Head. Clypeus: anterior margin medially without a dentiform projection, or distinct swelling.

Antennae. Antennomere 2 pyriform (Fig. 11D), relatively long (about two thirds length of antennomere 3—Table 11); antennomeres 5–10 moderately asymmetric (Fig. 11F), each article 1.5–1.6X longer than wide.

Male genitalia. Endophallus with sclerite x small, and in inverted position near basal lobe of phallus (Figs. 17D–E).

Included taxa. This species group includes two species, *C. basale* Dejean and *C. semirubricum* Reitter.

Habitat. The members of this species group occupy the temperate grassland, and tropical deciduous forest and savannah vegetation zones and are marginal in the desert and semi-desert zone (Table 17 and Fig. 24).

Geographical distribution. The range of the *basale* species group (Fig. 16) extends in the Eastern Hemisphere from Palaearctic Afghanistan westward to the Atlantic coast of Africa, in the northern part of the Afrotropical Region.

Relationships and chorological affinities This species group is postulated to be the adelphotaxon of the *semelederi* + *schueppelii* species groups. The geographical ranges of all three groups overlap broadly in southwestern Asia and in the northern part of the Afrotropical Region (Figs. 16, 18, 20, 21, 23).

***Cymbionotum (sensu stricto) semirubricum* (Reitter 1914)**
(Figs. 2F, 3E, 11E, 11G, 16, 17A–D)

Graniger semirubricus Reitter 1914: 265. TYPE MATERIAL: HOLOTYPE male [card-mounted], labeled: "Libanon"; "coll. Reitter"; "Monotypus [red print] [male symbol] 1914/ Graniger (Coscinia)/ semirubricus" [handwritten] [rectangular label, bordered with red]; (HNHM).—Bodemeyer 1915: 441.—Csiki 1929: 478.

Cymbionotum semirubricum; Lorenz 1998b: 149.

Graniger aethiopicus (Alluaud) 1923: 129. TYPE MATERIAL: LECTOTYPE, here selected, (sex not determined) (MRAC), labeled: "MUSEUM PARIS [printed]/ Lac Rodolphe/ Pays Tourkouana/ Mission/ du Borg de Bozas 1903" [handwritten] [green paper]; "aethopicus/ n. sp"; COLL. MUS. CONGO/ Col. P. Basilewsky"; "PARATYPUS" [orange paper]. **NEW SYNONYMY.**

Cymbionotum minax Andrewes 1935: 22. TYPE MATERIAL: HOLOTYPE female, labeled: "Captn Boys"; "Figured Specimen"; "Cymbionotum/ minax/ Type Andr. [handwritten] H. E. Andrewes det."; "TYPE COL: 693/ Cymbionotum/ minax/ Andrewes/ Hope Dept. Oxford" (OXUM). **NEW SYNONYMY.**

Cymbionotum a. aethiopicum; Basilewsky 1950: 235.

Cymbionotum a. airense Basilewsky 1950: 234. TYPE MATERIAL: 4 specimens, only one seen by us**.** PARATYPE, sex not determined, labeled: "PARATYPUS" [orange paper]; "Agadez/ AÏR SUD/ 525m/ IX.47"; "IFAN-1947/ L. CHOPARD/ A. VILLIERS"; "COLL. MUS. CONGO/ Col. P. Basilewsky" (MRAC). **NEW SYNONYMY.**

Note about type material. According to the original description of *Graniger semirubricus* (Reitter, 1914: 265), this species was based on a single male from Lebanon, received from E. von Bodemeyer.

According to the original description of *C. aethopicum*, Alluaud had in hand two specimens: the one noted above as lectotype that had been seen by Louis Bedel, and recognized as a new species, but not described by him; and a second specimen, from the Alluaud collection, collected at Diré-Daoua, and designated as a cotype. By virtue of that designation both specimens are cotypes, requiring lectotype selection. Thus, the former specimen, seen by Bedel, is selected as lectotype, and the Alluaud specimen as paralectotype. We have not seen the latter specimen. See Typification (above, under Methods) for justification of lectotype selection.

Basilewsky (1950: 234) based the description of *C. aethopicum airense* on four specimens. Of these, we have seen only the single paratype, noted above.

In the original description of *C. minax*, Andrewes (1935: 22) indicates that its basis is a single specimen, labeled originally only "Capt. Boys." Since that individual's collecting efforts were confined to northern India, that area was recorded as the source of that specimen, the latter having been indicated by us as holotype. It is illustrated by Fig. 2, Plate III in Andrewes (1935).

Notes about synonymy. Although the nominal forms *C. semirubricum* Reitter, *C. minax* Andrewes, and *C. aethiopicum* Alluaud (including *C. a. airense* Basilewsky) are readily distinguished from one another on the basis of a combination of elytral color pattern, details of setation and relative elytral length, males determined as approximate to each form, structurally and geographically, exhibit identical genitalic features. Further, samples identified as *C. minax* ("Far East") and *C. aethiopicum* ("E. and C. Africa") overlap broadly in color pattern (Table 13) and in relative elytral length (Table 14). The features purportedly differentiating *C. a. airense* Basilewsky (elytra broader, more elongate; setation more dense and longer; pronotum more densely punctate, head more sparsely sculptured) are difficult to judge, or variable within samples from various African localities. In view of the considerations above, it seems to us that these four forms are conspecific with one another.

Type area. Lebanon.

Recognition. Adults of *C. semirubricum* share most of their distinctive features with those of the allopatric *C. basale*, the other member of the *basale* species group. They differ in color of the basal area of the elytra: rufous or infuscated in *C. semirubricum* (Figs. 17A–C), black in *C. basale*. Specimens of the Afrotropical *C. semirubricum (aethiopicum* morph) have longer elytral setae (Fig. 2F) than have specimens of *C. basale (cf.* Fig. 2E). Males of these two species differ in details of the genitalia: preapical part of the phallus of *C. semirubricum* broader, apex more broadly rounded, and microtrichial field of the endophallus about as long as the medial part of the shaft (Fig. 17D); preapical part of the phallus of *C. basale* narrower, apex more narrowly rounded, and microtrichial field of the endophallus about half the length of the medial part of the shaft (Fig. 17E).

TABLE 13. Data about variation in extent of the distal black fascia and color of the humeral area on the elytra of the *Cymbionotum basale* species group.

	Black Fascia L./Elytra L.			Color of
	N	Range	Mean	Humeral Area
C. semirubricum Reitter				
Far East[1]	2	0.52–0.55	0.53	Rufous
Middle East[2]	11	0.20–0.34	0.26	Rufous
East & Central Africa[3]	13	0.48–0.60	0.55	Ruf[4].-Infuscated[5]
C. basale Dejean				
West Africa[6]	17	0.46–0.70	0.58	Black

[1] Northern India, Western Pakistan (*minax* morph)

[2] Turkey, Iraq, Lebanon, Saudi Arabia (*semirubricum* morph)

[3] Ethiopia, Sudan, Chad, Niger (*aethiopicum* morph)

[4] Lac Rodolph & Kaffa Prov., Ethiopia (2 exx.); Agadez, Niger (2 exx.)

[5] Sudan (7 exx); Shoa Prov., Ethiopia (1 ex.); and Chad (1 ex.)

[6] Mauritania, Sénégal, Mali, Gambia

TABLE 14. Data about variation in values for the ratio PL/EL among species and morphs of the *Cymbionotum basale* species group.

	PL/EL		
	N	Range	Mean
C. semirubricum Reitter			
FAR EAST[1]	3	0.43–0.45	0.44
MIDDLE EAST[2]	11	0.43–0.46	0.44
EAST & CENTRAL AFRICA[3]	13	0.44–0.48	0.47
C. basale Dejean			
WEST AFRICA	17	0.40–0.47	0.58

[1] *minax* morph—Northern India, Wesern Pakistan

[2] *semirubricum* morph—Turkey, Iraq, Lebanon, Saudi Arabia

[3] *aethiopicum* morph—Ethiopia, Sudan, Chad, Niger

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions (see also "geographical variation", below, and Table 14). With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *basale* species group, restricted as follows. Antennomere 2 relatively long

(Table 11). See Table 1 for data about setal length and Figs. 2F and 3E for illustrations of density of elytral punctation. Elytral color pattern as in Figs. 17A–C (for additional details, see "geographical variation, below). Male genitalia with form of phallus and endophallic armature as in Fig. 17D.

Geographical variation. Although samples are small and widely dispersed, a pattern of variation in external morphological features is evident. To exhibit this pattern, the geographical samples were grouped into three units, based on color pattern of elytra (Table 13), values for the ratio PL/EL (Table 14), setation and macrosculpture, and named informally according to names available within *C. semirubricum*: a Palaearctic Far Eastern form, the *minax* morph; a Palaearctic Middle Eastern form, the *semirubricum* morph; and a northern Afrotropical form, the *aethiopicum* morph.

