In addition to 43 lectotypes, neotypes are designated for two species, *Tetralonia coangustata* Dours, 1873, and *T. nigrifacies* Dours, 1873 (**syn. Eucera commixta** Dalla Torre & Friese, 1895).

Résumé. Révision des types historiques d'Eucerini (Hymenoptera : Apidae) conservés au Muséum national d'Histoire naturelle, Paris. Ce travail présente une première révision taxonomique des types historiques d'abeilles du Paléarctique occidentale de la tribu des Eucerini (Apidae) conservés au Muséum national d'Histoire naturelle, à Paris. Au total, 72 noms d'espèces sont révisés, 147 spécimens-types sont reconnus et 33 synonymes sont nouvellement proposés.

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De manière inattendue, certains des noms d'abeilles les plus anciens se sont avérés mal interprétés et ont été utilisés de manière incorrecte pendant une période de près de 200 ans, démontrant un manque substantiel de connaissances. Des mesures sont prises pour établir la taxonomie de ces espèces et de nombreuses autres, dont les noms sont continuellement utilisés dans les études et les bases de données sur la biodiversité. Les changements taxonomiques suivants sont proposés : *Tetralonia* Spinola, 1838 est rétabli en tant que genre valide et non en tant que sous-genre d'*Eucera* Scopoli, 1770 (sur la base de F. Freitas, in litt.) (**stat. rev.**). *Eucera speculifera* Pérez, 1910 **n. syn.** de *Eucera aeolopus* Pérez, 1910 ; *Eucera conspersa* Pérez, 1895 **n. syn.** de *Eucera algira* Lepeletier, 1841 ; *Eucera dentipes* Saunders, 1908 **n. syn.** de *Eucera algira* Lepeletier, 1841 ; *Tetralonia atroalba* Pérez, 1895 **n. syn.** de *Tetralonia brachycera* Gribodo, 1893 [*Eucera* (*Synhalonia*) *brachycera* (Gribodo)] ; *Eucera wahrmani* Benoist, 1950 **n. syn.** de *Eucera cinnamomea* Alfken, 1935 ; *Eucera fasciatella* Lepeletier, 1841 **n. syn.** de *Eucera clypeata* Erichson, 1835 ; *Eucera decolorata* Gribodo, 1924 **n. syn.** de *Eucera confinis* Pérez, 1895 ; *Eucera bolivari* Dusmet y Alonso, 1926 **n. syn.** de *Eucera confinis* Pérez, 1895 ; *Tetralonia mucida* Pérez, 1895 **n. syn.** de *Eucera* (*Synhalonia*) *cuniculina* Klug, 1845 ; *Eucera fulvescens* Walker, 1871 (et son nom de remplacement *E. aegyptiaca* Dalla Torre, 1896) **n. syn.** de *Eucera dimidiata* Brullé, 1832 ; *Eucera gracilipes* Pérez, 1910 (et son nom de remplacement *E. duplicata* Dusmet y Alonso, 1926) **n. syn.** de *Eucera furfurea* Vachal, 1907 ; *Eucera bicolor* Lepeletier, 1841 (et son nom de remplacement *E. algeriensis* Dalla Torre, 1896) **n. syn.** de *Eucera hispana* Lepeletier, 1841 ; *Eucera ephippia* Dours, 1873 **n. syn.** de *Eucera hispana* Lepeletier, 1841 ; *Eucera hispaliensis* Pérez, 1902 **n. syn.** de *Apis longicornis* Linnaeus, 1758 [*Eucera longicornis* (Linnaeus)] ; *Eucera fallax* Dusmet y Alonso, 1926 **n. syn.** de *Apis longicornis* Linnaeus, 1758 [*Eucera longicornis* (Linnaeus)] ; *Eucera subvillosa* Lepeletier, 1841 **n. syn.** de *Eucera nigra* Lepeletier, 1841 ; *Eucera contigua* Dusmet y Alonso, 1928 **n. syn.** de *Eucera nigrifacies* Lepeletier, 1841 ; *Tetralonia lucasi* Gribodo, 1893 [*Eucera* (*Synhalonia*) *lucasi* (Gribodo)] **n. syn.** de *Macrocera obscura* Brullé, 1832 [*Eucera* (*Synhalonia*) *obscura* (Brullé)] ; *Eucera grisea* var. *effasciata* Alfken 1926 **n. syn.** de *Eucera oraniensis* Lepeletier, 1841 ; *Eucera aciculata* Pérez, 1910 **n. syn.** de *Eucera polita* Pérez, 1895 ; *Eucera bipartita* Pérez, 1910 **n. syn.** de *Eucera proxima* Morawitz, 1875 ; *Eucera sulamita* Vachal, 1907 **n. syn.** de *Eucera syriaca* Dalla Torre, 1896 ; *Eucera kervillei* Pérez, 1910 **n. syn.** de *Eucera syriaca* Dalla Torre, 1896 ; *Eucera maxima* Tkalcü, 1987 **n. syn.** de *Eucera taurea* Vachal, 1907 ; *Eucera obsoleta* Pérez, 1910 **n. syn.** de *Eucera terminata* Pérez, 1895 (ainsi que le nom de remplacement de ce dernier *E. xanthura* Pérez, 1895) ; *Eucera uncinata* Lepeletier, 1841 **n. syn.** de *Eucera vidua* Lepeletier, 1841 ; *Tetralonia carbonaria* Pérez, 1895 **n. syn.** de *Eucera atrata* Klug, 1845 [*Tetralonia atrata* (Klug)]. De plus, *Eucera eucnemidea* Dours, 1873 est considéré comme synonyme, et formellement synonymisé avec *Eucera grisea* Fabricius, 1793 (**n. syn.**). Les noms du groupe-espèce suivants sont synonymisés, malgré leur préséance, en vertu du principe de stabilité des noms : *Eucera trivittata* Brullé, 1832 **n. syn.** de *Eucera bidentata* Pérez, 1887 ; *Eucera distincta* Lepeletier, 1841 **n. syn.** de *Eucera pollinosa* Smith, 1854 ; *Macrocera alternans* Brullé, 1832 [*Eucera* (*Synhalonia*) *alternans* (Brullé)] **n. syn.** de *Macrocera rufa* Lepeletier, 1841 [*Eucera* (*Synhalonia*) *rufa* (Lepeletier)] ; et *Eucera subfasciata* Lepeletier, 1841 **n. syn.** de *Eucera taurica* Morawitz, 1871. *Eucera impressiventris* Pérez, 1895 stat. rev. est ôté de la synonymie avec *Eucera punctatissima* Pérez, 1895, et rétabli comme espèce valide. En plus de la designation de 43 lectotypes, des néotypes sont désignés pour deux espèces, *Tetralonia coangustata* Dours, 1873, et *T. nigrifacies* Dours, 1873 (syn. *Eucera commixta* Dalla Torre & Friese, 1895).

Keywords: Taxonomy; Palaearctic; Mediterranean; Pollinators; solitary bees

The Muséum national d'Histoire naturelle (MNHN, Paris) houses some of the earliest and richest type collections of bees, particularly of Eucerini, reflecting the rise and bloom of taxonomy and systematics research in France during the nineteenth and early twentieth centuries. At least until the middle of the twentieth century, authors had a broad knowledge of bee and Hymenopteran taxonomy in general, but they had a very weak sense of the lower level systematic relationships among species and genera as accepted today. A major limiting factor of their systematics understanding was the difficulty of developing species concepts and linking them to nominal taxa. The competition between early European taxonomists to describe and document the enormous biodiversity of insects, and their limited means of communication with each other relative to the present days, has led to multiple names being proposed simultaneously for the same species by different authors in different countries. The confusion caused is well expressed in the articles and correspondence cited in this work. For example, much confusion persisted over the

identity of *Eucera longicornis* (Linnaeus, 1758), one of the earliest and most widely distributed species in Europe. However, beyond the uncertainty about the identity of species described from other parts of Europe, the results from this study suggest that early French authors did not see many of the types studied by their French contemporaries and predecessors, most of which should have been already deposited at the MNHN. Striking examples of this are some of the oldest species names that continue to be misinterpreted to this day (e.g. *Macrocera alternans* Brullé, 1832, *Eucera punctatissima* Pérez, 1895), and others whose validity status has never been settled (see details in the Results and Discussion sections). The French types of Eucerini have remained largely unstudied throughout the second half of the twentieth century when professional taxonomy started to decline in Western Europe. In addition, the specimens were largely inaccessible to bee taxonomists in Eastern Europe after the Second World War and the partition of Europe into geopolitical blocks.

This revision is essentially focused on the MNHN types, and presents an extensive literature review for each of the species revised in an annotated catalogue. It thus provides a wider perspective of the Western Palaearctic Eucerini in general, with information on type material from additional European institutions. Specifically, a total of 72 species names are revised and 182 original specimens are examined, of which 147 are recognised and labelled as type specimens. In addition, a total of 33 synonyms are newly proposed, of which four currently used names are relegated to the level of secondary synonyms, and an additional nine names are validated to replace (or add to) currently used names. The generic classification of the Eucerini has been and still is unstable due to weak morphological delineation of the recognised genera. Here, I adopt a classification informed by a recent unpublished phylogenetic study that includes a first, nearly complete representation of the tribe Eucerini and which is based on NGS methods (FV Freitas, in litt.). Results from that study, pertaining to the Old World Eucerini are largely congruent with those of Dorchin et al. (2018) based on Sanger sequencing techniques, but comprise some important changes. Unlike in Dorchin et al. (2018), the taxon *Tetralonia* Spinola, 1838 is resolved as sister to some Nearctic lineages, separately from the rest of the Old-World species. Thus, *Tetralonia* Spinola, 1838 is treated here as genus [including the Old-World lineages of *Tetraloniella* Ashmead, 1899 as delineated by Michener (2000)] separate from the genus *Eucera* Scopoli, 1770, which comprises the rest of the Old-World taxa. Additionally, the taxon known as *Cubitalia* Friese, 1911 is recovered as sister to the rest of the species in the subgenus *Eucera* (the lineages with two submarginal cells in the forewing). The genus *Eucera* is thus represented in this work by three subgenera, *Eucera* Scopoli, 1770 s. str., *Cubitalia* Friese, 1911, and *Synhalonia* Patton, 1879.

Methods

The species revised

The majority of the species included in this revision were first described in the publications of Brullé (1832) on the scientific expedition to Morée (the Peloponnese, Greece); the monograph of Lepeletier (1841) on the natural history of the insects, section Hymenoptera, including mainly Western European and North African species; Pérez (1895b), on new species of bees from “Barbarie” (mainly north-western Africa); Vachal (1907) on new Mediterranean *Eucera*; and Pérez (1910) on new species of bees collected in Syria by HG de Kerville. In addition, material from the historical collections of L Dufour, FJ Sichel, H Lucas, and others were occasionally examined to further investigate published species names that were reported from these collections. Specifically, only a few of the species described by Dours (1873) based on material from these collections were included because the Dours collection was destroyed after it was transferred to the USA, probably in a fire (Hörn & Kahle

1935, p. 60), and it is presumed that no original types have survived. Two neotypes, taken from coll. Pérez, are designated here to settle the identity of little-known species that were described by Dours (1873) from Algeria. Note, that the accurate date of publication of some of the works cited above is uncertain [see for example in Sherborn & Woodward (1901, p. 336) on the date of publication of the scientific expedition to Morée]. Here, I used the year of publication as it appears in the original publications, and in most cases no effect is expected on the taxonomy of the species given the early age of these works.

Identification of type material

A challenging task in this revision was the identification of original type material because individual marking of syntypes was not a common practice among the taxonomists of that time. Some of the historical collections of Eucerini are still preserved in the authors’ original boxes, but many putative type specimens were transferred to modern insect cases, while maintaining the same order found in the original boxes. Still, the type status of some specimens may be questioned given that authors of the same generation exchanged material between them, and introduced new material to their collection boxes. Thus, it often cannot be determined if these specimens were added prior or subsequent to the description of a species, and, accordingly if specimens of a different source are part of the original type series. Furthermore, some of the types were moved around the collection by past curators and investigators, resulting in the loss of certainty about their origins. The different characteristics listed below were used to identify types in each of the collections.

- Coll. Brullé: specimens mounted on long pins, handmade from stainless steel (henceforth referred to as ‘long light pins’) with metal heads of varying types, either with small round head welded onto the tapering conical tip of the pin, or with a fine wire folded around the tip of the pin. The presence of two types of original labels, handwritten in black ink probably by Brullé: (1) a square label with a serial number corresponding to that given in Brullé (1832); and (2) a large white disc written in black ink “Brulle Morée”. These labels are sometimes supplemented with determination labels that may have also been written by Brullé (see Figures 1–5). These types are surprisingly well preserved, given their age.
- Coll. Lepeletier: specimens mounted on long light pins similar to those mentioned, with metal heads of varying types, most commonly with large round head (as in Figure 8), but sometimes with small head as described above. A minority of the type specimens, mostly comprising specimens that originated from France, are mounted on short light pins with round small heads or heads made with fine wire as described above. The specimens may be labelled with white, green, blue, or yellow small discs that are sometimes crossed with black line (as in Figure 7), but in others no label is present. Some of the specimens have an original long label handwritten by Lepeletier with red ink on white paper, framed with red lines along both the upper and the lower margins (Figures 7 and 8). These were obviously head labels that were placed above or below the syntype series, or otherwise the group of specimens identified as belonging to a certain species (henceforth referred to as original head labels). They were likely associated to an individual type specimen by a later curator/s, perhaps with the intention to mark a specimen viewed as the most representative of that species. Additional specimens display a small, individual identification label, with Lepeletier’s handwriting in brownish (faded black) ink (Figure 6).



Figures 1–14. Eucerini, labels of type specimens in MNHN. 1–5, Types of Brullé (1832); the handwritten serial numbers, and locality and identification labels are probably by Brullé: 1, *Macrocera alternans* Brullé, 1832, holotype; 2, *Eucera vulpes* Brullé, 1832, lectotype; 3, *Eucera trivittata* Brullé, 1832, lectotype; 4, *Macrocera ruficollis* Brullé, 1832, holotype; at the bottom is a curator head label that was added to material extracted from coll. Brullé; 5, *Macrocera obscura* Brullé, 1832. 6–8, Types of Lepeletier (1841); the original long labels handwritten in red ink were obviously used as head labels: 6, *Eucera nigrilabris* Lepeletier, 1841, lectotype; the identification label is in Lepeletier’s handwriting, and although no locality is mentioned (including on the curator head label shown at the bottom), it suggests that the lectotype originated from Montpellier (France) rather than Oran (Algeria); 7, *Eucera notata* Lepeletier, 1841, lectotype; 8, *Eucera subfasciata* Lepeletier, 1841, holotype; an example is shown for a typical long pin, handmade from stainless steel with large round head. 9–13, Types of Pérez; the handwritten locality and identification labels are typically restricted to a minimum: 9, *Eucera barbiventris* Pérez, 1902; the head label is displaying the species name and a serial number, which correspond to the data in the catalogue of Pérez; 10, *Eucera parnassia* Pérez, 1902, holotype; a single type is presumed based on the presence of both a locality and a determination label; 11, *Macrocera julliani* Pérez, 1879, lectotype; 12, *Macrocera griseola* Pérez, 1879, lectotype; 13, *Eucera polita* Pérez, 1895, lectotype; both the locality and the identification labels were written by Vachal, the locality is illegible, possibly being “Medenine” (Tunisia). 14, Type of Vachal (1907): *Eucera gaullei* Vachal, 1907; the locality label is printed, with the day added in ink.

In choosing lectotypes, I systematically favoured the specimens displaying an original written label because these can be considered to be syntypes with the highest degree of confidence.

- Coll. Lucas: specimens mounted on long light pins with small round head and tapering conical tip as described above. The labels are typically including a large blue disc, on the underside of which there is usually a number written in black ink. This number corresponds to the serial numbers in the catalogue of Lucas, a catalogue in his handwriting that is preserved in the library of the MNHN. There is often also an identification label written in black ink by Lucas, which is placed vertically on the pin.
- Coll. Pérez: comprising specimens with varying preparation methods, probably because Pérez obtained material from various different sources. Different kinds of pins are used, often including pins that have had the head cut off. Specimens are frequently labelled with a small coloured disc, where different colours are used to indicate the month of collecting (in this work, light blue – March, purple – April, dark blue – May, green – June, or yellow – July). The specimens of each species were originally arranged above a common large head label, handwritten by Pérez in black ink and including the species name and a serial number, which correspond to the information in his catalogue (preserved at the library of the MNHN, and now also available online as a scanned copy at: <https://science.mnhn.fr/catalogue/ey-bib-perez1/>). These head labels are now sometimes associated with specific specimens (as in Figure 9), probably because they were transferred by a past curator to a new box together with the single specimen described or remained from the original type series. The individual labels used in a series of specimens are typically reduced to a minimum, and include only the locality in one word or even only a part of that word (see examples in Figures 11 and 12), or sometimes only the serial number alone is present (see example in the account of *Eucera rutila* Pérez, 1895). Consequently, a specimen labelled with the complete identification and locality data is more likely to be a single type (holotype, as in Figures 9 and 10), and one with partial data as part of a type series. In a few cases, the types described have labels written by other collectors, for example J Vachal has frequently exchanged eucerine bee material with Pérez (see example in Figure 13, and in the account of *Eucera conspersa* Pérez, 1895), and probably A de Perrin, who was the owner of the particular type (see in the account of *Eucera bidentata* Pérez 1887). The most recent types that were collected in Syria, received from HG de Ker-ville, and described in Pérez (1910), are more easily identified by having pins with round heads and white labels written in red ink by Pérez, typically with both the species name and the locality and month, but the latter two are sometimes missing. These types, and also earlier ones are not found in the catalogue of Pérez. In particular, many of the species (presumably) described from north-western Africa in Pérez (1895b) have no records in his catalogue, such that no further information on their type localities beyond “Barbarie” could be located. Many of Pérez’ syntypes, and also those of Vachal, were studied by the late DB Baker, and are marked with his type designation labels. These include holotype/lectotype labels in red and secondary type labels in blue, all which were added in the year 1990 but were never published.
- Coll. Vachal: all the types examined in this study were published in Vachal (1907). They are typically mounted on black coated pins with a golden round head welded onto the conical tip of the pin, and display rather minimal labels, reminiscent of those used by Pérez (above): typically, a locality

label printed with the locality name and the month, and with the day and/or year added in black ink (as in Figure 14). These labels are actually unusual for Vachal, who usually wrote the localities in ink, often as initials and with handwriting that is somewhat unkempt, which makes the labels illegible. Such labels appear here only in a minority of the specimens (see example in Figure 13). Additionally, the identification labels are usually written in black ink by Vachal and include only the name of the species, starting with a capital letter, followed by a symbol of ♀ or ♂, and the initials “Vach.” (as in Figure 14).

The structure of the catalogue

The species are presented in the annotated catalogue in alphabetic order for each genus separately, followed by comments on each of the species names examined. The species chresonymy includes a maximum of names that could be verified from the literature and via correspondence with curators in various repository institutes (see Acknowledgements). It comprises in addition to known synonyms, nomen nuda, misinterpretations, and published variations. Note that the validity of infraspecific names is not systematically verified in this work as was done for the species. Images illustrating the general habitus of type specimens and their labels are also provided as online supplementary material (albeit with limited resolution). Species diagnoses and geographical distribution ranges are not included. These data are currently being developed and will be presented in future works. Further data can be found in existing online databases, such as the Checklist of the Western Palearctic Bees (westpalbees, <https://westpalbees.myspecies.info>) and Discover Life (discoverlife, <https://www.discoverlife.org>).

The morphological terminology follows that of Michener (2000), including the abbreviations for metasomal tergites and sternites, T1–7 and S1–8, respectively.

Abbreviations

The following abbreviations are used for depository institutes of type material.

