COMMENTS ON THE GENUS AGRILUS CURTIS, 1825: WHERE DO WE GO NOW AND DO WE GO TOGETHER? (COLEOPTERA: BUPRESTIDAE: AGRILINAE)

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ABSTRACT

Comments on the genus Agrilus Curtis, 1825: Where do we go now and do we go together? (Coleoptera: Buprestidae: Agrilinae)

Comments are presented on the authorship of the enormous buprestid genus Agrilus Curtis, 1825 and the contemporary trend to divide it into subgenera. The A. pulchellus Bland, 1865 group is returned to placement under Engyaulus Waterhouse, 1889, which is proposed as a subgenus of Agrilus. The genus Agrilosambus Toyama, 1987 is reduced to subgenus rank.

Key words: Coleoptera, Buprestidae, Agrilinae, Agrilus, Engyaulus, Holarctic, synonymy

INTRODUCTION

The buprestid genus Agrilus Curtis, 1825 is the largest genus in the family and is perhaps the largest single genus, based upon estimated number of species, in the animal kingdom. In the penultimate fascicle of OBENBERGER'S (1936) catalogue, dedicated almost entirely to this genus, he listed 294 species from the Palaearctic region, 564 from the Oriental and Australasian regions, 936 from the New World, and 471 from the Ethiopian region, for a total, nearly 60 years ago, of 2265 species. Subsequent to that work, numerous species have been described from various parts of the world (e.g. various works by Fisher, Knoll, Obenberger, etc.). In fact, when I visited the Obenberger collection in Prague in 1990, Dr. S. Bily showed me a number of boxes that combined held nearly 1,000 manuscript names for undescribed Agrilus spp. which Obenberger was not able to publish.

Species of Agrilus are found virtually around the world in almost every habitat between the subalpine and littoral zones on every continent except Antarctica with some even known from distant oceanic islands in the mid-latitudes of the Pacific, e.g. Fiji and Tahiti. Host associations are wide-ranging within the dicot angiosperms, but as FISHER (1928) noted, there are no known associations with any gymnosperms.
THE AUTHORSHIP OF AGRILUS: CURTIS, DAHL, MEGERLE OR WHO?

One aspect of Agrilus taxonomy that is fundamentally important, and currently somewhat controversial, is the generic authorship. A recent shift by a few authors claims that Agrilus should be attributed to DAHL (1823) rather than CURTIS (1825), the traditionally credited author. This change was apparently first reported by BURAKOWSKI, et al. (1985), but one of two recent authors who have followed this change in their own work, E. Jendek, has told me (in litt.) that he has never checked this for himself. Except for JENDEK (1994a, 1994b) and HOŁYŃSKI (1993), all authors subsequent to Curtis’s description (see the nearly five page generic synonymy list in OBENBERGER (1936)) have credited Curtis with the authorship. While it may be true that DAHL’S (1823) usage does have priority over that by Curtis, I think that such an authorship change requires careful study and confirmation with a copy of the original publication before this shift is accepted. In concert with such investigation, we should also further research the situation mentioned by FISHER (1928) where he stated that many early authors attributed the name Agrilus to Megerle von Mühlfeld, reportedly used in his publications between 1801 and 1812 (MEGERLE 1801, 1805, 1812). Fisher was not able to examine any of Megerle von Mühlfeld’s publications and these are not currently available to me. Obviously if Megerle von Mühlfeld did properly validate the name Agrilus in any of his three works, his use of the name precedes either that by Dahl or Curtis. However, any change of this type should probably be proposed along with an application to the ICZN in line with the traditional «50 year rule».

IS THE SUBGENERIC RANK THE PROPER WAY TO DIVIDE AGRILUS?

For students of this family, we seem to have entered a period where the enormity of Agrilus is not so intimidating as there are currently efforts to revise and understand the regional faunas for several large parts of the world. The Agrilus of Mexico and Central America are being studied by HESPENHEIDE, with synonyms and new species proposed in several works (e.g. 1974, 1979, 1989). The Agrilus fauna of subsaharan Africa is currently being studied by CURLETTI (1993). The fauna of the eastern Palearctic and Oriental regions has been studied by KUROSAWA (e.g. 1954, 1956, 1957, 1976, 1981), DESCARPENTRIES & VILLIERS (e.g. 1963a, 1963b, 1963c), more recently by TOYAMA (1987, 1988) and is continued by JENDEK (1993, 1994a, 1994b). The last study of the Australian and Oceanic Agrilus was by OBENBERGER (1959). The faunas of both the Nearctic and western Palearctic regions are most likely fairly well understood by numerous concerted efforts over the last 150 years (e.g. FISHER 1928, for North America; BÍLÝ 1982, CURLETTI 1994, NIEHUIS 1988, for selected areas within the Palearctic region).