For macrosculpture, punctation of head, pronotum and elytra is dense, with adjacent punctures close enough to give a roughened appearance to the surface of the *minax* and *aethiopicum* morphs, in marked contrast to the *semirubricum* morph, in which the punctures are smaller and spaced more widely. In elytral color pattern (Table 13), the *minax* and *aethiopicum* morphs are also similar to one another, in that the apical black fascia occupies about half the elytral surface.

In setation, the *minax* and *semirubricum* morphs are similar to one another, in that the setae are moderately long. Also, in values for the ratio PL/EL (Table 14), the *minax* and *semirubricum* morphs are more like one another (mean values relatively low, signifying more elongate elytra) than like the *aethiopicum* morph, with a higher median value, indicating relatively shorter elytra.

Habitat, habits, and seasonal occurrence. The members of *C. semirubricum* occupy the three vegetation zones occupied by *basale* species group with concentration in temperate grassland and tropical deciduous forest and savannah (Table 17 and Fig. 24), at altitudes between sea level and 2000 m. The Afrotropical range of *C. semirubricum* is within the desert and dry woodland zones (Hall and Moreau 1970: xiii)**.** However, one of the desert localities (Agadez) has near it a variety of habitat types, including a rich and varied vegetation, occupying deep wadis (Chopard and Villiers, 1950: 21). Since the exact locality for these specimens (type series of *C. aethiopicum airense*) is not known, they could have been taken in any one of a variety of situations; that is, not necessarily desert. The altitudinal range extends from sea level to 1000 m. Adults were collected during the period April- October, but without records for June.

Geographical distribution (Fig. 16). Likely a Palaearctic indigene, the range of *C. semirubricum* extends in the Palaearctic Region from northern India westward to Lebanon, and in northern Afrotropical Africa from Saudi Arabia and southern Ethiopia westward to northeastern Niger.

Relationships and chorological affinities. This species is postulated to be the adelphotaxon of *C. basale* Dejean. These two species are allopatric in distribution (Fig. 16).

Material examined. In addition to the four type specimens noted above, we have seen 24 specimens from the following localities.

AFROTROPICAL REGION. CHAD: 700 km. NE Lac Tchad, 1925, P. Gavard, 1 (MRAC). **ETHIOPIA. Kaffa Province:** Mui Game Reserve, 10.IV.1972, R.O.S. Clarke, 1 (MRAC). **Shoa Province:** Awash National Park, 1000 m, 14–15.VIII. 1971, R.O.S. Clarke, 1 (MRAC). **NIGER. Aïr**: Agadez, 31.VIII.1953, P. Bruneau deMire, 1 (MNHP). **SAUDI ARABIA:** El Hedjaz, Millinger, 1 (BMNH). **SUDAN:** Ed Damer, Hudeiba, 24.VII.1962, R. Remane, 2 (ZSMC); Wad Medani, u–v light, 26.X.1979, F. Hieke, 5 (MRAC); same, 30–31.X.1979, 1 (MRAC).

PALAEARCTIC REGION. IRAQ. Baghdad, 6, 1 labeled "oberthüri, n. sp. Bedel" [not described] (Bates Coll., MNHP); Baghdad, IV.1936, 1 ex. (ZSMC); Assur, V.1908, 1, labeled "Graniger mesopotamicus David" [not described] (NHMW). **PAKISTAN. Makran Province:** 30km. N. Pasni, 12–15.III.1965, J.W. Neal, 1 (USNM). **Sind Province:** "Ex Musaeo F. Moore", 1 (MNHP). **TURKEY**. **Kurdistan:** Millinger, 1 (BMNH).

Cymbionotum (sensu stricto) basale **(Dejean 1831)**

(Figs. 16, 17E)

Coscinia basalis Dejean 1831: 480. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "basalis/ Dejean/ Sénegal/ Coll. Dejean." HOLOTYPE (card-mounted, sex not determined) labeled: "basalis m/ in Senegal super"; "Leprieur" (both preceding labels handwritten on blue paper]; "Ex Musaeo/ Chaudoir [red print].Chaudoir 1876: 125.
Graniger basalis; Csiki 1929: 477.
Cymbionotum basale; Lorenz 1998b: 149.

Note about type material. According to the original description, this species was based on a single specimen collected in upper Sénégal by M. Leprieur, and given to Dejean by M. Buquet. A second specimen, associated with the *C. basalis* box label, is labeled "dimidiata/ Nubie Bohem." That label name has not been published. An additional six specimens were not studied.

Type area. Upper Sénégal.

Recognition. Adults of *C. basale* share most of their distinctive features with those of the allopatric *C. semirubricum*, the other member of the *basale* species group. They differ in color of the basal area of the elytra: black in *C. basale*, rufous or infuscated in *C. semirubricum* (Figs. 17A–C). Specimens of *C. basale* have shorter elytral setae (*cf.* Fig. 2E) than the Afrotropical *C. semirubricum (aethiopicum* morph—Fig. 2F).

Males of these two species differ in details of the genitalia: phallus of *C. basale* narrower, apex more narrowly rounded, and microtrichial field of the endophallus about half the length of the medial part of the shaft (Fig. 17E); preapical part of the phallus of *C.*

semirubricum broader, apex more broadly rounded, and microtrichial field of the endophallus about as long as the medial part of the shaft (Fig. 17D).

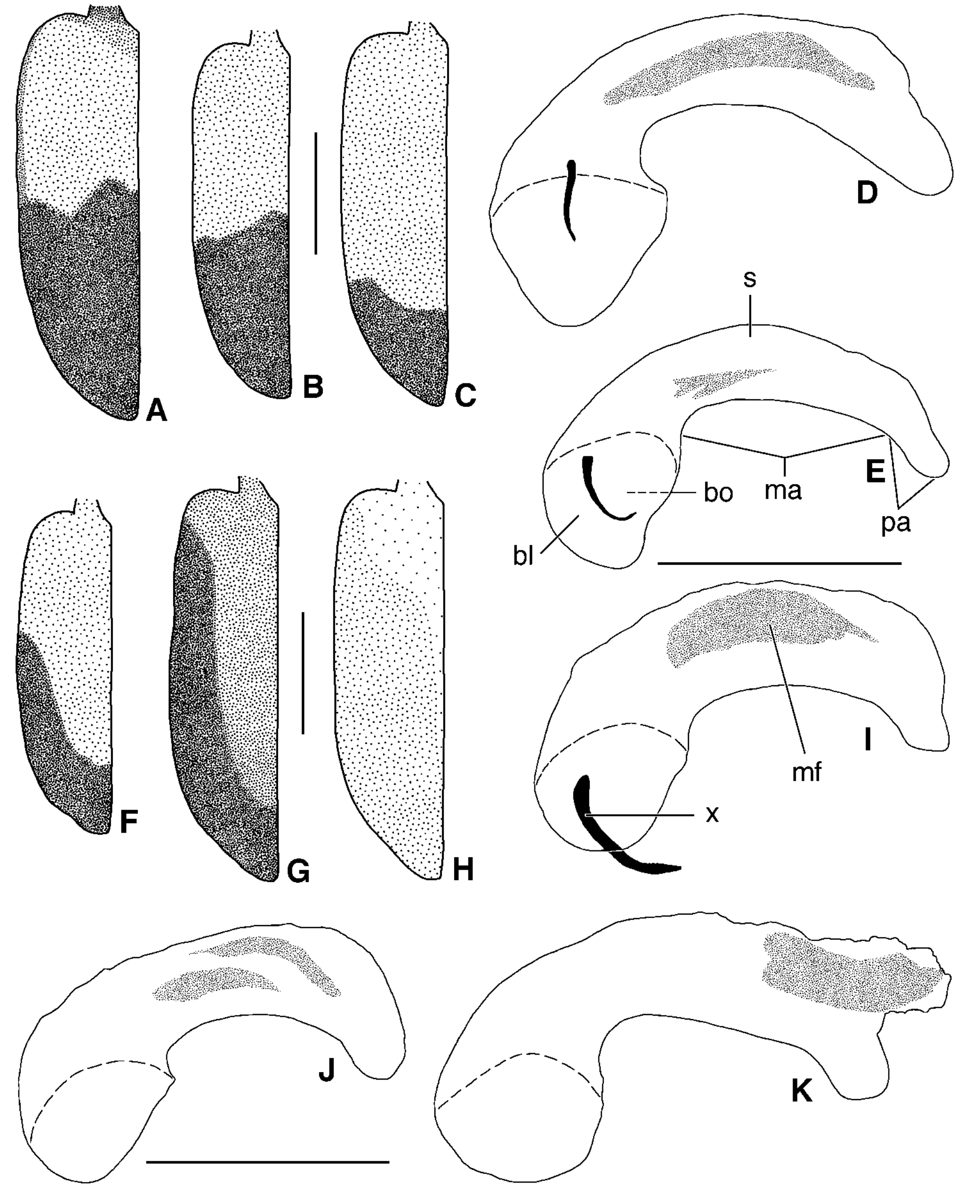

FIGURE 17. Structural features of *Cymbionotum* species illustrated with line drawings. A–C and F–H, left elytron, dorsal aspect, showing color pattern; D–E and I–K, male genitalia, left lateral aspect (phallus and endophallic armature). A (Awash Nat. Pk., Ethiopia), B (Lac Rodolphe, Ethiopia [lectotype of *C. aethiopicum* Alluaud]), C (Baghdad, Iraq), and D, *C. semirubricum* Reitter; E, *C. basale* Dejean; F (Karachi, Pakistan [holotype of *C. luniferum* Andr.]), G (Biskra, Algeria), H (Djibouti, Somalia) and I, *C. semelederi* Chaudoir; J, *C. striatum* Reitter; and K, *C. mandli* Jedlička. Legend: **bl**, basal lobe; **bo**, basal opening; **ma**, medial portion or shaft; **mf**, microtrichial field of endophallus; **pa**, preapical portion of shaft; **s**, shaft; **x,** sclerite x of endophallus. Scale bars: A–C and F–H = 1.0 mm; D, E, and I–K = 0.5 mm.

