

Case 3590***Scarabaeus* Linnaeus, 1758, *Dynastes* MacLeay, 1819, SCARABAEINAE Latreille, 1802, and DYNASTINAE MacLeay, 1819 (Insecta, Coleoptera, SCARABAEOIDEA): proposed conservation of usage**

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Abstract. The purpose of this application, under Articles 65.2.2 and 70.2 of the Code, is to conserve the usage of the widely used names *Scarabaeus* Linnaeus, 1758 for a dung roller beetle, SCARABAEINAE Latreille, 1802 for the dung beetles subfamily, *Dynastes* MacLeay, 1819 for the hercules beetles genus, and DYNASTINAE MacLeay, 1819, for the rhinoceros beetles subfamily. The current usage of these names is threatened by the overlooked type species designation of *Scarabaeus hercules* Linnaeus, 1758 (currently *Dynastes hercules*) for *Scarabaeus* by Lamarck in Jolyclerc, 1807b. Lamarck's designation would transfer the name *Scarabaeus* from the widely known dung roller beetles to hercules beetles (currently *Dynastes*) and the family-group name SCARABAEINAE from the dung beetles to the rhinoceros beetles (currently DYNASTINAE). It is proposed to set aside all type species fixations for *Scarabaeus* before Hope's designation (1837) of *Scarabaeus sacer* Linnaeus, 1758, which would maintain the current usage of all names involved.

Keywords. Nomenclature; taxonomy; Coleoptera; SCARABAEIDAE; DYNASTINAE; *Scarabaeus*; *Dynastes*; *Dynastes hercules*; dung roller beetles; hercules beetles; rhinoceros beetles.

1. Linnaeus (1758, pp. 342, 345) described the genus *Scarabaeus* containing 63 nominal species and essentially covering what is now considered the superfamily SCARABAEOIDEA. Lamarck (in Jolyclerc, 1807b, p. 368) designated '*Scarabaeus hercules*, Linn.' as the type species of this genus (for Lamarck's responsibility, see Jolyclerc, 1807a, p. iii; for the authorship of the anonymously published work, see Barbier, 1809, p. 53, and Quérard, 1854, p. 197). This type species designation has been overlooked ever since. Latreille (1810, p. 428) designated '*Geotrupes Hercules*,

Fab.' (= *Scarabaeus hercules* Linnaeus, 1758) as the type species for *Scarabaeus* (referred to as 'Scarabée'). Direction 4 of the ICZN (1954, pp. 635 ff) declared the type species designations in Latreille's (1810) 'Table des genres avec l'indication de l'espèce qui leur sert de type' as valid if only one species was selected and was included in the genus by its original author, and if no previous valid selection was made. Since all these conditions are met for *Scarabaeus*, Latreille's type species designation occasionally has been considered valid. Nine years later, MacLeay (1819, p. 22) changed the concept of *Scarabaeus* to the concept that has been in use ever since: 'the name *Scarabaeus* is here restored to the *Ateuchus sacer*, Fab.' (= *Scarabaeus sacer* Linnaeus, 1758). This wording cannot be considered a type species designation according to Article 69.1.1 because neither the term 'type', nor 'type species', nor an equivalent term was used. Hope (1837, p. 22) designated *Scarabaeus sacer* Linnaeus, 1758 as the type species of *Scarabaeus* Linnaeus ('*Sacer*. – Now the type of Mr. MacLeay's genus *Scarabaeus*'). This type species designation has been accepted ever since (for rare exceptions see paras. 2 and 4).

2. Creutzer (1799, p. 79) described the genus *Actinophorus* for nine nominal species of roller dung beetles, nowadays in the tribes SCARABAEINI, GYMNOPLEURINI, and SISYPHINI. *Actinophorus* was used in the few years following its introduction (Sturm, 1800; Duftschmid, 1805), but only sporadically later: Erichson (1848, p. 751) used it as a subgenus of *Ateuchus* Weber for some species currently in *Scarabaeus*, but excluding *S. sacer*. The usage as subgenus of *Ateuchus* was adopted by some authors, e.g. Boheman (1857), Gerstaecker (1871), Shipp (1895). Even fewer authors used *Actinophorus* as a valid generic name, namely Heyden (1886, 1887), Shipp (1896), and finally Lea (1922) in an uncommented list of previously recorded dung beetles from Australia. *Actinophorus* Creutzer was synonymized with *Scarabaeus* Linnaeus by Harold (1870, p. 104), followed by Bedel (1892). As the only authors in recent times, Ádám (1994, 1996), Ádám & Hegyessy (1998), and Enyedi & Varga (2006) used *Actinophorus* Creutzer, 1799 as a valid name. Enyedi and Ádám later returned to using *Scarabaeus* (Enyedi & Ádám, 2009; also Enyedi, 2006). Ádám (2003a) designated *Scarabaeus sacer* Linnaeus, 1758 as the type species of *Actinophorus* Creutzer.