BMNH	The Natural History Museum, London, UK;
ISEAP	Polish Academy of Sciences, Institute of Systematics and Evolution of Animals, Krakow, Poland;
MCNB	Museu de Ciències Naturals de Barcelona, Barcelona, Spain;
MHNG	Muséum d’Histoire Naturelle de Genève, Geneva, Switzerland;
MNB	Museum für Naturkunde – Leibniz Institute for Evolution and Biodiversity Science, Berlin, Germany;
MNCN	Museo Nacional de Ciencias Naturales, Madrid, Spain;
MNHN	Muséum national d’Histoire naturelle, Paris, France;
MSNG	Museo Civico di Storia Naturale, Genova, Italy;
MSNT	Museo Regionale di Scienze Naturali di Torino, Italy;
MTM	Hungarian Natural History Museum, Budapest, Hungary;
NHMD	Natural History museum of Denmark, University of Copenhagen, Denmark;
NMW	Naturhistorisches Museum Wien, Austria;
OOM	Oxford University Museum of Natural History, UK;
SEMC	Snow Entomological Collections, University of Kansas Natural History Museum, Lawrence, Kansas, USA;
ZINSP	Russian Academy of Sciences, Zoological Institute, St. Petersburg, Russia

Results

Genus *Eucera* Scopoli, 1770*Eucera (Eucera) aeolopus* Pérez, 1910

Eucera aeolopus Pérez 1910: 3. ♀, “Région verdoyante de Damas”. Lectotype: MNHN, designated here. Precedent name in accordance with the principle of the First Reviser, article 24.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera speculifera Pérez 1910: 6, n. syn. ♂, “Région verdoyante de Damas”. Holotype: MNHN, examined and labelled.

***Eucera aeolopus* Pérez, 1910.** The lectotype is the only specimen found, and may be considered as holotype based on the precise description, but the locality label is written in black ink with only “Damas” (Supplementary material, p. 9). A second original label handwritten in red ink by Pérez (and slightly smeared) reads: “aeolopus JP”. There is also a holotype label of Baker. The lectotype is well preserved, with only the right antenna broken.

***Eucera speculifera* Pérez, 1910.** The specimen is considered as holotype based on the precise description and the original label that contains both the locality data and date, handwritten in red ink: “speculifera JP Damas, Avril” (Supplementary material, p. 78). There is also a small purple disc (=April), and a holotype label of Baker. The holotype is relatively well preserved, missing only the left antenna from the 9th flagellar segment and the two hind distitarsi.

Eucera (Eucera) aequata Vachal, 1907

Eucera aequata Vachal 1907: 377. ♂, “d’Adana” (Turkey). Lectotype: MNHN, designated by Dorchin (2019, p. 461).

The lectotype has an original printed locality label (with only the day written in black ink): “Adana 12 V”, and a label handwritten by Vachal in black ink: “aequata ♂ Vach.” (Supplementary material, p. 10). There is also a printed curator label, and an unpublished neotype designation label by Baker. Dorchin (2019) examined the type via photographs, and designated it as lectotype for the reasons mentioned there (p. 461). The lectotype was previously remounted on a modern black enamelled pin. It was dissected unprofessionally (obviously not by Baker) and shows longstanding damage of various body parts. The genitalia, S8, S7, as well as S6, T7 and S5, are all added, uncleaned, onto two separate point cards, and with the remaining metasoma glued back, not exactly in place. Two additional male paralectotypes that were examined and labelled here are well preserved, and have original black coated pins and labels similar to those of the lectotype. The female was described in Dorchin (2019, p. 464).

Eucera (Eucera) algira Lepeletier, 1841

Eucera algira Lepeletier; Brullé 1840: 85. “Îles Canaries”. **Nomen nudum.**

Eucera algira Lepeletier 1841: 134. ♀, “Oran” (partim). Lectotype: MSNT, designated by Tkalců (1993, p. 826).

?*Eucera tenuimarginata* Dours 1873: 319. ♂, “Algérie”. Type material presumed lost (Hörn & Kahle 1935, p. 60). Synonymy in Alfken (1926, p. 100).

Eucera conspersa Pérez 1895b: 6, n. syn. ♀ (partim) (Tunisia). Lectotype: ♀, MNHN, designated here.

Eucera dentipes Saunders 1908: 264, n. syn. ♂, “Biskra” (Algeria). Holotype: BMNH.

Eucera notata var. *cretensis* Friese 1922, Konowia 1: 62. ♀♂, “von Creta, bei Cassea” (Canea = Crete; lapsus). Syntypes: ♀♂, “Creta Biró”, “Canea 1906.III”, MNB. Synonymy in westpalbees (<https://westpalbees.myspecies.info>, 6.VII.2022).

***Eucera algira* Lepeletier; Brullé (1840).** No description is provided but only a note: “Espèce déjà observée en Barbarie par M. Lepelletier de Saint-Fargeau fils”. [see also Lieftinck (1958, p. 14).] A single female specimen examined is badly preserved, mounted on a light small headed pin, and has labels handwritten in black ink by Brullé, “frg.” And “*Eucera algira* Lep.” (Supplementary material, p. 13). It also has a large blue disc, written on the underside with “3. 41.”, representing the batch entry code given to the material collected during the expedition to the Canary Islands.

***Eucera algira* Lepeletier, 1841.** In addition to the lectotype, Tkalců (1993) examined in MSNT a second syntype that belongs to *Eucera notata* Lepeletier, 1841. Tkalců (1984a, p. 73), first synonymised these two syntypes with *Eucera notata* Lepeletier, 1841. Nevertheless, Tkalců (1993, p. 826), confirmed the identity of the lectotype as distinct, despite the poor condition of both syntypes. There is no reason to speculate that these are not valid types since Lepeletier sold some of his type material to Spinola (Baker 1994, p. 1191), which is now preserved in MSNT. However, neither Tkalců (1984a) nor Tkalců (1993) provide information about the original labels that identify the syntypes. The description of Lepeletier (1841) fits both these species, and it is likely that the original syntype series was composite. Two additional female paralectotypes in MNHN are examined here. Of them, only the better preserved has a typical large headed pin and an original identification label of Lepeletier, and it belongs to *Eucera notata* Lepeletier, 1841 (Supplementary material, p. 12). This specimen should have been preferably designated as lectotype, in which case, *Eucera algira* Lepeletier, 1841 would have become a junior synonym of *Eucera notata* Lepeletier, 1841. The lectotype designated by Tkalců (1993, p. 826), thus has the advantage of preserving the species names in their customary use. The synonymy of these names is however supported by: (1) the fact that both types of female *Eucera algira* and male *Eucera notata* were collected in Oran by

Lepeletier's son; and (2) the mention of Lucas (1849, p. 162), that *Eucera algira* was found especially around Algiers ("aux environs d'Alger") while it seems to be much rarer around Oran ("Elle habite aussi les environs d'Oran, mais elle paraît y être beaucoup plus rare."). The second paralectotype belongs to *Eucera algira* Lepeletier, 1841, it is poorly preserved, and has a small headed pin and a vertical label handwritten by Lucas "Eucera algira, S.F. ♀" (Supplementary material, p. 12). This specimen was likely an original syntype to which Lucas added a determination label when studying coll. Lepeletier because it is missing the typical labels of Lucas, such as a large disc with a serial number.

***Eucera conspersa* Pérez, 1895.** The lectotype, and a non-conspecific male paralectotype examined here, are similarly mounted on black coated pins. They have similar turquoise locality labels written by Vachal that are illegible but probably mean "Foum tataouine" (Tataouine, Tunisia), which is a type locality in the south of Tunisia frequently visited by Vachal. The species is not recorded in Pérez' catalogue, such that the locality data could not be confirmed. The determination labels are similarly written in black ink by Vachal, that of the female lectotype reads "adpersa Pérez type ♀", and that of the male paralectotype "adpersa? Pérez ♂", but not "conspersa" (Supplementary material, p. 28). Since Pérez and Vachal exchanged material frequently and the description matches both the female and male, it can be assumed that either Pérez changed the name prior to the publication, or that Vachal has simply made a mistake when labelling the types received from Pérez. This assumption is supported by Pérez's doubtful association of the male ("♂ de la précédente?"), in agreement with the label of the male paralectotype. Both types are fairly well preserved but with many body parts broken. The lectotype is missing both antennae except the right scape and pedicle, the left hind leg, the right middle tarsus, and some other tarsal segments. There is also a small square white label written by Vachal with a code, probably "195", in addition to two printed curator labels.

***Eucera dentipes* Saunders, 1908.** The holotype, preserved in BMNH, is the only type specimen found (No. 17B,785), and was examined via correspondence with Joseph Monks, the curator of Hymenoptera in BMNH. It is well preserved and has the following labels written in black ink, a locality label with "Biskra 26.ii.97. A. ♂", an identification label with "Eucera dentipes Type. Saunders"; also, a second identification label added by DB Baker in the year 1981, which confirm the synonymy above.

***Eucera (Eucera) barbiventris* Pérez, 1902**

Eucera barbiventris Pérez 1902: XLVIII. ♂, "Catalogne, Castille". Lectotype: MNHN, designated here.

The lectotype is the only type specimen found. It has two original labels handwritten in black ink by Pérez: "Barcelona" and (an original head label) "barbiventris JP 1777" (Figure 9, Supplementary material, p. 19). The species is listed in Pérez' catalogue as follows: "– Espagne ♂ – Barcelone, ♂.". It is not clear if there was a single or more than one type. Dusmet y Alonso (1926, p. 98) redescribed the species and mentioned another putative syntype: "Un ♂ Montcada (9 marzo 1902) (Museo de Barcelona) (seguramente co-tipo)." The lectotype is well preserved, only missing the right antennae from the 5th flagellar segment, and the right hind distitarsus.

***Eucera (Eucera) bidentata* Pérez, 1887**

Eucera trivittata Brullé 1832: 335, n. syn. **Taxon inquirendum.** ♀, "entre Arcadia et Mavromati (antique Messène)" (Peloponnese, Greece). Lectotype: MNHN, designated by Tkalců (1984a, p. 71).

Eucera grisea auct. (nec Fabricius); Brullé (1832, p. 337), "environs de Messène." (Peloponnese, Greece) (misidentification).

Eucera bidentata Pérez 1887: 180. ♂, "Jaffa" (Israel and Palestine). Lectotype: MNHN, designated by Tkalců (1984a, p. 73). Type species of *Agatheucera* Sitdikov & Pesenko, 1988.

***Eucera trivittata* Brullé, 1832.** This name was not in use because it was considered as a synonym of *Eucera seminuda* Brullé, 1832 for many years (see below). It has priority as shown in the list above, but its junior synonym *Eucera bidentata* Pérez, 1887 has been extensively used in recent times. A case application with recommendation to retain the currently used name will be prepared for the International Commission on Zoological Nomenclature (ICZN). The lectotype is fairly well preserved for its age, with the following body parts missing: left antenna and right antenna from the 6th flagellar segment, right lower portion of propodeum, right middle leg, and the left middle femur is damaged by pests. It agrees with the original description and exhibits diagnostic characteristics, including the small size, about 11 mm long, surface structure of mesonotum and T1, and the structure of the scopal hairs. Tkalců (1984a, p. 71) provided an accurate description of the original lectotype labels, but no lectotype label of his was found (a printed curator label with only "Lectotype" is present, see in Figure 3). The second label described by Tkalců (1984a), the white disc written with "Brullé Morée", is missing. This old label typical to all specimens from the Morée expedition might have been worn and got lost subsequent to Tkalců's publication. Further, the lectotype designated by Tkalců (1984a) is listed by him as a synonym of *Eucera seminuda* Brullé, 1832, in agreement with the tentative synonymy of Alfken (1942, p. 207). The facts that *Eucera seminuda* Brullé is a much larger species, easily differentiated from *Eucera bidentata* Pérez, and that Tkalců was familiar with the two species, suggest that either Tkalců examined

a different specimen or he has not examined the type himself. It is assumed here that the second alternative is correct and that a single type is known. The designation of Tkalců (1984a) is valid and a label confirming it is now added to the lectotype (Supplementary material, p. 86). However, since serial numbers by Brullé (1832) refer to the entire type series and not to individual specimens, it is still possible that a different lectotype was designated by Tkalců (1984a). If this specimen is finally found it will have priority.

***Eucera grisea* auct. (nec Fabricius); Brullé (1832).** Only two original male specimens were examined and labelled in MNHN. Nevertheless, it is mentioned “Cette espèce est une des plus communes.” Both specimens are mounted on original long light pins and have original labels handwritten by Brullé, including a white disc with “Brulle morée” and a determination label with “*Eucera grisea* F. A. Brullé det. 1832.” (only the specimen mounted upside down has a label with “748”, corresponding to the species’ serial number) (Supplementary material, p. 41).

***Eucera bidentata* Pérez, 1887.** Tkalců (1984a, p. 73) accurately described the labels of the single type specimen but no lectotype label of his was found (only a printed curator label with “Lectotype”). It has an identification label written in black ink: “*Eucera bidentata* Pérez **n.sp.**”, not in the handwriting of Pérez. Another label is printed with “COLL A DE PERRIN” (with the year 1919, thus added subsequent to the original description by Pérez), and in addition to the type locality, is in agreement with the given in du Buysson (1887, p. 180): “Jaffa, ancienne Jopp (Syrie); pris par M. E. Abeille de Perrin.” The designation of Tkalců (1984a) is valid and a label confirming it is now added to the lectotype (Supplementary material, p. 21). The lectotype is complete and well preserved. The female is first described in Vachal (1907, p. 376), “d’Adana” (Turkey).

***Eucera (Cubitalia) boyadjiani* Vachal, 1907**

Eucera boyadjiani Vachal 1907: 371. ♀♂, “Adana” (Turkey).
Lectotype: ♂, MNHN, designated by Tkalců (1984c, p. 14).

The type series, including additional female and male paralectotypes that were examined here are mounted on identical black coated pins, and have similar locality labels printed in black “Adana 2, VI” with the “2,” and “I” added in black ink by Vachal (Supplementary material, p. 23). The lectotype is relatively well preserved but damaged apparently during manipulation, with the two antennae broken. The right middle tibia and tarsi, the uncleared genitalia, and S7 and S8 were all removed and glued unprofessionally onto different point cards, such that different parts are broken, including also the apicomedial portion of S6. The paralectotypes are two conspecific, previously unreported female and male, found in coll. Benoist (the female with an original identification label

of Vachal). They are both complete and well preserved, except that the male is partly missing the left middle leg.

***Eucera (Synhalonia) brachycera* (Gribodo, 1893)**

Tetralonia brachycera Gribodo 1893: 393. ♂, “Algeria (Boghari)”. Presumable syntypes, MSNG.

Tetralonia atroalba Pérez 1895b: 9, **n. syn.** (originally given as “*Atro-alba*”). ♀♂, (Algeria). Lectotype: ♂, “Biskra”, MNHN, designated here.

***Tetralonia brachycera* Gribodo, 1893.** No type material from Algeria was found, but Penati & Mariotti (2015, p. 29) report on two potential male syntypes that are preserved in MSNG, and listed from “Tunisi” (Tunisia) by Gribodo in an unpublished manuscript. These specimens display original labels handwritten by Gribodo, one of which also includes “Tipo ♂ Grib.” (Penati & Mariotti 2015, p. 29).

***Tetralonia atroalba* Pérez, 1895.** The aggregated syntype series, including four female and three male paralectotypes that were examined and labelled here, have a head label handwritten in black ink by Pérez: “atro-alba JP. 1477”, in agreement with Pérez’ inventory catalogue (No. 1477, p. 211). The lectotype and each of the paralectotypes are mounted on black headless pins and labelled similarly with a small light blue disc (= March) and a small white label handwritten in black ink “Biskra” (Algeria) by Pérez (Supplementary material, p. 17, 18). The male lectotype is complete like the rest of the type series, or some of the paralectotypes have only minor damage.

***Eucera (Eucera) cinnamomea* Alfken, 1935**

Eucera cinnamomea Alfken 1935: 181. ♀, “Nablus” (Israel and Palestine). Holotype: (“Typus”) ♀, “Palästina”, MNB.

Eucera wahrmani Benoist 1950: 100, **n. syn.** ♂, “Palestine: Jérusalem, Rehavia W” (Israel and Palestine). Lectotype: MNHN, designated here.

***Eucera wahrmani* Benoist, 1950.** The lectotype is the only specimen found, but there is no clear evidence that other types do not exist. The lectotype has the following labels: (1) Printed in black font “PALESTINE J. Wahrman”; (2) Handwritten in black ink “Jerusalem Rehavia: West 27.4.1945 *Notobasis syriaca*”; (3) Handwritten in black ink “*Eucera wahrmani* R. ...” with the last text illegible, and printed in black font at the bottom “R. Benoist det.”. There is also a printed type label (Supplementary material, p. 89).

***Eucera (Eucera) chypeata* Erichson, 1835**

Eucera eurygaster Illiger 1806: 133. ♀, “Algarvien”. Synonymy in Alfken & Bischoff (1933, p. 513, with reference to unspecified publication of Klug). **Nomen nudum.**

Eucera chypeata Erichson 1835: 108. ♂, “Puertoreal (Andalusien)”. Lectotype: “Andalus. Waltl”, MNB, designated by

Alfken & Bischoff (1933, p. 513). Type species of *Stilbeucera* Tkalčú, 1978.

Eucera similis Lepeletier 1841: 121. ♀, “Midi de la France”. Lectotype: MNHN, designated here. Synonymy in Alfken (1942, p. 207).

Eucera fasciatella Lepeletier 1841: 130, n. syn. ♀ (partim), “environs de Paris, prise dans le bois de Bondy près Paris”. Lectotype: MNHN, designated here.

Eucera punctilabris Lepeletier 1841: 132. ♂, “Environs de Bordeaux”. Types unlocated. Synonymy in Morawitz (1874, p. 147).

Eucera coarctata Eversmann 1852: 119. ♀♂, “in prov. Orenb., Saratov., et Astrachanensi”. Lectotype: ♂, “Oren” (Orenburg, S Russia), ZINSP, designated by Tkalčú (1978, p. 163). Synonymy in Tkalčú (1978, p. 163).

Eucera punctilabris var. *fuscescens* Gribodo 1893: 403. ♀, “Ungheria”. Syntypes: 4♀, not found in MSNG (Penati & Marzotti 2015, p. 58). Synonymy in Gribodo (1893, p. 403).

Eucera medusa Nurse 1904: 578. ♀, “Quetta”. Lectotype: BMNH, designated by Tkalčú (1978, p. 163). Synonymy in Tkalčú (1978, p. 163).

***Eucera similis* Lepeletier, 1841.** The lectotype is fairly well preserved for its age. It is mounted on an original large headed pin. It has two original labels of Lepeletier, a small label written in brownish (faded black) ink “*Similis.*”, and an original head label written in red ink “*E. trivittata* Br. . . . ♀”. Another label is written “3 vittata Br.” not in Lepeletier’s handwriting (Supplementary material, p. 77). It is missing some antenna and leg parts, but otherwise was fresh when collected, and the hairs and surface structures are diagnostic. Lepeletier may have suspected that this species is conspecific with *Eucera trivittata* Brullé, 1832 because the general appearance outlined is quite similar in the descriptions of both species (differing mainly in the colour of some hairs), and finally decided to describe it as distinct based on the larger body size.

***Eucera fasciatella* Lepeletier, 1841.** The lectotype is mounted on a short light pin, it has an original label of Lepeletier, written in red ink “*E. Fasciatella* ♀” and a small light green disc (Supplementary material, p. 32). It is in fragmentary condition, with only the mesosoma remaining on the pin, and with most of the leg parts missing or incomplete. The left hind leg and the remaining parts of the head are also present, glued onto a mounting board. Despite its poor condition the lectotype confidently compares with recent females of *Eucera clypeata* Erichson, 1835 from France, which largely agree with the original description. Excepted is the mention of translucent band along the apical margin of tergites, possibly due to the already worn condition of the specimen when collected, as suggested by the condition of its wings that are present. A paralectotype male examined and labelled here is not conspecific and belongs to *Eucera pollinosa* Smith, 1854. This specimen exhibits longstanding

significant damage, with most body parts incomplete, but the wings are preserved, suggesting the specimen was worn when collected, as also indicated by its bleached pale hairs. The specimen matches the original description and compares with a worn conspecific male from France that was found in coll. Pérez. In fresh, unworn males as well as females, this species has bright ferruginous hairs, and this has led Lepeletier to describe it twice, under two different names (see *Eucera distincta* Lepeletier, 1841 under that account of *Eucera pollinosa* Smith, 1854). The paralectotype has pin and labels similar to those of the lectotype (displaying “*E. Fasciatella* ♂”).