Descriptive notes. With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *basale* species group, restricted as follows. See Tables 3–9 for data about approximate variation in size and proportions (see also "geographical variation" for *C. semirubricum*, above, and Table 14). Male genitalia with form of phallus and endophallic armature as in Fig. 17E.

Habitat, habits, and seasonal occurrence. The geographical range of *C. basale* is within the dry and moist woodlands zones (Hall and Moreau 1970: xiii), and temperate grassland zone (Table 17 and Fig. 24), at altitudes between sea level and 400 m**.** Adults were collected during the period August–November, but without records for September.

Geographical distribution (Fig. 16). The range of *C. basale* is confined to northwestern Afrotropical Africa, where the species is precinctive.

Relationships and chorological affinities. This species is postulated to be the adelphotaxon of *C. semirubricum* Reitter. These two species are vicariant in distribution (Fig. 16).

Material examined. In addition to the single type specimen noted above, we have seen 16 specimens from the following localities. **GAMBIA:** Umg. Georgetown, 13º30'N, 14º40'W, 19–20.VIII.1989, T. & H.J. Bremer, 2 (ZSMC). **MALI:** Diaka, IFAN 1946, A. Pitor, 2 (MRAC). **MAURITANIA:** Rosso, J.L. Amiet, 4 (MRAC); Trarza, P. Basilewsky, 2 (MRAC). **SÉNÉGAL:** Badi, Mission IFAN au Parque National du Niocolo Koba, campment lumière, 18.XI.1959, 1 (MRAC); Galam, 1 (OXUM); Matam, 1 (MRAC); Richard Toll, Mission IFAN, XI.1967, A. Descarpentries, T. Laye, & A. Villiers, 2 (MRAC); Sedhiou (P. Gavard, 1933), P. Basilewsky, 1 (MRAC); "Sénégal", 15.X.1977, 1 (BMNH).

semelederi species group

Descriptive notes. Size and ratios of body parts (Tables 3–9). Size large, SBL (Table 3) about 4.5 mm or more, and EW, (Table 4) about 1.5 mm or more. Eyes moderately convex, values for ratio VW/HW (Table 8) 0.92 or less.

Color. Head and pronotum black to rufous; elytra concolorous, black or rufous, or bicolored, with posterior and lateral margins (Figs. 17F–G) black, and disc rufopiceous to rufous, or surface mostly infuscated and triangular area anteriad rufous (Fig. 17H). Antennae and mandibles black to rufous; palpi rufotestaceous; femora black to rufous, tibiae piceous to rufotestaceous, tarsi rufous to rufotestaceous.

Microsculpture. Dorsal surface (including postocular transverse impression and scutellum) without microlines, smooth.

Punctation and vestiture (Figs. 2C–D, 3A–B, 11A). Elytral punctures relatively small (Figs. 2C–D), and sparse (Fig. 3A), intermediate (Fig. 3B). Elytral setae short (Figs. 2C) to intermediate (Fig. 3B).

Head. Clypeus: males with anterior margin medially with distinct but not dentiform swelling; females without swelling.

Antennae. Antennomere 2 globose, not pyriform (Fig. 11E), relatively short (about half length of antennomere 3, Table 11); antennomeres 5–10 markedly asymmetric (Fig. 11G), each article about 1.9X longer than wide.

Included taxa. This species group includes three species: *C. semelederi* Chaudoir, *C. striatum* Reitter, and *C. mandli* Jedlička.

Habitat. The members of the *semelederi* species group occupy the temperate grassland vegetation zone, and marginally, the desert and semi-desert zone (Table 17 and Fig. 24).

Geographical distribution (Fig. 18). The range of the *semelederi* species group extends in the Palaearctic Region from western Asian Afghanistan to northwestern Africa, and across the northern part of the Afrotropical Region. This group is believed to be a Palaearctic indigene.

Relationships and chorological affinities. This species group is postulated to be the adelphotaxon of the more derived *schueppelii* species group. The geographical ranges of these groups overlap broadly in southwestern Asia and in the northern part of the Afrotropical Region (Figs. 18, 20, 22, 23).

***Cymbionotum (sensu stricto) semelederi* (Chaudoir 1861)**

(Figs. 2C, 3B, 11A, 14B, 17F–H, 17I, 18)

Coscinia semelederi Chaudoir 1861: 8. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "Semelederi/ Chaudoir/ Orient/ Semelederi." LECTOTYPE (point-mounted male, labeled: "Bagdad/ type" [handwritten]; "Ex Musaeo/ Chaudoir" [red print].—Marseul 1867: XXXIII.—Fairmaire 1868: 472.—Chaudoir 1871: 282.Piochard de la Brûlerie 1873: 98.—1875: 135.—Chaudoir 1876: 124.—Semenov 1890: 288.—Bedel 1897: 109.—Iakobson 1906: 306.

Graniger semelederi; Csiki 1929: 478.—Casale and Vigna Taglianti 1999: 363.

Cymbionotum semelederi; Lorenz 1998b: 149.

Cymbionotum collaris Baudi di Selve 1864: 213. TYPE MATERIAL: in Baudi di Selve Collection (MRSN). HOLOTYPE male, labeled with a small white octagonal piece of stiff paper.—Csiki 1929: 478.

Graniger collaris; Csiki 1929: 478.

Cymbionotum collare; Lorenz 1998b: 149.

Graniger algirinus Chaudoir 1876: 124 (not Motschulsky 1864: 198).—Marseul 1867: 211.

Coscinia funerula Fairmaire 1885: 440. LECTOTYPE (card-mounted) female, labeled: "funerula/ Fairm/ Obock" [handwritten]; " Ex Musaeo/ L. Fairmaire/ 1896" (MNHP). **NEW SYNONYMY.**

Graniger funerulus; Csiki: 1929: 477.

Cymbionotum semelederi funerulum Bruneau de Miré 1990: 505 (new combination).

Cymbionotum funerulum; Lorenz 1998b: 149.

Cymbionotum luniferum Andrewes 1935: 22**.** TYPE MATERIAL: HOLOTYPE (minuten-mounted, female, labeled: "Type" [circular label, ringed with red]; "India/ Nevinson Coll./ 1918-14"; "Cymbionotum/ luniferum/ Type Andr/ [handwritten]/ H. E. Andrewes det." [printed] (BMNH). **NEW SYNONYMY.**

Graniger houskai Jedlička 1951: 208. TYPE MATERIAL: HOLOTYPE (card-mounted); female, labeled: "Jordan Palestine/ ufve. klastera 9.10/ lgt. Houska 1943"; "TYPUS" [red paper]; "Graniger/ houskai/ sp. n/ det. ING. JEDLIČKA" [pink paper] (NMPC). **NEW SYNONYMY.**

Cymbionotum houskai; Lorenz 1998b: 149.

Notes about type material. In the original description of *C. semelederi*, Chaudoir (1861: 8) records three specimens, all from Baghdad: one received from the "Berlin Museum", and two, from M. Semeleder, of Vienna. Any of these could be chosen as lectotype, but only one was found at the Paris Museum, and it was chosen. A second authentic Chaudoir specimen is labeled "Georgie" and "Bayren", but it was not cited in the original description of this species, and accordingly is not available for choice as type material.

From the Museo Regionale Scienze Naturali, Torino, four specimens of *Cymbionotum* were received, pinned through a large white box label, behind the handwritten notation thereon, "G. Coscinia Dejean." On the posterior part of the label is printed "C. schuppeli Dej."; "collaris Baudi." In front of these notations are a male labeled "Reive del Giordano" (banks of the Jordan River) and two unlabeled females. The fourth specimen, a teneral male, is in front of the notation "Cypro." The basis for selecting this fourth specimen as holotype (see above) is its teneral cuticle (in the original description, described as "Non omnino maturum..."), and the specimen's proximity to the word "Cypro", the locality indicated in the original description. Further, the original description (Baudi di Selve, 1864: 214) refers to the clypeus as having an anterior tooth, which indicates the sex of the specimen as male. All four specimens are members of *C. semelederi* Chaudoir.

The original description of *Coscinia funerula* did not specify the number of specimens seen by the author. We have seen only one, but there could be more. Therefore, we have chosen that specimen as a lectotype, rather than treating it as a holotype of the species. See Typification (above, under Methods) for justification of lectotype selection.

