

**ARBOREAL BEETLES OF NEOTROPICAL FORESTS:
AGRA FABRICIUS, A TAXONOMIC SUPPLEMENT FOR THE
PLATYSCELIS GROUP WITH NEW SPECIES AND DISTRIBUTION RECORDS
(COLEOPTERA: CARABIDAE, LEBIINI, AGRINA)**

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Abstract

The *platyscelis* group of the carabid genus *Agra* Fabricius, an equatorially centered lineage, consists of 30 species that have a composite range extending from the isthmus of Panamá to French Guiana south into Brazil and Bolivia. The majority of species are found in the Amazon Basin. Structural features of both body and appendages are convergent with other carabid beetles that are known to dwell in ant nests, however, no life history of any *Agra* species is known. The following 12 specific taxa of the *platyscelis* group are described as new (type locality in parenthesis): *A. tingo* **new species**, (PERU, Huánuco, 13 km S Tingo Maria, Tambillo, Chico Canyon, 09°15'S, 76°23'W); *A. biolat* **new species**, (PERU, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W); *A. aeris* **new species**, (PERU, Madre de Dios, BIOLAT Biodiversity Station, Pakitza, 11°56'S, 71°17'W); *A. solimoes* **new species**, (BRAZIL, Amazonas, Tefé (Ega), 3°22'S, 64°42'W); *A. servatorum* **new species**, (PERU, Loreto, 1km SW Boca del Rio Samiria, Vigilante Post No. 1, 04°40'S, 74°18'W); *A. conhornigas* **new species**, (PERU, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W); *A. lilu* **new species**, (BRAZIL, Amazonas, Humaitá, 07°32'S, 63°02'W); *A. lindae* **new species**, (PERU, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W); *A. rondonia* **new species**, (BRAZIL, Rondonia, Ariquemes, 9°56'S, 63°03'W); *A. nex* **new species**, (BRAZIL, Amazonas, 2km N Itacoatiara-Manaus Highway, 11 km, W of Itacoatiara, Canadian Fathers' Pool, 03°08'S, 58°28'W); *A. manu* **new species**, (PERU, Madre de Dios, Manu Biosphere Res., Pakitza, 11°56'S, 71°17'W); *A. dax* **new species**, (PANAMA, Canal Zone, Barro Colorado Is., 09°10'N, 79°50'W). The females of *A. iquitosana* Erwin and *A. sasquatch* Erwin, and the male of *A. varzeicola* Erwin are described and illustrated for the first time.

A revised key and checklist are provided and distributions of all 33 species are dot-mapped. A general discussion for each of the new species, as well as for 12 additional species for which new locality records were found (*A. klugii* Brullé, *A. limulus* Erwin, *A. varzeicola*, *A. iquitosana*, *A. tarapotana* Erwin, *A. titan* Erwin, *A. platyscelis* (Chaudoir), *A. caliga* Erwin, *A. yeti* Erwin, *A. semiviridis* (Straneo), *A. sasquatch* Erwin, and *A. azureipennis* Erwin) is included. Remarks on systematics and biogeography based on the newly described specimens are provided.

Introduction

This paper supplements my previous revision of the *platyscelis* group (Erwin 1982b) in that it provides data from newly acquired specimens on loan from museums and from recent fieldwork in the western Amazon Basin. In total, I have now studied 88 specimens in the *platyscelis* group. Here I provide a new key, revised checklist, new locality records, and descriptions for 12 new species. *Agra* are beetles of the high canopy and dense understory microhabitats such as suspended dry leaves and vine tangles, therefore they are not easily

collected. Considering the rate of new species accumulation (Fig. 14) since my earlier revision, it can be assumed that this supplement will not be the last for this species group. Because this contribution is a taxonomic supplement, I refer the reader to my previous papers for a more complete description of the group and its relationships with other *Agra* groups (Erwin 1982*a, b*, 2000; Erwin and Pogue 1988). In addition, I provide here a matrix of characters and their states. The lengthy descriptions of these characters can be found in Erwin (2000), thus are not repeated here.

Methods

This contribution is meant to be used in conjunction with my previous revision; illustrations need not be published twice, therefore cross-referencing to previous illustrations is used where appropriate. These are given in **bold** script. Numerous new illustrations are also included here, both for the new species described and for species known previously from only one sex. General procedural methods are as described previously (Erwin 1970, 1973, 1974, 1994). Species concepts are outlined in Erwin and Kavanaugh (1981). Character sets have been amplified from those published before (Erwin 1978, 1982*a, b*, 1983, 1984, 1986, 1987, 1993, 1996) and may be found elaborated in Erwin (2000). One hundred and nine characters and their states are referred to in the character matrix (Table 1); the states are described in an Appendix in Erwin (2000). Some additional states, not found in the species of the *novaurora* complex (Erwin 2000) are provided here (see Appendix).

Measures for body parts are presented in the species descriptions as single specimen measures, if that is all I saw, or ranges based on the smallest and largest of all specimens studied for each species. All specimens were measured with a Summagraphics digitizing pad and camera lucida. Measures are presented in millimeters, coded as follows: **ABL** = apparent body length, that length used by most previous authors as total length as measured by holding up a ruler alongside the specimen (see Erwin and Kavanaugh 1981); **SBL** = standardized body length, that length introduced by Ball (1972) and modified by Kavanaugh (1979), and equal here to the sum of LH, LP, and LE (see Erwin and Kavanaugh 1981); **TW** = total width across the widest portion of the elytra, actually measured as the left elytron (**WE**) and doubled to obtain value. The small line, which accompanies each set of illustrations, equals 1.0 mm.

Species groups are assigned a two-digit number, species a three-digit number for ease of reference from key to text to checklist and to previously published groups. A secondary purpose of such a numbering system is to allow the entire set of group revisions to be eventually organized and indexed as a single monograph on electronic media. Unless otherwise specified, illustrations are of specimens with starred (*) database numbers under each species description. In order to save space therefore, it is not necessary to repeat these locality data in every figure caption. All geographic data, measures, and field data have been standardized, then computerized using appropriate programs at the Smithsonian Institution. Locality records given below for each species are enhanced from that given on the specimen labels through geographic research on maps and in gazetteers. All specimens referred to herein have been assigned a unique number in the form ADP 000000, FOG-000000, or BIOLAT-000000. Data concerning each specimen will soon be retrievable from the NMNH carabid database archives using that number at <http://entomology.si.edu>.

Taxonomy

Agra Fabricius (Erwin 1982a)

Section *Erythropus* (Erwin 1982a)

04. The *platyscelis* group (Erwin 1982b)

Revised checklist of the species of the *platyscelis* group.

The *klugii* subgroup

- 001. *Agra howdenorum* Erwin (1982b:194) [Trinidad]
- 002. *Agra baccii* (Straneo) (1958:39) [Brazil]
- 003. *Agra tingo* **new species** [Perú]
- 004. *Agra biolat* **new species** [Perú]
- 005. *Agra aeris* **new species** [Perú]
- 006. *Agra solimoes* **new species** [Brazil]
- 007. *Agra klugii* Brullé (1837:10) [Bolivia, Perú]
- 008. *Agra ecaligis* Erwin (1982b:197) [Ecuador]

The *platyscelis* subgroup

- 009. *Agra conhormigas* **new species** [Perú]
- 010. *Agra yodella* Erwin (1982b:197) [French Guiana]
- 011. *Agra limulus* Erwin (1982b:199) [Ecuador, Perú]
- 012. *Agra tumatumari* Erwin (1982b:199) [Guyana]
- 013. *Agra varzeicola* Erwin (1982b:199) [Brazil]
- 014. *Agra ariasi* Erwin (1982b:200) [Brazil]
- 015. *Agra lili* **new species** [Brazil]
- 016. *Agra olivencana* Erwin (1982b:201) [Brazil]
- 017. *Agra iquitosana* Erwin (1982b:201) [Brazil, Perú]
- 018. *Agra tarapotoana* Erwin (1982b:201) [Perú]
- 019. *Agra servatorum* **new species** [Perú]
- 020. *Agra titan* Erwin (1982b:201) [Brazil, French Guiana]
- 021. *Agra platyscelis* (Chaudoir) (1861:110) [Brazil]
- 022. *Agra guyanensis* (Chaudoir) (1863:119) [French Guiana, Guyana]
- 023. *Agra lindae* **new species** [Perú]
- 024. *Agra seabrae* Erwin (1982b:205) [Brazil]
- 025. *Agra rondonia* **new species** [Brazil]
- 026. *Agra nex* **new species** [Brazil]
- 027. *Agra manu* **new species** [Perú]

The *semiviridis* subgroup

- 028. *Agra caliga* Erwin (1982b:206) [Panamá]
- 029. *Agra semiviridis* (Straneo) (1968:273) [Brazil]
- 030. *Agra yeti* Erwin (1982b:207) [Brazil]
- 031. *Agra sasquatch* Erwin (1982b:208) [Brazil]
- 032. *Agra azureipennis* Erwin (1982b:208) [Perú, Venezuela]
- 033. *Agra dax* **new species** [Panamá]

Revised Key to the Species of the *Platyscelis* Group

Figures in boldface are found in Erwin (1982b); otherwise, new “Figs.” are herein. Note that key steps 16 and 21 are triplets.

