

THE GENUS *THORECTES* MULSANT, 1842: A RECTIFICATION  
REGARDING ITS TYPE SPECIES AND SOME  
CONSIDERATIONS ABOUT ITS TAXONOMY  
(Coleoptera, Geotrupidae)

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THE QUESTION OF THE TYPE SPECIES

As correctly pointed out by López-Colón & Alonso-Zarazaga (2006), contrary to our assertions (Branco & Ziani, 2006; Branco, 2007), Mulsant (1842) did include two species in his new genus *Thorectes*. In fact, next to the description of the French species, Mulsant wrote (page 369): «*Obs.* Dans tous les exemplaires qui m'ont passé sous les yeux du *T. haemisphericus*, espèce voisine qui habite le nord de l'Afrique, le prothorax n'a point le rebord interrompu à la base. § Les descriptions de Rossi sont si incomplètes qu'il serait difficile de reconnaître si son *Scar. haemisphericus* se rapporte à l'espèce qui porte ce nom dans Olivier, ou à notre *T. laevigatus*.» [In all the specimens that I have examined of *T. haemisphericus*, closely related species that inhabits North Africa, the prothorax does not have at all the margin interrupted on the basis. § Rossi's descriptions are so incomplete that it would be hard to tell if his *Scar. haemisphericus* is the same that bears this name in Olivier, or our *T. laevigatus*.]. Even though Olivier's original spelling is "hemisphaericus", not "haemisphericus", it is clear that Mulsant was referring to *Scarabaeus hemisphaericus* Olivier, 1789 (junior synonym of *Scarabaeus marginatus* Poiret, 1787) and that he regarded it as belonging to his new genus. Hence, both *Scarabaeus laevigatus* sensu Mulsant, 1842 (= *Scarabaeus intermedius* O.G.Costa, 1839) and *Scarabaeus hemisphaericus* Olivier, 1789 (= *Scarabaeus marginatus* Poiret, 1787) are valid candidates for the designation of a type species for *Thorectes* Mulsant, 1842.

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Subsequently to Mulsant (1842), the genus *Thorectes* was revised by Jekel (1866) who treated it as a subgenus of *Geotrupes* Latreille, 1796, and stated (page 551): «Type: *Scar. laevigatus* Fabr.». It is clear from his text that, under the name *laevigatus*, Jekel mixed up more than one species, including *Scarabaeus intermedius* O.G.Costa, 1839 which is not mentioned anywhere in his work. Under “*Geotrupes (Thorectes) laevigatus*”, Jekel (1866) wrote (page 553): «Espèce la plus répandue de toutes celles de ce groupe; son habitat en Europe est très-étendu, elle se trouve jusques en Syrie, en Barbarie, etc., et est très-variable sous le rapport de la taille, de la ponctuation du thorax et des élytres. Il y a certainement lieu de revoir avec soin tous les éléments qu’on regarde généralement comme appartenant à cette espèce polymorphe; ...» [The most widely distributed of all species in this group; its distribution in Europe is very wide, it occurs in Syria, in Barbary, etc., and it is very variable in its body size, its punctuation of thorax and elytra. There are certainly good reasons to revise carefully all the features that are usually considered characteristic of this polymorphic species].

As already stated elsewhere (Branco, 2007), the option offered by Article 70.3 of the Code, that if an author discovers that a type species was misidentified, the author may select, and thereby fix as type species, the species that will, in his or her judgement, best serve stability and universality, is in this case precluded by Boucomont’s (1905) choice. Boucomont (1905) wrote (page 216): «type: *G. intermedius* Costa = *laevigatus* auct.».

Moreover, Boucomont’s choice may not be considered a forgotten nomenclatural act because it was recently implicitly accepted as valid by Král *et al.* (2001), who wrote (page 5): «Boucomont (1905) in his revisional study assigned the *Thorectes* species to two subgenera, nominotypical *Thorectes* (= *Odontotrypes* Fairmaire) with the type species *Geotrupes intermedius* Costa, 1827, and the new subgenus *Odontotrupes* Boucomont, 1905 with type species *Geotrupes orichalceus*.».