In the original description of *C. luniferum*, Andrewes (1935: 22) indicated that its basis is a single female specimen, from Lyallpur in the Punjab, collected by T. B. Fletcher, and labeled India, Nevinson Collection. That specimen must be the holotype, as indicated above.

In the original description of *Graniger houskai,* Jedlička (1951: 208) recorded only a single specimen of that species, indicated as type, collected by Jaroslav Houska, in Jordan, which, at the time, was part of Palestine.

Notes about synonymy. The basis for synonymy is that the putatively diagnostic features (principally pronotal details, extent of elytral punctation and color) of *C. funerulum, C. luniferum* and *C. houskai*, are within the range of variation of *C. semelederi*, as determined by comparison of the types with other, principally Middle Eastern, material**.** Bruneau de Miré (1990: 505) stated that it was possible to distinguish *C. funerulum* at the subspecific level, but he recognized that some population samples within the range of *C. s. funerulum* were impossible to identify at the subspecific level. To us, it seems best to avoid subspecific recognition within *C. semelederi* (see "Geographical variation", below).

Type locality. Iraq: Baghdad.

Recognition. Adults of *C. semelederi* share most of their distinctive features with those of the allopatric *C. striatum* and *C. mandli*, the other members of the *semelederi* species group. They differ in punctation of the elytra: more dense in *C. semelederi* (Fig. 3B), less so in *C. striatum* (Fig. 3A) and in *C. mandli***.** Many specimens of *C. semelederi* have bicolored or uniformly rufous elytra, whereas all known specimens of *C. striatum* and *C. mandli* have uniformly black elytra. The posterior margin of the pronotum is beaded. Males of these three species differ in details of the genitalia: apex of the phallus of *C. semelederi* (Fig. 17I) obliquely subtruncate, whereas the apex of the phallus of the other two species (Figs. 17J–K) is more rounded. Further, these specimens differ in details of the endophallus: *C. semelederi* (like *C. mandli)* has a single microtrichial field, whereas *C. striatum* has two fields, and *C. semelederi* has sclerite x, which is lacking from the endophalli of the other two species.

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions (see also "geographical variation", below, and Table 15)**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *semelederi* species group, restricted as follows. Antennomere 2 relatively short (low values for A2L/ A3L, Table 11). See Table 1 for data about setal length and Figs. 2C and 3B for illustrations of setal length (short) and density (intermediate) of elytral punctation. Eyes moderately prominent, head relatively broad (Fig. 11A). Elytral color pattern as in Figs. 17F–H (for additional details, see "geographical variation", below). Form of pronotum as in Fig. 14B. Male genitalia with form of phallus and endophallic armature as in Fig. 17I.

Geographical variation. An overall pattern in color of the dorsal surface was discerned, as shown by the data in Table 15, although color intensity was more or less graded and some rufous individuals were probably teneral when killed, and for others, melanization may have been delayed. Specimens were designated as "uniform dark" (head, pronotum and elytra the same color, varying from black to rufopiceous); or "uniform rufous" (head, pronotum and elytra rufous); or "bicolored" (head and pronotum dark, elytra bicolored; or head and pronotum rufous, elytra bicolored). Three bicolored patterns were distinguished: "luniferum" (Fig. 17F), with elytral surface principally rufous, and a dark band extended from the apical margin to about half the length of the elytron; "Biskra" (Fig. 17G), with dark marginal band extended almost the entire length of the elytron; and "Djibouti" (Fig. 17H), principally rufous, with the parascutellar area rufotestaceous. Four areas were recognized, based on more or less natural geographical or zoogeographical divisions.

Each of the major patterns is present in each of the areas, with predominance as follows: uniform rufous, in Afrotropical Africa; bicolored "Biskra", in Palaearctic Africa; and uniform dark in the Middle East. In the Palaearctic Region east of the Black Sea, uniform dark and bicolored forms are about equal in frequency, with most bicolored individuals exhibiting the "Biskra" variant and the "luniferum" variant limited to northern India, Pakistan and Afghanistan. The "Djibouti" variant of the bicolored form is limited to Djibouti (near Obock, type locality of *C. funerulum),* in eastern Afrotropical Africa. Overall, the darker condition (including bicolored "Biskra" and "luniferum") is predominant in the Palaearctic samples, whereas the paler condition is predominant in the Afrotropical Region.

Habitat, habits, and seasonal occurrence. The members of *C. semelederi* occupy altitudes between sea level and 1500 m the temperate grassland vegetation zone, and in Africa, this species occurs marginally in the desert and semi-desert zone (Hall and Moreau 1970: xiii, Map B) (Table 17 and Fig. 24). Adults of *C. semelederi* were collected throughout most of the year, except in January and February. The data suggest two peak periods of activity in the Palaearctic Region: April–May and September–October. For the Afrotropical Region, most specimens were collected during the period July–August.

Geographical distribution (Fig. 18). The geographical range of *C. semelederi* extends across the southern Palaearctic Region from northern India westward to Morocco in North Africa; and in the Afrotropical Region from the southwestern Arabian Peninsula, westward to Mali and Mauritania. Like its species group, *C. semelederi* is believed to be a Palaearctic indigene.

Relationships and chorological affinities. Based on its more extensive elytral punctation, this species is postulated to be the more primitive adelphotaxon of the species pair *C. striatum* + *C. mandli. Cymbionotum semelederi* is at least parapatric with the other two species (Fig. 18). Sympatry is possible, but has not been documented.

Material examined. In addition to the 9 specimens noted under Type material, above, we have seen 254 specimens from the following localities.

PALAEARCTIC REGION. AFGHANISTAN: "Afghanistan", 1 (UASM); same, Kuschke, Coll. Hauser, 1896, 1 (ZSMC); Dilaram, 1 (NMPC). **ALGERIA:** Biskra, L. Bedel, 4 (L. Bedel Coll., MNHP); same, VI.1886, 2 (L. Bedel Coll., MNHP); same, IV. 1895, A. Chobaut, 2 (MNHP) and V.1898 (MNHP); Ksabi-Tisaudi, Saoura, 27.III.1979, R. Grimm, 1 (ZSMC). **ARMENIA**: "Armenia", 1 (HNHM). **AZERBAIJAN:** Evlax, 1 (L. Bedel Coll., MNHP); same, Dr. Martin, 1 (L. Bedel Coll., MNHP); same, Dr. Martin, 1 (L. Bedel Coll., NMPC); same, G. de la Kouza, 1 (L. Bedel Coll., MNHP); Lenkoran, Strasser, 3 (ZSMC). **"CAUCASUS":** Araxesthal, Reitter, 1 (HNHM). **CYPRUS. Ammochostos:** 2 km. E Agios Sergios, 35º11 20 N, 33º5340E, 15.IV.1990, R.D. Ward, 14 (CMNH); 1 km. N. Sotira, Paralimni, salt lake, 35º02 15 N, 33º5730E, 25.II.1990, R.D. Ward, 4 (CMNH); same,_except 1.IV.1990, 1 (CMNH). **Larnaca:** Salzee, 17.XII.1988, R. Grimm, 3 (ZSMC); salt lake, at Larnaca, 34º53 00 N, 33º3645E, 24.III.1990, R.D. Ward, 5 (CMNH); salt lake, on lake bed, 33º5340 N, 33º3645E., 13.IV.1990, R.D. Ward. 24 (CMNH); salt lake (SW airport), 34º53 00 N, 33º3645E, 23.IV.1990, R.D. Ward, 5 (CMNH); same, 19.V.1990, 1 (CMNH). **EGYPT:** Bir Odbib, side of Gulf of Suez, 15.IV.1927, 1 (USNM); Edwah, 6.IX.1910 (MRAC); "Egypt", Reitter, 1 (HNHM); Heloran, 1893, Fenyes, 1