- 1. Mentum with median tooth short and markedly bifid, length $\frac{1}{3}$ or less than that of lateral lobe (as in **Figs. 5A&5N**) 2
- 1'. Mentum with median tooth moderately elongate, finely bifid or entire, length about $\frac{1}{2}$ that of lateral lobe (as in **Figs. 5B–5M**) 15

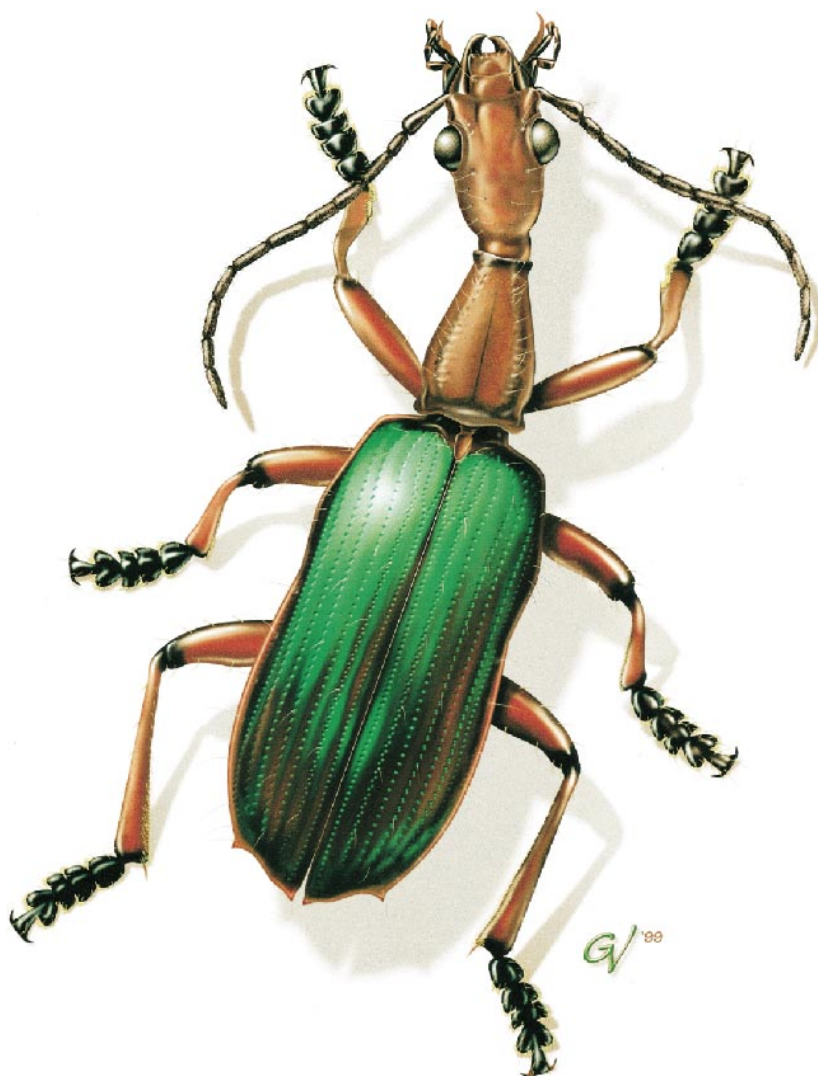


Fig. 1. Habitus of *Agra dax* male, Barro Colorado Island, Panamá.

- 2(1). Tarsomere 5 of posterior leg long and triangulate (as in **Fig. 2A**)
 inserted into markedly emarginate tarsomere 4 3
- 2'. Tarsomere 5 of posterior leg broad and plate-like (as in **Fig. 2B**),
 inserted into markedly transverse tarsomere 4 10
- 3(2). Head, palpomeres, prothorax, antennae, legs, and disc of sternum VI
 bright rufous; knees infuscated, elytra bright cupreous green
 008. *Agra ecaligis* Erwin
- 3'. Combination of characteristics not as above, at least head, palpom-

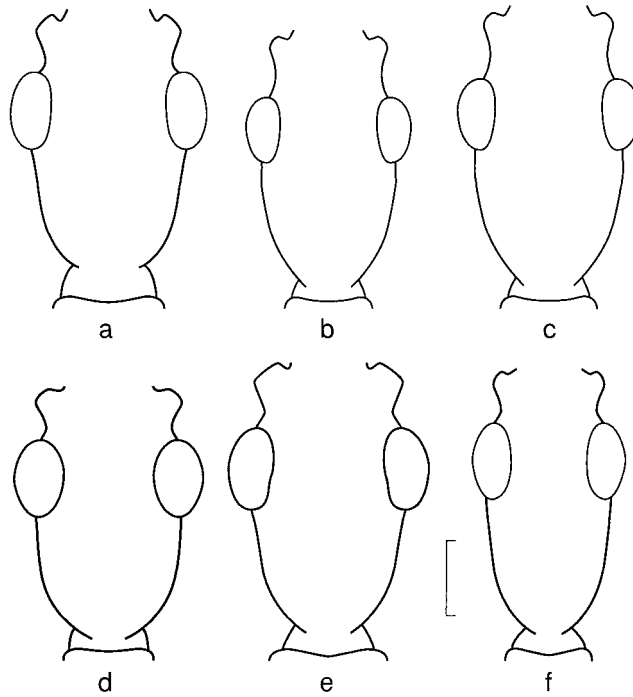


Fig. 2. Head (dorsal aspects of postcranium) of *Agra* species. **a)** *A. biolat* male; **b)** *A. aeris* female; **c)** *A. aeris* male; **d)** *A. solimoaes* male; **e)** *A. tingo* female; **f)** *A. iquitosana* female.

- eres, prothorax, antennae, legs, and sterna rufopiceous, infuscated, piceous, or black 4
- 4(3). Elytron with intervals flat or nearly so; elytral color dark green without coppery reflection 5
- 4'. Elytron with intervals markedly convex in apical third; elytral color light green with coppery reflections 6
- 5(4). Elytron with sutural apex minutely acuminate; femora dark, almost black 006. *Agra solimoaes* n. sp.
- 5'. Elytron with sutural apex acute; femora rufous 002. *Agra baccii* (Straneo)
- 6(4'). Elytra dark metallic olivaceous green 7
- 6'. Elytra bright coppery green 9
- 7(6). Legs black 003. *Agra tingo* n. sp.
- 7'. Legs rufescent with black knees 8
- 8(7'). Prothorax with subbasal sulcus deep, subbasal ridge complete 001. *Agra howdenorum* Erwin
- 8'. Prothorax with subbasal sulcus shallow, subbasal ridge interrupted 002. *Agra klugii* Brullé
- 9(6'). Elytron with sutural apex minutely acuminate 004. *Agra biolat* n. sp.

- 9'. Elytron with sutural apex acute; femora rufous
 005. *Agra aeris* n. sp.
- 10(2'). Elytra metallic green with coppery blue reflections; intervals markedly convex, punctulae of interneurs markedly transverse
 032. *Agra azureipennis* Erwin
- 10'. Elytra metallic green, no trace of blue reflections; intervals not or barely convex, punctulae moderately transverse 11
- 11(10'). Labrum deeply emarginate; ultimate labial palpomere (**Fig. 3B**) subsecuriform, sides divergent, length less than that of scape
 028. *Agra caliga* Erwin
- 11'. Labrum entire; ultimate labial palpomere (**Fig. 3C**) paralleliform, sides barely divergent, length greater than that of scape 12
- 12(11'). Venter bright rufous; size small, ABL = 17.5 mm
 030. *Agra yeti* Erwin
- 12'. Venter infuscated along mid-area; size larger, ABL more than 19.0mm 13
- 13(12'). Apex of mid tibia markedly produced (Fig. 4a); head, posteriorly, of both sexes rounded (Figs. 3 j, k), somewhat swollen
 033. *Agra dax* n. sp.
- 13'. Apex of mid tibia not produced (Fig. 4b); head, posteriorly, of male (females unknown) tapered-angulate (**Figs. 25 & 27**), not swollen 14
- 14(13'). Apex of posterior tibia truncate, distal angle not produced (Fig. 4b)
 029. *Agra semiviridis* (Straneo)
- 14'. Apex of posterior tibia with distal angle obliquely produced (**Fig. 6N**) 031. *Agra sasquatch* Erwin
- 15(1'). Mentum with median tooth apically broad and truncate (as in **Fig. 5C**) 16
- 15'. Mentum with median tooth narrow, apex narrowly bifid or acute (as in **Fig. 5B**) 19
- 16(15). Legs rufobrunneous, concolorous, not in contrast with elytra and forebody. Pronotum surface shiny. Size medium, ABL = 16.0–16.8mm
 010. *Agra yodella* Erwin
- 16'. Legs ferrugineous, in contrast with piceous elytra and forebody; with infuscated knees. Pronotum with dense, fine microsculpture, surface matte-like. Size small, ABL = 14.5 mm
 009. *Agra conhormigas* n. sp.
- 16". Legs ferrugineous, in contrast with piceous elytra and, often, forebody; with infuscated knees. Pronotum surface shiny. Size medium, ABL = 17.2–19.5 mm 17
- 17(16"). Elytron with coarsely punctulate interneurs, punctulae large, wider than adjacent interval, sets of punctulae commonly grouped in elongate foveae 011. *Agra limulus* Erwin
- 17'. Elytron with finely punctulate interneurs, punctulae much narrower than adjacent interval, not grouped in elongate foveae 18
- 18(17'). Elytron with apical sutural angle perfectly square, tip not produced (**Fig. 35**) and with surface of disc and humeral area finely microsculptured, but very shiny 012. *Agra tumatumari* Erwin
- 18'. Elytron with apical sutural angle acuminate, finely produced (**Fig. 36**), surface of disc and humeral area coarsely microsculptured, dull
 013. *Agra varzeicola* Erwin