With a group so speciose, it might make sense to carve it up into smaller entities that could be studied individually. In fact, OBENBERGER (1957), arguably a «splitter», tried to find characters to separate Agrilus into smaller units but concluded, from the huge variability observed within the range of species, that there was no way to do so. Subsequently, the works of ALEXEEV (e.g. 1960, 1979, 1981a, 1981b, 1990) on the Palearctic Agrilus and CURLETTI (1993) on the
«Ethiopic» fauna have described and utilized numerous subgenera for these faunas. Unfortunately the temptation to split off small groups or single species on the basis of few or even single character state differences, that might appear feasible in one regional perspective, often fail in a broader sense.

**IS THERE A Holarctic Fauna?**

That there are common genera between the buprestid faunas of the Palaearctic and Nearctic is no surprise as discussed by OBENBERGER (1958a, 1958b). In other genera (e.g. Anthaxia Eschscholtz, 1829), workers in North America have adopted the same subgeneric (with some now as genera) scheme defined by European researchers, while in other groups (e.g. Acmaeodera Eschscholtz, 1829, Chrysobothris Eschscholtz, 1829), the size of the respective faunas has perhaps restricted understanding and consensus by workers on either side of the northern Atlantic. But is there conspecificity between the Palaearctic and Nearctic faunas?

In terms of North American Agrilus we know that the fauna has been «invaded» by species from both the West and East Palaearctic regions. HESPNHEIDE (1968) first recorded A. pilosovittatus Saunders, 1873, a Japanese species, from New Jersey. The European A. hyperici Cruetzter, 1789 has been successfully imported into the northwestern U.S. to control Klamathweed or St. John’s Wort, Hypericum perforatum. ALEXEEV (1990) records A. sinuatus (Olivier, 1790), A. cyanescens Ratzeburg, 1837 and A. aurichalcus Redtenbacher, 1849 (= A. rubicola Abielle de Perrin, 1897 = A. viridis Linnaeus, 1758, var. fagi Ratzeburg, 1839) as being common to both the Palaearctic and Nearctic. Other European Agrilus species are also known to have been introduced or are conspecific with North American species, but most of these records are not yet published.

According to the work of ALEXEEV (1979), the Palaearctic Agrilus can be separated into seven subgenera: Agrilus (s. str.), A. (Anambus) C. G. Thomson, 1864, A. (Sinuatiagrilus) Alexeev, 1979, A. (Arquagrilus) Alexeev, 1979, A. (Quercuagrilus) Alexeev, 1979, A. (Dentagrilus) Alexeev, 1979, A. (Austragrilus) Alexeev, 1979; he (1981b) later added A. (Xeragrilus) Alexeev, 1981. In 1990, Alexeev utilized Uragrilus Semenov-Tian-Shianskij, 1935, at the generic level. According to OBENBERGER (1957), both Uragrilus and Epinagrilus Stepanov, 1954, originally proposed as a subgenus, are synonyms of Agrilus. One problem with the subgenera of Alexeev and Stepanov is that they may not be valid according to Art. 13b of the ICZN. I can find no designation in the literature for type species for any of the subgeneric taxa proposed by Alexeev nor for Epinagrilus; in contrast, those recently described by CURLETTI (1993) all have type species designations.