3. For much of the nineteenth century, the current *Scarabaeus* species were often assigned to the genus *Ateuchus* Fabricius (1801, pp. XII, 54), which had been created for 58 nominal species including *Scarabaeus sacer* Linnaeus. Fabricius (1801) used *Scarabaeus* in the current sense of the scarabaeoid family GEOTRUPIDAE. However, Weber (1801, p. 10) had introduced the genus *Ateuchus* at least one and a half months earlier: Weber's book was published before March 1801 (Evenhuis, 1997; see also BZN 62: 124) whereas the introductory chapter of Fabricius's *Systema Eleutheratorum* is dated '10. April. 1801'. Fabricius (1801) did refer to Weber neither in his description of *Ateuchus* nor in the introduction of his book where authors are listed. *Ateuchus* likely was a widely used manuscript name that was incidentally published by two authors around the same time. *Ateuchus* Fabricius, 1801 is a junior homonym of *Ateuchus* Weber, 1801 and therefore permanently invalid. The type species of *Ateuchus* Weber is *Ateuchus histerooides* Weber, 1801 (p. 37) by monotypy, a North American species without close relationship to *Scarabaeus* in its current concept, hence the name *Ateuchus* is of no relevance to the present Case. Perty (1830, p. 38) introduced the family-group name ATEUCHITES, based on *Ateuchus* Weber, which has

rarely been used at the family rank in the sense of SCARABAEINAE (Shipp, 1894; Ádám, 1994, see para. 7) and is a junior subjective synonym of COPRIDES Leach, 1817 (see para. 9).

4. Though *Ateuchus* and *Actinophorus* have also been in use for *Scarabaeus sacer* and/or related species in the nineteenth century, the generic name *Scarabaeus* has been in continuous use as a valid name for this group of beetles since its introduction by Linnaeus (1758) (e.g. MacLeay, 1819; Heer, 1838; Hope, 1838; Mulsant, 1842; Gaubil, 1849; Harold 1870; Heyden et al., 1883, 1891; Bedel, 1892). Since 1900, *Scarabaeus* has been used exclusively for this taxon with the exception of the listing by Lea (1922; see para. 2) and the idiosyncratic, but Code-compliant, use of *Actinophorus* by Ádám (1994, 1996, 2003a). Later, Enyedi & Ádám (2009) returned to the established use of *Scarabaeus* as valid for dung rolling beetles. A list of 195 references from Zoological Record for the usage of *Scarabaeus* as a valid name since 1900 is held by the Commission Secretariat.

5. MacLeay (1819, p. 22) introduced the name *Dynastes* for ‘the genus *Scarabaeus* of Latreille’. Although not fulfilling modern standards of a bibliographic reference, the reference to *Scarabaeus* sensu Latreille is unequivocal: from 1802, Latreille (e.g. 1802, 1804, 1810, 1817) invariably used *Scarabaeus* in the sense of rhinoceros beetles, mostly with *Scarabaeus hercules* Linnaeus as an example or the type species (see para. 1). *Dynastes* MacLeay, 1819 is available by indication under Article 12.2.1. Kirby (1825, p. 567) designated *Scarabaeus hercules* Linnaeus as the type species of *Dynastes* MacLeay. *Dynastes* has been used in this sense ever since (Burmeister, 1847; Bates, 1888; Heyne & Taschenberg, 1908; Endrödi, 1947; Ritcher, 1966; Dechambre, 1980; Endrödi, 1985; Lachaume, 1985; Ratcliffe & Cave, 2006; Iannacone-Oliver & Soras-Vega, 2010). A list of 66 references from Zoological Record for the usage of *Dynastes* MacLeay in titles or abstracts as a valid name since 1900 is held by the Commission Secretariat.