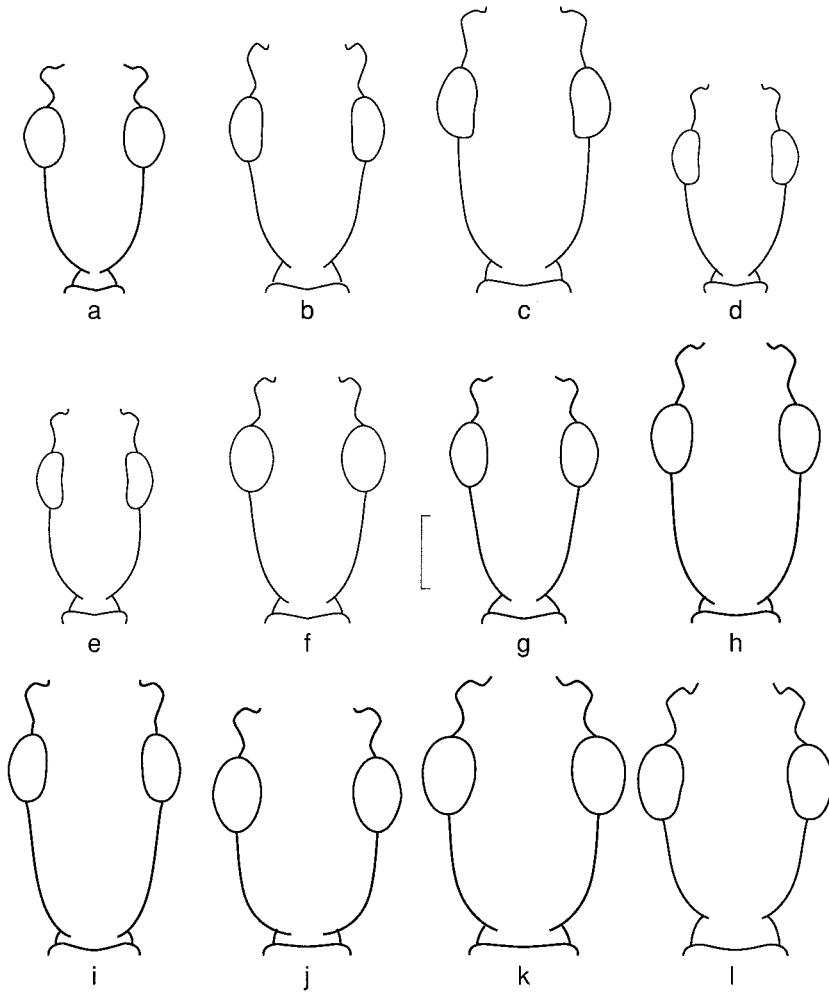


Fig. 3. Head (dorsal aspects of postcranium) of *Agra* species. **a)** *varzeicola* male; **b)** *A. servatorum* male; **c)** *A. servatorum* female; **d)** *A. conhornigas* male; **e)** *A. lilu* female; **f)** *A. lindae* male; **g)** *A. rondonia* male; **h)** *A. nex* female; **i)** *A. manu* female; **j)** *A. dax* male; **k)** *A. dax* female, **l)** *A. sasquatch* female.

- 19(15'). Elytra brilliant metallic green, legs and forebody bright ferrugineous 20
- 19'. Combination of characteristics not as above; elytra dark green, metallic blue, or piceous, forebody dark rufous or piceous, legs infuscated or ferrugineous 21
- 20(19). Apex of elytron lobed at middle (Fig. 6h) 026. *Agra nex* n. sp.
- 20'. Apex of elytron straight (**Fig. 44**) 024. *Agra seabrae* Erwin
- 21(19'). Elytra brilliant metallic blue, legs and forebody piceous, head dark rufopiceous at sides 027. *Agra manu* n. sp.

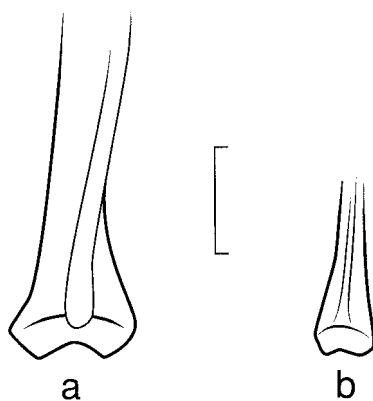


Fig. 4. Tibial apex of right posterior leg (caudal aspect, above; lateral aspect, below) of *Agra* species. **a)** *A. dax* male; **b)** *A. semiviridis* male.

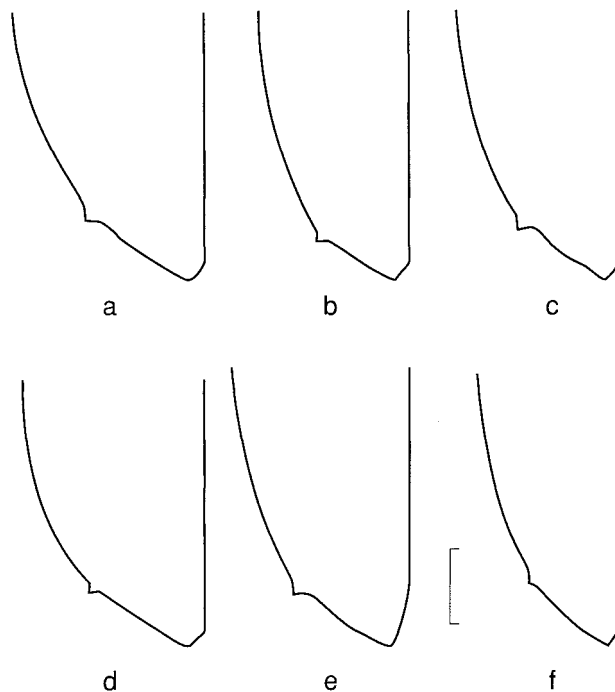


Fig. 5. Elytron (left side, dorsal aspect of apex) of *Agra* species. **a)** *A. biolat* male; **b)** *A. aeris* female; **c)** *A. aeris* male; **d)** *A. solimoes* male; **e)** *A. iquitosana* female; **f)** *A. varzeicola* male.

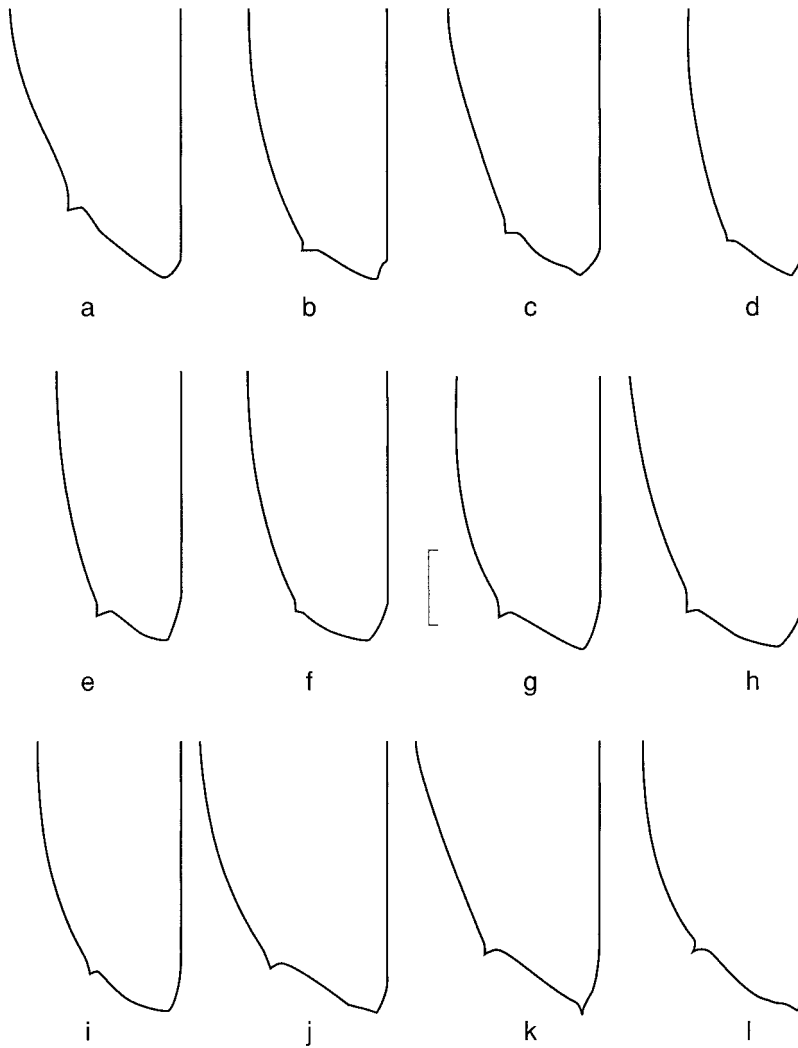


Fig. 6. Elytron (left side, dorsal aspect of apex) of *Agra* species. **a)** *A. tingo* female; **b)** *A. servatorum* male; **c)** *A. servatorum* female; **d)** *A. conhornigas* male; **e)** *A. lilu* female; **f)** *A. lindae* male; **g)** *A. rondonia* male; **h)** *A. nex* female; **i)** *A. manu* female; **j)** *A. dax* male; **k)** *A. dax* female; **l)** *A. sasquatch* female.

- 21'. Elytra brilliant metallic blue, legs and forebody bright rufous, disc of pronotum infuscated 025. *Agra rondonia* n. sp.
 21". Combination of characteristics not as above; elytra dark green or piceous, forebody dark rufous or piceous, infuscated or ferrugineous 22
 22(21"). Tibia of middle and posterior legs with lateral apex markedly produced (**Fig. 6F**) 23

- 22'. Tibia of middle and posterior legs with lateral apex not much produced (**Fig. 6K**) 25
- 23(22). Elytron with punctulae of interneurs, on average, wide-spaced, separated by more than their own diameter; elytra black 014. *Agra ariasi* Erwin
- 23'. Elytron with punctulae of interneurs, on average, close-spaced, separated by less than their own diameter; elytra dark olivaceous ... 24
- 24(23'). Legs concolorous, size small (ABL = 15.5 mm) 015. *Agra lilu* n. sp.
- 24'. Legs with dark knees, size large (ABL = 17.0–21.5 mm) 019. *Agra servatorum* n. sp.
- 25(22'). Femora of all legs with apex definitely darkly pigmented (as opposed to shadow cast by base of tibia at knee joint) 26
- 25'. Femora concolorous rufous or piceous 27
- 26(25). Palpi rufous, apical palpomere with slightly infuscated disc 017. *Agra iquitosana* Erwin
- 26'. Palpi piceous 016. *Agra olivencana* Erwin
- 27(25'). Elytra piceous, without trace of green 018. *Agra tarapotoana* Erwin
- 27'. Elytra dark olive green 28
- 28(27'). Postcranium very broad and long (**Fig. 20**); ABL = 21.8 to 23.5mm; Range: Guyana's and northeastern Amazon 020. *Agra titan* Erwin
- 28'. Postcranium inflated OR tapered to neck (**Figs. 21–22**); ABL = 17.0 to 23.0mm; Range: western Amazon OR Guyana's/Surinam 29
- 29(28'). Mentum with narrow, bifid tooth; postcranium tapered to neck in male, (**Fig. 3f**); Range: southern Perú 023. *Agra lindae* n. sp.
- 29'. Mentum tooth not bifid; postcranium tapered or not, somewhat inflated; Range: central Amazon to Surinam, Guyana's 30
- 30(29'). Postcranium inflated (**Fig. 21**); Range: upper middle Rio Solimoes 021. *Agra platyscelis* (Chaudoir)
- 30'. Postcranium tapered to neck (**Fig. 22**); Range: Guyana's, Surinam 022. *Agra guyanensis* (Chaudoir)

The *klugii* subgroup

001. *Agra howdenorum* Erwin (**Fig. 9**)

Geographical Distribution (**Fig. 9**). Previously known from only Trinidad. A misidentified specimen (ADP 69350) from Obidos, Para, Brazil reported in Erwin (1982b), is, in fact, *A. howdenorum*.