(USNM); Kharga Oases, 27.III.1928, A. Alfieri, 1 (USNM). **IRAQ:** Abu-Ghraib, 27.IV.1938, R. Remane, 1 (ZSMC); Baghdad, 8 (H.W. Bates Coll., MNHP); same, 2 (MNHP); same, 1 (H.W. Bates Coll., SAMC); same, R.W.G. Hingston, 1 (BMNH); same, IV.1936, Frey, 2 (ZSMC); "Mesopotamia", 1, (ZSMC). **IRAN. Fars Province:** Bushehr, 8.V.1977, J.T. Huber, 3 (UASM). **JORDAN. Zarga Governorate:** 5 km E. Azraq al Janubi, 10.V.1991, R.D. Ward, 14 (CMNH). **KAZAKHSTAN:** "Turkestan", Reitter, 5 (NHMW) & 1 (ZSMC). **KUWAIT:** Al Janra Pool, 29º21N, 47º42E, 19.IV.1996, R.D. Ward, 5 (CMNH); same, 3.V.1996, 1 (CMNH); Kuwait City (N. of bay), 29º20N, 48º00E, 30.III.1996, R.D. Ward, 6 (CMNH); Kuwait City, 29º20N, 48º00E, 21–30.IV.1996, R.D. Ward, 2 (CMNH); 33 km SW Kuwait City, 29º14N, 47º45E, 24.II.1996, R.D. Ward, 7 (CMNH). **MAURITANIA:** Atar, X/XI.1948, L. Berland & A. Villiers, 1 (MRAC); Bafrechie, IFAN, 1953, 15.IX–10.X.1953, A. Villiers, 2 (MRAC); Rosso, J.L. Amiet, 1 (MRAC). **MOROCCO:** Hassi Mahjez, Daoura (Sahara), V.1950, Reymond, 1 (MRAC). **PAKISTAN:** Lahore, at light, VII–VIII.1957, J. Maldonado, 1 (USNM). **PALESTINE:** Jericho, 1 (MNHP). **SYRIA:** Halab district, Sabkhatal Jabbul env. 30 km. SE Halab, salt lake, 400 m, 26.IV.2000, S. Benedikt, 1 (PMGC). "Syria", 1 (H.W. Bates Coll., MNHP). **TUNISIA:** Tozeur, G.C. Champion (Champion Coll., BMNH). **TURKEY: Anatolia.** Ova Gölü sea, W of Antelya, 26.IV.1982, A. Casale, 2 (ACCT). Korykos, 17.V.1983, Wellschmied, 1 (ZSMC). **TURKMENIA:** Askabad, 1 (HNHM); Aschabad, 5–9.V.1989, S. BeŹv‡ż, 1 (ZSMC); Imambaba, 2 (NHMW); Oase Tedschen, VIII.1903, 1 (NMPC); Tcharshanga, 14.IV.1992, S. BeŹv‡ż, 6 (ZSMC); Tedschen, 1 (HNHM), 2 (NHMW), 4 (NMPC); Transcaspia, 1 (MRAC), 4 (NMPC), 1 (NHMC), 1 (UASM).

AFROTROPICAL REGION. CHAD: 700 km. NE Lake Tchad, P. Gavard, 1 (MRAC); Tibesti, P. Bruneau de Miré. **NIGER:** 38 km. S. Agadez, 2.VIII.1981, R. Grimm, 13 (ZSMC); Asamakra, 30.VII.1981, R. Grimm, 1 (ZSMC).). **SAUDI ARABIA:** El Hedjaz, Millinger, 4 (BMNH). **SOMALIA:** Djibouti, Bonhoure, 2 (MNHP); same, III.1901, Bonhoure, 4 (Maindron-Babault Coll., MNHP). **SUDAN:** Diberia, W. Halfa District, 26–30.IX.1962, S. Panelius, 2 (MRAC); Ed Damer, Hudeiba, 18.IX.1961, R. Remane, 1 (ZSMC); same, 14.VI.1962, 1; same, 20–28.VII.1962, 12 (ZSMC). Khartoum, 3.VIII.1914, R. Corram, 1 (BMNH); same, VII & X.1959, P.L.G. Benoit, 1 (MRAC). **YEMEN:** Wadi Zabid, V.1970, A. Szaky-Marzso, 2 (HNHM); "Yemen", 1 (H.W. Bates Coll., MNHP).

We did not see the specimens recorded from Tibesti, Chad (Bruneau de Miré, 1990). The place of deposition is unknown, but is probably MNHP.

COUNTRY UNKNOWN: banks of the River Jordan, 1 (MRSN); Foum Imirhou, 17.X.1957, 4 (MNHP); Sefirksch, 1 (ZSMC). **NO LOCALITY, OR LABEL ILLEGIBLE:** 2 (MNHP); 2 (MRSN); 3 (NHMW); 1 (NMPC); 2 (USNM); 2 (ZSMC).

TABLE 15. Data about variation in color of elytra for geographically selected samples of *Cymbionotum semelederi* Chaudoir.

		No. Individuals/ elytral color		
Geographical Area	N	Uniform black to rufopiceous	Bicolored	Uniform rufous
East of Black Sea[1]	44	21	22[2]	1
Middle East[3]	33	26	2[4]	5
Palaearctic Africa[5]	22	6	12[4]	4
Afrotropical Africa[6]	32	1	5[7]	26

[1] Afghanistan, Pakistan, Turkestan, Turkenistan, Armenia, Azerbaijan, Iran

[2] Biskra pattern, 19 exx.; *luniferum* pattern, 3 exx.

[3] Iraq, Turkey, Syria, Israel, Jordan, Yemen, Saudi Arabia, Cyprus

[4] Biskra pattern

[5] Egypt, Algeria, Tunisia

[6] Eritrea, Somalia, Sudan, Niger, Mauritania

[7] Biskra pattern, 2 exx.; Djibouti pattern, 3 exx.

Cymbionotum (sensu stricto) striatum (Reitter 1894)
(Figs. 2D, 3A, 11E, 11G, 17J, 18)

Coscinia striata Reitter 1894:122. TYPE MATERIAL: HOLOTYPE female [card-mounted], labeled: "Sefir-kuh./ Nordlich von Herat" [handwritten]; "Coscinia/ striata m." [handwritten]; "coll. Reitter"; "Holotypus [red print] 1894/ Coscinia/ striata/ Reitter" [handwritten] [rectangular label, bordered with red]; (HNHM).
Cymbionotum striatum; Lorenz 1998b: 149.

Note about type material. According to the original description (Reitter, 1894: 122), this species was based on (we believe) a single specimen as only one measurement is provided in the original description.

Type locality. Afghanistan: Sefir-kuh, in the mountains of Herat.

Recognition. Adults of *C. striatum* share most of their distinctive features with those of the allopatric *C. semelederi* and *C. mandli*, the other members of the *semelederi* species group. Adults differ from those of *C. semelederi* in punctation of the elytra: less dense in

C. striatum (Fig. 3A), more so in *C. semelederi* (Fig. 3B). Many specimens of *C. semelederi* have bicolored or uniformly rufous elytra, whereas all known specimens of *C. striatum* have uniformly black elytra. The posterior margin of the pronotum is not beaded. Males differ in details of the genitalia: apex of the phallus of *C. striatum* (Fig. 17J) more rounded, but obliquely subtruncate in *C. semelederi* (Fig. 17I). Further, *C. striatum* has two microtrichial fields in the endophallus, whereas *C. semelederi* has a single field. In most of these features, *C. striatum* is like *C. mandli*, the two differing only in details of the male genitalia: phallus curved more markedly preapically in *C. striatum*, and endophallus with two microtrichial fields (Fig. 17J); in *C. mandli*, phallus curved more gradually preapically, and endophallus with a single microtrichial field (Fig. 17K).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *semelederi* species group, restricted as follows. See Table 1 for data about setal length, and Figs. 2D and 3A for illustrations of setal length (intermediate) and density (sparse) of elytral punctation**.** Male genitalia with form of phallus and endophallic armature as in Fig. 17J.

Habitat. The localities for *C. striatum* are in the temperate grassland vegetation zone (Table 17 and Fig. 24), at altitudes between 1000 and 2100 m.

Geographical distribution (Fig. 18). This species, precinctive in the Palaearctic Region, is known only from Afghanistan and Pakistan, in Western Asia.

Relationships and chorological affinities. Based on the apotypic reduced elytral punctation, *C. striatum* and *C. mandli* are postulated to be adelphotaxa. These two species are allopatric (Fig. 18).

Material examined. In addition to the holotype (for details, see "Notes about type material", above), we have seen two specimens of *C. striatum* from the following localities. **AFGHANISTAN:** "Afghanistan", Kuschke Coll., Hauser, 1896, 1 (NHMW). **PAKISTAN:** 80 km. NW Quetta, 2100 m, 15.V.1965, Kasy & Vartian, 1 (NHMW).

Cymbionotum (sensu stricto) mandli (Jedlička 1963)

(Figs. 17K, 18)

Graniger mandli Jedlička 1963: 173. TYPE MATERIAL: two (of four) specimens, labeled as follows. HOLOTYPE (card-mounted; sex not determined) (NMPC): "Persien/ Dr. Löffler"; "Holotypus"[pink paper]; "Graniger/ mandli/ sp. n/ det. ING. JEDLIČKA" [pink paper]. PARATYPE (card-mounted; sex not determined) (NMPC): "Persien/ Dr. Löffler"; "Holotypus" [pink paper]; "Graniger/ mandli/ sp. n/ det. ING. JEDLIČKA" [pink paper].

Cymbionotum mandli; Lorenz 1998b: 149.

Note about type material. Jedlička (1963: 174) based the description of *G. mandli* on four specimens (we saw only the two noted above), all from the type locality (determined by reference to the original description).

Type locality. IRAN: Jaz-Murian Sink, at approximately 27°30'N, 59°00E, at an altitude between 400 and 1000m.