6. The first higher-category name based on *Scarabaeus* was introduced by Laicharting (1781, unpaginated page opposite p. XII): Scaraboides, used instead of the then usual Eleutherata or Coleoptera for all beetles (‘Käferartige Insecten’). Since Laicharting introduced this name at order level (‘Ordnung’), it is not an available family-group name according to Article 35.1. Ádám’s (1994, 1996, 2003b) and Ádám & Hegyessy’s (1998) use of ‘SCARABAEIDAE (Laicharting, 1781)’ is erroneous. Latreille (1802, p. 144) was the first to introduce a family-group name based on *Scarabaeus*: SCARABAEIDES. The family included the nominal genus *Scarabaeus* Linnaeus. Latreille (1802) is the author of the nominal family SCARABAEIDAE, whose type genus is *Scarabaeus* Linnaeus, 1758. SCARABAEIDAE has been in ubiquitous use ever since, but its concept changed during the first 50 years of its existence along with the concept of its type genus (see para. 1). Zoological Record found 5916 unique references using SCARABAEIDAE in titles or abstracts after 1899. A list of the 1000 most recent records is held by the Commission Secretariat.

7. Without any explanation, Ádám (1994, 1996) and Ádám & Hegyessy’s (1998) used ‘SCARABAEIDAE (Laicharting, 1781)’ (= SCARABAEIDAE Latreille) in Latreille’s sense of DYNASTINAE or DYNASTIDAE (rhinoceros beetles) of modern authors whereas he calls SCARABAEINAE of modern authors ‘ATEUCHINAE (Castelnau, 1840)’ in 1994 and ‘COPRIDAE (Leach, 1815)’ in 1996 and 1998 (Ádám & Hegyessy, 1998). The latter nomenclature was followed by Enyedi & Varga (2006) only. In 2003a, Ádám created

the new family-group name ACTINOPHORINI for *Actinophorus* and *Ateuchetus* Bedel, 1892, i.e. what almost all other authors currently subsume under *Scarabaeus*. No other author has adopted ACTINOPHORINI.

8. The first family-group name based on *Dynastes* MacLeay, 1819 was DYNASTIDAE MacLeay, 1819 (p. 64) and has been used for the rhinoceros beetles (Bates, 1888; Dechambre, 1980; Endrödi, 1985; Lachaume, 1985; Ratcliffe & Cave, 2006) or a subgroup of these (Burmeister, 1847) ever since. The family-group name was even maintained by authors using the name *Scarabaeus* for *Dynastes* (Castelnau 1840, p. 110) or following Latreille's genus concepts otherwise (e.g. Lacordaire, 1856, p. 387; Jacquelin du Val & Fairmaire, 1859–63, p. 69). A list of 429 references from Zoological Record for the usage of DYNASTINAE in titles or abstracts since 1910 is held by the Commission Secretariat.

9. The second oldest family-group name based on a dung beetle genus after SCARABAEIDAE is COPRIDES Leach, 1817 (type genus *Copris* Geoffroy, 1762). COPRINAE (or COPRINI) has been used ever since, but rarely instead of SCARABAEINAE (Erichson, 1848; Lacordaire, 1856; and in some German-speaking literature where SCARABAEIDAE and *Scarabaeus* are used, but SCARABAEINAE is not: Reitter, 1892; Machatschke, 1969, Allenspach, 1970). In general, COPRINI is considered a subgroup (tribe) of SCARABAEINAE.

10. Despite being unaware of Lamarck's (in Jolyclerc, 1807b) type species designation, several authors have recognized the implications of Latreille's (1810) identical type species designation (Harold, 1870; Arrow, 1931) and subsequent Direction 4 (Ádám, 1994; Ziani, 2002; Ádám, 2003a; Zidek & Pokorný, 2005; Branco, 2007; Löbl & Smetana, 2007). Harold (1870) states that despite *Actinophorus* being the valid name for *Scarabaeus*, *Scarabaeus* undoubtedly is to be conserved ('Gattung *Scarabaeus*. Es scheint mir unzweifelhaft, dass fuer diese Gattung, welche sonst *Actinophorus* heissen müsste, der Linné'sche Name zu conserviren sei.' ['Genus *Scarabaeus*. It seems unquestionable to me that for this genus, that otherwise would have to be called *Actinophorus*, the Linnean name has to be conserved.']). He continues that *Scarabaeus hercules* was just the first species listed by Linnaeus, but by no means considered typical by the author, because Linnaeus did not create a new generic name but chose *Scarabaeus*, the traditional name for *S. sacer*. Likewise, Mulsant (1842, p. 44) stated: 'Avec M. Mac-Leay nous restituons aux insectes de ce genre le nom de *Scarabaeus*, sous lequel ils étaient connus des Romains' ['With Mr Mac-Leay we reinstate for the insects of this genus the name *Scarabaeus* under which it was known by the Romans']. Arrow (1931, p. 37) reviewed the nomenclatural history of SCARABAEINAE and proposed to treat *Scarabaeus* and *Dynastes* as nomina conservanda. Ádám (1994, 2002) was the only author content with following the Code with all consequences, using *Actinophorus* as valid and changing the concept of SCARABAEIDAE (for the latter see also Ádám, 2003b). This changed concept of SCARABAEIDAE for DYNASTIDAE was followed only by Ádám's compatriot Enyedi (2004, 2006), who did still use, however, the generic name *Scarabaeus* as valid, but outside the SCARABAEIDAE (Enyedi, 2006). A few years later, in a jointly authored paper, Enyedi & Ádám (2009) returned to the established use of SCARABAEIDAE. Ziani (2002) suggested referring to Article 70.2 to involve the Commission to invalidate Latreille's type species designation for *Scarabaeus*, but no further action was taken. Misinterpreting Recommendation 67B, Zidek & Pokorný (2005) erroneously