Variation. There are two detectable differences between the specimens of Trinidad and Obidos, Brazil. The former has absolutely flat elytral intervals and a slightly lobed margin between the apical point of the elytra. The latter specimen has slightly convex intervals and a straight margin. Otherwise, I could find no difference between the two represented populations.

003. *Agra tingo* **new species** (**Figs. 2e, 6a, 9**)

Diagnosis. Head tapered-rounded (**Fig. 2e**). Mentum with median tooth short and markedly bifid, length $\frac{1}{3}$ or less than that of lateral lobe (as in **Figs**

5A&5N). Tarsomere 5 of posterior leg long and broadly triangulate (as in **Fig. 2A**) inserted into markedly emarginate tarsomere 4. Elytron (Fig. 6a) with intervals flat or nearly so; punctures of interneurs fine and evenly spaced throughout length of elytron; elytral color dark green without coppery reflection. Legs black.

Description. (See Table 1): Size: ABL = 23.00 mm; SBL = 21.24 mm; TW = 6.06 mm; LH = 4.15 mm; LP = 4.29 mm; LE = 12.80mm.

Geographical Distribution (Fig. 9). At present, this species is known only from the type locality in central Perú.

Specimens Examined. Holotype female, PERÚ, Huánuco, 13 km S Tingo Maria, Tambillo, Chico Canyon, 09°25'S 76°23'W, 850 m, J.E. Eger, Apr-11-17-1987, FSCA, *ADP 04441.

Etymology. The specific epithet, *tingo*, is from the name of the famous collecting site in Perú, Tingo Maria.

004. *Agra biolat*, new species

(Figs. 2a, 5a, 7a, 9)

Diagnosis. Elytra bright coppery green. Mentum with median tooth short and markedly bifid, length $\frac{1}{3}$ that of lateral lobe. Tarsomere 5 of posterior leg long and inserted into markedly emarginate tarsomere 4. Elytron with sutural apex minutely acuminate (5a).

Description. (See Table 1): Size: ABL = 20.00 mm; SBL = 19.24 mm; TW = 5.32 mm; LH = 3.93 mm; LP = 4.01 mm; LE = 11.30 mm.

Geographical Distribution (Fig. 9). Known only from the type locality on the Rio Tambopata watershed of eastern Perú. There, it is sympatric with the closely related *A. klugii* Brullé (see below).

Specimens Examined. Holotype male, PERÚ, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W, MUSM, T. L. Erwin *et al.*, Nov-11-1983 *ADP 93789.

Etymology. Named for the 1980's Smithsonian Institution Program, *Biodiversity in Latin America*, which had its roots in methods and ideas developed at Explorer's Inn, the type locality for this species.

005. *Agra aeris*, new species

(Figs. 2b, 2c, 5b, 5c, 7b, 9)

Diagnosis. Elytra bright coppery green. Mentum with median tooth short and markedly bifid, length $\frac{1}{3}$ that of lateral lobe. Tarsomere 5 of posterior leg long and inserted into markedly emarginate tarsomere 4. Elytron with sutural apex acute (5b, c).

Description. (See Table 1): Size: ABL = 21.00–22.00 mm; SBL = 20.82–21.64 mm; TW = 5.48–6.28 mm; LH = 4.07–4.41 mm; LP = 4.41–4.57 mm; LE = 12.00–13.00 mm.

Geographical Distribution (Fig. 9). Known only from the type locality on the Rio Manu watershed of eastern Perú. There, it is sympatric with the closely related *A. klugii* Brullé (see below).

Specimens Examined. Holotype male, PERÚ, Madre de Dios, BIOLAT Biodiversity Station, Pakitza, 11°56'S, 71°17'W, MUSM, T.L. Erwin & B.D. Farrell., Sept-9-1988 *BIOLAT/11645

Etymology. The name, *aeris*, is from the Latin meaning "of the air" referring the fact that these beetles live in the high frontier of the tropical forest canopy.

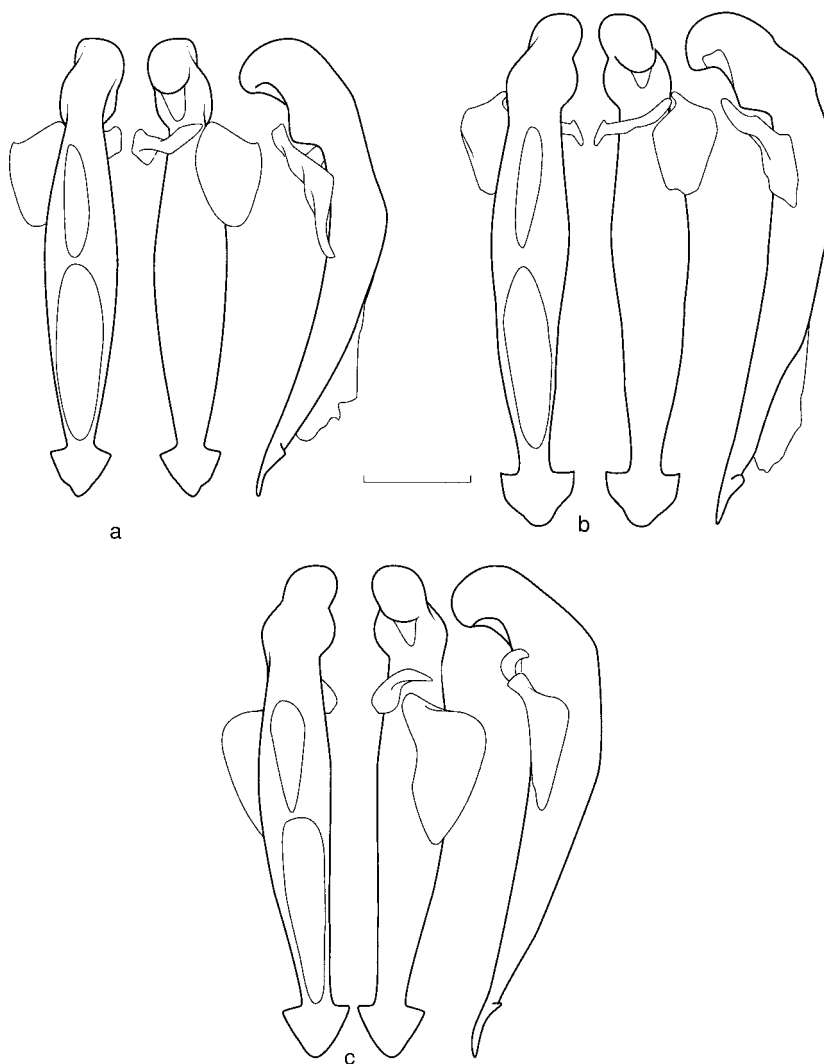


Fig. 7. Aedeagus (dorsal/ventral/left lateral aspects) of *Agra* species. **a)** *A. biolar*; **b)** *A. aeris*; **c)** *A. solimoaes*.

006. *Agra solimoaes*, **new species**
(Figs. 2d, 5d, 7c, 9)

Diagnosis. Elytral color dark green without coppery reflection; femora dark, almost black. Elytron with intervals flat or nearly so; with sutural apex minutely acuminate (5d).

Description. (See Table 1): Size: ABL = 20.50 mm; SBL = 19.45 mm; TW = 5.72 mm; LH = 4.05 mm; LP = 4.45 mm; LE = 11.90 mm.

Geographical Distribution (Fig. 9). At present, this species is known only from the type locality at Tefé, on the upper Rio Solimoes.

Specimens Examined. Holotype male., (BRAZIL, Amazonas, Tefé (Ega), 3°22'S, 64°42'W, *ADP 3145.

Notes. In the Liebke collection at WAR, this specimen was determined by Liebke and filed as *A. platyscelis* Bates.

Etymology. The name, *solimoes*, is that of the River, the Rio Solimoes of the western Amazon Basin, along which these beetles live

007. *Agra klugii* Brullé (1837:10)
(Fig. 9)

Geographical Distribution (Fig. 9). Previously know only from Cochabamba, Bolivia, this species apparently is found regionally in the lowlands of the southwestern Amazon Basin.

New Locality Records. 1 male, PERÚ, Madre de Dios, Pakitza, Zone 2, 11°56'47"S, 71°17'W, 356 m, T. L. Erwin & B. D. Farrell, 6-Sep-1988, canopy fogging of *Pouteria* sp. USNM, BIOLAT/COLE-17473; 1 female, same locality, 1 st quebr., 11°56'47"S, 71°17'W, 356 m, T. L. Erwin, 15-Sep-1989, MUSM, BIOLAT/COLE-11645; 1 female, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W, T. L. Erwin *et al.*, 7-Nov-83, USNM, ADP 93789, FOGGING-1809.