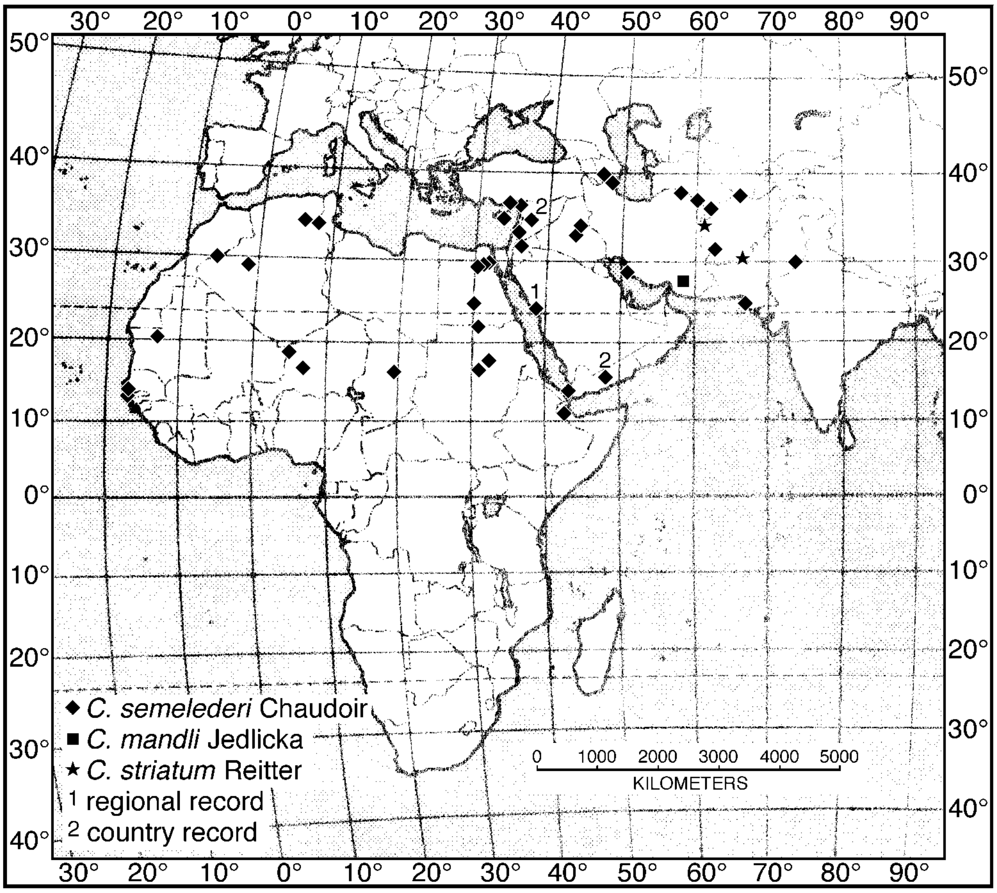

FIGURE 18. Geographical range of the species of *Cymbionotum (s. str.) semelederi* species group illustrated with an outline map of southwestern Asia, southern Europe and Africa.

Recognition. Adults of *C. mandli* share most of their distinctive features with those of the parapatric *C. semelederi* and allopatric *C. mandli*, the other members of the *semelederi* species group. Adults differ from those of *C. semelederi* in punctation of the elytra: less dense in *C. mandli* (cf. Fig. 3A), more so in *C. semelederi* (Fig. 3B). Many specimens of *C. semelederi* have bicolored or uniformly rufous elytra, whereas all known specimens of *C. mandli* have uniformly black elytra and the posterior margin of the pronotum is beaded. Males differ in details of the genitalia: apex of the phallus of *C. mandli* (Fig. 17K) more rounded, but obliquely subtruncate in *C. semelederi* (Fig. 17I). In most of these features, *C. mandli* is like *C. striatum*, the two differing only in details of the male genitalia: phallus curved more markedly preapically in *C. striatum*, and endophallus with two microtrichial fields (Fig. 17J); in *C. mandli*, phallus curved more gradually preapically, and endophallus with a single microtrichial field (Fig. 17K).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *semelederi* species group, restricted as follows. Setal length and density of elytral punctation similar to that of *C. striatum* (see Table 1 and Figs. 2D, 3A). Male genitalia with form of phallus and endophallic armature as in Fig. 17K.

Habitat. The locality for *C. mandli* is, like that of *C. striatum,* in the temperate grassland vegetation zone (Table 17 and Fig. 24), at altitudes between 400 and 1000 m.

Geographical distribution (Fig. 18). This species is known only from its Iranian type locality, in Western Asia and is thus precinctive in the Palaearctic Region.

Relationships and chorological affinities. Based on the apotypic reduced elytral punctation and absence of sclerite **x** from the endophallus, *C. mandli* and *C. striatum* are postulated to be adelphotaxa. These two species are allopatric (Fig. 18), since their known geographical ranges do not overlap.

Material examined. Holotype, only. For details, see "Type Material", above.

schueppelii species group

Descriptive notes. Size and ratios of body parts (Tables 3–9). Size small, SBL (Table 3) about 4.25 mm or less, and EW (Table 4) about 1.5 mm or less. Eyes moderately convex to nearly flat, values for ratio VW/HW (Table 8) 0.96 or less.

Color. Head and pronotum black; elytra black (few individuals) or bicolored, with patterns various (Figs. 19A–B, 19E–F, 19I–J, 19L–N, 22A–C) or completely testaceous. Antennae and mandibles black to rufotestaceous; palpi rufotestaceous to testaceous; femora and tibiae rufous to testaceous, tarsi rufotestaceous.

Microsculpture. Dorsal surface without microlines, smooth, except postocular transverse impression and anterior part of scutellum with slightly transverse sculpticells.

Vestiture. Dorsal surface with setae short (Table 1 and Fig. 2B), setation moderately dense (Figs. 3C–D) to very sparse (cf. Fig. 3B).

Head. Clypeus: anterior margin medially with or without distinct dentiform projection.

Antennae. Antennomere 2 pyriform (cf. Fig. 11D), relatively long (about two thirds length of antennomere 3—Table 11); antennomeres 5–10 moderately asymmetric (cf. Fig. 11F), each article about 1.3–1.5x longer than wide.

Included taxa. This species group includes three superspecies, and 14 species.

Habitat. The members of the *schueppelii* species group occupy five vegetation zones, with concentration in the temperate grassland and tropical deciduous forest and savannah zones (Table 17 and Fig. 24).

Geographical distribution. The *schueppelii* species group (Figs. 20, 21, 23) is precinctive to the Eastern Hemisphere, its range extending from Vietnam, in the Oriental Region, westward to Palaearctic eastern Africa, and southward in the Afrotropical Region to southern South Africa.

Relationships and chorological affinities. This species group is postulated to be the adelphotaxon of the more generalized *semelederi* species group. The geographical ranges of these groups overlap broadly in southwestern Asia and in the northern part of the Afrotropical Region (Figs. 18, 20, 21, 23).

schueppelii superspecies

Descriptive notes. Size and ratios of body parts (Tables 3–9). For *schueppelii* species group, size, on average, intermediate, SBL (Table 3) and EW (Table 4) overlapped broadly by *fasciatum* superspecies (larger on average) and *microphthalmum* superspecies (smaller on average). Eyes moderately convex, values for ratio VW/HW (Table 8) overlapped broadly by *fasciatum* superspecies, narrowly (values higher on average) by *microphthalmum* superspecies.

Color. Dorsal surface uniformly rufous, or black (few individuals), or bicolored: head and pronotum black; elytra bicolored, anteriorly rufous, posterior two thirds to half black (Figs. 19A–B). Antennae rufopiceous to rufous; mandibles black to rufous; palpi rufotestaceous; femora and tibiae rufous, and tarsi testaceous.

Microsculpture. Dorsal surface without microlines, smooth, or smooth except postocular transverse impression with microlines obscure, mesh pattern not formed, and anterior part of scutellum with slightly transverse sculpticells.

Vestiture. Dorsal surface with setae short (cf. Table 1 and Fig. 2B), elytral punctures relatively small, punctation moderately dense (Fig. 3C).

Head. Clypeus: anterior margin medially with distinct dentiform projection (cf. Fig. 11C, **ct**).

Included taxa. This superspecies includes three species, *C. schueppelii* Dejean, *C. rufotestaceum* Fairmaire, and *C. capicola* Péringuey.

Habitat. The members of the *schueppelii* superspecies occupy four vegetation zones: temperate deciduous forest, temperate grassland, tropical deciduous forest and savannah, and marginally, desert and semi-desert (Table 17 and Fig. 24).

Geographical distribution (Fig. 20). The range of the *schueppelii* superspecies is principally African. It is probably indigenous in the Afrotropical Region, with an incursion into the Palaearctic Region.

Relationships and chorological affinities. Based on color pattern (bicolored elytra with posterior margins broadly black) and relatively large eyes, this superspecies may be the primitive adelphotaxon of the more derived *fasciatum* + *microphthalmum* superspecies pair. The geographical ranges (Figs. 20, 21, 23) of all three superspecies overlap broadly in the northern part of the Afrotropical Region.

Cymbionotum (sensu stricto) schueppelii (Dejean 1825)
(Figs. 3C, 19A–C, 20)

Siagona Schuppelii Dejean 1825: 363. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "schuppelii/ Dejean/ Egypte/ Coll. Dejean." HOLOTYPE (male, incomplete, head and prothorax missing; point-mounted) labeled: "schuppeli m/ in Egypt"; "Schüppel" [both preceding labels handwritten on blue paper]; "Ex Musaeo/ Chaudoir" [red print].