***Eucera punctilabris* Lepeletier, 1841.** No type material was found in MNHN and it was presumed lost (Tkalčú 1978, p. 163). The description of female and redescription of male are given in Pérez (1879, p. 168). Gribodo (1893, p. 403) mentioned the males are probably conspecific with females of the species *Eucera clypeata* Erichson based on material that he received from Pérez, nevertheless he retained the species name and further added a subspecific name.

***Eucera (Eucera) confinis* Pérez, 1895**

Eucera confinis Pérez 1895b: 7. ♂, (Algeria). Holotype: MNHN, examined and labelled.

?*Eucera nigra* var. *decolorata* Gribodo 1924: 18, n. syn. (♀), “Algeria”. Types unlocated.

Eucera bolivari Dusmet y Alonso 1926: 101, n. syn. ♂, Spain. Holotype: “Lozoya (Provincia de Madrid)”, MNCN. Synonymy with *Eucera decolorata* Gribodo, 1924 in Risch (1999, p. 136).

***Eucera confinis* Pérez, 1895.** The holotype is mounted on a long light pin with a small round head. It has two labels handwritten in black ink by Pérez: “Bône” (Annaba, Algeria) and “*confinis* JP” together with a printed curator label and a holotype label that was added by Baker (Supplementary material, p. 27). It is badly damaged as a result of an unsuccessful attempt to dissect the specimen, with only the head and the mesosoma minus various parts mounted on the pin, and with some leg parts glued to the underside of the mesosoma, which is partial, glued dorsal side down on a mounting board and largely obscured; the morphologically diagnostic disc of S6 is mounted on a separate board. Eight conspecific females and one male are identified and placed in coll. Pérez (as also in coll. Vachal) under the unrelated species name *Eucera nigra* Lepeletier, 1841 (misidentification), and are labelled with the serial number 2036 from Pérez’ catalogue (p. 252). An additional female and two males included in that series belong to the closely related *Eucera punctatissima* Pérez, 1895, which Pérez (1895b) diagnosed based on vestiture colour alone, but both these species exhibit variation in their vestiture colour from fulvous to blackish dark brown.

***Eucera nigra* var. *decolorata* Gribodo, 1924.** No type material is known or found in coll. Gribodo in MSNG (Penati & Mariotti 2015, p. 41). The species affiliation of this name cannot be determined with confidence, but its placement in the *bidentata* group of species as suggested by Risch (1999, p. 136), quoting Tkalců (in litt.) fits better the short description provided by Gribodo (1924, p. 18). This in particular includes the smaller size and the lighter ferruginous hairs of legs as compared to those of *Eucera nigra* Lepeletier, 1841, which would be a misidentification of that latter species by Gribodo (1924, p. 18). *Eucera decolorata* auct. might also represent the closely related *Eucera punctatissima* Pérez, 1895, or a combination of this species and *Eucera confinis*, the two species which fly together in both Algeria and Morocco. The alternative would be a lighter variation, structurally identical with *Eucera nigra* Lepeletier, 1841, but with uniform fulvous hairs as intended by Gribodo. Such lighter female specimens are actually known from both Algeria and Morocco, and correspond with a female specimen treated by Lepeletier as *Eucera atricornis* Fabricius, and a second conspecific non-type female placed in coll. Lepeletier under the name *Eucera subvillosa* Lepeletier, 1841. Both these specimens are labelled, each with the different name mentioned above, by Lucas. Regardless of the true identity of the species, synonymy with any of the three alternatives listed above renders this name invalid.

***Eucera bolivari* Dusmet y Alonso, 1926.** Risch (1999, p. 136) proposed that this species consists of the males corresponding to *Eucera decolorata* Gribodo, 1924, but the identity of that latter species cannot be confirmed (see above). I have not seen type material of the current species that is preserved in MNCN, and the synonymy proposed is based merely on the description of S6 in Dusmet y Alonso (1926, p. 101): "... formando cada una un ángulo marcado.", which is diagnostic.

***Eucera (Synhalonia) cuniculina* Klug, 1845**

Eucera cuniculina Klug 1845: table 50, fig. 14. ♂, "Cahirae" (Cairo, Egypt). Holotype: MNB, examined by Baker (1997, p. 199).

Tetralonia mucida Pérez 1895b: 9, n. syn. ♀♂ (partim). Lectotype: ♂, "Biskra" (Algeria), MNHN, designated here.

Eucera cunicularia Klug; Dalla Torre 1896, p. 229 (unjustified emendation of *Eucera cuniculina* Klug).

***Tetralonia mucida* Pérez, 1895.** The type series is listed in Pérez' catalogue, No. 1474, p. 211, as "f Kerkenna (Tunisie)", "♂♀ Biskra" (Algeria), "m Egypt (Waltl)", "Médeira, mai (de gaulle)" (Madeira). Specimens from these type localities were selected as paralectotypes including a female and a male from "Biskra" (Algeria), a male from "Egypt.Wlt" (= *Eucera pumila* Klug, 1845), and a female from "Kerkena Tunisie" (sic). The lectotype and the female and male paralectotypes that originate in Biskra are mounted on headless black coated pins and

have small light blue discs (= March), and labels written in black ink by Pérez "Biskra" as well as a printed curator label (Supplementary material, p. 52). The lectotype is entire and well preserved, it was dissected for the purpose of the present study and the genitalia, S6–8, and T6 and T7 are now displayed on a mounting board. Other non-type specimens that were found among the type series include conspecific female (from "Alger") and male, and additional female and male (from "Egypte") that belong to the species *Eucera pumila* Klug, 1845.

***Eucera (Eucera) dimidiata* Brullé, 1832**

Eucera dimidiata Brullé 1832: 334. ♂, "moins commun que le précédens" (the Peloponnese, Greece). Holotype: MNHN, examined and labelled.

Eucera fulvescens Walker 1871: 52, n. syn. ♂, "Cairo". Holotype: BMNH.

Eucera dizona Dours 1873: 316. ♂, "Algérie". Type material presumed lost (Hörn & Kahle 1935, p. 60; Tkalců 1978, p. 159). Synonymy in Schulz (1906, p. 62).

Eucera bifasciata Radoszkowsky 1876: 126. ♂, Egypt. Holotype: "EGYPT C.BRA", ISEAP, examined by Tkalců (1978, p. 159). Synonymy in Schulz (1906, p. 62).

Eucera punica Gribodo 1894: 280. ♀♂, "d'Algeria". Types unlocated. Synonymy in Alfken (1926, p. 113).

Eucera meridionalis Dalla Torre & Friese 1895: 58, replacement name for *Eucera bifasciata* Radoszkowsky, 1876 (nec *Tetralonia bifasciata* Smith, 1854). Synonymy in Schulz (1906, p. 62).

Eucera aegyptiaca Dalla Torre 1896: 223, replacement name for *Eucera fulvescens* Walker, 1871 (nec *Tetralonia fulvescens* Giraud, 1863).

***Eucera dimidiata* Brullé, 1832.** The holotype is mounted on a small headed long light pin, and labelled with white disc written "Brulle Morée", and a small square label written with the serial number "744" (Supplementary material, p. 29). The holotype is in fair condition for its age, with the left antenna broken after the first flagellar segment, and the left mid- and hind legs missing beyond the femur. It is difficult to determine with confidence the identity of the type based only on external characteristics (I did not want to manipulate this single old type to expose its genital complex), and the original description may also fit *Eucera nigrilabris* Lepeletier, 1841. This includes the mention of pale apical margin of all abdominal tergites ("Abdomen pâle au bord postérieur de tous les segments") and the presence of some grey hairs along their edge ("quelques poils gris se remarquent sur les côtés"). The small size of the holotype compared to specimens of *Eucera nigrilabris* Lepeletier, 1841 from Greece supports retaining the species concept in its customary use.

Tkalců (1978, p. 159) described *Eucera dimidiata* ssp. *stehliki* Tkalců, 1978 from "O. Afghanistan, Prov. Nengrahar" as distinct.

***Eucera fulvescens* Walker, 1871.** The holotype, preserved in BMNH is the only type specimen found (No. 17B.783),

and was examined via correspondence with Joseph Monks, the curator of Hymenoptera in BMNH. It is fairly well preserved but with hairs matted and dirty with debris and mould hypha. It has a locality label printed in black font “Gardens, Cairo and Suburbs.”, an identification label written in black ink “*Eucera fulvescens*. Walk.”, and a second identification label added by DB Baker in the year 1981, which confirm the synonymy above.

***Eucera punica* Gribodo, 1894.** No type material from Algeria is known, but Gribodo (1924, p. 20) mentions additional specimens from Tunisia. According to Penati & Mariotti (2015, p. 102) these are specimens from “Tunis (Mnila)” that were reported in an unpublished manuscript as having been used in the species description, and therefore they should be considered as syntypes; these include the following records: 2♀♂ “Zavia Mechili”, ♂ “Derna”, ♀ “Merg”, coll. Gribodo, MSNG; and 6♀ “Zavia Mechili”, coll. Festa, MSNT.

***Eucera (Eucera) furfurea* Vachal, 1907**

Eucera furfurea Vachal 1907: 375. ♀♂, “Gulek” (Turkey). Lectotype: ♀, MNHN, designated here.

Eucera gracilipes Pérez 1910: 14, n. syn. ♂, “Région verdoyante de Damas”. Lectotype: MNHN, designated here. Junior homonym of *Eucera gracilipes* Pérez, 1895.

Eucera duplicata Dusmet y Alonso 1926: 119, replacement name for *Eucera gracilipes* Pérez, 1910.

***Eucera furfurea* Vachal, 1907.** A lectotype and additional three female and a male paralectotypes were examined and labelled here. The entire type series is conspecific and has identical original labels of Vachal, printed with “Taurus” and a handwritten date (with the month printed) “16 V 11” (Supplementary material, pp. 34, 35). The lectotype is the best-preserved female specimen, missing the left antenna from the 2nd flagellar segment, and some tarsal segments. Among the paralectotypes are: female with a lectotype label of Baker, and a well-preserved male with the genitalia and S7 and S8 dissected and placed onto a mounting board. Vachal (1907) proposed the name *Eucera transversa* for the male if it proves to be non-conspecific.

***Eucera gracilipes* Pérez, 1910.** The lectotype is well preserved, missing only the right antenna from the 4th flagellar segment. It is labelled with a small purple disc (= April), and has an original label, written in red ink by Pérez: “*gracilipes* JP Damas, Avril”. There is also a printed curator label, and a lectotype label of Baker (Supplementary material, p. 39). A paralectotype examined here has similar labels to that of the lectotype, including an identification label with “*gracilips*” (sic), and a paralectotype label of Baker (Supplementary material, p. 39). It is fairly well preserved with some antennal and leg segments broken or missing.

***Eucera (Eucera) gaullei* Vachal, 1907**

Eucera gaullei Vachal 1907: 374. ♀♂, “d’Adana” (Turkey). Lectotype: ♂, MNHN, designated here.

Additional four females and two males were examined and labelled as paralectotypes. The type series is well preserved, missing only some antennae and leg segments. They are mounted on similar black coated pins with small round golden heads, and with original labels printed with “Adana” and “V” in black and with the rest of the date added in black or brownish ink. The lectotype has a label with “Adana IV” and a second label written in black ink by Vachal “*gaullei* ♂ Vach” (Figure 14, Supplementary material, p. 36); it is missing only the left antenna from the 2nd flagellar segment. The paralectotypes include four females and two males that were collected in April or May, except for a single female that was collected in July (Supplementary material, p. 36). Two female specimens that were found among the type specimens belong to *Eucera laxiscopa* Alfken, 1935, and they display similar labels and pins to those of the type series. These female specimens are not considered as types because Vachal mentioned only five females and five males in his type series. In addition, they do not fit the description, specifically the apical fasciae on T3 is not extended anteromedially, the hairs on both sides of the pygidial plate are not golden-reddish but pale fulvous, and there are almost no hairs on both sides of T2, which are conspicuous in the female types.

***Eucera (Eucera) genovefae* Vachal, 1907**

Eucera genovefae Vachal 1907: 372. ♀♂, “Ghardaia (Sud algérien)”. Lectotype: ♂, MNHN, designated here.

The male lectotype has a bluish locality label printed with “Ghardaia” and the date handwritten in black ink by Vachal “3.91” (the “1” not clear) (Supplementary material, p. 37). There is also a printed curator label. It is fairly well preserved, but with some tarsal segments missing on both hind legs. A female paralectotype examined here has two labels handwritten in black ink by Vachal: “Ghardaia 3.98” and “*Genovefae* ♀ Vach”. It also has two printed type labels (Supplementary material, p. 37). The female specimen is intact, but it was not selected as lectotype because less distinctive than the male.

***Eucera (Eucera) gracilipes* Pérez, 1895**

Eucera gracilipes Pérez 1895a: 192. ♂, “Ténérife”. Holotype: MNHN, examined by Tkalců (1993, p. 827).

Tkalců (1993, p. 827) provided description of the female and redescription of the male in a table as well as accurate description of the original type labels, but no lectotype label of his was found (only a red label printed with “Lectotype”). The designation of Tkalců (1993) is valid and a

label confirming his designation is now added to the lectotype (Supplementary material, p. 38). The male lectotype is well preserved and intact but with all legs folded under the body, obscuring the tarsal segments of the front and middle legs and the base of the underside of metasoma.

Eucera (Eucera) grisea Fabricius, 1793

Eucera grisea Fabricius 1793: 345. (♂), “in Barbariae floribus Mus. Dom. Desfontaines”. Lectotype: NHMD, designated by Tkalčú (1984a, p. 72).

Eucera eucnemidea Dours 1873: 321, n. syn. ♀♂, “Algérie, midi de la France ... Coll. Dours”. Type material presumed lost (Hörn & Kahle 1935, p. 60). Type species of *Pteneucera* Tkalčú, 1984. Synonymy in Tkalčú (1984a, p. 72, as probable synonym); formally synonymised here.

Eucera albigena De-Stefani Perez 1882: 156. ♂, (Sicily). Type material presumed lost (Romano 2006, p. 216, table 3). Synonymy with *Eucera eucnemidea* Dours, 1873 in De-Stefani Perez (1887, p. 114) (“sicché sono d’avviso di ritenere l’*albigena* come sinonimo dell’*eucnemidea*”).

***Eucera grisea* Fabricius, 1793.** Tkalčú (1984a) reported as “Holotype” an original male specimen, which he suspected belonging to *Eucera eucnemidea* Dours, 1873. DB Baker subsequently recovered two male syntypes in NHMD, not a single specimen as given by Zimsen (1964, p. 422, type 1200). He newly labelled the second specimen, which belongs to *Eucera elongatula* Vachal, 1907 as lectotype, and Tkalčú’s lectotype as paralectotype because only the former specimen displays an original label written in black ink by Fabricius “*grisea*” (Supplementary material, p. 40), and it agrees with the previous interpretation of Alfken (1942, pp. 206–207). Indeed, this should have been the ideal decision, but the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>), article 74.6, states that “... if it is considered subsequently that the original description was based on more than one specimen, the first author to have published before 2000 the assumption that the species-group taxon was based upon a single type specimen is deemed to have designated that specimen as the lectotype.” Thus, Tkalčú’s (1984a) lectotype has priority and is accepted here. My recent examination of the Fabricius’ types in NHMD confirms the identity of both syntypes as given above, although both are not easily determined due to their poor state of preservation. Particularly, Tkalčú’s (1984a) description of the lectotype is accurate; it is missing the metasoma beyond T1 and S1, and the front as well as hind right leg beyond the coxa. These specimens are likely syntypes because they are similarly mounted on original short light pins with large round heads made by hand from stainless steel, and both of them agree with the original description. A new lectotype label was added to Tkalčú’s (1984a) specimen to clarify its lectotype status (Supplementary material, p. 40).

Eucera (Eucera) hispana Lepeletier, 1841

Eucera bicolor Lepeletier 1841: 127, n. syn. ♂, “Oran” (Algeria). Types unlocated.

Eucera hispana Lepeletier 1841: 135, ♀, “Espagne”. Lectotype: coll. Spinola, MSNT, designated by Tkalčú (1978, p. 168). Type species of *Hetereucera* Tkalčú, 1978, p. 167. Precedent name in accordance with the principle of the First Reviser, article 24.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

?*Eucera ephippia* Dours 1873: 317 (given as “*Eucera ephippia*, Sichel”), n. syn. ♀♂, “Iles de l’Archipel grec. Coll. Sichel, Dours” (Algeria). Type material presumed lost (Hörn & Kahle 1935, p. 60). **Nomen dubium.**

Eucera brevicornis Dours 1873: 322. ♂, “Algérie. Coll. Dours”. Type material presumed lost (Hörn & Kahle 1935, p. 60). Synonymy in Pérez (1902, p. XLVI, in footnote), Alfken (1936, p. 2, quoting Pérez 1913, in litt.).

Eucera doursana Dalla Torre & Friese 1895: 57, replacement name for *Eucera brevicornis* Dours, 1873 [nec *Tetralonia brevicornis* Smith, 1854 = *Paracolletes brevicornis* (Smith, 1854)].

Eucera algeriensis Dalla Torre 1896: 224, replacement name for *Eucera bicolor* Lepeletier, 1841 (nec *Macrocera bicolor* Lepeletier, 1841).

***Eucera bicolor* Lepeletier, 1841.** No type material was found in MNHN. Non-type material in coll. Pérez and Vachal belong to *Eucera oraniensis* Lepeletier, 1841, but the original description of vestiture, and the comparatively short antennae (“Antennes d’un tiers plus courtes que le corps”) agree with recent males from Northern Africa that are conspecific with *Eucera hispana* Lepeletier, 1841 not with *Eucera oraniensis* Lepeletier, 1841.

***Eucera hispana* Lepeletier, 1841.** The only type specimen known is a female lectotype that was sent to Spinola by Lepeletier and is now preserved in MSNT (Casolari & Casolari Moreno 1980, p. 141). Syntypes were neither found in MNHN, at least since the inquiry of Alfken (1936, p. 2), nor in OUM (Baker 1994). The determination of this species by Alfken (1936, p. 10, in key, based on Pérez 1913, in litt., and on material sent from his collection) from North Africa in addition to Spain is correct, and agrees with the description of *Eucera bicolor* Lepeletier, 1841, described in the male sex from “Oran”.

***Eucera ephippia* Dours, 1873.** A possible synonym given that the type locality, “Iles de l’Archipel grec.” is in Algeria and not in Greece. The same type locality is given repeatedly in that work as a locality in Algeria (for example, in the description of *Eucera bibalteata* Dours, *Eucera pedata* Dours, and *Eucera semistrigosa* Dours). Thus, the interpretation of Pérez (1913, in litt.), quoted in Alfken (1936, p. 2) that *Eucera ephippia* Dours cannot be a synonym of *Eucera hispana* Lepeletier, 1841 because it is actually from the Greece archipelago (where the latter species does not occur) is erroneous and led Alfken astray. The size of the female given in the original description suggests *Eucera hispana*, but not the vestiture colour, and the male may belong to

either this species or to *Eucera polita* Pérez, 1895, which is smaller (“plus grêle que la ♀”) and has similarly short antennae (“Antennes de la moitié de la longueur du corps.”).

Eucera (Eucera) impressiventris Pérez, 1895

Eucera impressiventris Pérez 1895b: 7. ♂, (Algeria). Lectotype: MNHN, designated here.

The entire type series, including also seven male paralectotypes were examined and labelled here. The type series are similarly mounted on light headless pins and labelled with a small purple disc (= April), except for one specimen, and have minimal labels written in black ink by Pérez “Alger” (Supplementary material, p. 44). The species is listed in Pérez’ catalogue under the serial number 835 (although the species name was corrected and is not easily read), where the type series is noted to be taken from “aux environs d’Alger” (around Algiers, Algeria). The series of specimens originating from coll. Pérez is placed above a corresponding head label with the serial number 835, and specimens that have different locality labels were not considered as types. The type series is well preserved and complete (including the lectotype), except for two specimens that are partial. Alfken (1914, p. 229) has erroneously established the synonymy of this species with *Eucera punctatissima* Pérez, 1895 that is described based on females. He probably intuitively associated these species that are described in different sexes in Pérez (1895b) and exhibit superficial resemblance, without examining type material as they are obviously unrelated (see also in the account of *Eucera punctatissima* Pérez, 1895). A male specimen from coll. de Gaulle that was identified and labelled by Pérez has a curator lectotype label but is obviously not a type specimen because it is originating from “Oran”.