For the Nearctic fauna, ALEXEEV (1990) places the following species in the genus Uragrilus: A. quadriguttatus (Gory, 1841), A. acutipennis (Mannerheim), 1837, A. anxius (Gory, 1841), A. viaticollis (Randl) and A. bilineatus (Weber, 1801). Into the subgenus A. (Quercuagrilus) he places: A. otiosus (Say, 1836), A. frosti Knall, A. abductus Horn, 1891, A. geminatus (Say, 1823), and A. defectus LeConte, 1859 and into A. (Arquagrilus) he places: A. fuscipennis Gory, 1841, A. angelicus Horn, 1881, A. masculinus Horn, 1891, A. crataegi Frost, 1913, A. transimpressus Fall, 1925, A. eliptoni Knall, 1941, and A. albocomis Fisher, 1928. This leaves numerous other North American species remaining within the nominate
Agrilus viridis (Linnaeus)  

1. Frontovertex flattened, not projecting beyond anterior extent of eyes; broadly depressed between eyes.
2. Antennal cavities separated by distance greater than own width.
3. Submarginal lateral pronotal carina nearly entire from base to apex.
4. First metatarsomere elongate, length greater than \(2 + 3 + 4\) taken together.

Agrilus pulchellus Bland species group

1. Frontovertex arcurate, projecting anteriorly beyond eye; longitudinally grooved.
2. Antennal cavities separated by distance less than own width.
3. Submarginal lateral pronotal carina short, or absent in \(u_{ahensis}\), and situated at some distance from both base and apex on hypomeron.
4. First metatarsomere short, length less than \(2 + 3\) taken together.

Table 1: Character state differences between Agrilus viridis (Linnaeus) (generic type species) and the A. pulchellus group.

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subgenus, although some are obviously different from the type species A. viridis (Linnaeus, 1758), until a complete revision has been accomplished. Clearly further study is needed to refine the classification and more realistically place species as distinct from one another as many North American species are (e.g. A. ventralis Horn, 1891, A. snowi Fall, 1905, A. cavifrons Waterhouse, 1889, etc) and in addition take into consideration the origin and radiation into North America (north of Mexico) elements from both the eastern and western Palaearctic and northern Neotropical regions.

THE RANK AND PLACEMENT OF ENGYAULUS WATERHOUSE, 1889

In the recent revision of the Agrilus pulchellus Bland, 1865, species group, NELSON & WESTCOTT (1991) left Engyaulus Waterhouse, 1889, as a synonym of Agrilus as first proposed by FISHER (1928). OBENBERGER (1934, 1943) preferred to leave Engyaulus at the genus rank. The characters utilized by WATERHOUSE (1889) to distinguish this taxon were: front of head very prominent and regularly arched, antennal cavities round and nearly contiguous, and first metatarsomere short. While Fisher didn’t think these differences warranted generic status, a comparison of the type species of A. viridis (Linnaeus, 1758), to those placed in the pulchellus group (Table 1) reveals differences substantial enough, in light of contemporary Agrilus thinking, to warrant the resurrection of Engyaulus to subgeneric rank under Agrilus.

The A. pulchellus group, as recorded by NELSON & WESTCOTT (1991), also share a biological character as they are apparently associated with and possibly utilize as larval hosts various members of the Asteraceae. The species and subspecies now placed in A. (Engyaulus) are as follows; the full synonymy and distribution is found in the revision by Nelson and Westcott.
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CHECKLIST OF AGRILUS (ENGYAULUS) WATERHOUSE, 1889


inhabitilis Kerremans, 1900: 341
  syn. ineptus Horn, 1894: 378 (name preoccupied).
  ssp. inhabitilis ................................................ Mexico: Baja California Sur
  ssp. chalcogaster Van Dyke, 1946: 83......................... U.S.: California

pulchellus Bland, 1865: 382................................. U.S.: Arizona, Texas; Mexico
  syn. pinalicus Wickham, 1903: 69
  syn. pulchellus var. martini Obenberger, 1943: 86
  syn. rubrovittatus (Waterhouse, 1889): 50 (as Engyaulus) ........................................
  ........................................................ Mexico; Guatemala; U.S.: New Mexico
  syn. rubrovittatus Dugès, 1891: 28


While much remains to be done in fitting the North American Agrilus fauna into the system proposed by Alexeev as well as considering the many possible species groups and subgenera in both the Nearctic and northern Neotropical regions, the existence of a described taxon for the A. pulchellus group allows for some subscription to the system beginning to take shape for the Old World fauna. And while there may be a problem with the validity of some of the Palaearctic subgenera of Agrilus, it seems clear that a consensus has developed regarding the subgeneric rank in Agrilus as one way to better deal with this enormous group.