Consequently, according to the rules set up in the International Code of Zoological Nomenclature, the type species of *Thorectes* Mulsant, 1842 is *Scarabaeus laevigatus* sensu Mulsant, 1842 (= *Scarabaeus intermedius* O.G.Costa, 1839), by subsequent designation of Jekel, 1866: 551 (not by monotypy as incorrectly stated by Branco & Ziani, 2006, and Branco, 2007). Therefore, we confirm that *Jekelius*

López-Colón, 1989, having the same type species, is a junior objective synonym of *Thorectes* Mulsant, 1842. However, if *Jekelius* has been as widely used as López-Colón & Alonso-Zarazaga (2006) claim, it could be conserved as a valid name provided that the International Commission on Zoological Nomenclature would rule for setting aside Boucomont's 1905 choice, and would designate *Scarabaeus laevigatus* Fabricius, 1798 as type species of *Thorectes* Mulsant, 1842. We would not oppose such a proposal to the Commission but, for the reasons explained below, we would still rank *Jekelius* as a subgenus of *Thorectes*.

#### SOME CONSIDERATIONS ABOUT THE TAXONOMY OF THE GENUS

As it is most commonly the case with flightless beetles, the taxonomy of the genus *Thorectes* at species level is complicated. Many species tend to show significant inter-population variation, and a number of species have been repeatedly re-described on local populations that differ slightly from other populations. To make the problem worse, a number of new "species" were based on one or a few specimens, with little, if any appreciation of both intra- and inter-population variation. As a consequence, the number of species in the genus is still a matter of debate. However, that problem is not the object of this note. We shall leave it aside here, and concentrate on the question of whether the genus should or should not be split in subgenera and/or genera.

Erichson (1847) synonymized *Thorectes* Mulsant, 1842 with *Geotrupes* Latreille, 1796, and Jekel (1866) downgraded it to subgenus of *Geotrupes*. Following Jekel (1866), for more than a century most authors treated *Thorectes* as a subgenus of *Geotrupes*, until Baraud (1970) proposed its restoration to the original rank of genus. Despite the title of his work, Baraud (page 141) wrote: «A notre avis, les *Thorectes*, si bien caractérisés en particulier par leur aptérisme, devraient constituer un genre, aussi distinct des *Geotrupes* que le sont par exemple les *Typhoeus*» [in our opinion, the *Thorectes*, so well characterized particularly by their aptery, should form a genus, as distinct from the *Geotrupes* as, for instance, the *Typhoeus* are].

The first split of *Thorectes* Mulsant, 1842 was proposed by Jekel (1866) who created the "division" *Silphotrupes* for *Thorectes punctatissimus* (Chevrolat, 1840), *Thorectes escorialensis* (Jekel, 1866) and

*Thorectes silphoides* (Jekel, 1866), with *Geotrupes punctatissimus* Chevrolat, 1840 as its type species.

In his revisional work of the phylogeny of the Geotrupinae, based solely on the male and female genitalia, Zunino (1984) transferred *Geotrupes (Thorectes) armatus* Boucomont, 1905, described from the Chinese transition zone, to the genus *Chromogeotrupes* Bovo & Zunino, 1983, restricting thence the range of the genus to the Palearctic Region. Zunino identified two phylogenetic lineages within *Thorectes*, writing (pages 82-83): «l'esame di un congruo numero di specie a distribuzione mediterraneo-anatolica, delle tre specie imalaiane e di *T. banghaasi* sembra indicare nell'ambito del genere la presenza di due linee filetiche, rappresentate l'una dalla maggioranza delle specie mediterraneo-anatoliche e da *T. banghaasi*, l'altra dalle specie imalaiane nonché, fra quelle mediterranee, da almeno *T. geminatus* e *T. punctatissimus*. Soltanto una nuova revisione del genere, che tenga conto dell'evoluzione dei caratteri genitali, potrà portare ulteriori chiarimenti al problema.» [the examen of an adequate number of Mediterranean species, of the three Himalayan species and of *T. banghaasi* seems to indicate the presence of two phylogenetic lineages within the genus, one including the majority of Mediterranean-Anatolian species and *T. banghaasi*, the other including the three Himalayan species as well as, amongst the Mediterranean ones, at least *T. geminatus* and *T. punctatissimus*. Only a new revision of the genus, that takes into account the evolution of the genital characters, will be able to bring further clarification to the problem]. Although recognizing the existence of two phylogenetic lineages within *Thorectes*, Zunino did not propose any formal split of the genus.

The next split was proposed by López-Colón (1989). With Zunino's 1984 assertion, quoted above, as a starting point, and based on the analysis of the male genitalia of most Mediterranean species, López-Colón split *Thorectes* into four subgenera:

*Thorectes* s. str. with *Scarabaeus laevigatus* Fabricius, 1798 as type species, and including *T. valencianus* (Baraud, 1966), *T. baraudi* López-Colón, 1981, *T. ferreri* López-Colón, 1983, *T. distinctus* Marseul, 1878, *T. armifrons* (Reitter, 1892), and *T. trituberculatus* (Reitter, 1892).