The *platyscelis* subgroup

009. *Agra conhormigas*, new species
(Figs. 3d, 6d, 8b, 10)

Diagnosis. Head small, tapered-ovoid to neck (Fig. 3d). Mentum with median tooth moderately elongate, apically broad and truncate, entire, length about ½ that of lateral lobe (as in Fig. 5C). Pronotum with course, fine, microsculpture, surface matte-like. Legs ferrugineous, in contrast with piceous elytra and forebody; with infuscated knees. Elytral apex obliquely straight (Fig. 6d). Size small, ABL = 15.5mm. Male aedeagus with asymmetric apex (Fig. 8b).

Description. (See Table 1): Size: ABL = 15.50 mm; SBL = 15.26 mm; TW = 3.88 mm; LH = 3.41 mm; LP = 3.29 mm; LE = 8.65 mm.

Geographical Distribution (Fig. 10). At present, this species is known only from the type locality in southeastern Perú.

Specimens Examined. Holotype male, PERÚ, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W, T. L. Erwin, 28-Oct-1982, MUSM, *ADP 03120.

Notes. The type was collected by insecticidal foggings of a leguminous tree, numbered #72, in secondary forest along the Rio La Torre Trail.

Etymology. The name, *conhormigas*, is contracted Spanish meaning "with ants." The type was among the specimens I collected by fogging a tree in 1982. That fogging also produced 48 species of ants and this was documented by E. O. Wilson (1987) who kindly studied my ant samples.

011. *Agra limulus* Erwin (1982b:199)
(Fig. 10)

Geographical Distribution, (Fig. 10). Previously known only from Tarpoto, Perú, this species apparently inhabits the regional lowlands of the western Amazon Basin.

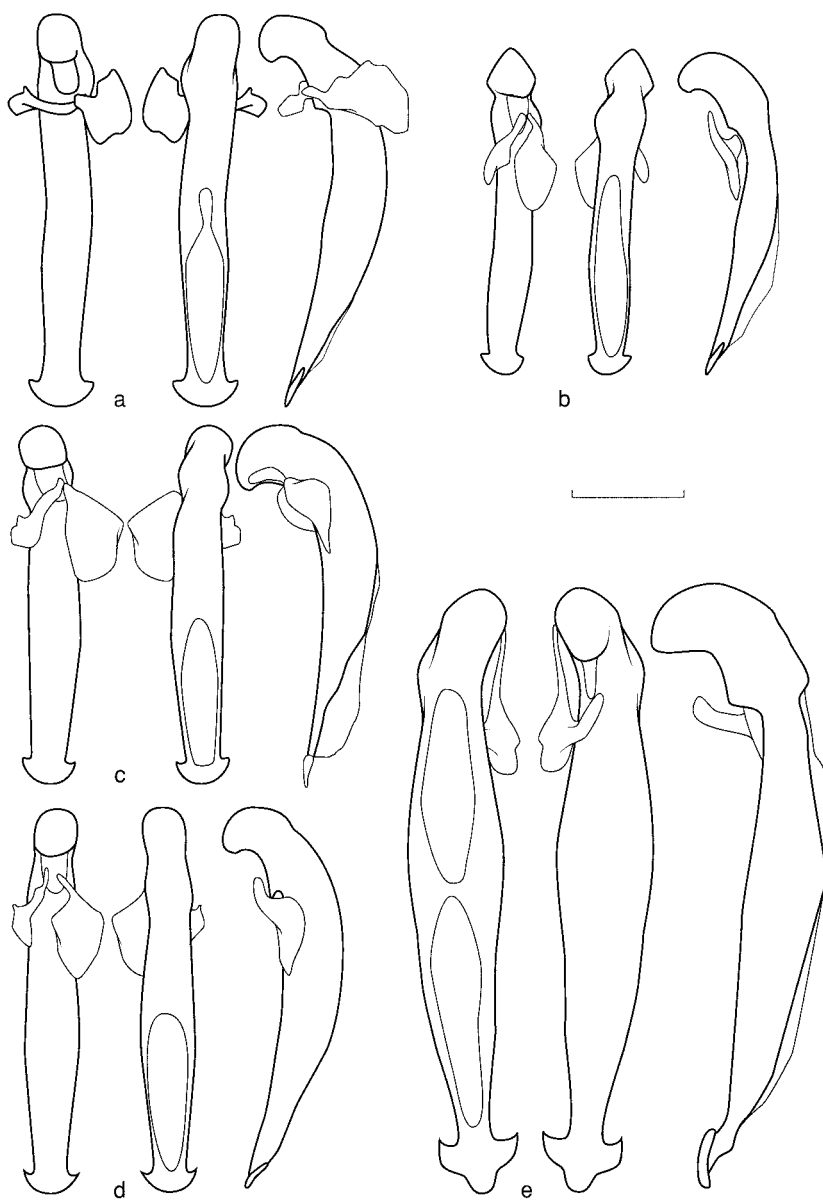


Fig. 8. Aedeagus (dorsal/ventral/left lateral aspects) of *Agra* species. **a)** *A. servatorum*; **b)** *A. conhornigas*; **c)** *A. lindae*; **d)** *A. rondonia*; **e)** *A. dax*.

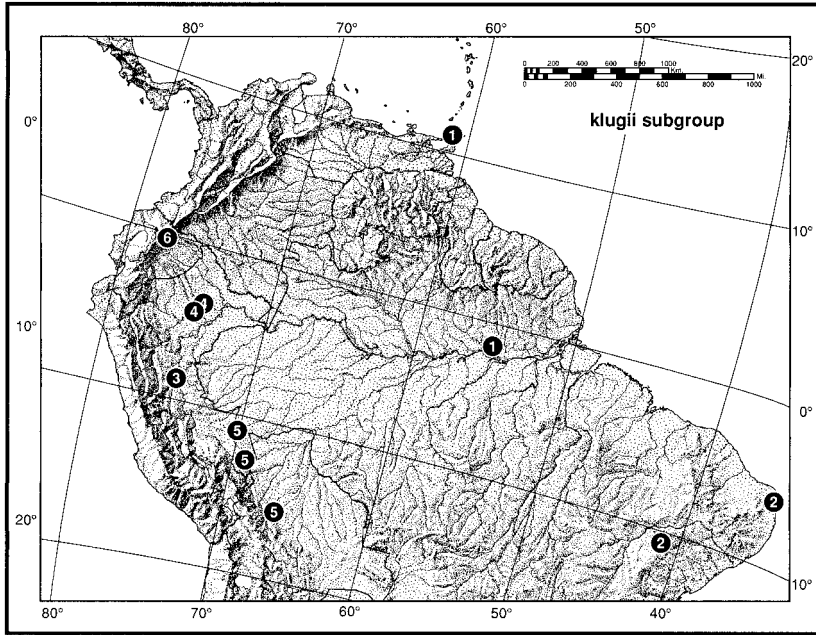


Fig. 9. Geographical distribution map: Members of the *klugii* subgroup. 1) *A. howdenorum*; 2) *A. baccii*; 3) *A. tingo*; 4) *A. klugii*; 5) *A. ecaligis*; 6) *A. biolar*; 7) *A. aeris*; 8) *A. solimoaes*.

New Locality Record. 1 male, ECUADOR, Napo, Res. Ethnica Haorani, 1km S Onkone Gare Camp, Trans-Ent. Lot# 726, 00°39'S, 76°26'W, 220 m, T. L. Erwin *et al.*, 12-Feb-1995, USNM, ADP 87417.

013. *Agra varzeicola* Erwin (1982b:199)
(Figs. 3a, 5f, 10)

Description. (Head (Fig. 3a); elytral apex (Fig. 5f). (See Table 1): Size: ABL = 18.00 mm; SBL = 16.56 mm; TW = 4.44 mm; LH = 3.35 mm; LP = 3.56 mm; LE = 9.65 mm.

Geographical Distribution (Fig. 10). Previously known from near Manaus, Brazil, this species apparently inhabits the regional lower Amazon River.

New Locality Record. 1 male, BRAZIL, Pará, Taperinha-Santarem, 02°30'S, 54°19'W, 73 m, A. H. Fassel, 1920, MNHP, ADP 58548.

Notes. Unfortunately, the male genitalia are missing from the specimen, hence their characteristics remain unknown.

015. *Agra lili*, **new species**
(Figs. 3e, 6e, 10)

Diagnosis. Head broadly ovoid to neck (Fig. 3e). Mentum with median tooth narrow, apex narrowly bifid (as in **Fig. 5I**). Tibia of middle and posterior legs with lateral apex markedly produced (as in **Fig. 6F**). Elytron (Fig. 6e) with

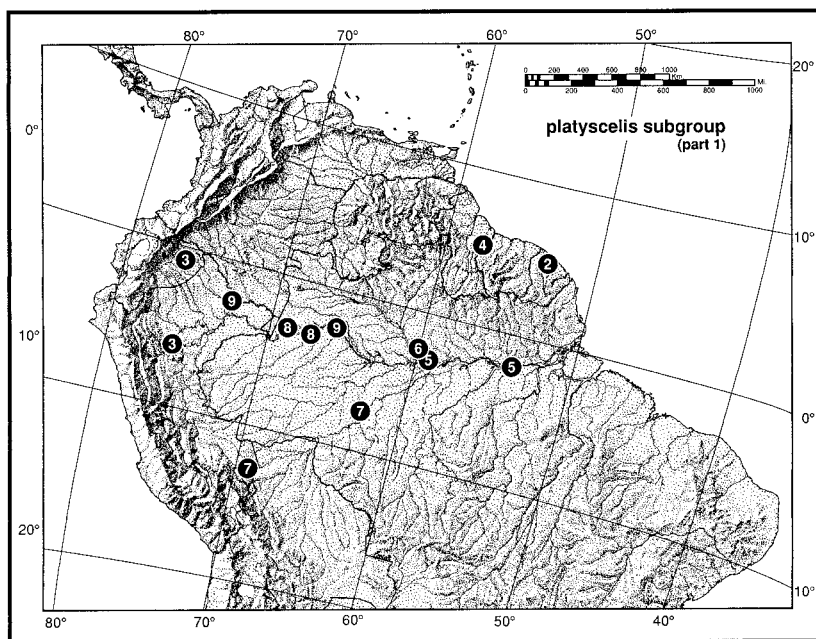


Fig. 10. Geographical distribution map: Members of the *platyscelis* subgroup. 1) *A. conhornigas*; 2) *A. yodella*; 3) *A. limulus*; 4) *A. tumatumari*; 5) *A. varzeicola*; 6) *A. ariasi*; 7) *A. lili*; 8) *A. olivencana*; 9) *iquitosana*.

punctulae of interneurs, on average, close-spaced, separated by less than their own diameter. Elytra dark olivaceous; head, prothorax and legs bright rufous.