In other regions, there have been several more recent efforts to call attention to putative specially derived species of Agrilus. The description of Agrilosambus by TOYAMA (1987) was based solely on a difference in the number of serrate antennomeres. Toyama reported that A. taoi has the antennae serrate from the sixth antennomere, in contrast to Agrilus, he said, which has the antennae serrate from the fourth antennomere. Unfortunately, it has been known for sometime that Agrilus has the antennae serrate from either the fourth or fifth antennomere. In his revision of the North American species of Agrilus and key to the species, FISHER (1928) divided the genus into two groups with a couplet stating «Antennae serrate from fourth joint» or «... fifth joint». Surely the next step in the transition series is that listed by Toyama as the only generic criterion used to validate Agrilosambus and is simply insufficient reasoning to retain this taxon as a valid genus. Nothing else from the brief generic description by Toyama demonstrates that Agrilosambus is a otherwise distinct. If additional divergent characters states are present in A. taoi, it may in fact represent a taxon distinct from Agrilus, but these are not discussed in the description. While there is precedent for erecting and maintaining buprestid genera based on differences in the number of serrate antennomeres, there are always corroborating character states to support these taxa. In a putative sister-group to Agrilina, the Cylindromorphina Portevin, the two African genera Zita Bellamy, 1992 and Zitella Bellamy, 1992 (not Théry, see BELLAMY, 1995) are separated with Zita having the standard 11 (for buprestids) antennomeres, with the last 6 serrate, while Zitella has the apomorphic condition of only 10 antennomeres, with the last 5 serrate. Obviously the apomorphic loss of one antennomere is more significant in defining Zitella than the number that are serrate.
Thus *Agrilosambus* is proposed herein to be lowered to the subgeneric rank, equal to the only other subgenus from the Oriental region, *A. (Igagrilus)* Kurosawa (1981). While both *A. (Agrilosambus) taoi*, comb. n., and *A. (Igagrilus) elongatissimus* Kurosawa, 1981, the unique type species for their respective taxa, may eventually be found to be congeneric to other species, I find no reason to perform wholesale synonymy at the genus/subgenus level and support the concept of *Agrilus* subgenera with this slight downgrading. The revision of the Afrotropical subgenus *Agrilomorpha* Théry, 1909 (*sensu* Curletti 1993) is nearly complete (Bellamy, in prep.).

Other subgenera for *Agrilus* are needed for parts of the world where this rank and concept has not been applied. Certainly the huge and diverse Neotropical fauna would benefit from such taxonomic application. The genus *Paradomorphus* Waterhouse, 1887, was correctly synonymized under *Agrilus* by Hespénhéide (1974) since the type species, *P. albicollis* Waterhouse, 1887, from Jamaica, is congeneric. However, a group of species formerly placed within *Paradomorphus*, e.g. the *P. carissimus* Waterhouse, 1892, group, are at least subgenerically distinct and are awaiting their own inclusive taxon. In the Australasian region, a small species group [*c.f. deyrollei* Kerremans, 1892, = *elongatus* Deyrolle, 1864; *zubaczi* Obenberger, 1959 = *cupripes* (Carter, 1924)] await separation into a subgenus and there are perhaps other species groups that might be accorded the same rank.

THE SUBGENERAE AND SYNONYMS OF AGRILUS AND URAGRILUS

Genus *Agrilus* Curtis, 1825

Type species: *Buprestis viridis* Linnaeus (designation by Curtis, teste Fisher 1928)

Syn. *Teres* Harris, 1829

Syn. *Euryotes* Dejean, 1837

Syn. *Paradomorphus* Waterhouse, 1887

Type species: *Paradomorphus albicollis* Waterhouse

Subg. *Agrilomorpha* Théry, 1909

Type species: *Agrilomorpha rothschildi* Théry

Subg. *Agrilosambus* Toyama, 1987 [*stat. n.*]

Type species: *Agrilosambus taoi* Toyama (by designation)

Subg. *Anambus* C. G. Thomson, 1864

Type species: *Anambus caeruleoviolaceus* Thomson

Subg. *Arquagrilus* Alexeev, 1979

Type species: none designated

Subg. *Australagrilus* Alexeev, 1979

Type species: none designated

Subg. *Bubagrilus* Curletti, 1993

Type species: *Agrilus embrikstrandellus* Obenberger

Subg. *Coroebilus* Curletti, 1993

Type species: *Agrilus grandis* Gory & Laporte

Subg. *Dentagrilus* Alexeev, 1979

Type species: none designated

Subg. *Arquagrilus* Alexeev, 1979
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Type species: *Agrilomorpha rothschildi* Théry