assumed that Latreille (1810) had designated *Scarabaeus sacer* as type species for both *Ateuchus* Fabricius and *Scarabaeus* Linnaeus, which is not the case. Branco (2007) presented the case comprehensively and suggested referring a case to the Commission under Article 65.2.2. Löbl & Smetana (2007, p. 25) recommended maintaining common usage of *Scarabaeus* with the type species *Scarabaeus sacer* Linnaeus until a case is made to the Commission and a ruling is published. Branco (2011) repeated his earlier suggestion, which we hereby put into effect.

11. Strictly following the Code would have the following consequences:

- (a) At the genus-group level: the established and undisputed generic name *Dynastes* for hercules beetles would be replaced by *Scarabaeus*, a widely used name for dung roller beetles. A genus of around 120 species of dung roller beetles, amongst them the sacred scarab of the Egyptians, would no longer be named *Scarabaeus*, but receive the almost forgotten name *Actinophorus*.
- (b) At the family-group level: the well known name DYNASTINAE for rhinoceros beetles would be replaced by SCARABAEINAE, which is currently in ubiquitous use for dung beetles. Dung beetles would be named COPRINAE Leach, 1817, the next oldest family-group name based on a dung beetle generic name. Old-world dung rollers, well-known as SCARABAEINI, would get the name ACTINOPHORINI. The superfamily SCARABAEOIDEA would remain unchanged, but in classifications placing dung and rhinoceros beetles in different families (e.g. Baraud, 1992; Carpaneto & Piattella, 1995; Kim, 2001; Morón, 2004; Lacroix, 2010), the scarab dung beetles would no longer belong to the SCARABAEIDAE.

It is unlikely that those drastic changes would be accepted in future as they have not been adopted in the past even though the nomenclatural facts have been published several times. Even a nomenclature strictly following the Code was proposed (Ádám, 1994, 2003a), but found only a single follower during the subsequent 18 years, and was later abandoned by its author himself (Enyedi & Ádám, 2009).

12. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to set aside all type species fixations for the nominal genus *Scarabaeus* Linnaeus, 1758 before that of *Scarabaeus sacer* Linnaeus, 1758 by Hope, 1837;
- (2) to place on the Official List of Generic Names in Zoology the following names:
 - (a) *Scarabaeus* Linnaeus, 1758 (gender: masculine), type species *Scarabaeus sacer* Linnaeus, 1758, as ruled in (1) above;
 - (b) *Dynastes* MacLeay, 1819 (gender: masculine), type species *Scarabaeus hercules* Linnaeus, 1758 by subsequent designation by Kirby (1825);
- (3) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *sacer* Linnaeus, 1758, as published in the binomen *Scarabaeus sacer* (specific name of the type species of *Scarabaeus* Linnaeus, 1758);
 - (b) *hercules* Linnaeus, 1758, as published in the binomen *Scarabaeus hercules* (specific name of the type species of *Dynastes* MacLeay, 1819);
- (4) to place on the Official List of Family-Group Names in Zoology the following names:
 - (a) SCARABAEIDAE Latreille, 1802, type genus *Scarabaeus* Linnaeus, 1758 (Insecta, Coleoptera);

- (b) DYNASTINAE MacLeay, 1819, type genus *Dynastes* MacLeay, 1819 (Insecta, Coleoptera).

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