Description. (See Table 1): Size: ABL = 15.50 mm; SBL = 14.62 mm; TW = 3.90 mm; LH = 2.94 mm; LP = 3.12 mm; LE = 8.56 mm.

Geographical Distribution (Fig. 10). At present, this species is known only from the type locality in the mid-southern Amazon Basin of Brazil.

Specimens Examined. Holotype female, BRAZIL, Amazonas, Humaitá, 07°32'S, 63°02'W, 70 m, G.S. Andrade, Aug-1980, SEABRA, *ADP 03139.

Etymology. In the movie, *The Fifth Element*, the spectacular alien-reconstruct (after a near fatal crash to earth in her spaceship) was nicknamed "Lilu" by the protagonist, and to her this "red-headed" species is dedicated.

016. *Agra olivencana* Erwin (1982b:201)

Note. The holotype female is in MNHP. This fact was left out of the previous revision.

017. *Agra iquitosana* Erwin (1982b:201)
(Figs. 2f, 5e, 10)

Geographical Distribution (Fig. 10). Previously known from Iquitos, Perú, this species is now known to occur along the upper Amazon River in both Perú and Brazil.

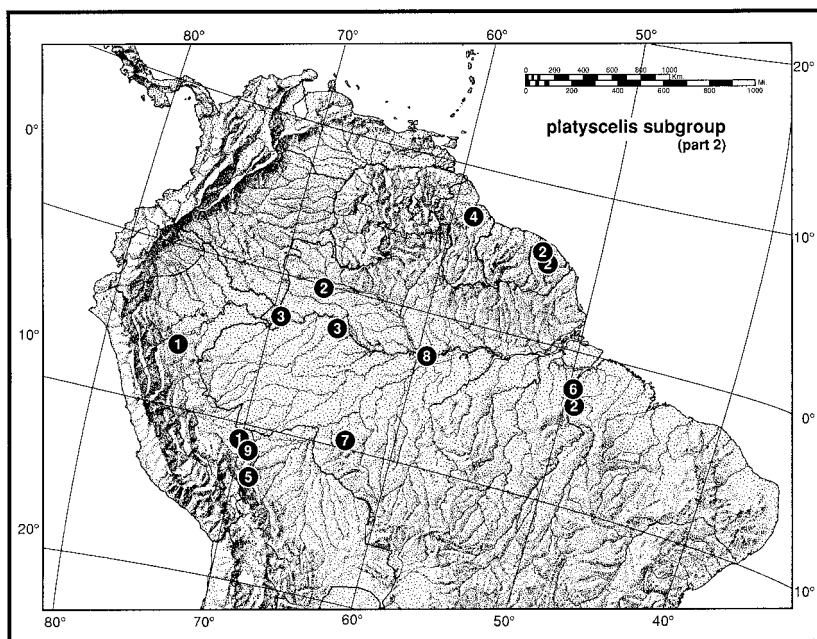


Fig. 11. Geographical distribution map: Members of the *platyscelis* subgroup. 1) *A. tarapotoana*; 2) *A. titan*; 3) *A. platyscelis*; 4) *A. guyanensis*; 5) *A. lindae*; 6) *A. seabrae*; 7) *A. rondonia*; 8) *A. nex*; 9) *A. manu*; 10) *A. servatorum*.

New Locality Record. 1 female, BRAZIL, Amazonas, Fonte Boa, 02°31'S, 66°05'W, 112 m, D. Hahnel, MNHP, ADP 59835.

018. *Agra tarapotoana* Erwin (1982b:201)
(Fig. 11)

Geographical Distribution (Fig. 11). Previously known from only one locality in central lowland Perú, this species is now known from the western Amazon Basin of Perú.

New Locality Record. 1 female, PERÚ, Madre de Dios, Manu Biosphere Res., Pakitza, 11°56'47"S, 71°17'W, 250 m, M.G. Pogue, 12-Sep-1988, USNM, BIOLAT/COLE-17437.

019. *Agra servatorum* **new species**
(Figs. 3b, 3c, 6b, 6c, 8a, 11)

Diagnosis. Head tapered-ovoid in male, broadly rounded in female (Figs. 3b, c). Mentum with median tooth short and markedly bifid, length $\frac{1}{3}$ or less than that of lateral lobe (as in **Figs 5a–5n**). Tarsomere 5 of posterior leg long and broadly triangulate (as in **Fig. 2a**) inserted into markedly emarginate tarsomere 4. Elytron (Figs. 6b, c) with intervals flat or nearly so; punctures of internuans basally coarse and uneven; elytral color dark green without coppery reflection. Legs rufescent with black knees. Male aedeagus (Fig. 8a).

Description. (See Table 1): Size: ABL = 17.00–21.50 mm; SBL = 17.27–

20.42 mm; TW = 4.14–6.02 mm; LH = 3.55–4.20 mm; LP = 3.59–4.42 mm; LE = 10.10–11.80 mm.

Geographical Distribution (Fig. 11). This species occurs in the black water subsidence zone between the Samiria and Pacaya Rivers in central Perú.

Specimens Examined. Holotype male, PERÚ, Loreto, 1km SW Boca del Rio Samiria, Vigilante Post No. 1, 04°40.5'S, 74°18'W, 390 m, T.L. Erwin, 31-Aug-1991, MUSM, *ADP 51635. Paratypes, 2 females, same data as type, USNM, MUSM, ADP 51633, 51636; 1 female, same locality as type, T.L. Erwin & M.G. Pogue, Colls., USNM, ADP 67325; 2 females, Cocha Shinguito, 05°08'S, 74°45'W, 390 m, T. L. Erwin *et al.*, 25-May-1990, USNM, ADP 04307, 04308.

Notes. The type series was collected by insecticidal foggings of epiphyte-laden trees in the igapó zone of the Rio Samiria.

Etymology. Two of my hard-working assistants on the expeditions up the Samiria River in central Perú were the sisters Servat, Grace and Milagros, and it is for them that this species is named, *servatorum*.

020. *Agra titan* Erwin (1982b:201)
(Fig. 11)

Geographical Distribution (Fig. 11). Previously known definitely from Cayenne, French Guiana, and from several old specimens with exceedingly poor labels, this species can now be assumed to inhabit the north-central and eastern Amazon Basin of Brazil and French Guiana.

New Locality Records. 1 female, BRAZIL, Pará, Truce, 03°42'S, 49°27'W, B. Silva, Jan-1980, SEABRA, ADP 03141; 1 female, S. Gabriel, Rio Negro, 00°08'S, 67°05'W, Roman Exp., UASM, ADP 61566; 1 female, FRENCH GUIANA, Kaw Road, PK-33, J.E. Wappes, 24–25-Aug-1995, JEWG, ADP 93466.

021. *Agra platyscelis* (Chaudoir) (1861:110)
(Fig. 11)

Geographical Distribution. The specimen reported from Tambopata, Perú, in my 1982 revision was based on a misidentification (see *A. lindae*, below). *A. platyscelis* is presently known only from the upper Rio Solimoes in Brazil (see Fig. 64).

Notes. A specimen collected by Bates, labelled “Ega” (IRSN) apparently lost its head and prothorax at some point in time. These were subsequently replaced with those of a species of the *busqueti* group. Thus, the specimen is now a composite, however, its body through which is the pin, that of *A. platyscelis*, confirms its presence in or around Ega (now Tefé).

023. *Agra lindae*, new species
(Figs. 3f, 6f, 8c, 11)

Diagnosis. Head with postcranium tapered to neck in male (Fig. 3f). Mentum with narrow, bifid tooth (as in Fig. 5I). Elytra obliquely rounded at apex (Fig. 6f), dark olive green. Femur concolorous, rufopiceous. Range: southern Perú. Male aedeagus with apex slightly asymmetric (Fig. 8c).

Description. (See Table 1): Size: ABL = 17.00 mm; SBL = 18.82 mm; TW = 4.02 mm; LH = 4.46 mm; LP = 3.86 mm; LE = 10.50 mm.

Geographical Distribution (Fig. 11). At present, this species is known only from the type locality in southeastern Perú.

Specimens Examined. Holotype male, PERÚ, Madre de Dios, 30 air km SW Puerto Maldonado, Rio Tambopata Res., 12°50'S, 69°20'W, 290m, J.B. Heppner, 6–10-Nov-1979, MUSM, *ADP 56238.

Etymology. One of my dedicated research assistants on trips to Tambopata in the early 1980's was Linda Sims, and it is for her that this species is named, *lindae*.

Note. The holotype described here as *A. lindae* was included in Erwin (1982b) under *A. platyscelis*, however, upon reexamination it is clearly not that species.

025. *Agra rondonia*, new species

(Figs. 3g, 6g, 8d, 11)

Diagnosis. Head elongate, markedly tapered to neck (Fig. 3g). Mentum with moderately elongate median tooth, moderately broad, truncate (as in Fig. 5H). Elytra (Fig. 6g) brilliant metallic blue, legs and forebody bright ferrugineous. Male aedeagus with apex symmetric (Fig. 8d).