Subg. *Agrilosambus* Toyama, 1987 [*stat. n.*]

Type species: *Agrilosambus taoi* Toyama (by designation)

Subg. *Anambus* C. G. Thomson, 1864

Type species: *Anambus caeruleoviolaceus* Thomson

Subg. *Arquagrilus* Alexeev, 1979

Type species: none designated

Subg. *Australagrilus* Alexeev, 1979

Type species: none designated

Subg. *Bubagrilus* Curletti, 1993

Type species: *Agrilus embrikstrandellus* Obenberger

Subg. *Coroebilus* Curletti, 1993

Type species: *Agrilus grandis* Gory & Laporte

Subg. *Dentagrilus* Alexeev, 1979

Type species: none designated

Palaearctic, Afrotropical

Oriental

Palaearctic

Holarctic

Palaearctic

Afrotropical

Afrotropical

Palaearctic
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Subg. Diplolophotus Abeille de Perrin, 1897
  Type species: none designated, genus erected for Diplolophotus martini Abeille de Perrin and Agrilus desertus (Klug)  
  Afrotropical

Subg. Duttus Curletti, 1993
  Type species: Agrilus purpuratus Klug  
  Afrotropical

Subg. Engyaules Waterhouse, 1889 stat. n.
  Type species: Engyaules rubrovitattus Waterhouse  
  Nearctic, Neotropical

Subg. Igagrilus Kurosawa, 1981
  Type species: A. (Igagrilus) elongatissimus Kurosawa  
  Oriental

Subg. Melagrilus Curletti, 1993
  Type species: Agrilus escalerai Obenberger  
  Afrotropical

Subg. Personatus Curletti, 1993
  Type species: Buprestis sexguttatus Thunberg  
  Afrotropical

Subg. Quercuagrilus Alexeev, 1979
  Type species: none designated  
  Holarctic

Subg. Robertius Théry, 1947
  Type species: Agrilus (Robertius) taylori Théry  
  Afrotropical

Subg. Sinuatiagrilus Alexeev, 1979
  Type species: none designated  
  Palaearctic

Subg. Xeragrilus Alexeev, 1981b
  Type species: none designated  
  Palaearctic

Genus Uragrilus Semenov-Tian-Shianskij, 1935
  Type species: Agrilus guerini Lacordaire  
  Holarctic

Syn. Epinagrilus Stepanov, 1954 (Obenberger 1957)
  Type species: none designated, three species included by Stepanov (1954)

FINALS THOUGHTS: GENERA, SUBGENERA OR WHAT?

One aspect that is quite clear when we look at a subject as large as the enormity presented by Agrilus is that different philosophies will surface and claim to be the most objective. If we look beyond this summary of Agrilus and its subgenera, to the other genera of the subtribe Agrilina, some might question the rank and definition of at least some of those taxa. It might be easiest, for now, to argue that those taxa originally defined at the generic level, should remain there. For example, how much more significant are the characters that separate the African species placed within Parakamosia Obenberger, 1924, Sjoestedtius Théry, 1931 or Malawiella Bellamy, 1990 from Agrilus (Agrilomorpha) or A. (Personatus)? Certain species or species groups in the Neotropical region (e.g. A. coatlycuei Fisher, 1938) seem to share suites of character states that would argue for their separation, either to genus or subgenus rank. On the other hand, the monotypic genus Agrilochyseus Théry, 1935 from Brazil rather seems to fall within the variation of Neotropical Agrilus described by OBENBERGER (1957) when he discussed his inability to subdivide Agrilus. The recent comments of JENDEK (unpubl.) are indisputable in that this work can only progress to clear resolution through the study of all types; in a group of such
enormous numbers of species and variation, the mere reading of descriptions will not suffice.

Thus we are faced with coming to terms in defining a contemporary working philosophy that will allow researchers from different regions and backgrounds to approach their studies of Agrilus from some point of agreement, despite the fact that no clear definition or agreement has ever been reached about what constitutes a genus as opposed to a subgenus or species group. Therefore I invite an increase in communication and dialogue between those who will help solve this most enormous task that lies before those interested in the family Buprestidae.

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