Eucera (Synhalonia) lanuginosa Klug, 1845

Macrocera alternans auct. (nec Brullé, 1832); Brullé (1840, p. 85). (♀), “Îles Canaries” (misidentification).

?*Tetralonia atricornis* Spinola 1838: 539. ♂, “en Egypte, en Nubie et en Arabie”. Syntypes: 2♂, MSNT, reported by Casolari & Casolari Moreno (1980, p. 143). Synonymy in Alfken (1926, p. 108).

Macrocera ruficollis auct. (nec Brullé); Lepeletier (1841, p. 89). ♀ (partim), “Oran” (Algeria) (misidentification).

Eucera lanuginosa Klug 1845: table 50, fig. 11. ♂, “ad Saccharam lecta” (?Saqqara, Egypt). Holotype: “Aegypt”, MNB, examined by Tkalcù (1993, p. 820).

Macrocera grandis Fonscolombe; Pérez 1895a, p. 192: 1♀ 2♂, “Canaria” (Canary Islands) (misidentification).

Tetralonia dziedickii Radoszkowsky 1876: 126, ♀♂, (“Egypte”). Syntypes: 3♀ 3♂, “Egypt”, “Egyptus.”, “EGYPT BRA”, ISEAP. Given as replacement name for *Tetralonia atricornis* Spinola (1838) (nec *Eucera atricornis* Fabricius, 1793). Synonymy in Alfken (1926, p. 108).

?*Eucera spinolae* Dalla Torre & Friese 1895: 59, replacement name for *Tetralonia atricornis* Spinola (1838, p. 539) (nec *Eucera atricornis* Fabricius, 1793).

Tetralonia berlandi var. *canariensis* Dusmet y Alonso 1926: 172. ♂, “de Palma (Canarias)” (La Palma, Canary Islands). Holotype: MNCN [not examined by Tkalcù (1993)]. Synonymy in Tkalcù (1993, p. 820), given as *Tetralonia lanuginosa* var. *canariensis* Dusmet y Alonso, 1926.

Macrocera alternans auct. (nec Brullé, 1832); Brullé (1840). No description is provided but only a note “Espèce déjà trouvée en Grèce et en Barbarie.”. A badly preserved and damaged female is the only corresponding original specimen. It has no identification label, and is identified based on the original pin, the large blue disc written with the code “3. 41.” [as described in the account of *Eucera algira* Lepeletier; Brullé (1840)], and a curator label printed with “MUSEUM PARIS CANARIES WEBB & BERTHELOT 3-4” (Supplementary material, p. 15).

Macrocera ruficollis auct. (nec Brullé); Lepeletier (1841). A single female specimen was found and examined here. It has the original pin and head label of Lepeletier (the label is partial, displaying “*Ruficollis* ♀”), and is badly preserved, with multiple body parts missing, especially the metasoma beyond T1 (Supplementary material, p. 73). The original series must have been composite, including females that were probably conspecific with *Eucera rufa* (Lepeletier, 1841) in combination with *Eucera lanuginosa* Klug, 1845 (see notes below). The males were likely particularly large specimens of *Eucera rufa*, and Lepeletier did not associate them with that species, which he diagnosed based on the overall reddish vestiture colour. They did not belong to *Eucera lanuginosa* because males of this species have light hairs on the metasoma, and the description mentions that all tergites beyond T2 are entirely black. Also, Lepeletier mistakenly wrote that Brullé (1832) described only the female (“Brullé a décrit la femelle seulement.”) when he actually described the species based on the male sex. These assumptions made above are supported by the descriptions and illustrations of both the female and male provided by Lucas (1849, p. 156, pl. 2, fig. 9), who has studied original specimens of Lepeletier in MNHN. *Eucera rufa* and *Eucera lanuginosa* are found in sympatry in “Oran” (Algeria), and additional non-type specimens determined by these authors show that they were not able to distinguish between them. For example, four males that were found above a curator head label with “*M. ruficollis* St Farg.” written on it all belong to *Eucera rufa*. Three of them originate from coll. Lucas and were determined by him (all three have typical large blue discs with the code “1165”, and one has additionally a vertical label written with “*Macrocera ruficollis* ♂”). The fourth specimen is fairly well preserved, and may represent original material as it has an original label of Lepeletier. The label however has

only “*M. ♀*” (without specific name), thus it was obviously transferred from a female specimen and it cannot be determined which species was intended by Lepeletier. Further, *Macrocera alternans* auct. (nec Brullé, 1832) in Brullé (1840), listed above from the Canary Islands, belongs to *Eucera lanuginosa*, but the name is in fact synonymous with *Eucera rufa* (Lepeletier, 1841) (see in the account of that species). The two species are undistinguished also in Dufour (1852, p. XLV) and in Pérez (1879, p. 155), where the erroneous synonymy of *Macrocera ruficollis* Brullé, 1832 with *Macrocera rufa* Lepeletier, 1841 or its synonym *Macrocera grandis* Fonscolombe, 1846 is retained. Alfken (1926, p. 108) was probably the first to recognise *Eucera lanuginosa* as distinct from *Eucera rufa*, but he did not see the type material of this species or its other synonymy.

***Tetralonia atricornis* Spinola, 1838.** The types were probably not examined by modern taxonomists, and the name would have priority if the synonymy cited above is proved true. At present, neither Spinola’s (1838, p. 539) description nor the reference illustration in Savigny (1798–1801, pl. 2, fig. 3) are sufficient to confidently determine the species identity.

***Eucera (Eucera) longicornis* (Linnaeus, 1758)**

Apis longicornis Linnaeus 1758: 574. ♂, “in Europa”. Lectotype: Linnean Society, London, designated by Day (1979, p. 66). Type species of *Eucera* Scopoli, 1770.

?*Apis linguaria* Fabricius 1775: 388. ♂, “in Saxoniae” (Schleswig-Holstein, Germany). Type material lost (Tkalcù 1984a, p. 61). Synonymy in Dalla Torre (1896, p. 237), Friese (1896, p. 102), Tkalcù (1984a, p. 61).

?*Apis dealbator* Christ 1791: 181, table IV, fig. 9. ♀, “Kronenberg an der Höh” (Germany). Type material: lost (Gusenleitner & Schwarz 2002, p. 13). Synonymy in Warncke (1986, p. 95).

Apis tuberculata Fabricius 1793: 334. ♀, “Kiliae” (Kiel, Germany). Lectotype: NHMD, designated by Tkalcù (1984a, p. 61). Synonymy in Spinola (1806, p. 149).

Eucera vulgaris Spinola 1806: 149. ♀, replacement name for *Apis tuberculata* Fabricius, 1793 [given as “*Apis tuberulata*. Fab.” (sic)].

Eucera deffcilis Dufour 1841: 420, n.15. ♀♂, “aux environs de Saint-Séver”. Type material: lost (Pérez 1879, p. 164). Synonymy in Alfken (1913, p. 232, as “*Eucera difficilis* Duf.”).

Eucera linguaria (Fabricius); Lepeletier (1841, p. 122) (given as “*Eucera linguaria* Latr.”), ♀♂, “Commune dans la partie méridionale de l’Europe et en France”. Listed in Dalla Torre (1896, p. 238), Friese (1896, p. 102).

Eucera subrufa Lepeletier 1841: 129. ♂, “De Lyon et de Saintes”. Lectotype: MNHN, designated here. Synonymy with “*Eucera difficilis* Duf.” in Pérez (1879, p. 164).

Eucera hispaliensis Pérez 1902: XLVII, n. syn. ♀♂, “Séville” (Spain). Lectotype: ♂, MNHN, designated here.

Eucera atricollis Friese 1922, Konowia, 1: 63. ♀, “Smyrna in Kleinasien” (Anatolia, Turkey). Lectotype: MNB, designated by Tkalcù (1984a, p. 61). Synonymy in Tkalcù (1984a, p. 61).

Eucera fallax Dusmet y Alonso 1926: 116, n. syn. [given as “*E. fallax* n. sp. ♂. (Pérez, sin descripción)”. ♂, “Vallvidrera (prov. de Barcelona)”. Holotype: coll. Antiga, MCNB.

Eucera pillichii Alfken 1932: 120. ♀♂, “Simontornya, Czepel, Törökbólint” (Csepel Island, Törökbálint; Hungary). Holotype: ♀, MNB, examined by Tkalcù (1984a, p. 61). Synonymy in Móczár (1954, p. 368, in key).

***Eucera deffcilis* Dufour, 1841.** Pérez (1879, p. 164) reported on the original type series that he studied in coll. Dufour under the name “*Eucera difficilis* Duf.”. Indeed, this was the name intended by Dufour based on a head label in his handwriting that was found in his collection. It appears that two specimens were placed above this head label but these were neither found in coll. Dufour nor elsewhere. Pérez provided the following synonymy: *Eucera linguaria* (Fabricius) in Lepeletier (1841) for the female and *Eucera subrufa* Lepeletier, 1841 for the male, both which are recognised here as junior synonyms of *Eucera longicornis* (Linnaeus, 1758). Pérez (1879, p. 164) further mentioned that the species is widespread in the south of France, and re-described the female as well as male based on material from different localities by comparing them to “*Eucera longicornis*”, which he misinterpreted and confused with *Eucera nigrescens* Pérez, 1879 (Tkalcù 1984a, p. 61). The diagnostic characters that he listed include the lighter reddish-brown vestiture with almost complete absence of apical hair bands on T2 and T3, the finer and more conspicuous punctation of tergites, and the more translucent integument of marginal zones. He however also recognised colour variation among the specimens that he examined, including the occurrence of darker individuals. Males examined in coll. Pérez and in coll. Vachal from the south of France (Bordeaux, Haute le Vienne, “Argent”), confirm this finding by showing varying extents of tergite hair colour and transparency of integument. All these species show morphological characteristics of *Eucera longicornis* (Linnaeus), including the genitalia and associated sternites that were dissected for detailed examination.

***Eucera linguaria* (Fabricius); Lepeletier (1841).** The material found under this name in coll. Lepeletier is composite. It includes two specimens with original pins and head labels: a badly preserved male (without the metasoma), and a female that also displays a small green disc, both which are conspecific with *Eucera longicornis* (Linnaeus, 1758) (Supplementary material, p. 49). Three additional specimens are of uncertain status. They comprise two comparatively well-preserved conspecific males (one dissected to examine the genitalia) and a female that belongs to *Eucera nigrescens* Pérez, 1879. These specimens are displaying labels written by Brullé (Supplementary material, p. 49) and they were not considered as original material studied by Lepeletier because they were possibly added to the

collection subsequent to the publication of Lepeletier's monograph.

***Eucera subrufa* Lepeletier, 1841.** Two males were found under this name in coll. Lepeletier, both with typical long light pins and a white paper disc. The less badly preserved and with original head label written in red "*E. subrufa* ♂" is designated as lectotype (Supplementary material, p. 80). The lectotype is missing flagellar segments of both antennae (with those of the left antennae added onto a mounting board). The left lower side of the propodeum and left coxae are damaged by pests, and the metasoma has only T1–4 and S1 remaining. The second male, labelled as paralectotype, is badly damaged by pests and missing various body parts, including the entire metasoma. Both these specimens match the original description and are conspecific with *Eucera defficialis* Dufour, which represents a lighter colour form of *Eucera longicornis* (Linnaeus, 1758). Interestingly, a single conspecific male specimen that was found in coll. Lepeletier, and which displays original pin and label written in red "*E. dissimilis* ♂" as well as a small green disc is not included in Lepeletier's (1841) monograph. This specimen largely agrees with the description of *Eucera subrufa*, and it was possibly considered as a different species because the hairs on T5–7 are slightly lighter whitish, not ferruginous as given in the original description (but the types of *Eucera subrufa* are missing the distal tergites and this characteristic could not be compared).

***Eucera hispaliensis* Pérez, 1902.** A single, well-preserved male specimen in coll. Pérez is designated as lectotype. It is mounted on a light headless pin and has two labels written by Pérez, a minimal locality label with "Séville" in black ink, and an identification label with "*hispaliensis*" in brownish ink. There are also three curator labels, two of which are type labels (Supplementary material, p. 43). It is well preserved but with both antennae partly covered by old mould, the right antenna broken into three segments added together on a mounting board, and the right middle distitarsus is missing, and was likely amputated by the pin when the specimen was prepared. The lectotype shows identical structural characteristics to *Eucera longicornis* (Linnaeus, 1758) in agreement with recent male specimens, including specimens that were dissected to compare the genital structures. This name therefore represents a light colour form of *Eucera longicornis* (Linnaeus, 1758) that occurs in the Iberian Peninsula with additional intermediate forms found in the south of France (mentioned above). An example to such an intermediate colour form is actually the female holotype and paratype of *Eucera hispaliensis* ssp. *septemtrionalium* Tkalců, 1984b described by Tkalců (1984b, p. 7) from "Batuecas, Salamanca (España)". These female specimens were separated based on their darker vestiture compared to the corresponding males, including two male specimens

that were taken at the same locality and date as the females, but which were not included in the type series due to a lack of significant colour differences from the nominal subspecies.

***Eucera atricollis* Friese, 1922.** This is a melanic dark form, and intermediate populations with varying colours were reported by Tkalců (1984a, p. 61) from Varna, NE Bulgaria.

***Eucera fallax* Dusmet y Alonso, 1926.** Dusmet y Alonso (1926, p. 116) described the species based on unpublished material named by Pérez, including the holotype and a paratype from coll. Antiga, and he retained the original name proposed by Pérez. A likely original specimen found in coll. Pérez is mounted on light headless pin and has two labels written by Pérez, a small label written in red ink "Barcelone" and another written in brownish ink "*fallax* JP". It is in a relatively good condition, nearly complete, and is most reminiscent of *Eucera hispaliensis* Pérez, 1902 from Spain, which is listed above as an additional synonym.

***Eucera (Eucera) microsoma* Cockerell, 1922**

Eucera pumila Pérez 1910: 2. ♀, "Région de Homs" (Syria). Lectotype: MNHN, designated here. Junior homonym of *Eucera pumila* Klug, 1845.

Eucera microsoma Cockerell 1922: 361, replacement name for *Eucera pumila* Pérez, 1910 (nec *Eucera pumila* Klug, 1845).

***Eucera pumila* Pérez, 1910.** The lectotype is the only specimen found. It has an original locality label, handwritten in black ink presumably by Kerville: "Entre Homs et le lac de Homs (Syrie), 22 mai 1908" onto which the metasoma and the right hind leg are glued, together with an identification label handwritten in red ink by Pérez: "*pumila* JP". There is also a holotype label of Baker (Supplementary material, p. 70). The lectotype is fairly well preserved, despite being broken and partly dirty with glue.

***Eucera (Eucera) nigra* Lepeletier, 1841**

Eucera subvillosa Lepeletier 1841: 125, n. syn. ♂, "Oran" (Algeria). Lectotype: MNHN, designated here.

Eucera nigra Lepeletier 1841: 126. ♀, "Oran" (Algeria). Lectotype: MNHN, designated here. Precedent name in accordance with the principle of the First Reviser, article 24.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera atricornis auct. (nec Fabricius); Lepeletier (1841, p. 128). ♀ (partim), "Oran" (Algeria) (misidentification.)

Eucera aterrima (Friese, in litt.) Dalla Torre 1896: 225, replacement name for *Eucera nigra* Lepeletier, 1841 (nec *Macrocera nigra* Lepeletier, 1841).

Eucera nigrita ssp. *aterrima* Friese; Risch (2001, p. 369), "Sizilien ... Tunesien".

***Eucera subvillosa* Lepeletier, 1841.** The lectotype is mounted on a long light pin and has a vertical label

written with “*Eucera Subvillosa* S. F. coll. ♂” (Supplementary material, p. 81). Another, likely conspecific female found next to the lectotype in coll. Lepeletier has a similar pin and label with “*Eucera Subvillosa*, de StFarg. ♀” (Supplementary material, p. 81). Both these labels are handwritten in black ink by Lucas and were evidently added to original material in coll. Lepeletier. Lucas (1849, p. 161) specifically mentions that he never collected this species but studied Lepeletier’s original specimens deposited in MNHN (“Cette espèce, que je n’ai pas rencontrée, a été prise, aux environs d’Oran, par M. le lieutenant-colonel Lepeletier de Saint-Fargeau.”), including both the male and the non-type female that was obviously associated with the male subsequent to the publication of Lepeletier’s (1841) monograph. The male is therefore considered here as an original type specimen. The female seems to be a lighter colour variation of *Eucera nigra* Lepeletier, 1841, structurally identical but with uniform fulvous hairs, in agreement with recent material from Rabat (Morocco) and a female from “Oran” (Algeria) from coll. de Gaulle. Tkalčú (1984a, p. 73) mentioned two additional doubtful syntypes that are preserved in coll. Spinola in MSNT and which belong to *Eucera notata* Lepeletier, 1841. The lectotype is comparatively less badly preserved, with probably the left front leg detached and partly damaged by pests, the other front (right) leg and the right antenna missing, all legs and various other body parts partly damaged by pests, and S2 exerted and covering S3.

***Eucera nigra* Lepeletier, 1841.** The lectotype is mounted on a long light pin, and has an original label of Lepeletier written in red ink “*E. Nigra* ♀” (Supplementary material, p. 53). It is comparatively well preserved, slightly damaged by pests, with only the left compound eye missing. A paralectotype examined and labelled has a similar pin and no label (Supplementary material, p. 53). It is heavily damaged by pests, with various body parts missing, including the entire metasoma and some of the legs. This species is probably conspecific with *Eucera albofasciata* Friese, 1895 because it exhibits negligible morphological differences in both the female and male. The latter name is not included as a synonym in the list above because further work is needed to establish this synonymy with confidence.

***Eucera atricornis* auct. (nec Fabricius); Lepeletier (1841).** Three female specimens were found above a blue curator head label displaying “*E atricornis* St Farg. Algérie” (Supplementary material, p. 16), each of which represents a different species, different from the nominal species. A first, mostly complete specimen better fits the original description, which is not particularly informative, in the ferruginous hairs that cover T5 (“le cinquième cilié de poils raides couchés ferrugineux”). It has the original pin and vertical label of Lucas written with “*Eucera atricornis*, Fabr. ♀”, and is conspecific with another female

that was paired, probably by Lucas with the male of *Eucera subvillosa* Lepeletier, 1841 (see above). As in the case of that latter species, Lucas (1849, p. 162) specifically mentions that he never collected this species that seems to be quite rare (“Je n’ai pas trouvé cette espèce, qui paraît assez rare.”). This is likely an original specimen also because it matches the more detailed redescription provided by Pérez (1879, p. 159) based on female and male specimens that he studied in coll. Dufour, which had a note “ipse Lepelet”, thus were confirmed by Lepeletier himself. A second, less well-preserved female belongs to *Eucera oraniensis* Lepeletier, 1841. It is mounted on an atypical short light pin and has an identification label written by Lepeletier (Supplementary material, p. 16). The placement of this specimen here is odd because it is easily differentiated from the previous one based on its smaller size and vestiture pattern, and Lepeletier already described the female under another name. The third specimen belongs to *Eucera colaris* Dours, 1873, and is probably not part of the original series because its pin and label are not of Lepeletier’s. It is unlikely that Lepeletier considered this specimen as conspecific given its larger size and different vestiture pattern. No putative male specimens were found, but both the original description and the redescription of Pérez (1879, p. 159) suggest that it is conspecific with *Eucera ferruginea* Lepeletier, 1841, p. 140, which was described from “Oran” only in the female sex. The specimen reported by Pérez (1879) was however smaller compared to recent specimens of this species from Tunisia and Morocco.

***Eucera (Eucera) nigrescens* Pérez, 1879**

Eucera longicornis Latreille (nec Linnaeus); Lepeletier (1841, p. 118), ♀♂ (partim), “Commune dans la plus grande partie de l’Europe.” (misidentification).

Eucera longicornis var. *nigrescens* Pérez 1879: 166. ♀♂, “Corse” (Corsica). Lectotype: ♂, MNHN, designated here.