Description. (See Table 1): Size: ABL = 17.50 mm; SBL = 17.63 mm; TW = 4.66 mm; LH = 3.84 mm; LP = 3.89 mm; LE = 9.90 mm.

Geographical Distribution (Fig. 11). At present, this species is known only from the type locality in western Brazil.

Specimens Examined. Holotype male, BRAZIL, Rondonia, Ariquemes, 9°56'S, 63°03'W, 90 m, B. Silva, Aug-1980, SEABRA, *ADP 03140.

Etymology. The specific epithet, *rondonia*, is from the name of the Brazilian State where the now famous conflagrations of the 1980's for the purpose of changing rain forest to ranch land for cattle have made short work of much of the species' habitat.

026. *Agra nex*, new species

(Figs. 3h, 6h, 11)

Diagnosis. Head elongate and broadly rounded (Fig. 3h). Mentum with median tooth moderately narrow, (as in Fig. 5B). Apex of elytron (Fig. 6h) lobed at middle. Elytra brilliant metallic green; legs and forebody bright ferrugineous; knees infuscated.

Description. (See Table 1): Size: ABL = 19.00–23.00 mm; SBL = 17.26–20.04 mm; TW = 4.56–5.72 mm; LH = 3.59–3.83 mm; LP = 3.68–4.51 mm; LE = 2.28–2.86 mm.

Geographical Distribution (Fig. 11). This species is now know to occupy the forests along the shores of the upper Rio Solimoes in Brazil.

Specimens Examined. Holotype female, BRAZIL, Amazonas, 2 km N Itacoatiara-Manaus Highway, 11 km W of Itacoatiara, Canadian Fathers' Pool, 03°08'S, 58°28'W, 90 m, E. G. & E. A. Munroe, 11-May-1972, CNC, *ADP 57283; 1 female, Amazonas, Fonte Boa, 02°32'S 66°01'W, 112 m, BMNH, ADP 03114.

Etymology. The epithet, *nex*, is from the Latin, *nevis*, meaning violent death and refers to the fate of the animals and plants in and around the type locality as the Brazilian ranchers burn the forests to grow cattle.

027. *Agra manu*, new species

(Figs. 3i, 6i, 11)

Diagnosis. Head slightly tapered to neck, markedly elongate (Fig. 3i). Mentum with median tooth narrow, apex narrowly bifid (as in Fig. 5J). Pronotum

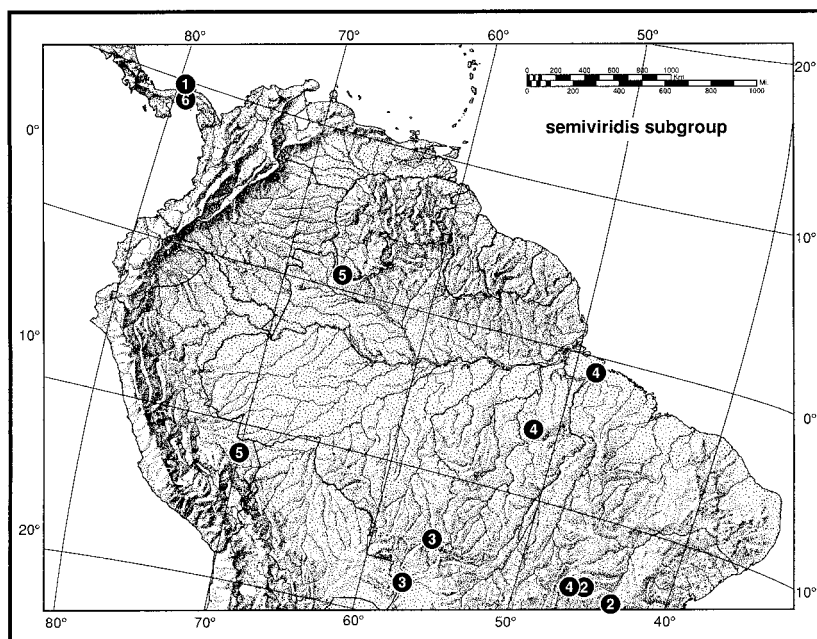


Fig. 12. Geographical distribution map: Members of the *semiviridis* subgroup. 1) *A. caliga*; 2) *A. semiviridis*; 3) *yeti*; 4) *A. sasquatch*; 5) *A. azureipennis*; 6) *A. dax*.

elongate and narrow. Elytron (Fig. 6i) brilliant metallic blue, legs piceous, prothorax and head piceous.

Description. (See Table 1): Size: ABL = 20.50 mm; SBL = 19.79 mm; TW = 4.24 mm; LH = 4.26 mm; LP = 4.33 mm; LE = 11.20 mm.

Geographical Distribution (Fig. 11). At present, this species is known only from the type locality in southeastern Perú.

Specimens Examined. Holotype female, PERÚ, Madre de Dios, Manu Biosphere Res., Pakitza, 11°56'47S, 71°17'W, 350 m, M.G. Pogue, 9-Oct-1987, MUSM, *BIOLAT/COLE-00034.

Etymology. The epithet, *manu*, is from the Rio Manu, which passes to the west of the former BIOLAT Research Station at Pakitza.

The *semiviridis* subgroup

028. *Agra caliga* Erwin (1982b:206)

(Fig. 12)

Geographical Distribution (Fig. 12). Formerly known only from Barro Colorado Island in the Canal, this species is now known from the mainland at two nearby sites.

New Locality Records. 1 male, PANAMÁ, Canal Zone, Barro Colorado Is., 09°10'N, 79°50'W, 30 m, H. Wolda, 29-Jun-1978, USNM, ADP 75995, 1 female, 5-Sep-1977, USNM, ADP 76912, 1 male, 16-Jul-1977, USNM, ADP 75942, 1 male, 14-Jan-1978, USNM, ADP 84674, 1 male, 18-Jan-1978,

USNM, ADP 84657, 1 male, 21-May-1978, USNM, ADP 83203, 1 male, 15-May-1978, USNM, ADP 62436; 1 male, Frijoles, 09°10'N, 79°48'W, 30 m, B. D. Gill, 1-May-1981, BGILL, ADP 56889, 1 male, J.G. Edwards, 13-May-1981, SJSU, ADP 04556; 1 male, Gamboa, 09°10'N, 79°45'W, 30 m, B. D. Gill, Jun-15-20-1983, USNM, ADP 61681; 1 male, Santa Rita, A. Thurmon, June-10-76, USNM, ADP 60052.

029. *Agra semiviridis* (Straneo) (1968:273)
(Figs. 4b, 12)

Geographical Distribution (Fig. 12). This is a species of the south-central uplands of Brazil.

New Locality Records. 1 male, BRAZIL, Minas Geras, Est. Ecol. De Pirapitinga, Logoa Três Marias, 18°22'S, 45°19'W, 560 m, D. Yanega, Nov-10-1996, USNM, ADP 07613.

030. *Agra yeti* Erwin (1982b:207)
(Fig. 12)

Geographical Distribution (Fig. 12). This species occurs regionally in and around the Pantanal of Brazil.

New Locality Records. 1 male, BRAZIL, Mato Grosso, Corumbá, 19°01'S, 57°39'W, 50 m, RNH.

031. *Agra sasquatch* Erwin (1982b:208)
(Figs. 3l, 6l, 12)

Diagnosis. Head, posteriorly, of female rounded (Fig. 3l), somewhat swollen. Ultimate labial palpomere (as in **Fig. 3C**) paralleliform, sides barely divergent, length greater than that of scape, narrower than in male. Tarsomeres without modified white setae. Elytral (Fig. 6l) apex more elongate than in male. Venter without central pubescence of male. Female styli (as in **Fig. 7**).

Description. (Female): Size: ABL = 21.00 mm; SBL = 19.30 mm; TW = 5.60 mm; LH = 3.80 mm; LP = 3.80 mm; LE = 11.70 mm.

Geographical Distribution (Fig. 12). Surprisingly widespread in the south-eastern Amazon Basin and central plateau of Brazil, sympatric with *A. semiviridis* (Straneo) at Logoa Três Marias.

New Locality Record. 1 female, BRAZIL, Minas Geras, Ilha de Três Marias, 18°22'S, 45°19'W, 560 m, D. Yanega, Nov-20-1997, USNM, *ADP 07635.

032. *Agra azureipennis* Erwin (1982b:208)
(Fig. 12)

Geographical Distribution (Fig. 12). The discovery at Pakitza of *Agra azureipennis* came as a great surprise because normally *Agra* species possess such small ranges. This species is now thought to be transamazon in distribution, but see Note below.

New Locality Records. 1 male, PERÚ, Madre de Dios, Pakitza, clearing, 11°56'47"S, 71°17'W, 356 m, G. Servat, 5-Sep-1989, USNM BIOLAT/COLE-10895; 1 male, Venezuela, Amazonas, San Simón del Cocuy, 01°08'N, 66°50'W, 60 m, J. Sykora, Mar-13-25-1974, UCV, ADP 85381.

Note. While virtually identical in male genitalia, form of elytra and prothorax, these two specimens have a slightly different head shape, the one from

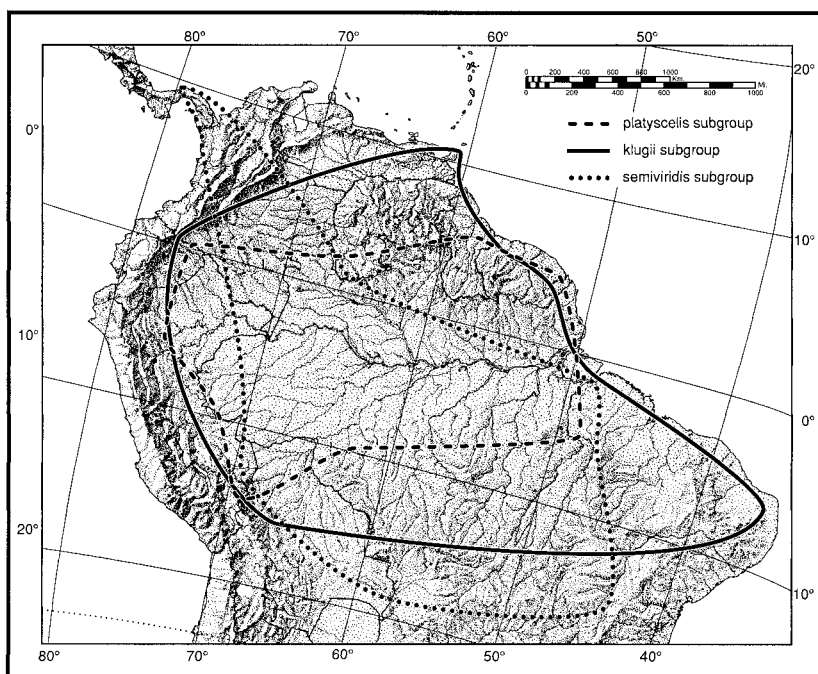


Fig. 13. Distribution of subgroups using peripheral localities to circumscribe total range of areas for detecting overlap and centers of radiation.