*Silphotrupes* Jekel, 1866 with *Geotrupes punctatissimus* Chevrolat, 1840 as type species, and including *Th. escorialensis* (Jekel, 1866) and *T. geminatus* (Gené, 1839), and conditionally, since he had not ex-

amined those species but according to Zunino (1984), *T. nepalensis* (Baraud, 1974), *T. martensi* (Krikken, 1980), and *T. stellosus* (Krikken, 1980).

*Jekelius* López-Colón, 1989 with type species *Geotrupes intermedius* Costa, 1827 [sic!], and including *T. brullei* (Jekel, 1866), *T. nitidus* (Jekel, 1866), *T. sericeus* (Jekel, 1866), *T. punctatolineatus* (François, 1904), *T. sardous* (Erichson, 1847), *T. punctulatus* (Jekel, 1866), *T. rugatulus* (Jekel, 1866), *T. hispanus* (Reitter, 1892), *T. albaracinus* Wagner, 1928, *T. chalconotus* (Chevrolat, 1840), *T. castilianus* López-Colón, 1985, *T. balearicus* López-Colón, 1984, and *T. marginatus* (Poiret, 1787).

*Zuninoeus* López-Colón, 1989 with type species *Geotrupes hoppei* Hagenbach, 1825 [sic!], monobasic.

Subsequently to his 1989 paper, López-Colón (1996) proposed a further split of *Thorectes* Mulsant, 1842. On the basis mainly of the male genitalia but with the addition, this time, of a few features from external morphology, López-Colón (1996) proposed the elevation of *Silphotrupes* Jekel, 1866, *Jekelius* López-Colón, 1989, and *Zuninoeus* López-Colón, 1989 to the rank of genus, and created the new genus *Baraudia* for *Geotrupes geminatus* Gené, 1839 alone.

Besides, López-Colón (1996) proposed:

the split of *Thorectes* sensu López-Colón, 1989 (type species *Scarabaeus laevigatus* Fabricius, 1798) in two subgenera, *Thorectes* s. str., and *Renaudia* López-Colón, 1996 (now *Renaudtrupes* López-Colón, 2006 since *Renaudia* is a preoccupied name) with *Thorectes distinctus* Marseul, 1878 as type species.

The split of *Jekelius* López-Colón, 1989 (type species *Geotrupes intermedius* O.G.Costa, 1839) in three subgenera, *Jekelius* s. str., *Petrovitzia* López-Colón, 1996 (now *Rudolfpetrovitzia* Rey & López-Colón, 2003, since *Petrovitzia* is a preoccupied name) with type species *Scarabaeus marginatus* Poiret, 1787, and *Reitterius* López-Colón, 1996 with type species *Geotrupes (Thorectes) punctulatus* Jekel, 1866.

In the following year, Palmer & Cambefort (1997) published an analysis of the phylogeny and biogeography of the Mediterranean species. They examined the following 33 taxa (the matrix of characters includes only 32 species, but their cladogram shows 33 species): *albarracinus* Wagner, 1928, *armifrons* (Reitter, 1892), *asperifrons* (Fairmaire, 1866), *balearicus* López-Colón, 1984, *banghaasi* (Reitter, 1892), *brullei* (Jekel, 1866), *castilianus* López-Colón, 1985, *catalonicus* López-

Colón, 1991, *chalconotus* (Chevrolat, 1840), *chersinus* Delabie, 1954, *coiffaiti* Baraud, 1969, *demoflysi* (Baraud, 1965), *distinctus* Marseul, 1878, *escorialensis* (Jekel, 1866), *geminatus* (Gené, 1839), *hispanus* (Reitter, 1892), *hoppei* (Sturm & Hagenbach, 1825), *intermedius* (O. G. Costa, 1839), *laevigatus* (Fabricius, 1798), *latus* (Sturm, 1826), *margi-natus* (Poiret, 1787), *nitidus* (Jekel, 1866), *punctatissimus* (Chevrolat, 1840) (*punctatissimus* was missed out in the matrix of characters, but it is included in the cladogram), *punctatolineatus* (François, 1904), *punctulatus* (Jekel, 1866), *puncticollis* (Lucas, 1849), *reflexus* (Jekel, 1866), *rugatulus* (Jekel, 1866), *sardous* (Erichson, 1847), *sericeus* (Jekel, 1866), *trituberculatus* (Reitter, 1892), *valencianus* (Baraud, 1966), and *variolipennis* Marseul, 1876.