Eucera longicornis var. *cineta* Friese 1895: 203. ♀, “in Hungaria Caucasoque”. Syntype: “Sarepta 1893 Becker”, MNB. Synonymy in Tkalčú (1984a, p. 62).

Eucera longicornis var. *immaculata* Friese 1895: 203. ♀, “In Dalmatia”. Lectotype: NMW, designated by Tkalčú (1984a, p. 62). Synonymy in Tkalčú (1984a, p. 62).

***Eucera longicornis* Latreille (nec Linnaeus); Lepeletier (1841).** The original specimen series is composite, all three females and two of the three males belong to this species, and an additional male is conspecific with *Eucera longicornis* (Linnaeus, 1758). Two of the three females are mounted on typical pins and have identification labels in Lepeletier’s handwriting. Of these, the best preserved comes from “Bondy C. juin” (Île-de-France, in June; the “C.” may be a number), and agrees with the description except that the hairband on T5 is complete and not interrupted medially (Supplementary material p. 50). The second female that has an original head label is in

fragmentary condition, and its morphological examination is therefore more difficult. Of the two conspecific males, only one has a typical pin, and the other that is slightly smaller in size is poorly preserved, which renders detailed morphological comparisons difficult (Supplementary material p. 50). The third male belonging to *Eucera longicornis* (Linnaeus, 1758) is mounted on an atypical short pin (Supplementary material p. 50). It is relatively well preserved and agrees with the description despite having the hairs on T6 lighter given the comment added by Lepeletier (1841, p. 121) “Les poils roux passent facilement au gris cendré sale dans les individus âgés de cette espèce.”

***Eucera longicornis* var. *nigrescens* Pérez, 1879.** The syntype series, including four female paralectotypes, is well preserved, and similarly marked with original locality labels that have “Corse” written on them by Pérez. They have three additional printed labels, one of which is a red type label that was added by Le Divelec in the year 2018. The lectotype (with a serial number EY31355) is mounted on a long light pin with round head welded to the conical tip of the pin, while the female paralectotypes are displaying different types of pins (Supplementary material, p. 54). Note that the morphological variation observed among the subspecies introduced by Tkalců (1984a, p. 62, 63) – *Eucera nigrescens* ssp. *continentis* Tkalců, 1984a from “S-Frankreich” and “NW-Spanien”; and *Eucera nigrescens* ssp. *contraria* Tkalců, 1984a from “S-Griechenland”, “Kreta bis nach Mitteleuropa”, and “Kleinen Asien, Iran” – overshadows the variation found between this species and other taxa that he considered as distinct, namely *Eucera vidua* Lepeletier, 1841 and *Eucera codinai* Dusmet y Alonso, 1926 [the latter treated as subspecies of the former by Tkalců (1984a)]. Further revision is necessary to substantiate species concepts, and the taxonomy of these taxa is likely to be further modified.

***Eucera (Eucera) nigrifacies* Lepeletier, 1841**

- Eucera nigrifacies* Lepeletier 1841: 132. ♂, “Environs de Bordeaux” (France). Types unlocated.
- Eucera caucasica* Morawitz 1874: 147, ♀, “Derbent” (Dagestan Republic, Russia). Lectotype: designated by Sitdikov (1988, p. 108), MNB. Synonymy in Tkalců (1984a, p. 73, given as *Eucera nigrifacies caucasica* Morawitz, 1874).
- Eucera cornuta* De-Stefani Perez 1882: 155. ♂, “dintorni della città di Alcamo, nella contrada detta Portella di Fraccia” (Sicily). Type material presumed lost (Romano 2006, p. 216, table 3). Synonymy and description of ♀ in De-Stefani Perez (1887, p. 114, given as *Eucera nigrifacies* Lep. var. *cornuta*).
- Eucera sedula* Mocsáry 1879a: 17. ♀, “In Hungaria meridionali ad Jassenovam” (Jasenovo, Serbia). Syntype?, “Jászakisér” (northern Hungary), MTM. Synonymy in Dalla Torre (1896, p. 241), Friese (1896, p. 126).
- Eucera eucnemidea* (nec Dours); Vachal (1907, p. 378) (in key): “*nigrifacies* Lep., ♂ d’*eucnemidea* Drs.” (lapsus).
- ?*Eucera contigua* Dusmet y Alonso 1928: 267, n. syn. [originally given as “*E. contigua* nov. sp. (Pérez in litt.)”]. ♀♂, Algeria,

Morocco. Holotype: ♀, “Téniet-el-Haad, cerca de Argel” (Théniet El Had, Algeria), MNCN.

***Eucera nigrifacies* Lepeletier, 1841.** No type material was found in MNHN. Description of female and redescription of male are in Pérez (1879, p. 169).

***Eucera eucnemidea* (nec Dours); Vachal (1907).** DB Baker reported in an unpublished manuscript on an offprint sent by Vachal to Alfken, in which he clarified that he mistakenly substituted “et” for “♂ d” and added a marginal note “Deux espèces”, confirming that the two species are distinct.

***Eucera contigua* Dusmet y Alonso, 1928.** The type material listed in Dusmet y Alonso (1928, p. 267) was not examined here, and includes the following paratypes: a male from “Ouarsenis” (Algeria), seven males from “de Argelia”, 10 males from “de Amismiz” (Amizmiz, Morocco), and a male from “del Glauï (Marruecos)”. The species is listed in the catalogue of Pérez (No. 2035) as “*Eucera contigua* JP”, and specimens in coll. Pérez with a corresponding serial number and matching localities are males from “Mascara” (2 specimens), “Ouarsenis” (1), and “Téniét” (3), all which are belonging to *Eucera nigrifacies* Lepeletier, 1841; a single female from “Ouarsenis” is excepted and belongs to *Eucera grisea* Fabricius, 1793 (= *Eucera eucnemidea* Dours, 1873). The female holotype and the first male paratype listed above should be part of Pérez’ type series, and although I have not seen them, the holotype is likely conspecific with the males from Téniét. While Dusmet y Alonso (1928) realised that the male is reminiscent of “*eucnemidea* Dours”, and mentioned in his description the unique strongly branched scopal hairs of the female (“escobilla larga y suelta, pelos plumosos”), he still associated the species with the unrelated species *Eucera spatulata* Gribodo, 1893 and *Eucera saundersi* Friese, 1899.

***Eucera (Eucera) nigrilabris* Lepeletier, 1841**

- Eucera nigrilabris* Lepeletier 1841: 116. ♂ (partim), “Oran ... Montpellier”. Lectotype: ♂, MNHN, designated here.
- Eucera canescens* Dours 1873: 311. ♀, “Algérie”. Type material: presumed lost (Hörn & Kahle 1935, p. 60; Tkalců 1984a, p. 66). Synonymy in Tkalců (1984a, p. 66).
- Eucera frivaldszkyi* Mocsáry 1877a: 109. ♂ (partim), “Prope Byzantium (Constantinople)” (near Istanbul, Turkey). Type material, ?MTM. Synonymy in Dalla Torre (1896, p. 242), Friese (1896, pp. 134, 153, given as “*Eucera frivaldszkyi*”, based on examination of Mocsáry’s types).
- Eucera terminalis* Smith 1879: 109. ♀♂, “South of France”. Holotype: ♀, BMNH, (Tkalců 1984a, p. 66). Synonymy in Meade-Waldo (1914, p. 399).

***Eucera nigrilabris* Lepeletier, 1841.** In addition to the lectotype, two females and a male paralectotypes were examined and labelled in this work. Lepeletier (1841, pp. 116–118) confused the sexes of *Eucera nigrilabris*



Figures 15–18. Eucerini bee species described by early French authors. **15**, *Eucera numida* Lepeletier, 1841, ♂; **16**, *Eucera nigrilabris* Lepeletier, 1841, ♀; **17**, *Eucera ruficollis* (Brullé, 1832), ♂; **18**, *Eucera rufa* (Lepeletier, 1841), ♀. Photograph credit: © NJ Vereecken.

and *Eucera numida*, both which he received from his son from “Oran” (Algeria; “Oran. Envoyée par mon fils”). Pérez (1879, pp. 171–173) redescribed the two species and adopted the name “*nigrilabris*” to male *Eucera nigrilabris* Lepeletier, 1841 plus female *Eucera numida* Lepeletier, 1841 (illustrated in Figures 15 and 16 and in Supplementary material, pp. 56, 57). Friese (1896, p. 151) was the first to formally describe this confusion. The lectotype is comparatively less badly preserved, mounted on an atypical short light pin, and has a small white label handwritten in brownish ink “*Nigrilabris*” by Lepeletier in addition to a large pink disc. There is also a blue head label added by a curator that does not mention the locality (Figure 6, Supplementary material, p. 56) but the pin and labels suggest that the lectotype originate from Montpellier (France) (“Montpellier. Collection Latreille appartenant au général Dejean”) rather than “Oran”. The lectotype is nearly complete, but is rather fragile with the left antenna nearly broken at the articulation of the 2nd and 3rd segments, and the right galea nearly broken at its base. Among the paralectotypes, a first, badly

preserved female (belonging to *Eucera numida* Lepeletier, 1841) has original pin and labels, including a head label written by Lepeletier “*E. Nigrilabris* ♀” (Supplementary material, p. 57). A second conspecific female, which is better preserved, was found above a corresponding curator head label and has an original pin, but is lacking an individual label. Finally, the male paralectotype has a typical pin but no label (Supplementary material, p. 56). It was found among the type specimens of *Eucera numida* taken from coll. Lepeletier. It is in fair condition for its age and obviously does not match the original description of *Eucera numida* but that of *Eucera nigrilabris*. It is assumed here that this specimen was misplaced in the collection by a past curator or investigator following the historical confusion and possible reorganisation of the types of the two species (see also under the account of *Eucera numida* Lepeletier, 1841).

Tkalců (1984a, p. 66) described *Eucera nigrilabris* ssp. *rufitarsis* Tkalců, 1984a from “Griechenland ... Türkei”, and *Eucera nigrilabris* ssp. *orientis* Tkalců, 1984a from “Palästina” as distinct.

***Eucera (Eucera) notata* Lepeletier, 1841**

Eucera notata Lepeletier 1841: 126. ♂, “Oran”. Lectotype: MNHN, designated here.

Eucera obesa Dours 1873: 320. ♀♂, “Algérie”. Type material presumed lost (Hörn & Kahle 1935, p. 60). Synonymy in Dalla Torre (1896, p. 242).

Eucera notata var. *obscuriventris* Friese 1922: 62, ♀, “Algerien”. “Type”, “Tunis merid. Alger”, MNB.

Eucera notata var. *sordida* Alfken 1914: 228. ♀♂, “Bab el Oued”, “Hussein Dey” (Algeria). Syntypes: ♀ “la Macta Oran Algeria”; ♂ “Bab el Oued Alger”, “Mustapha Alger”, MNB.

***Eucera notata* Lepeletier, 1841.** The lectotype is displaying original pin and labels, including a small white disc crossed with a black line and a head label written in red ink “*E. Notata* ♂” (Figure 7, Supplementary material, p. 58). It is badly preserved, the right antenna and left hind leg are missing, and the upper right portion of the pronotum and mesonotum as well as underside of mesosoma are damaged by pests. The paralectotype is comparatively better preserved, mounted on an original pin (with loose, misplaced round head), and a horizontal label written by Lucas “*Eucera* ♂. *notata* S. F” (Supplementary material, p. 58). The label was added by Lucas who studied original material in coll. Lepeletier, but the specimen is an original syntype because it lacks the large blue disc with serial number typical of Lucas, and the pin is different than the ones that he used.

***Eucera (Eucera) numida* Lepeletier, 1841**

Eucera numida Lepeletier 1841: 117. ♂ (partim), “Oran” (Algeria). Lectotype: ♂, MNHN, designated here. Precedent name in accordance with the principle of the First Reviser, article 24.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera africana Lepeletier 1841: 124. ♂, “Oran” (Algeria). Types unlocated. Synonymy in Dalla Torre (1896, p. 242), Friese (1896, p. 175).

***Eucera numida* Lepeletier, 1841.** In addition to the lectotype, two females and a male paralectotypes were examined and labelled in this work. Lepeletier (1841, pp. 116–118) confused the sexes of *Eucera nigrilabris* and *Eucera numida*, both which he received from his son from “Oran” (“Oran. Envoyée par mon fils”). Pérez (1879, pp. 171–173) redescribed the two species and adopted the name “*numida*” to male *Eucera numida* Lepeletier, 1841 plus female *Eucera nigrilabris* Lepeletier, 1841 (illustrated in Figures 15 and 16). Friese (1896, p. 175) was the first to formally describe this confusion. All the four type specimens are identified by original pins. The lectotype is labelled with a small white disc crossed with a black line (Supplementary material, p. 59). It is badly damaged by pests, missing the ventral side of the antennae, the compound eyes, underside of

head, left side of mesosoma, and the left front leg. The diagnostic S6 is complete. The male paralectotype is poorly preserved and badly damaged by pests. It has an original head label of Lepeletier, written in red “*E. Numida*” but followed with a ♀ symbol (Supplementary material, p. 59), thus the label was obviously transferred from a female syntype by a curator subsequent to the description of Pérez (1879). Among the female paralectotypes, one is in fragmentary condition, yet confidently compares with *Eucera nigrilabris* Lepeletier, 1841. It is identified as original also by a small crossed bluish-green disc (Supplementary material, p. 60). The second has an original label of Lepeletier displaying “*E. Nigrilabris* ♂” (Supplementary material, p. 60). This label was probably transferred from another specimen by a curator, and was supplemented with a comparable curator head label following the historical confusion between the two species. Accordingly, an additional male belonging to *Eucera nigrilabris* Lepeletier, 1841, which was found next to the lectotype, is assumed here to be a paralectotype of that latter species rather than part of the current type series.

Tkalcù (1977, p. 223, 224) described *Eucera numida* ssp. *clarior* Tkalcù, 1977 from “Spanien, Italien”, and *Eucera numida* ssp. *balearica* Tkalcù, 1977 from “Balearen” as distinct.

***Eucera africana* Lepeletier, 1841.** No type specimens were found in MNHN, but a single non-type specimen likely originating in coll. Lepeletier is present. It is mounted on an atypical short light pin, and has a small label in Lepeletier’s handwriting displaying “*africana*”. It also has a locality label written “*Sicile Bibron*” and a comparable curator head label (Supplementary material, p. 11). The original type is described from “Oran” and was sent by Lepeletier’s son (“Oran. Envoyée par mon fils.”), and although this specimen cannot be considered as type, it largely matches the original description (only the colour of hairs of T2 is slightly different, with darker hairs restricted to the posterior margin), and confirms the synonymy above. Lepeletier’s description “... poils du dessus du corps d’un cendré blanchâtre.” actually refers to the hairs on the ventral side of the body (lapsus). Two other male specimens that were found next to the one described above are labelled by Lucas and were likely added by him, including one that belongs to *Eucera notata* Lepeletier, 1841, and an unidentified and almost completely destroyed specimen, suggesting that Lucas’ interpretation of the species was incorrect or inconsistent.

***Eucera (Eucera) oblitterata* Pérez, 1895**

Eucera oblitterata Pérez 1895b: 7. ♀♂, (Algeria). Lectotype: ♀, “Aïn Keraza”, MNHN, designated by Tkalcù (1978, p. 163).

Eucera inversa Vachal 1907: 373. ♀, “d’Algérie (Tiaret)”. Lectotype: “Tiaret”, MNHN, designated by Tkalcù (1978, p. 163). Synonymy in Tkalcù (1978, 63, p. 163).

Eucera clypeata var. *hispanica* Dusmet y Alonso 1926: 108. ♀♂, Iberian Peninsula. Lectotype: ♀, “Paracuellos de Jarama” (Madrid), MNCN, designated by Tkalců (1978, p. 163). Synonymy in Tkalců (1978, p. 163).

***Eucera obliterata* Pérez, 1895.** Tkalců (1978, p. 63) provides accurate description of the original lectotype labels, but no lectotype label of his was found. This designation is nevertheless valid and a label confirming it is now added to the single female type found (Supplementary material, p. 61). Pérez (1895b) does not provide locality data for any of the species described, and the current species is not listed in his catalogue either. However, Benoist (1924, p. 110) reported on the following localities that he recorded in coll. Pérez: “Aïn Kerasa, Alger, Chiffa, Orléansville” (Chlef; Algeria), and Dusmet y Alonso (1926, p. 149) further reported on type localities of additional female, “Algérie”, and a male, “Orléansville”. The lectotype and a single male paralectotype that were examined and labelled here, are similarly mounted on black coated pins with golden round heads, and are displaying a small dark blue disc (= May) and an original label written in black ink by Pérez “Aïn Keraza” (Supplementary material, p. 61). The lectotype is fairly well preserved with both middle and hind legs, and the metasoma glued to the remaining of the specimen. The male paralectotype is intact and fits well the description.

***Eucera inversa* Vachal, 1907.** Tkalců (1978, p. 63) provides an accurate description of the original lectotype labels, but no lectotype label of his was found. This designation is nevertheless valid and a label confirming it is now added to the single type specimen found (Supplementary material, p. 45). The lectotype is mounted on a black coated pin with small golden head. It is fairly well preserved with only the two hind distitarsi missing and with the hairs matted on some of the tergites.

***Eucera (Synhalonia) obscura* (Brullé, 1832)**

Macrocera obscura Brullé 1832: 333. ♂, “aux environs de Navarin” (Pylos, Messenia, Greece). Holotype: MNHN, examined and labelled.

Tetralonia lucasi Gribodo 1893: 394, n. syn. ♀♂, “Algeria (Boghari)”. Syntypes: ♀ “Algérie”, ♂ “Algeria”, MSNG.

***Macrocera obscura* Brullé, 1832.** The holotype is mounted on a typical long light pin. It has the following labels: (1) small white label handwritten in brownish (or faded black ink) “navarin”; (2) white label handwritten in black ink “macrocera”; (3) white disc handwritten in black ink “Brulle Morée”; (4) small label handwritten in black faded ink “*obscura* Br.”; (5) small white label handwritten in black ink “Type!”; (6) white label handwritten in black ink “*Macrocera obscura* Brullé Type.”; (7–10) three printed curator labels and an additional written identification label (Figure 5, Supplementary material, p. 62). The holotype is badly preserved and was worn already

when collected (“Nous avons décrit cette espèce sur un seul individu en mauvais états”). The head is almost entire, with both antennae broken, the right antenna after the second flagellar segment and the left after the first; the head was glued to the mesosoma which is covered in places with old glue, with the lower left posterolateral portion missing, and with only the right middle leg present from the basitarsus basally, the incomplete hind coxa, and the two left wings, which confirm the worn condition of the specimen; the metasoma is complete, although with the hairs abraded. The specimen assignment to species is difficult due to its condition, particularly the right middle femur and basitarsus that are the only remaining leg parts are partly covered with old glue, but the unmodified basitarsus and the comparatively sparse hairs on the ventral side of the femur, together with the informative S6 and the size of the specimen are sufficiently diagnostic.

***Tetralonia lucasi* Gribodo, 1893.** Known syntypes from collection Gribodo in MSNG include a male from “Algeria”, a male and a female from “Algérie”, and Penati & Mariotti (2015, p. 77) report on additional potential syntypes, including a male and three females that are listed by Gribodo from “Tunisia Sidi Bu Said” and “dintorni di Tunisi” (Tunisia) in an unpublished manuscript. These latter specimens display original labels handwritten by Gribodo, one of which also includes “*Tetralonia Lucasi punica* ♀ Grib. Tipo D. Gribodo.” (Penati & Mariotti 2015, p. 77). Gribodo (1893, p. 394) associated his female specimens with that illustrated by Lucas (1849, p. 156, pl. 3, fig. 1), and dedicated his species to him. However, both the female and male illustrated by Lucas more likely belong to the related species *Eucera ruficollis* (Brullé, 1832) (= *Eucera alternans* auct. nec Brullé) than to the species currently referred to as *Eucera lucasi* (Gribodo, 1893) (see discussion under the account of *Macrocera longicornis* Lepeletier, 1841). I have not seen Gribodo’s type series and the synonymy above is based on his description alone, but the name remains invalid under each of the circumstances described.