Coscinia schuppelii Dejean 1831: 479.—Klug 1832: t23, f2.—Piochard de la Brûlerie 1875: 135.

Coscinia schuppeli; Chaudoir 1876: 119.

Graniger schueppeli; Csiki 1929: 478.

Graniger schüppeli; Burgeon 1935: 192.

Cymbionotum schueppelii; Lorenz 1998b: 149.

Cymbionotum capicola rufofasciatum Basilewsky 1948: 57. TYPE MATERIAL: 4 specimens, card-mounted (MRAC). HOLOTYPE female, labeled: "MUSEUM PARIS/ ZAMBÈZE/ NOVA CHUMPANGA/ J. SURCOUF 1928"; "SEPTEMBRE" [each label blue paper]; "HOLO/ TYPE [blue print, paper pale red]; "Cymbionotum capicola ssp. rufofasciatum nov [handwritten]/ P. BASILEWSKY det. P. BASILEWS [printed]." PARATYPE male, labeled: "PARATYPUS [printed]/ ssp. rufofas-/ciatum Basil [handwritten]" [orange paper]; "COLL. MUS. CONGO/ Nova Chumpanga/ (Zambèze)/ (don P. Basilewsky) [handwritten]." PARATYPE female, labeled: "PARA/ TYPE" [blue print, paper pale red]; "MUS PARIS/ DED VI.1947"; "MUSEUM PARIS/ ZAMBÈZE/ NOVA CHUMPANGA/ J. SURCOUF 1928"; "SEPTEMBRE" [each label blue paper]; "R. DET./ 5262"; "Cymbionotum capicola Pér/ ssp. rufofasciatum nov [handwritten]/ P. Basilewsky det." [printed]. PARATYPE female, labeled: "PARATYPUS" [orange paper]; "MUSEUM PARIS/ ZAMBÈZE/ NOVA CHUMPANGA/ J. SURCOUF 1928"; "COLL MUS. CONGO/ Col. P. Basilewsky." **NEW SYNONYMY.**

Cymbionotum rufotestaceum Baehr 2003: 402 (not Fairmaire, 1903).

Note about specific epithet. Lorenz (1998a: 793) wrote: "Schuppelii" is an incorrect original spelling, according to art. 32c(ii)" (ICZN 1985: 32 = ICZN 1999: 40, art. 32.5.1), and must therefore be corrected. The internal evidence for this assertion for this specific epithet is that first, the species is dedicated to one "M. Schüppel" who had provided the type specimen (Dejean 1825: 364); and second, in the index (*l.c.*, 463), "*Schüppelii*" is used. Thus, one may conclude that the umlaut was omitted inadvertently from the original spelling, on p. 363. According to the International Code of Zoological Nomenclature (1999: 40, art. 32.5.2.1.), the letter "ü" is to be indicated by "ue" in a specific epithet, and hence the corrected spelling "*schueppelii*".

Notes about type material. The original description (Dejean 1825: 363) records, for this species, a single specimen presented by M. Schüppel to P.F.M.A. Dejean. The box label, cited above, gives Egypt as the place of collection, which is in agreement with Dejean's text. Accordingly, we accepted this specimen as the holotype of *C. schueppelii.*

In the original description of *C. capicola rufofasciatum* (Basilewsky 1948: 57), dates of collection are recorded as X and XII (or October and December), but the month indicated on the holotype label is September. We are unable to explain this discrepancy, but it seems relatively unimportant. A specimen collected in Mozambique (MRAC) is labeled "Paratype", but it cannot be thus because that locality is not recorded in the original description.

Note about synonymy. The subspecies *C. c. rufofasciatum* is treated as conspecific with *C. schueppelii*, and not with *C. capicola* on the basis of similarity in phallic details shared by the former two taxa. Specimens of *C. rufofasciatum* do not differ significantly from specimens of *C. schueppelii* living elsewhere and hence the proposed synonymy of those names.

Type area. Egypt.

Recognition. See the key to species, above. Adults of *C. schueppelii* are most like those of *C. capicola*. See the treatment of *C. capicola* below, for details about color differences. Males of the two species differ in phallic form and form of the microtrichial field of the endophallus: for *C. schueppelii* (Fig. 19C), shaft ventrally set off more sharply from basal lobe, preapical portion narrower, and microtrichial field bifurcate apically (cf. Fig. 19D). Concolorous females of both this species and *C. fasciatum* are indistinguishable from one another, except by association with microsympatric males.

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and superspecies, restricted as follows. Color of head and pronotum dimorphic: dark (black to piceous), or rufous. Elytra dimorphic: either bicolored (Figs. 19A–B) dark (black to piceous) posteriorly, pale (rufous) anteriorly; or completely rufous. Male genitalia with form of phallus and endophallic armature as in Fig. 19C.

Variation. Of 82 specimens, the elytra of 2 are uniform piceous; of 68, more or less bicolored piceous and rufous; and of 12, concolorous rufous. The bicolored and concolorous rufous morphs are distributed throughout the range of *C. schueppelii;* the 2 individuals with concolorous piceous elytra are from Kiang West National Park, Gambia.

Habitat, habits, and seasonal occurrence. The range of *C. schueppelii* occupies three vegetation zones: temperate grassland, tropical deciduous forest and savannah, and marginally, desert and semi-desert (Hall and Moreau 1970: xiii, Map B), (Table 17 and Fig. 24), at altitudes between sea level and 2000 m. Adults of *C. schueppelii* have been collected in every month of the year, except May. Most of them were collected during the period September-November, suggesting maximum activity during that period.

Geographical distribution (Fig. 20). Widespread in the drier parts of the sub-Saharan Afrotropical Region, the geographical range of *C. schueppelii* extends northward to Israel, in the Palaearctic Region. Like its superspecies, *C. schueppelii* is probably an Afrotropical indigene.

Relationships and chorological affinities. Based on overall similarity and allopatric but proximal geographical ranges, we postulate that this species, *C. rufotestaceum* and *C. capicola* are equally closely related to one another, and thus form a phylogenetic tritomy.

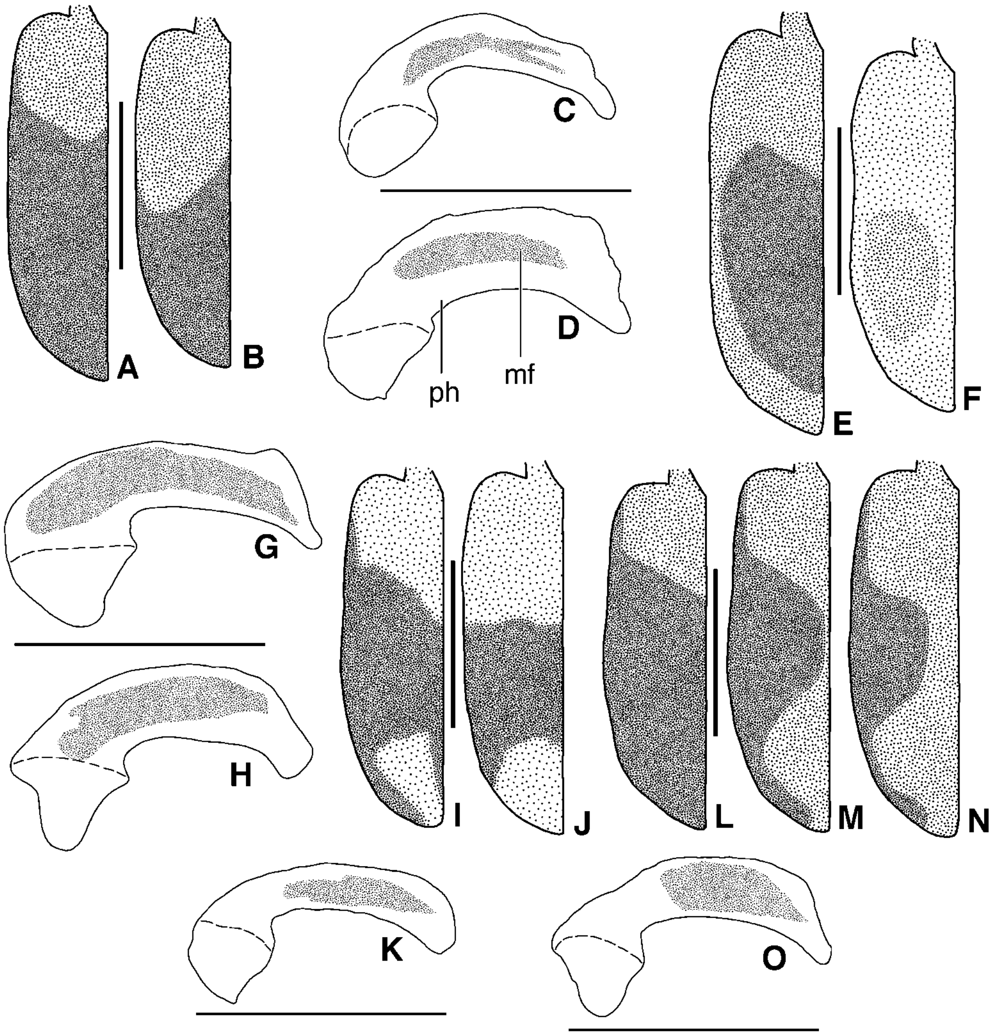

FIGURE 19. Structural features of *Cymbionotum* species illustrated with line drawings. A–B, E–F, I–J and L–N, left elytron, dorsal aspect, showing color pattern. C–D, G–H and K–O, male genitalia, left lateral aspect (phallus and endophallic armature). A–C, *C. schueppelii* Dejean; D, *C. capicola* Péringuey; E–G, *C. helferi* Chaudoir; H, *C. fasciger* Chaudoir; I–K, *C. fluviale* Andrewes; and L–O, *C. pictulum* Bates. Legend: **mf**, microtrichial field of endophallus; **ph**, phallus. Scale bars: A, B, E, F, I, J and L–N =1.0 mm; and C, D, G, H, K, and O = 0.5 mm.