Their cladistic analysis was based on 37 characters, including 26 from the external morphology and 11 from the aedeagus, and they used as outgroups *Allotrypes mandibularis* (Reitter, 1896), *Trypocoprís alpinus* (Sturm & Hagenbach, 1825) and *Lethotrypes inermis* (Ménétries, 1832).

Their cladogram (figs 1, 3) shows *Thorectes* as a monophyletic group, i.e., all the 33 species examined share, among them alone, a common ancestor or, in other words, none of the 33 species examined showed up in the cladogram as being more closely related to any of the three outgroup species than to any other species of *Thorectes*. Obviously, the fact that a group is monophyletic does not entail that it should not be split. However, Palmer & Cambefort analysis does not give support to any claims that *Thorectes* should be split for being polyphyletic.

Palmer & Cambefort (1997) concluded that the 33 species studied are separated in two main clades. Regarding the four subgenera proposed by López-Colón in 1989, Palmer & Cambefort dismissed any justification for the subgenus *Zuninoeus* but accepted that, with some adjustments as to the included species, the other three subgenera could be maintained. They concluded as follows.

Subgenus *Thorectes* sensu López-Colón, 1989 (page 5): «D'après López-Colón (1989) et Ruiz et al. (1994), ce sous-genre comprendrait les espèces suivantes: *laevigatus* Fabricius, 1798 (espèce-type); *valencianus* Baraud, 1966; *baraudi* López-Colón, 1981; *ferreri* López-Colón, 1983; *distinctus* Marseul, 1878; *armifrons* Reitter, 1893 et *trituberculatus* Reitter, 1893. La plupart de ces espèces se retrouvent dans le



premier clade de notre arbre phylogénétique, et le sous-genre pourrait donc être accepté, après une légère émendation, dans le cadre de notre hypothèse de phylogénie.» [According to López-Colón (1989) and Ruiz *et al.* (1994), this subgenus would include the following species: *laevigatus* Fabricius, 1798 (type species); *valencianus* Baraud, 1966; *baraudi* López-Colón, 1981; *ferreri* López-Colón, 1983; *distinctus* Marseul, 1878; *armifrons* Reitter, 1893 and *trituberculatus* Reitter, 1893. The majority of these species are in the first clade of our phylogenetic tree, therefore, the subgenus could be accepted, after a small emendation, within the frame of our phylogenetic hypothesis].

Subgenus *Silphotrupes* Jekel, 1866 (page 8): «D'après López-Colón (1989, 1992a), ce taxon comprendrait les espèces suivantes: *punctatissimus* Chevrolat, 1840 (espèce-type); *escorialensis* Jekel, 1866; *geminatus* (Gené, 1839). Or, dans notre hypothèse de phylogénie, si les deux premières espèces forment en effet un clade bien séparé, la troisième appartient à un autre clade. Le nom pourrait toutefois être conservé pour regrouper les deux espèces *escorialensis* et *punctatissimus*.» [According to López-Colón (1989, 1992a), this taxon would include the following species: *punctatissimus* Chevrolat, 1840 (type species); *escorialensis* Jekel, 1866; *geminatus* (Gené, 1839). Now, in our phylogenetic hypothesis, whereas the first two species form a well separated clade, the third belongs to another clade. The name, however, could be maintained for the two species *escorialensis* and *punctatissimus*].

Subgenus *Jekelius* López-Colón, 1989 (= *Thorectes* s.str.) (Page 8): «D'après son auteur, ce sous-genre comprend au moins les espèces suivantes: *intermedius* Costa, 1827 (espèce-type); *brullei* Jekel, 1866; *nitidus* Jekel, 1866; *sericeus* Jekel, 1866; *punctatolineatus* François, 1904; *sardous* Erichson, 1847; *punctulatus* Jekel, 1866; *rugatulus* Jekel, 1866; *hispanus* Reitter, 1893; *albarracinus* Wagner, 1928; *chalconotus* Chevrolat, 1840; *castillanus* López-Colón, 1985; *balearicus* López-Colón, 1984 et *marginatus* Poiret, 1787. Dans notre hypothèse de phylogénie, il conviendrait d'appliquer le nom subgénérique de *Jekelius* au clade rassemblant toutes les autres espèces. On observe en effet, par exemple dans la structure de l'édéage, que la différenciation la plus significative se fait entre la paire *T. escorialensis-punctatissimus* et *T. hoppei* (fig. 2).» [According to its author, this subgenus