***Eucera (Eucera) oraniensis* Lepeletier, 1841**

Eucera oraniensis Lepeletier 1841: 123. ♀ (partim), “Oran” (Algeria). Lectotype: ♀, MNHN, designated here.

?*Eucera affinis* Spinola 1838: 538. ♂, “en Égypte, en Nubie, et en Arabie par M. Fischer”. Types unlocated. Synonymy in Alfken (1926, p. 114).

Eucera grisea var. *effasciata* Alfken 1926: 113, n. syn. ♀♂, “Kingi” (Egypt). Syntypes: ♀♂, “Kingi”, “Aegypten A. Andres”, MNB.

***Eucera oraniensis* Lepeletier, 1841.** The lectotype is mounted on a pin that was painted in black with small round head, and has a small blue disc crossed with black line, and an original label of Lepeletier written in red ink “*E. oraniensis* ♀” (Supplementary material, p. 64). This

label is curiously written on the other side “*Dissimilis* ♂”! The lectotype is fairly well preserved, having the head glued to the mesosoma with white glue, with only the scape and pedicel remaining from the right antenna, and the left antenna largely missing after the 4th flagellar segment; the last two segments of left middle leg are also missing. It is conspecific with specimens misidentified as *Eucera grisea* and *Eucera bicolor* in both coll. Pérez and coll. Vachal. A second female paralectotype is similarly well preserved. It is mounted on a small headed long light pin and has labels of Lucas, including a large blue disc written “Oran”, and a vertical label written on one side “*Eucera oraniensis* S. F. ♀.” and “coll. St. Farg.” on the other (Supplementary material, p. 65). As indicated by the labels, this specimen is likely an original type rather than added by Lucas because there is no serial number on the underside of the blue disc, and the pin is not exactly the kind used by Lucas. Another badly preserved female originating from coll. Lepeletier probably belongs to the species *Eucera elongatula* Vachal, 1907. It has original pin and label written in red ink “*Oraniensis* 26.” (Supplementary material, p. 65). This specimen is not considered here as type because it does not match the original description, in particular the hairs of the middle and hind legs are light, not ferruginous. It is however possible that Lepeletier considered this specimen as conspecific or treated it as a variation of his nominal species subsequent to the publication of his monograph. A single paralectotype male examined and labelled here is conspecific with *Eucera grisea* Fabricius, 1793 (= *Eucera eucnemidea* Dours, 1873). Its type status is identified by the original pin and a small light blue disc crossed with a black line that is identical to that of the lectotype (Supplementary material, p. 64). It is well preserved, nearly intact, and fits the description, but the conspicuous tufts of stiff hairs on S5 are not mentioned, which is unusual because Lepeletier typically placed emphasis on vestiture pattern and colour. This has led Alfken (1942, p. 207) to synonymise the male with *Eucera elongatula* Vachal, 1907, a species that shares with *Eucera grisea* Fabricius, 1793 the dark, immaculate face and small body size, but both these species were not included elsewhere in Lepeletier’s (1841) monograph. Another possible source of confusion is the description and illustration in Lucas (1849, p. 159, pl. 3, fig. 2) of both the male and the female, which were made based on the types of Lepeletier (1841). While the female was identified correctly, two series of male specimens with typical pins and labels of Lucas were each found above a comparable curator head label, and comprise a conglomerate of different species. A first series of four males labelled with large blue discs with different serial numbers are all conspecific with *Eucera elongatula*. A second series of four additional males comprise the species *Eucera*

oraniensis, *Eucera elongatula* and *Eucera clypeata* Erichson, 1835.

***Eucera affinis* Spinola, 1838.** No specimens are represented by named material in coll. Spinola, MSNT (Casolari & Casolari Moreno 1980). Alfken (1926, p. 114), justifiably expressed doubt about the species identity given the brief description.

***Eucera (Eucera) parnassia* Pérez, 1902**

Eucera parnassia Pérez 1902: XLVII. ♀, “M¹ Parnasse” (Greece).
Holotype: MNHN, examined and labelled.

The specimen is considered as holotype based on the precise description and on two original labels handwritten in black ink by Pérez, a locality label “Parnass”, and a determination label “*Parnassia* JP” (Figure 10, Supplementary material, p. 66). The small incongruence in the name displayed on the locality label (that is missing the “e” at the end) is probably due to Pérez’ habit of cutting the labels to the minimum size after their preparation. There is also a holotype label of Baker. The holotype is well preserved, missing only the two terminal tarsal segments of the left front leg, and the left middle leg.

***Eucera (Eucera) pici* Vachal, 1907**

Eucera pici Vachal 1907: 371. ♀♂, “Mersina” (♀), “Adana” (♂).
Lectotype: ♂, MNHN, designated here.

The lectotype is the only specimen found. It has an original locality label printed with “Adana 1 V” (the day written in black ink), and an identification label written in black by Vachal “*Pici* ♂ Vach” (Supplementary material, p. 67). There is additionally a lectotype label of Baker. The lectotype is fairly well preserved with only the right hind leg minus the coxa, and the right distitarsal segment missing.

***Eucera (Eucera) polita* Pérez, 1895**

Eucera polita Pérez 1895b: 8. ♀, (Tunisia). Lectotype: MNHN, designated here.

Eucera aciculata Pérez 1910: 6, n. syn. ♂, “Région verdoyante de Damas”. Holotype: ♂, MNHN, examined and labelled.

***Eucera polita* Pérez, 1895.** The lectotype is the only type specimen found. It displays two handwritten labels by Vachal, probably “Medenine” (Tunisia), and “*polita* Pérez Type” (Figure 13, Supplementary material, p. 68). Because Vachal and Pérez often exchanged material, there is no reason to doubt that this single female is a syntype. There is no record for this species in Pérez’ catalogue, and the exact locality data could not be confirmed. ***Eucera aciculata* Pérez, 1910.** The specimen is considered as holotype based on the precise description and the original labels: handwritten in red ink by Pérez and including

the full locality data and date: “*aciculata* JP Damas, Avil” (sic). It also has a small purple disc (= April) and a holotype label of Baker (Supplementary material, p. 8). The holotype is relatively well preserved with only the left antenna, and the right antenna from the 4th flagellar segment missing.

Eucera (Eucera) pollinosa Smith, 1854

Eucera distincta Lepeletier 1841: 139, n. syn. ♂, “environs de Paris”. Lectotype: ♂, MNHN, designated here. **Nomen oblitum** in accordance with article 23.9.1 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera pollinosa Smith 1854: 294. ♀, “Albania”. Holotype: BMNH. **Nomen protectum** in accordance with article 23.9.1.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera chrysopyga Pérez 1879: 157. ♀♂, “Toulouse ... Midi ... Bordeaux, Tarbes, Périgueux” (France), “Habite aussi l’Algérie”. Lectotype: ♂, MNHN, designated here. Synonymy in Meade-Waldo (1914, p. 399).

Eucera favosa Mocsáry 1879b: 240. ♀♂, “In Hungaria centrali non procul a Budapestino ... et in Slavonia” (Pérez in litt.) “Gallia meridionali-orientali (Toulouse)” (France). Syntype ♀, MTM. Synonymy with *Eucera chrysopyga* Pérez, 1879 in Pérez (1890, p. 158).

***Eucera distincta* Lepeletier, 1841.** The lectotype is badly preserved, mounted on a short light pin, and displaying an original label of Lepeletier written in red ink “*E. Distincta* ♂” (Supplementary material, p. 30). The head is missing the antennae; the mesosoma is broken around the pin such that the specimen is loose on the pin, but the legs are largely complete and only partly damaged by pests, with only the right middle distitarsus missing; the metasomal tergites are present but only T1 attached, T2 and T3 were fixed at some historical time with an excessive amount of glue, T4 detached and rotated to a ventral position, and T5–7 partly obscured under T3; S2 and probably also S3 are obscured by glue and by the tergites. The type exhibits characteristics in agreement with a recent male of *Eucera pollinosa* Smith, 1854 from France.

***Eucera pollinosa* Smith, 1854.** The type (BMNH, No. 17B.780.) is well preserved, and has labels written in black ink, including a locality label with “Albania” and identification labels with “*pollinosa* Type. Sm.” and “*Eucera pollinosa* Type. Smith.”. There is also a lectotype (“Lectotypus”) designation label that was added by Sitdikov in the year 1987, but the original description suggests that a single specimen was studied, thus a holotype.

***Eucera chrysopyga* Pérez, 1879.** This junior synonym (as shown in the list above) has been intermittently used as a replacement valid name due to the homonymy of *Eucera pollinosa* Smith, 1854 with *Tetralonia pollinosa* (Lepeletier, 1841) when the genus *Tetralonia* Spinola, 1838 was treated as subgenus of *Eucera* Scopoli, 1770 (as in

Dorchin et al. 2018). Under the classification adopted in this work, the name *Eucera pollinosa* Smith, 1854 becomes available and has priority. The male lectotype is entire and well preserved, displaying a locality label that is written “Toul^{sc}” (Toulouse, France) by Pérez, in addition to a printed curator label (Supplementary material, p. 25). A female paralectotype that was also examined and labelled here is nearly complete, and has a locality label (written with “Toul.^{sc}”) and a curator label similar to that of the lectotype (Supplementary material, p. 25).

Eucera (Eucera) proxima Morawitz, 1875

Eucera proxima Morawitz 1875: 61. ♀, “in valle Sarafshan” (Zarafshan valley, Tajikistan). Syntypes: ?ZINSP.

Eucera graeca Radoszkowsky 1876: 98. ♀, “Syra” (Island Syros, Greece). Holotype: “Syra”, ISEAP, examined by Tkalcù (1984a, p. 66). Synonymy in Sitdikov & Pesenko (1988, p. 82).

Eucera nitidiventris Mocsáry 1879b: 242. ♀, “In Hungaria centrali in montibus ad Budam sitis”. Syntypes: 4♀, MTM. Synonymy with *Eucera graeca* Radoszkowsky, 1876 in Tkalcù (1984a, p. 66).

Eucera bipartita Pérez 1910: 5, n. syn. ♂, “Région verdoyante de Damas” (Syria). Lectotype: MNHN, designated here.

***Eucera bipartita* Pérez, 1910.** The lectotype is the only type specimen found. It has a small purple disc (= April) and two original labels written by Pérez: a locality label with “Damas” in black ink, and an identification label with “*bipartita* JP Damas, Avril” in red ink (Supplementary material, p. 22). There is also a holotype label of Baker. The lectotype is fairly well preserved, with both antennae missing from the 4th flagellar segment, and the rest of the right antenna glued onto a printed curator label.

Eucera (Eucera) punctatissima Pérez, 1895

Eucera punctatissima Pérez 1895b: 5. ♀, (Algeria). Lectotype: MNHN, designated here.

All specimens of the type series, including also three female paralectotypes that were examined and labelled here, are similarly mounted on headless black coated pins, and are labelled with a small green disc (= June), a locality label written in black ink by Pérez, and a printed curator label (Supplementary material, p. 71). The specimens are relatively well preserved and complete, except one, in which the metasoma was previously repaired. The lectotype has a label written “Téniet el. H” (Algeria). Among the paralectotypes, one has a label identical to that of the lectotype, and the other two a label with only “Téniet” written on it. A fifth female specimen that was found among the type series is mounted on a light handmade pin and has a small green disc but no locality label. It is entire, and having darker vestiture that does not resemble as well as the lighter specimens the unrelated *Eucera chrysopyga* Pérez, 1879 (= *Eucera pollinosa*

Smith, 1854) as given in the description. This specimen is not included here as paralectotype although it may have been considered as such by Pérez. It is not conspecific and belongs to *Eucera confinis* Pérez, 1895, which flies together with the present species in both Algeria and Morocco. See more details in the account of *Eucera confinis* Pérez, 1895, including comments on the uncertain identity of *Eucera decolorata* Gribodo, 1924.

Eucera (Synhalonia) rufa (Lepeletier, 1841)

Macrocera alternans Brullé 1832: 332, Pl. XLVIII, fig. 4, n. syn. ♀, “dans les environs de Carithène” (Karytaina, Arcadia, Greece). Holotype: MNHN, examined and labelled. **Taxon inquirendum.**

Macrocera longicornis Lepeletier 1841: 90. ♂, “En Dalmatie”. Syntype: OUM, examined by Baker (1994, p. 1196). Junior homonym of *Eucera longicornis* (Linnaeus, 1758). Synonymy in Baker (1994, p. 1196) (nec *Macrocera longicornis* Lepeletier & Audinet-Serville, 1828).

Macrocera rufa Lepeletier 1841: 91, ♂, “Espagne” (Spain). Holotype: OUM, examined by Baker (1994, p. 1197).

Macrocera grandis Fonscolombe 1846: 47. ♂, “aux environs d’Aix” (Aix-en-Provence, France). Lectotype: OUM, designated by Baker (1996, p. 542). Synonymy in Baker (1994, p. 1196), mentioned as a doubtful synonym in Alfken (1926, p. 108).

Eucera ruficollis var. *rufa* Dalla Torre & Friese 1895: 59.

Tetralonia berlandi Dusmet y Alonso 1926: 167, replacement name for *Macrocera grandis* Fonscolombe, 1846.

Tetralonia berlandi var. *rufa* Dusmet y Alonso 1926: 171.

***Macrocera alternans* Brullé, 1832.** Brullé’s (1832, p. 332) mention of only one encounter with the species (“Nous n’avons trouvé qu’une seule fois cette espèce”) is interpreted here as a single specimen. The description supports this interpretation by matching exactly the holotype, including the hair pattern of T5, which is described for only the portion that is exposed and visible under the preceding T4. The holotype is a relatively well preserved, comparatively large female, and is slightly lighter than recent specimens (the black basal tomentum of tergites probably faded with age, having reddish hue). It was very fresh when collected, with the wing edges almost intact, and only the right flagellar segments and left tarsal segments distal to the basitarsus are missing. The holotype is mounted on a long light pin, and displays original labels written in black ink by Brullé, including the serial number “739”, a large white disc with “Brulle Morée”, and an identification label with “*Macrocera alternans* Brullé type.”. There are two additional curator labels (Figure 1, Supplementary material, p. 14). The current name precedes the other long-used names listed above and has priority. Nevertheless, I prefer not to adopt the name *Eucera alternans* for this species for the sake of name stability, as this name has been used universally for another related species for nearly 200 years! [see under

Eucera ruficollis (Brullé, 1832)]. A case application will be prepared for the International Commission on Zoological Nomenclature (ICZN) with recommendation to retain the junior synonym currently in use, *Eucera rufa* (Lepeletier, 1841).

***Macrocera longicornis* Lepeletier, 1841.** No type was found in MNHN. The illustration of the male in Lucas (1849, p. 156, pl. 3, fig. 1) neither agrees with Lepeletier’s original description nor with the OUM syntype, and the type series has probably dispersed prior to Lucas’ work (Baker 1994) such that he has not seen the original type series. The female and male illustrated by Lucas resemble most closely the species *Eucera ruficollis* (Brullé, 1832) (= *Eucera alternans* auct. nec Brullé, 1832), although Gribodo (1893, p. 394) associated the female with another related species that was not yet described at that time, and which is newly synonymised here with *Eucera obscura* (Brullé, 1832) (*Macrocera obscura* Brullé, 1832 = *Tetralonia lucasi* Gribodo, 1893). This assumption is confirmed by specimens that originate from coll. Lucas, with serial numbers and labels that were added by him, including one that displays “*Macrocera longicornis* S. F.”, and which were found above a curator head label with the same species name. These include a pair of specimens, a female and a male that belong to *Eucera ruficollis* (Brullé, 1832). However, another male specimen with similar labels belongs to the species *Eucera rufa* (Lepeletier, 1841).

***Macrocera rufa* Lepeletier, 1841.** The only specimen found is a non-type male, associated with a curator head label indicating that it comes from coll. Lucas. This specimen is displaying labels of Lucas, written with “Oran” and “*Macrocera rufa* de St-Farg.”. It is relatively well preserved and complete, and belongs to *Eucera atricornis* Fabricius, 1793. A label clarifying its non-type status is now added to the specimen.

Eucera (Synhalonia) ruficollis (Brullé, 1832)

Macrocera ruficollis Brullé 1832: 333, pl. XLVIII, fig. 5. ♂, “Une seule fois, dans les montagnes du Lycée” (Mount Lykaion, Peloponnese, Greece). Holotype: MNHN, examined and labelled. No type was studied by Alfken (1926) as implied by Tkalců (1984a, p. 58).

?*Macrocera longicornis* Lepeletier & Audinet-Serville 1828: 528. ♂, “Montpellier” (France). Types unlocated. Junior homonym of *Eucera longicornis* (Linnaeus, 1758). Synonymy in Alfken (1926, p. 108), Baker (1994, p. 1197).

***Macrocera ruficollis* Brullé, 1832.** The mention of Brullé (1832, p. 333) of only one encounter “Une seule fois” is interpreted as a single specimen, hence a holotype. The holotype is fairly well preserved for its age. It was obviously remounted on a modern black enamelled pin because the pin diameter is conspicuously smaller than the hole made in the thorax by the original pin, and due

to the remains of old glue on the underside of the thorax. It is labelled with an original white disc written with “Brullé Moree”, and two labels written by Brullé, one with “macrocera ruficollis”, and the other with the serial number “740” (Figure 4, Supplementary material, p. 72). The holotype is missing both antennae, and the detached, putative right scape and pedicel that were rested on the head are now added on a white mounting board; the front underside of mesosoma is damaged by pests, and the legs are missing the right middle distitarsus, and both hind tarsi. The species name was erroneously interpreted in different ways by different authors (see in the Discussion section). Since Alfken (1926) it was considered as conspecific with the female described under the name *Macrocera alternans* Brullé, 1832, and was synonymised with that species, which itself was misinterpreted. Consequently, it has been used incorrectly or has not been in use for nearly 200 years! This work settles both species concepts by synonymising *Eucera alternans* (Brullé, 1832) with *Eucera rufa* (Lepeletier, 1841) (see under the latter species’ account), and reestablishes *Eucera ruficollis* (Brullé, 1832) as the valid name for this species (see also in Figures 17 and 18).

***Eucera (Eucera) squamosa* Lepeletier, 1841**

Eucera squamosa Lepeletier 1841: 134. ♀, “Patrie Inconnue. Musée de M. de Romand”. Types unlocated.

Eucera rutila Pérez 1895b: 5. ♀♂, Algeria. Lectotype: ♀, MNHN, designated here. Synonymy in Tkalcù (1978, p. 167).

***Eucera squamosa* Lepeletier, 1841.** No type material is known. According to Baker (1994, p. 1192, fig. 2), coll. De Romand, which included the types, was deposited via De Saussure at MHNG, but no type material was found there.

***Eucera rutila* Pérez, 1895.** All the type specimens, including three female paralectotypes, are mounted on long light pins with a small round head welded onto a conical tip, and a blue locality label written in black ink “Algérie” as well as a printed curator label that reads “MUSEUM PARIS Coll. J. Vachal 1911” (Supplementary material, p. 74). The lectotype has additionally a label written in black ink with the serial number “bis 440”, probably by Vachal. It is the best-preserved specimen of the syntype series, with only the antennal flagella largely missing. Otherwise, it is complete but the wings are folded over the body and cover T1, and the metasoma is strongly bent downward and obscures the posterior ventral part of the mesosoma. The paralectotypes are more badly damaged, missing various body parts and are covered with mould hypha to various extents. One of the paralectotypes has an identification label written “*rutila* type Pérez” by Vachal. The entire type series has lecto/paralectotype labels added by Baker. No male syntypes were found.

***Eucera (Eucera) syriaca* Dalla Torre, 1896**

Eucera velutina Smith 1879: 110. ♂, “Syria, Magdala”. Holotype: BMNH. Junior homonym of *Eucera (Synhalonia) velutina* (Morawitz, 1874) (= *Tetralonia velutina* Morawitz, 1874).

Eucera syriaca Dalla Torre 1896: 248, replacement name for *Eucera velutina* Smith, 1879 (nec *Tetralonia velutina* Morawitz, 1874).

Eucera sulamita Vachal 1907: 373, n. syn. ♀, “Jérusalem”. Lectotype: MNHN, designated here.

Eucera kervillei Pérez 1910: 12, n. syn. ♂, “Doummar (Anti-Liban)” (Syria). Lectotype: MNHN, designated here.