Venezuela being slightly more angulate posteriorly. In addition, its areas of body and appendage infuscation are slightly more extensive. I do not regard these as differences significant enough to warrant recognizing them as separate species, however new collections may help refine that opinion.

033. *Agra dax*, **new species**
(Figs. 1, 3j, 3k, 4a, 6j, 6k, 8e, 12)

Diagnosis. Head, posteriorly, of both sexes rounded (Fig. 3 j, k), somewhat swollen. Labrum entire; ultimate labial palpomere (as in **Fig. 3C**) paralleliform, sides barely divergent, length greater than that of scape. Tarsomere 5 of posterior leg broad and plate-like (as in **Fig. 2b**), inserted into markedly transverse, emarginate tarsomere 4; apex of mid tibia markedly produced (Fig. 4a). Elytral (Fig. 6j, k) intervals not or barely convex, punctulae moderately transverse. Venter infuscated along mid-area. Elytron metallic green, no trace of blue reflections. Male aedeagus (Fig. 8e).

Description. (See Table 1): Size: ABL = 19.50–22.00 mm; SBL = 19.48–20.36 mm; TW = 5.72–6.54 mm; LH = 3.37–4.01 mm; LP = 4.07–4.13 mm; LE = 11.40–12.30 mm.

Geographical Distribution (Fig. 12). At present, this species is known only from the type locality in Panamá.

Specimens Examined. Holotype male, PANAMÁ, Canal Zone, Barro Colorado Is., 09°10'N, 79°50'W, 30 m, H. Wolda, 7-May-1978, USNM, *ADP

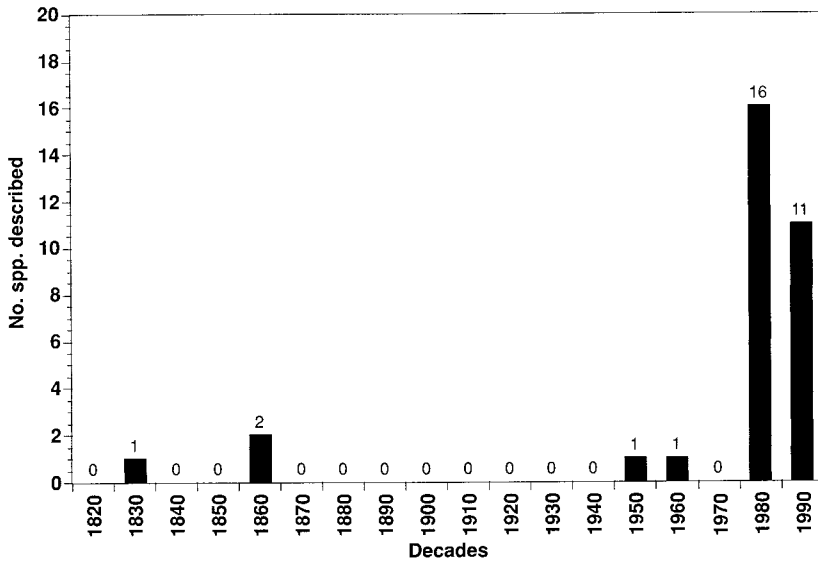


Fig. 14. Rate of species descriptions in the *platyscelis* group by decades.

83871, 1 female paratype, same data as type, USNM, ASP 02032 1 male paratype, W. R. Silberglied & A. Aiello, 16-Apr-1978, USNM, ADP 81117, 1 female paratype, C. Rettenmeyer, 25-Mar-1955, UKLK, ADP 83192.

Etymology. The epithet, *dax*, comes from the character on the television program *Star Trek, Deep Space Nine*, “Dax,” played by the actress, Terry Farrell, and it is to her this species is dedicated.

Biogeography

Erwin and Pogue (1988), based on phylogenetic analyses provided biogeographic maps of other lineages of Section *Erythropus* of the genus *Agra*. Several species of the *platyscelis* group were included in the analyses. However, with 33 species now described for the group, it is appropriate to revisit its biogeography. These beetles inhabit the canopies of tropical forests. They are different from the majority of *Agra* species, in that they have several characteristics common to other carabids known to live with ants (Erwin 1982).

The results of Erwin and Pogue (1988) indicate that the *platyscelis* subgroup is basal to the *klugii* subgroup. Even though the *semiviridis* subgroup was not included, its extreme attributes, developed far more toward “myrmecophily” than the other two groups, suggest that it is the most derived of the three lineages.

Figure 13, using the “biogeographic map” method (Mickevich 1981), demonstrates that all three subgroups of the *platyscelis* group generally occupy the Amazon Basin and adjacent tropical forests. All three share virtually the same Amazon-centered range, with the *semiviridis* subgroup (with the most derived “myrmecopilus” characteristics) also found in Panamá and on the western-most flank of the South Atlantic Forest. However, when one studies the detailed subgroup maps (Figs. 6–9), a pattern emerges that tells a somewhat

different story. The *klugii* and *semiviridis* subgroups are substantially at the periphery of Amazonia, while the *platyscelis* subgroup is centered within the Amazon Basin and is not found outside of it. With the exception of *A. azur-eipennis*, the *semiviridis* subgroup is somewhat amphi-amazonia, while that of the *klugii* subgroup is circum-amazonia. Unfortunately, the species of these subgroups are known from so few collections that the realities of the observed patterns are perhaps not close to the truth. The *platyscelis* group, now a total of 33 known species, is known from only 89 specimens from a mere 47 localities. Compared with other *Agra* species, these are rare beetles, perhaps because of their life style. Given the fate of their environment, the tropical forest, we may never know how these elegant beetles evolved. Is the current pattern one of contemporary ecological exclusion by the *platyscelis* subgroup over the other two, or might we invoke Bill Brown's (1957) centrifugal speciation, or perhaps the taxon pulse model (Erwin 1998). Regardless, without more field data, none of these ideas can be tested.

Regarding Relationships

In 1982, I organized the three subgroups treated here as a single species group based on the highly modified legs and tarsomeres (Erwin 1982*b*); indeed, much earlier Chaudoir (1861) was moved to erect a separate genus for the *platyscelis* lineage, *Agridia*. Later, in a partial phylogenetic analysis, Erwin and Pogue (1988) showed deeper relationships and partial monophyly when several other species groups of *Agra* were used as outgroups in the analysis. A casual glance at the matrix herein (Table 1) shows that perhaps only leg characteristic are indicators of relationships. Could these compressed legs be convergent? Since compressed legs and antennae are also found in known myrmecophiles such as *Helluomorphoides* Ball and *Pseudomorpha* Kirby species, perhaps these character states have also evolved across *Agra* lineages with multiple invasions of the domain of ants. Clearly, a knowledge of the natural history of these beetles would be more than useful.

Acknowledgments

I deeply thank the curators of the following museums who generously provided types and other specimens of the *platyscelis* group from collections in their care: The Natural History Museum, London, England (BMNH); Bruce Gill, private collection, Carleton University, Ottawa, Canada (BGILL); A. Smetana, Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario (CNC); Robert Woodruff, Florida State Collection of Arthropods, Gainesville, FL (FSCA); James Wappes, private collection, Bulverde, Texas (J.E.W.C.); H. Perrin, J. Menier, Museum National d'Histoire Naturelle, Paris, France (MNHP); Gerardo Lamas, Natural History Museum at San Marcos University, Lima, Perú (MUSM); J. Krikken, Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands (RNH); C. Seabra, private collection, Rio de Janeiro, Brazil (SEABRA); J. Gordon Edwards, J. G. Edwards Entomological Museum, San Jose State University, San Jose, CA (SJSU); G. E. Ball, D. Spheley, University of Alberta Strickland Museum of Entomology, Edmonton, Canada (UASM); J. Garcia R., Instituto de Zoologia Agricola, Universidad Central de Venezuela, Maracay (UCV); S. Ashe, University of Kansas, Lawrence, Kansas (UKLK); Department of Entomology, Smithsonian Institution, Washington, D. C. (USNM). Heartfelt thanks also go to George Venable who provided illustration services and Milagros Servat and Mike Pogue who

assisted in databasing all *Agra* specimens under study. Funding for my *Agra* studies is received from the Neotropical Lowlands Research Project (Richard Vari, Principal Investigator) and the Department of Entomology, National Museum of Natural History (Robert Robbins, Chairman), of the Smithsonian Institution. This is paper # 103 in the BIOLAT Series.

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(Received 3 August 1999; accepted 29 November 1999; full page charges borne by the author)

Appendix A

New character states not included in the list of 109 characters provided in Erwin in press.

Character #9. Mentum (tooth)

3. Tooth short, broad, bifid

6. Tooth long, narrowed, finely bifid

Character #16. Antennae (color)

5. Flagellar articles black, contrasting with pale or bicolored scape

Character #34. Elytron (color)

32. Black with blue sheen.

Character #51. Abdominal sternum VI (vestiture)

13. Apically multisetiferous in both sexes.

14. Pilose medially in male, sparsely setiferous in female