includes at least the following species: *intermedius* Costa, 1827 (type species); *brullei* Jekel, 1866; *nitidus* Jekel, 1866; *sericeus* Jekel, 1866; *punctatolineatus* François, 1904; *sardous* Erichson, 1847; *punctulatus* Jekel, 1866; *rugatulus* Jekel, 1866; *hispanus* Reitter, 1893; *albarracinus* Wagner, 1928; *chalconotus* Chevrolat, 1840; *castillanus* López-Colón, 1985; *balearicus* López-Colón, 1984 and *marginatus* Poiret, 1787. According to our phylogenetic hypothesis, it would be suitable to apply the subgeneric name *Jekelius* to the clade grouping all the other species. One can see, for instance in the structure of the aedeagus, that the most significant differentiation takes place between the pair *T. escorialensis-punctatissimus* and *T. hoppei* (fig. 2)].

Subgenus *Zuninoeus* López-Colón, 1989 (page 9): «Ce dernier sous-genre comprendrait la seule espèce *hoppei* Hagenbach, 1825. Nous ne pensons pas que le niveau d'isolement de cette espèce par rapport au reste du clade puisse justifier ce sous-genre.» [This last subgenus would include the sole species *hoppei* Hagenbach, 1825. We do not believe that the level of isolation of that species in relation to the remaining clade could justify this subgenus].

Since López-Colón's 1996 and Palmer & Cambefort's 1997 papers, three more species, listed here in the original combinations, were described: *Thorectes (Thorectes) coloni* Ruiz, 1998 from Morocco (Tleta-Taghramt, Anyera, Rif) (Ruiz, 1998), *Thorectes shankara* Carpaneto & Mignani, 1999 from the Himalaya (Kedarnath, Uttar Pradesh, India) (Carpaneto & Mignani, 1999), and *Thorectes (Silphotrupes) orocantabricus* Verdú & Galante, 2000 from northern Spain (Puerto de Ancares, León) (Verdú & Galante, 2000).

The genus *Thorectes* Mulsant, 1842 includes some 35 to 45 species, dependent on the accepted synonymies (see comment above), all from the Palearctic Realm. In comparison with other genera of Geotrupini, the genus is morphologically rather homogeneous. In our view, the differences between the various species and/or group of species within the genus are not important enough to justify its split in several genera. Whilst we agree with Palmer & Cambefort (1997), that the subgenera *Thorectes* s. str. (= *Jekelius* López-Colón, 1989) and *Thorectes* sensu López-Colón, 1989 (still lacking a valid name), corresponding to the two main clades in their phylogenetic analysis, could be maintained, we do not think that the maintenance of the subge-



nus *Silphotrupes* Jekel, 1866 is justified, at least not before the relationship, suggested by Zunino (1984) but questioned by Carpaneto & Mignani (1999), between its type species, *punctatissimus* Chevrolat, and the Himalayan species is elucidated, and the position of the Himalayan species in relation to the other species of the genus is established. Apart from this reservation concerning the relationships of the Himalayan species, we hold that no further split of the genus is either necessary or desirable. Of course, as any other taxonomical judgement, ours is subjective.

#### SUMMARY

A rectification is made to the authors' previous statement about the reason why *Scarabaeus laevigatus* sensu Mulsant, 1842 (= *Scarabaeus intermedius* O.G. Costa, 1839) is the validly designated type species of *Thorectes* Mulsant, 1842. The history of the taxonomy of *Thorectes* Mulsant, 1842 is briefly reviewed, and reasons are adduced why the authors believe that the split of the genus, beyond eventually the recognition of two or perhaps three subgenera, is neither necessary nor desirable.

#### RIASSUNTO

*Il genere Thorectes Mulsant, 1842: una rettifica riguardante la sua specie tipo ed alcune considerazioni circa la sua tassonomia (Coleoptera, Geotrupidae).*

In questo lavoro viene presentata una rettifica ad una precedente asserzione degli stessi autori sulle ragioni per cui *Scarabaeus laevigatus* sensu Mulsant, 1842 (= *Scarabaeus intermedius* O.G. Costa, 1839) è la specie tipo validamente designata di *Thorectes* Mulsant, 1842. Viene inoltre esposta una breve storia tassonomica del genere *Thorectes* Mulsant, 1842, e vengono evidenziati i motivi per cui gli autori ritengono che ulteriori divisioni del genere, al di là di un eventuale riconoscimento di due o forse tre sottogeneri, non sono ne' necessarie ne' tantomeno auspicabili.

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