***Eucera sulamita* Vachal, 1907.** Alfken (1933, p. 67) retained the species as distinct from *Eucera velutina* Smith, 1879 without providing meaningful distinguishing characteristics. The lectotype is the only specimen found and has original labels, handwritten in black ink by Vachal: “Jerusalem” and “*Sulamita* ♀ vach” (Supplementary material, p. 82). There is also a lectotype label of Baker. The lectotype is well preserved with only the right middle distitarsus and left hind distitarsus missing.

***Eucera kervillei* Pérez, 1910.** The paralectotypes include six males that were examined and labelled here. The type series is mounted on dark pins with small golden round heads (except for one specimen). The lectotype and two of the paralectotypes are from coll. Kerville, having a locality label handwritten in black ink by Kerville: “Doummar (Anti-Liban) (Syrie), 17 Avril 1908”, and a second similar label, probably also written by Kerville, “Cotype”, in addition to a curator label printed in black with “MUSEUM PARIS SYRIE GADEAU DE KERVILLE 1919” (Supplementary material, p. 47). The lectotype is fairly well preserved, missing the right antenna and the two last tarsal segments of the left hind leg. It additionally has a lectotype designation label of Baker. The remaining four paralectotypes are from coll. Pérez, and are labelled with the locality “Dammar” (Supplementary material, p. 48). These specimens that each is missing parts of the antennae and tarsal segments are labelled with a small purple disc (= April), except for one which also differs in the kind of pin used. The specimens originating from coll. Pérez, and a specimen from coll. Kerville that has no locality label are additionally having a label that reads “OF NOT TYPE STATUS D.B. Baker rev. 1990”, which was added because the locality is slightly different from “Doummar” as given in the original description. The species is however listed in the catalogue of Pérez (No. 2037) as follows: “Dammar (Anti-Liban), plusieurs ♂ très usés, 15 Avril.”. This description of the type series confirms that the entire series was used to describe the species, but Baker did not see the catalogue of Pérez, and his decision is not accepted.

***Eucera (Eucera) taurea* Vachal, 1907**

Eucera taurea Vachal 1907: 374. ♂, “un ♂, de Gulek (Cilicie)” (Turkey). Holotype: MNHN, examined and labelled.

Eucera maxima Tkalčů 1987: 225, n. syn. ♀, “Asia minor”. Holotype: MNB.

***Eucera taurea* Vachal, 1907.** The holotype has an original locality label printed in black font “Taurus 16 V 11”, with only the day and year added in black ink, and an identification label written by Vachal “*Taurea* ♂ Vach.” (Supplementary material, p. 83). There is also a holotype label of Baker. The holotype is well preserved with only the right hind distitarsus missing.

***Eucera (Eucera) taurica* Morawitz, 1871**

Eucera subfasciata Lepeletier 1841: 136, n. syn. ♂, “aux environs de Paris”. Holotype: MNHN, examined and labelled.

Nomen oblitum in accordance with article 23.9.1 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera taurica Morawitz 1871: 311. ♀, “Tauria”. Syntypes probably lost, not found in ZINSP and ISEAP (Proshchalykin et al. 2019). **Nomen protectum** in accordance with article 23.9.1.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera spectabilis Mocsáry 1879a: 15. ♀♂, “Gerbenáč” (Grebenac, Serbia). Syntypes: 2♀, 1♂, MTM. Junior homonym of *Eucera (Synhalonia) spectabilis* (Morawitz, 1875) (= *Tetralonia spectabilis* Morawitz, 1875). Synonymy in Sitdikov & Pesenko (1988, p. 85).

Eucera vestalis Mocsáry; Morawitz 1890: 355. **Nomen nudum.** Sex not indicated, “Ordoss, am Chuan-che”. Synonymy in Morawitz (1890, p. 355).

Eucera asiatica Alfken 1936: 10 (♀), 12 (♂) (in key). “Armavir am Kuban” (Armavir, Krasnodar Territory, Russia), “Samara” (S Russia), “Eriwan” (Yerevan, Armenia), “Alma Ata” (Almaty, Kazakhstan), “Aulie Ata” (Taraz, Jambyl, Kazakhstan), “Turan”. Holotype: ♂ (“Typus”), “Distr. Armavir Gulkevitschi St. Selek. Exp.”, MNB. Synonymy in Sitdikov & Pesenko (1988, p. 85).

***Eucera subfasciata* Lepeletier, 1841.** The type is treated as holotype because Lepeletier (1841, p. 137) mentioned a single specimen in his collection (“Je n’en ai qu’un individu. Ma collection.”). The holotype is mounted on a typical pin and has an original label of Lepeletier written in red ink “*E. Subfasciata. ♂.*” (Figure 8, Supplementary material, p. 79). It is badly preserved, with the following body parts missing: right antenna, right front leg from the tibia distally, many of the tarsal segments, and the entire metasoma except for T1. The holotype was compared to a male from Avignon, France, which was further dissected to confirm congruency of the diagnostic genital structures. As shown in the list above, this is a senior primary synonym that should have priority. However, the name *Eucera taurica* Morawitz, 1871 has been used universally for about 150 years and is retained for the sake of name stability.

***Eucera spectabilis* Mocsáry, 1879.** Originally given as synonym of *Eucera tomentosa* Morawitz, 1875 (p. 65; nec *Eucera tomentosa* Dours, 1873). Mocsáry (1881, p. 15) listed this name as a synonym of *Eucera tomentosa* Dours, 1873 with reference to Morawitz (1875), in contrast to Mocsáry (1879a, p. 15) (lapsus). See also note in Alfken (1936, p. 6). Three specimens are preserved in MTM, a female with an unpublished lectotype label and additional female and a male with paralectotype labels that were added by B Tkalčů in the year 1981.

***Eucera vestalis* Mocsáry; Morawitz (1890).** Alfken (1936, p. 8) confirms that no such nominal species was described by Mocsáry.

***Eucera (Eucera) terminata* Pérez, 1895**

Eucera terminata Pérez 1895b: 6. ♀♂, Sicily. Lectotype: ♀, MNHN, designated here. Precedent name in accordance with the principle of the First Reviser, article 24.2 of the International Code of Zoological nomenclature (ICZN 1999; <https://www.iczn.org/the-code/the-code-online/>).

Eucera xanthura Pérez 1895b: 65, replacement name for *Eucera terminata* Pérez, 1895 [nec *Tetralonia terminata* Smith, 1854 = *Thygater dispar* (Smith, 1854), listed by Dalla Torre (1896, p. 248) under *Eucera*].

Eucera obsoleta Pérez 1910: 7, n. syn. ♂, “Région verdoyante de Damas”. Holotype: MNHN, examined and labelled.

***Eucera terminata* Pérez, 1895.** The lectotype is the only specimen found. It is mounted on a light headless pin and has a small dark blue disc (= May), and a minimal label written in brownish (faded black) ink by Pérez “Sicile”. It is placed above a head label that is written in black ink by Pérez on both sides, on one side “*xanthura* JP”, and on the other “*terminata* JP” (Supplementary material, p. 84). There is also a curator label, and a syntype label that was added by DB Baker in the year 1991. The lectotype is relatively well preserved, but missing the ventral portion of some of the antennal flagellar segments and some of the distitarsal leg segments, and the pin is partly obscuring the diagnostic posteromedial surface of the mesonotum.

***Eucera obsoleta* Pérez, 1910.** The single specimen found is considered here as holotype based on the accurate description and the complete label. The label is handwritten in red ink by Pérez: “*obsoleta* JP Damas, avril” (Supplementary material, p. 63). It is fairly well preserved, with the head minus the two antennae glued back to the mesosoma, which is missing the left middle leg, and the terminal segments of some other legs. The morphologically informative S6 is present and distinct.

***Eucera (Eucera) vidua* Lepeletier, 1841**

Eucera vidua Lepeletier 1841: 121. ♀, “Oran” (Algeria). Type material: presumed lost (Tkalčů 1984a, p. 63).

Eucera bicincta Lepeletier 1841: 137. ♂, “Oran” (Algeria). Lectotype: MNHN, designated here. Synonymy in Alfken (1914, p. 225), Tkalců (1984a, p. 63).

Eucera uncinata Lepeletier 1841: 138, n. syn. ♂, “Oran” (Algeria). Lectotype: MNHN, designated here.

***Eucera vidua* Lepeletier, 1841.** Pérez (1879, p. 166) associated the female of this species to a species that he erroneously interpreted and described as a variety of *Eucera longicornis* (Linnaeus, 1758) from Corsica, namely *Eucera nigrescens* Pérez, 1879 (see in the account of that species), and consequently synonymised these two species names. Tkalců (1984a, pp. 61–65) revised the group, recognised the current species as distinct from *Eucera nigrescens* Pérez, 1879, and further subdivided each of them into several subspecies. However, the diagnostic characteristics listed by Tkalců (1984a) are prone to greater variation than that depicted in his illustrations, such that the morphological boundaries between the species are ambiguous. I refrain from modifying the taxonomy of this species group here because this requires a more detailed revision.

***Eucera bicincta* Lepeletier, 1841.** The lectotype and another male examined and labelled as paralectotype are mounted on similar long light pins, they are badly preserved, conspecific, and agree in diagnostic characteristics with recent specimens of *Eucera vidua* Lepeletier, 1841 from Algeria and Morocco. The lectotype has an original, truncate label of Lepeletier written in red ink “*E. Bicincta*”, without the sex symbol (Supplementary material, p. 20). It is missing the terminal portions of both antennae, right upper side of head, and the metasoma except T1 and T2, and with the remaining body parts largely agreeing with the original description. The paralectotype has no label and is comparably damaged.

***Eucera uncinata* Lepeletier, 1841.** The lectotype is the only specimen found. It is mounted on a long light pin, and labelled with a small white disc crossed with a black line and an original label of Lepeletier written in red ink “*E. Uncinata* ♂” (Supplementary material, p. 87). It is badly preserved with only the proboscis left from the head, the mesosoma missing most of its ventral surface, with the wings present, but all the remaining legs partly damaged by pests, and the metasoma has only T1 remaining. The original description matches the remaining parts of the type and also agrees with a recent male from Algeria, except only for the complete band of light hairs on T5, which was limited to the lateral extremities in the type specimen.

***Eucera (Eucera) vulpes* Brullé, 1832**

Eucera vulpes Brullé 1832 : 336. ♂, “en allant d’Arcadia à Messène” (Peloponnese, Greece). Lectotype: MNHN, designated here.

Eucera parvula Friese 1895: 205. ♀, “Istria (Pola); Dalmatia et Corsica” (Pula in the Istria peninsula, Croatia). “Type” (holotype), (locality on label undetermined), MNB. Type species of *Rhyteucera* Sitdikov & Pesenko, 1988. Synonymy in Risch (1999, p. 129).

***Eucera vulpes* Brullé, 1832.** The lectotype has two printed curator labels, and five original labels handwritten in black ink, at least the first written by Brullé but probably also the others, as follows: (1) a serial number “747”; (2) a disc written “Brulle morée”; (3) “type”; (4) “*Eucera vulpes* Brullé types.”; and (5) “*Eucera vulpes* Br. != *tri-vittata* Br. ♂” (Figure 2, Supplementary material p. 88). The synonymy in the latter label is probably based on the incorrect assumption made at the end of the description that “This male seems to us to be that of the preceding species” (which is *Eucera trivittata* Brullé, 1832) (“Ce mâle nous paraît être celui de l’espèce précédente”). The lectotype is well preserved for its age, with the right antenna and left hind tarsal segments missing, and the left antenna detached and added on a mounting board, and partly covered with mould. The specimen was dissected by a past unknown investigator and probably then remounted on a modern light pin given that the pin is slightly narrower than the hole made in the mesonotum by the original pin. It has T6, the genitalia as well as S6–8 added on a mounting board, with S8 broken, and T7 missing. Three additional male specimens that are all in fragmentary condition (two without the head) were located with original labels similar to that of the lectotype. Of them, only one is conspecific and is labelled here as paralectotype (Supplementary material, p. 88). The other two belong to *Eucera bidentata* Pérez, 1887, and do not fit the description; in particular there is/was no yellow maculation on their clypeus.

Genus *Tetralonia* Spinola, 1838, stat. rev.

***Tetralonia atrata* (Klug, 1845)**

Eucera atrata Klug 1845: table 50, fig. 13. ♀, “Prope Cahiram” (Egypt). Holotype: MNB, reported by Friese (1896, p. 99).

Tetralonia carbonaria Pérez 1895b: 8, n. syn. ♀, (Tunisia). Holotype: examined and labelled.

***Tetralonia carbonaria* Pérez, 1895.** The single specimen associated with an original head label that is written by Pérez “*carbonaria* JP *atrata* Klug?” is considered as holotype. It is mounted on a light headless pin and has a small dark blue disc (= May) and a locality label written in black ink by Pérez “Gafsa” (Tunisia), in addition to a printed curator label (Supplementary material, p. 24). The holotype was fresh when collected and is well preserved except that both antennae are detached and added in cotton wool below the specimen. Pérez (1895b, p. 8) compared the species to “*T. tricincta* Lep. = *graja* Ev.” and the

diagnosis he provided as compared to *Tetralonia graja* (Eversmann, 1852) is accurate. However, the lectotype of *Macrocera tricincta* Lepeletier, 1841, that was examined in this work, is conspecific with *Tetralonia dentata* (Klug, 1835), which is in line with the notes given by Pérez (1879, p. 153) (see also comments on *Macrocera tricincta* Lepeletier, 1841 below). The head label associated with the specimen shows that Pérez realised the possible synonymy listed above.

***Tetralonia coangustata* Dours, 1873**

Tetralonia coangustata Dours 1873: 325. ♂, “Alg. Esp. ex Mieg. Coll. L. Duf.” (Algeria, Spain). Neotype: “Bône” (Annaba, Algeria), MNHN, designated here.

The species is briefly described based on male specimens taken from coll. Dufour. As in another similar case (see in the account of *Tetralonia nigrifacies* Dours, 1873), a head label with the species name was found in coll. Dufour, but not the actual specimens, which are now considered lost (Hörn & Kahle 1935, p. 60). The neotype is a relatively well-preserved male specimen selected from a series of conspecific females and males from Bône (Annaba), and additional females are from “Algerie” and “Mascara”, Algeria. All these specimens come from coll. Pérez, and were found above an original head label written by him, “*Macrocera coangustata*, Dufour”. Three additional females from “Mascara” and a male from “Sidi-el-Hani Tun” (Tunisia) that were probably placed here by Pérez are not conspecific and are considered as belonging to *Tetralonia nigrifacies* Dours, 1873. The former series from “Bône” is listed in Pérez’ catalogue, together with a male from “Constantine” (Algeria), but not the latter series. The species is rather distinct, and the males agree with the original description (the female is undescribed), including the immaculate clypeus, short antennae, and the metasomal T2–5 that are covered with greyish tomentose hairs and have lighter whitish posterior hairbands (“reliquis cinereo-tomentosis-fasciis albidioribus”). The size mentioned is too large, the body length is 15 mm, and Pérez provided a measure of only 13 mm in his catalogue and added a comment “lapsus?”. This assumption made by Pérez is reasonable given that the forewing length provided in the original description, 9 mm, is accurate and is a bit smaller compared to that given for *Tetralonia nigrifacies* Dours, 1873 in the same publication, 10 mm, together with a body length of only 14 mm. The neotype is mounted on a light headless pin, and has a small label written in black ink “Bône” by Pérez together with a printed curator label (Supplementary material, p. 26). It was relatively fresh when collected, and fairly well mounted on the pin, but typically too high, obviously leading to breakage of the left antenna and loss of flagellar segments 8–11; also, the mesonotum was

broken just anterior to the insertion point of the pin and some excessive old glue that was applied to fix the specimen on the pin has caught the front right tarsal segments. Otherwise, the front and middle legs are folded under the specimen such that mostly the dorsal side of the tibia and basitarsus can be observed, but the wings are spread apart, uncovering the informative surface structure of the tergites, and the sternites, especially the diagnostic S6, are exposed.

***Tetralonia dentata* (Klug, 1835)**

Eucera dentata Klug 1835. ♀♂. Types unlocated (not found in MNB).

Macrocera tricincta Lepeletier 1841 : 100. ♀, “Îles d’Hières” (Îles d’Hyères, south-eastern France). Lectotype: MNHN, designated here. Synonymy in Dalla Torre (1896, p. 230), Friese (1896, p. 67).

Tetralonia dentata flaviscopa Hedicke 1933: 134. ♀, “Aulie Ata” (Taraz, Kazakhstan). Holotype: coll. Hedicke. Types unlocated (not found in MNB). Synonymy in Schwarz et al. (1996, p. 144).

Tetralonia dentata fulviscopa Hedicke 1933: 134. ♀, France, Sicily, Armenia, western Russia. Holotype: “Alikocak, Prov. Abaran, Armenien” (Aparan, Armenia), coll. Hedicke (not found in MNB). Synonymy in Schwarz et al. (1996, p. 144).

Tetralonia dentata fusciscopa Hedicke 1933: 134. ♀, France, Italy, Switzerland, Serbia. Holotype: “Deliblat, Südungarn” (Deliblato, Serbia), coll. Hedicke. Types unlocated (not found in MNB). Synonymy in Schwarz et al. (1996, p. 144).

***Eucera dentata* Klug, 1835.** The following taxa were described as distinct: *Tetralonia dentata amseli* Alfken, 1938, p. 112 (type locality not given); *Tetralonia dentata atlantis* Tkalčů, 1998, p. 62, from Algeria and Morocco; and *Tetralonia dentata extrema* Tkalčů, 1998, p. 63, from Mongolia.

***Macrocera tricincta* Lepeletier, 1841.** The lectotype is mounted on a typical pin and has an original label, written in red ink “*Macrocera Tricincta* ♀” (Supplementary material, p. 85). It is fairly well preserved with only the right antenna missing. The hairs and surface sculpture of the tergites is however partly obscured due to white fatty secretion on the bases of the tergites, and because the typical light tomentum is matted and appears dark, but the original light tomentose hairs are seen on a small dry portion of T4 anteromedially. The hair colour is generally darker ferruginous (excluding the light basal tomentum of tergites) compared to Central European populations of *Tetralonia dentata* (Klug, 1835). Conspecific males from coll. Pérez that were dissected for detailed examination of the genitalia and associated sternites show identical morphology to those of Central European specimens. The synonymies in Dalla Torre (1896, p. 230) and in Friese (1896, p. 67) are probably based on Pérez (1879, p. 153). Pérez (1879) suspected that this species is either a synonym of *Tetralonia dentata* (Klug, 1835), which he indicated appears with darker hair colour in the south of

France, or, alternatively representing the female of *Macrocer a ruficornis* (Fabricius) in Lepeletier (1841), but he could not be certain based on the original description alone.

***Tetralonia fulvescens* Giraud, 1863**

Tetralonia fulvescens Giraud 1863 : 42. 8♀, 5♂, “du fort de la Brunette près de Suse” (near Susa, Italy). Lectotype: ♀, MNHN, designated here.

Macrocer a dufourii Pérez 1879: 148. ♀♂, “Lot (coll. L. Dufour), une femelle.” (Lot, Midi-Pyrénées in south France); “Une femelle et un mâle d’Espagne (ma collection)” (Spain). Lectotype: ♀, “Lot”, coll. Dufour, MNHN, designated here. Synonymy in Tkalců (1979, p. 146).

?*Tetralonia dufouri* var. *fumatipennis* Dusmet y Alonso 1926: 178. ♀, “Cutamilla (Provincia de Guadalajara)” (Spain). Syn-types: ?MNCN.

Tetralonia acutangula Morawitz 1878: 35. “Akstafinskaja” (Ağstafa), “Tauskaja” (Tovuz), “Tschemachlinskaja”. Lectotype: ♂, (type locality not mentioned), ZINSP, designated by Tkalců (1979, p. 146). Synonymy in Tkalců (1979, p. 146).

***Tetralonia fulvescens* Giraud, 1863.** Giraud lists in his catalogue two small boxes with a total of 10 “*fulvescens*” specimens from “Piémont (Suze)”, which is matching exactly the number of types in his collection [although a total of 13 specimens is reported in Giraud (1863)]. The type series that is placed above a white head label and written in black “*fulvescens* Giraud” was examined via correspondence with R Le Divelec in MNHN. The lectotype and the six female and three male paralectotypes are all well preserved and complete, except for one female that is badly damaged, with the metasoma detached, and now added onto a mounting board below the specimen. A seventh female paralectotype that was found in coll. Sichel has labels of Giraud, including the locality “Suse.”, and a label handwritten by Giraud “Pour vous. – *Tetralonia fulvescens* Giraud.” (Supplementary material, p. 33). These labels confirm that the specimen received by Sichel was part of the original type series.

***Macrocer a dufourii* Pérez, 1879.** The lectotype is a single female found in coll. Dufour. It is mounted on a long light pin with small round head welded to the conical tip of the pin, and has two labels written in black ink by Dufour: “Lot” and “*Macrocer a Doursii*. ♀ L. Duf.”, and a determination label written in purple ink by Pérez “*Dufourii* J.P. imprimé hier” (Supplementary material, p. 31). The lectotype is well preserved and clean, only missing the hind right distitarsus. Putative type material in coll. Pérez from Spain with locality labels in his handwriting include a conspecific female from “Andls” (Andalusia), two females from “Aragon”, a male from “Aragon” that is probably conspecific and two other males from “Barcelone” that are likely also conspecific but which have

lighter antennae. Light ferruginous antennae are diagnostic of other closely related species, but these species are much smaller in size. None of these specimens are considered here as paralectotype because it cannot be determined which of them are the original syntypes studied by Pérez.

***Tetralonia julliani* (Pérez, 1879)**

Macrocer a julliani Pérez 1879: 150. ♀, “Marseille” (France). Lectotype: MNHN, designated here.

Tetralonia biroi Mocsàry 1879b: 233 (originally given as “*Tetralonia Biroi*”). ♀♂, “In Hungária meridionali-orientali”. Lectotype: ♀, “Tasnád” (Tășnad, Romania), MTM, designated by Tkalců (1979, p. 144). Synonymy in Tkalců (1979, p. 144, as *Tetralonia julliani* ssp. *biroi* Mocsàry, 1879).

***Macrocer a julliani* Pérez, 1879.** This name has priority over *Tetralonia biroi* Mocsàry, 1879 because it was published in September compared to November 1879, respectively (Tkalců 1979, p. 143, footnote). Four additional female paralectotypes are examined and labelled here. The entire type series is mounted on light headless pins and has minimal labels written in black ink by Pérez, “Mars^{le}”, and the same printed curator labels (Figure 11, Supplementary material, p. 46). The lectotype is relatively well preserved and reflects best the description; it misses only the two last tarsi of the middle left leg. The paralectotypes are also well preserved: one relatively small specimen is intact and the rest are missing some distal tarsal and antennal segments. Three additional conspecific males that were found in coll. Pérez have the same locality labels, but were not included in the species description.

Tkalců (1979, p. 144) described *Tetralonia julliani tarraconensis* Tkalců, 1979 from Spain, and *Tetralonia julliani ebmeri* Tkalců, 1979 from Iran as distinct.

***Tetralonia malvae* (Rossi, 1790)**

Apis malvae Rossi 1790 : 107. ♂, “in provinciis Florentina et Pisana” [Florence (Firenze) and Pisa provinces, Italy]. Types unknown.

Eucera antennata Fabricius 1793: 345. ♂, “in Europa”. Neotype: “Lazio, Valle dell’Insupherata (Roma)”, NHMD, designated by Michener (1997, p. 19). Type species of *Macrocer a Latreille*, 1810 (nec Meigen, 1803) = *Tetralonia* Spinola, 1838. Synonymy in Dalla Torre (1896, p. 239), Friese (1896, p. 93).

Macrocer a albida Lepeletier 1841: 98. ♂, “Espagne”. Lectotype: OUM, designated by Baker (1994, p. 1197). Synonymy in Baker (1994, p. 1197).

Macrocer a malvae (Rossi); Lepeletier (1841, p. 96). ♀♂, “Toute la France, de Paris au midi. Tous les Musées.”.

Eucera crinita Klug 1845: table 50, fig. 12. ♀, “In Syriam semel lecta” [“Lebanon” in Baker (1997, p. 199)]. Holotype: MNB, examined by B Tkalců (Baker 1997, p. 199). Synonymy in Dalla Torre (1896, p. 240, as *Eucera malvae* var. *crinita* Klug, 1845), Friese (1896, p. 93), Baker (1996, p. 544).

***Eucera antennata* Fabricius, 1793.** Known syntypes were considered by Michener (1997, p. 19) as not representing genuine type material, a decision that has significance for the taxonomy of the Eucerini because this is the type species of the genus *Tetralonia* Spinola (see above). The Fabrician syntypes altogether include four type specimens, not three as given in Zimsen (1964, p. 422, type 1201). The occurrence of two males in the Lund collection, NHMD that display “ex Ins. St. Thomas” (St. Thomas, Virgin Islands) is however correct (Zimsen 1964, p. 422). This has probably confused Michener (1997, p. 19), who reported on only one such specimen from St. Thomas, citing DB Baker’s (in litt.) identification of the specimen as belonging to the species *Melissodes trifasciata* Cresson, 1878, and displaying an unpublished lectotype designation of B Tkalců (Baker 1996, p. 554). The two other type specimens mentioned by Michener (1997, p. 19) originate in the “Kiel collection”, NHMD (although only one of them was listed by Zimsen 1964, p. 422), and were first identified and labelled by B Tkalců (not by Baker as cited by Michener). Their identification as belonging to *Eucera impressiventris* Pérez, 1895 (= *Eucera punctatissima* auct. nec Pérez, 1895) and *Tetralonia strigata* (Lepeletier 1841) are confirmed based on my recent examination of the Fabricius types in NHMD. Michener’s (1997) neotype designation is important in fixing *Tetralonia malvae* (Rossi, 1790) as the type species of the genus *Tetralonia* Spinola, but his exclusion of these two latter type specimens based on the morphological description is rather weak. At least the *Tetralonia strigata* specimen cannot be excluded as genuine type material because it also agrees with the type locality “Habitat in Europa”, although less well than does *T. malvae* (*T. strigata* is known from France and the Iberian Peninsula). Its acceptance as the type species of *Tetralonia* would not change the generic classification (Dorchin et al. 2018); however, this action is undesired given the already complicated taxonomic history of this genus (see in Baker 1996).

***Macrocera malvae* (Rossi); Lepeletier (1841).** The original series studied by Lepeletier comprises three badly preserved and damaged females and a male specimen that are not mounted on typical pins, but the male and one of the females are identified by original head labels written in red ink “*M. Malvae* ♂” and “*M. Malvae*”, respectively (Supplementary material, p. 51). All these specimens agree with the description, and exhibit diagnostic characteristics such as the typical sparse scopal hairs of the females.

***Tetralonia nana* Morawitz, 1874**

Tetralonia nana Morawitz 1874: 144. ♀♂, “Derbent” (Dagestan Republic, Russia). Lectotype: ♂, ZINSP, designated by Proshchalykin et al. (2019, p. 38).

Macrocera griseola Pérez 1879: 150. ♀, “Bordeaux” (France). Lectotype: MNHN, designated here. Synonymy in Dalla Torre (1896, p. 241), Friese (1896, p. 85).

Tetralonia tenella Mocsáry 1879b: 235. ♂, “In Hungária meridionali-orientali”. Synonymy in Dalla Torre (1896, p. 241), Friese [1896, p. 85, based on original syntype collected in “Tasnad” (Tâșnad, Romania)].

***Macrocera griseola* Pérez, 1879.** The lectotype is the only specimen found. It is mounted on a light headless pin and has a small yellow disc (= July) and a minimal label written in black ink by Pérez “Bord.” in addition to a printed curator label (Figure 12, Supplementary material, p. 42). It is well preserved, missing only the hind right distitarsus. Dusmet y Alonso (1926, p. 189) reported on another pair of specimens in MNHN that were labelled with “*nana* Mor., *griseola* J. P.”, but these specimens were not found and could not have been original syntypes because only the female was described by Pérez (1879).

***Tetralonia nigrifacies* Dours, 1873**

Tetralonia nigrifacies Dours 1873: 323 [originally given as “*Tetralonia* (*Macrocera*) *nigrifacies* L. Duf.”]. ♀♂, “Alg. Fr. mérid. Coll. L. D. Dours.” (Algeria, southern France). Neotype: ♀, “Mascara” (Algeria), MNHN, designated here.

Eucera commixta Dalla Torre & Friese 1895: 57, replacement name for *Tetralonia nigrifacies* Dours, 1873 (nec *Eucera nigrifacies* Lepeletier, 1841).

***Tetralonia nigrifacies* Dours, 1873.** As given in the original description, specimens under this name were taken from coll. Dufour. This collection is preserved in MNHN in the original boxes of Dufour, where a head label with the species name in Dufour’s handwriting was found, but the specimens are missing. It is assumed here that Dours extracted Dufour’s specimens for study and that these were lost when his collection was destroyed (Hörn & Kahle 1935, p. 60). This assumption is supported by the fact that Pérez (1879) has not seen the original specimens in coll. Dufour, which he received from A Laboulbène, and did not report on the species as he has done with others originating from that collection (e.g. *Macrocera salicariae* Lepeletier, 1841, *Macrocera dufourii* Pérez, 1879, *Macrocera inaequidistans* Dours, 1873). The female neotype is a relatively well preserved specimen selected from a series of three conspecific females from “Mascara” (Algeria). These specimens and a conspecific male from “Sidi-el-Hani Tun” (Tunisia) are all from coll. Pérez, and were found above an original head label written by him “*Macrocera coangustata*, Dufour” together with additional males and females that belong to that species. It is not clear if Pérez overlooked the current series from “Mascara” and they were possibly placed there by a curator that misidentified the species for *Tetralonia coangustata* Dours, 1873 (see also in the account of that species). The species is rather distinct, and the original descriptions of both the

female and the male fit well the specimens examined (although the male is slightly larger, not smaller than the females), but not those of *Tetralonia coangustata* Dours, 1873. In addition, Dours' (1873, p. 323) mention of the species occurrence in southern France followed with his comment "Reçue en grand nombre." suggest that additional syntypes in his collection were not conspecific. However, there is no other species known to me that would fit the description equally well. Among the diagnostic characteristics provided, especially distinctive are the relatively large size (body length 14 mm, forewing length 10 mm); the presence of basal bands of short, white tomentum on T2 and T3, and similar basal and apical bands on T4 in the female; and the short antennae, immaculate clypeus, and basal whitish tomentum of all tergites of the male. The neotype is mounted on black coated pin with golden round head, and has a small green disc, label written in black ink "Mascara" not by Pérez, as well as a printed curator label (Supplementary material, p. 55). It is entire, with the wings spread apart such that the characteristic features of the metasoma can be easily observed. The legs are however partly covered by the wings and by the metasoma that is bent downwards, and pollen grains in the scopa partly obscure the scopal hairs.

***Tetralonia pollinosa* (Lepeletier, 1841)**

Macrocera pollinosa Lepeletier 1841 : 92. ♀ (partim), "Environs de St.-Sever. Envoyée par le savant M. Léon Dufour." Lectotype: ♀, OUM, designated by Baker (1994, p. 1200).

Tetralonia mediocris Eversmann 1852: 122. ♀♂, "in promontoriis Uralensibus Australibus" (Orenburg province, Russia). Lectotype: ♀, "Spask., Jul." (Spasskoe, Orenburg Province, Russia), ISEAP, designated by Proshchalykin et al. (2019, p. 35). Synonymy in Dalla Torre (1896, p. 244), Friese (1896, p. 72).

Tetralonia canescens Dours 1873: 325 (originally given as *Tetralonia canescens* L. Duf.). ♂, "Alg. Esp. Fr. mérid.". Type material presumed lost (Hörn & Kahle 1935, p. 60). Synonymy in Pérez (1879, p. 151).

Tetralonia fossulata Morawitz 1874: 142. ♂, "Derbent" (Dagestan Republic, Russia). Syntypes probably lost, not found in ZINSP and ISEAP (Proshchalykin et al. 2019). Synonymy in Dalla Torre (1896, p. 244), Friese (1896, p. 72).

?*Tetralonia adusta* Mocsàry 1877b: 233. ♀, "In Hungária centrali". Syntype?: "Tasnád" (Tășnad, northern Romania), MTM. Synonymy in Dalla Torre (1896, p. 244), Friese (1896, p. 72).

***Macrocera pollinosa* Lepeletier, 1841.** Additional paralectotypes examined and labelled here include four females that are conspecific with the lectotype and two males that belong to *Tetralonia dentata* (Klug, 1835). These can be divided into two distinct series, the first includes three females and a male that are mounted on similar original pins and displaying original identification labels in Lepeletier's handwriting (Supplementary material, p. 69). One of these females has an original identification label written by Dufour. This latter specimen

must have been part of the original type series sent by Dufour to Lepeletier and kept in his collection. The second series comprises a badly preserved and incomplete female and male that are similarly mounted on typical pins and display small blue discs and small identification labels written by Lepeletier (Supplementary material, p. 69). Finally, a male that was found next to the first series of types belongs to the unrelated *ruficornis*-group of species of the genus *Tetralonia*. It does not fit with the original description because it has white hairs on T6 medially on the disc rather than darker reddish hairs ("le sixième également revêtu d'écaillés, rousses sur le dos, plus pâles sur les côtés"), and is not considered as type. Description of the female and redescription of the male are given in Pérez (1879, p. 151).

***Tetralonia salicariae* (Lepeletier, 1841)**

Macrocera salicariae Lepeletier 1841 : 102. ♀♂, "Environs de Paris; à St.-Sever. Envoyée par M. Léon Dufour sous le nom que je lui conserve." (around Paris; Saint-Sever, south France). Lectotype: ♀, MNHN, designated here.

Macrocera meridiana Lepeletier; Dufour 1841: 420 [originally given as "*Macrocera meridiana*. Lep. (inéd.), *ex ipso*."]. ♀♂, (no locality given). Synonymy in Pérez (1879, p. 146).

Tetralonia lythri Schenck 1867–1868: 280. ♀♂, "Danzig". New interpretation for *Tetralonia salicariae* (Lepeletier, 1841) in Brischske (1862, p. 3). Synonymy in Pérez (1879, p. 146).

Tetralonia basalis Morawitz 1871: 313. ♂, "Bei Kasan" (Kazan, Russia). Synonymy in Pérez (1879, p. 146). Lectotype: ♂, "Kasan" (Kazan, Republic of Tatarstan, Russia), ZINSP, designated by Proshchalykin et al. (2019, p. 37). Synonymy in Levchenko et al. (2017, p. 322).

***Macrocera salicariae* Lepeletier, 1841.** Additional paralectotypes examined and labelled here include three females and four males, and two additional female and four male syntypes were reported from OUM by Baker (1994, p. 1200), under the name "*meridiana*". Lepeletier (1841) adopted Dufour's in litteris name instead of his proposed name "*meridiana*", and Baker (1994, p. 1200) could not find proof that Dufour's work was published subsequently to that of Lepeletier (1841), and recommended that the current name should be retained (see synonymy above). The lectotype is a badly preserved female specimen, but the best-preserved of the type specimens found. It is mounted on a long light pin with small head made of folded wire and is labelled with a small blue disc and an original label of Lepeletier, written in red ink: "*M. Salicariae* ♀" followed below with lower case font: "*Eucera* L.D. *meridiana* // *alticincta* LeP." (Supplementary material, p. 75). The use of the genus name "*Eucera*" together with the initials "L.D.", and the reference to "*alticincta*" on the label are not clear because *Macrocera alticincta* Lepeletier, 1841 was described in the same work and is a distinct species. The lectotype is missing the following body parts: right side of head, most of the antennae,

the front left portion of the mesosoma, the middle and hind left legs, and the two front legs are present and detached, possibly fixed to an old mass of glue that obscures the front underside of head and mesosoma, including the mouth parts, and some leg segments. The metasoma is present, with S2 and S3 detached. The surface sculpture of the mesonotum and tergites as well as the scopal hairs and the face are characteristic. The paralectotype series is conspecific and comprises three additional females and four males, all which are in fragmentary condition and largely incomplete. Of them, a female and a male are displaying typical pins and identification labels or otherwise curator labels that indicate their origin in the collection of Lepeletier. Two additional females and three males that were found next to the other syntypes are mounted on slightly thinner pins and have no labels (Supplementary material, pp. 75, 76). They are considered as types under the assumption that they were received from Dufour while already prepared.

Dalla Torre (1877, p. 163) listed *Tetralonia salicariae* var. *alboclypeata* Dalla Torre, 1877, and *Tetralonia salicariae* var. *flavoclypeata* Dalla Torre, 1877, both from “um Sigmundskron bei Bozen” (south Tyrol, Italy) as distinct.

Discussion

The large number of type specimens recognised in this revision and the many new synonyms proposed shed light on the poor state of knowledge regarding the historical, name bearing types in MNHN and the taxonomy of the Western Palaearctic Eucerini in general. Some synonyms confirmed in this study are apparently long known, but often suggestive because they have been proposed by authors that did not directly examine the type material [together with other proposed synonyms that are actually incorrect, notably in Friese (1896)]. An example is the old confusion over the identity of the species *Eucera longicornis* (Linnaeus, 1758), which is traced back among French authors at least to Lepeletier (1841). Lepeletier (1841) referred to this species as *Eucera linguaria* Latreille, 1809 (among other names), and used the name *Eucera longicornis* Latreille, 1829 for the species known today as *Eucera nigrescens* Pérez, 1879, originally described as the variation *Eucera longicornis* var. *nigrescens* Pérez, 1879. A striking example of taxonomic confusion resolved in this work is that between the species *Macrocera ruficollis* Brullé, 1832 and *Macrocera alternans* Brullé, 1832, the latter newly synonymised here with the species known today as *Eucera rufa* (Lepeletier, 1841) (see illustrations in Figures 17 and 18). These two names were erroneously interpreted in different ways since their publication in Brullé (1832) to date. Here too, the confusion likely started with Lepeletier (1841), who switched the two species concepts. Lepeletier (1841) misinterpreted

Macrocera ruficollis (authority not mentioned) as *Macrocera alternans* Brullé, 1832 (Figure 18), in combination with a closely related species that was later described under the name *Eucera lanuginosa* Klug, 1845, which he could not distinguish. He added a description for the female of *Macrocera alternans* Brullé, 1832 based mainly on vestiture colour, which fits best the conspecific female of the true *Macrocera ruficollis* Brullé, 1832. However, he may have examined a specimen with abraded vestiture, but this could not be confirmed because no specimens under this name were found in the Lepeletier collection. Finally, he newly described a male under the name *Macrocera rufa* Lepeletier, 1841, which differed from his *Macrocera ruficollis* only in vestiture colour, thereby creating a new synonym. This has led astray some other European authors, like Friese (1896), who adopted the confused species concepts as applied by Lepeletier (1841). Alfken (1926), via correspondence with L Berland in the MNHN, recognised the true identity of the type of *Macrocera ruficollis* Brullé, 1832, but not that of *Macrocera alternans* Brullé, 1832, and erroneously synonymised these names, a condition that remained unchanged to this day. A second striking example involves the species names *Eucera impressiventris* Pérez, 1895 and *Eucera punctatissima* Pérez, 1895, both of which were described based on different sexes in the same work. Alfken (1914, p. 229) erroneously synonymised these names, probably by intuitively associating the males and females that exhibit a superficial resemblance, but which are in fact unrelated. The name *Eucera impressiventris* Pérez, 1895 is resurrected from this synonymy for the first time in the present work, although this would have been clear to anyone examining the types located in the general collection in MNHN, even if only due to the conspicuous size difference between the species. It is surprising that the incorrect taxonomy concerning the types of Eucerini in the MNHN remained undetected for such a long time considering the long history of taxonomy and systematics research in this part of the world. The fact that many rich and historically important collections remain largely unstudied today reflects the low priority given to basic taxonomy and collection-based research in the academia and the funding agencies. This has begun to change to some extent due to the need for accurate species identification in biodiversity studies, particularly of organisms of environmental interest such as pollinators. This study demonstrates how basic taxonomic research is essential to improve the understanding and communication of species names, which are continuously being used in biodiversity studies and databases.

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