Material examined. In addition to the type material noted above, we have seen 76 specimens of *C. schueppelii* from the following localities.

PALAEARCTIC REGION. PALESTINE: Jericho, IV.1926, O. Theodor, 1 (BMNH).

AFROTROPICAL REGION. ANGOLA: Mungobi, VII.1948, C. Koch, 1 (MRAC). **CAMEROON:** Koze-Guétalé, P. Bruneau de Miré- XI.1969, 2; IV.1970, 2; VI.1970, 2; IX.1970, 3; XI.1970, XII.1970, 1 (MNHP); Garoua, 2.X.1966, 1, & 25.VI.1974, P. Bruneau de Miré, 3 (MNHP); Maroua, X–XI.1965, G. Schmitz, 1 (MRAC). **CENTRAL**

AFRICAN REPUBLIC (= French Equatorial Africa): Fort Crampel (= Kaga Bandoro), Il Bangshi, X.1950, 1, & IX.1954, 1, Breuning (MRAC). **CHAD:** Bas Chari, Fort Lamy, J. Decourse, 1 (MRAC); Dist. Kanem, N'Gouri, IX.1958, 2, & X–XI.1958, 2, P. Renaud (MRAC); NE Fort Archembault, Bahr Salamat, 1904, J. Decourse, 1 (MRAC); Balabidja a Koho, Mission Chari-Tchad, Bas Chari Mani, 1904, J. Decourse, 1 (MRAC); Mission Chari-Tchad, Fort Lamy, H. Franz, 2 (MRAC); Deressia b. Lai, H. Franz, 14 (MRAC); Souronde b. Deressia, Dist. Lai, H. Franz, 1 (MRAC). **CONGO (DRC). Katanga:** Lufira, 13.IV.1925, C. Seydel, 1 (MRAC). **CONGO (= FRENCH CONGO):** Bahr-Sara, Boubo, 1908, J. Kerendel, 1 (MRAC). **ETHIOPIA. Gemu-Gofa Province:** Arba Minch, 8–9.IX.1972, R.O.S. Clarke, 1 (MRAC). **Harer Province:** Bahadu Guani, 28.XI.1971, R.O.S. Clarke, 1 (MRAC); Melca Werer, 10.VII.1972, R.O.S. Clarke, 1 (MRAC); Wabi Shebell, 24–26.VII.1972, R.O.S. Clarke, 1 (MRAC). **Ilubabor Province:** Gambela, X.1972, G. de Rougemont, 3 (MRAC); same, 15–18.XI.1972, R.O.S. Clarke, 4 (MRAC). **Shoa Province:** Hawash (=Awash) Railway Station, ca. 3500', 2.IX.1926, J. Omer-Cooper, 2 (BMNH). **GAMBIA:** Kiang West National Park, Tubab Kollon Pt., 6.XI.1998, W. Schacht, 2 (ZSMC). **KENYA:** Taveta, 750 m, III.1912, Alluaud & Jeannel, 1 (MRAC). **MAURITANIA:** Trarza, P. Basilewsky, 1 (MRAC). **NIGERIA:** 23 km. SW Niamey, 9–12.VIII.1981, Grimm, 1 (ZSMC). **SAUDI ARABIA:** El Hedjaz, 1915, 1 (BMNH). **SÉNÉGAL:** Libreville, Grand Bassam, 2 (MRAC); Podor R. Reg., 26.III.1966, 4 (USNM); Tatki, 15.1V.1967, T. Leye, R. Roy, 1 (MRAC). **SOMALIA:** Belet Amin, VII.1934, Patrizi, 1 (MRAC). **SUDAN:** Disa, Allison, 1 (HNHM); Juba-Terakeka, 2–6.III.1963, Linnavouri, 2 (MRAC); Kosti, at light, 22.I.1963, Linnavouri, 3 (MRAC); Mwolo-Mundri, 24.II.1963, Linnavouri, 3 (MRAC); Upper Nile: Malakal, 5–20.I.1963, Linnavouri, 4 (MRAC). **UGANDA. Turkana Province:** Lodwar, 17.IX.1934, 1 (BMNH).

Cymbionotum (sensu stricto) rufotestaceum (Fairmaire 1893)
(Fig. 20)

Coscinia rufotestacea Fairmaire 1893: 145. TYPE MATERIAL: see notes, below. LECTOTYPE (here selected) (MNHP), female, card-mounted, labeled: "Somalis/ Banan-Abdallah" [handwritten]; "rufotestacea/ Fairm!/ [illegible handwriting]." Six PARALECTOTYPES (here designated), females, card-mounted, labeled: "Coscinia/ rufotestacea/ Fairm./ Somalis" [handwritten]; "PARATYPUS" [orange paper]; "MUSEUM PARIS-/ Collection/ Léon Fairmaire/ 1906"; "COLL. MUS. CONGO/ Col. P. Basilewsky" (MRAC).- "Coscinia/ rufotestacea/ Fairm/ Somalis" [handwritten]; "PARATYPUS" [orange paper]; Col. P. Basilewsky" (MRAC).- "Somalis/ Fairmaire/ vidit" [handwritten]; "Coscinia/ rufotestacea Fm./ Somalis" [handwritten]; "R. DET/ 2025/ L"; "MUSÉE DU CONGO/ Somalis (ex Fairmaire)" [handwritten]/ Ex. coll Clermont" (MRAC).- two exx., on one card, "rufotestac/ Fairm 1893/ Somalis [handwritten]; "Ex Musaeo/ L. Fairmaire/ 1896" (MNHP).- "Abdallah/ Somalis" [handwritten]; "Ex Musaeo/ L. Fairmaire/ 1896" (MNHP).
Graniger rufotestaceus; Csiki 1929: 478.
Cymbionotum rufotestaceum; Lorenz 1998b: 149.

Note about type material. The number of specimens examined was not specified, but the size measurements in the original description indicate more than one. The single specimen that we saw with the complete name of the type area, written in what appears to be Fairmaire's handwriting, was chosen as lectotype. The printing on the locality labels of the specimens designated as paralectotypes seems to be in the same hand as the printing on the lectotype label. Basilewsky labeled two specimens as paratypes, but that seems inappropriate in the absence of a specified holotype, which seems not to exist. Hence, those specimens were treated as paralectotypes. See Typification (above, under Methods) for justification of lectotype selection.

Type locality. In the original description of *C. rufotestacea*, Fairmaire (1893: 145) recorded by implication the type area as "Banan-Abdallah, Somalis," the only locality mentioned, which we believe is in present-day Ethiopia.

Recognition and taxonomic status. With considerable hesitation, we recognize *C. rufotestaceum* as a distinct species, in part because of the marked similarity of the adults to those females of *C. schueppelii* and *C. fasciatum* with concolorous rufous elytra, and in part because of absence of males and thus potentially diagnostic features of the male genitalia. However, the scutellum without microsculpture mesh provides a means of recognition, and thus isolation from otherwise similar and geographically proximal species.

Although similar to *C. subcaecum* in size, color and smooth scutellum, specimens of *C. rufotestaceum* differ in eye size and form (VW/HW 0.83–0.88 [0.85]; *C. subcaecum*, 0.94) which places the two species in different superspecies. Further, *C. rufotestaceum* and *C. subcaecum* are widely separated geographically (Fig. 20; cf. Fig. 23).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and superspecies, restricted as follows. Dorsal surface concolorous, rufous, or with head and pronotum rufous and elytra rufotestaceous. Elytra concolorous.

Habitat. The members of *C. rufotestaceum* occur in the tropical deciduous forest and savannah vegetation zone (Hall and Moreau 1970: xiii, Map B), (Table 17 and Fig. 24), at altitudes between 400 and 1000 m.

Geographical distribution (Fig. 20). This species is known only from the type area, in southeastern Ethiopia, and is thus precinctive to the Afrotropical Region.

Relationships and chorological affinities. See this topic for *C. schueppelii.*

Material examined. We have seen only the types. For details, see "Notes about type material", above.

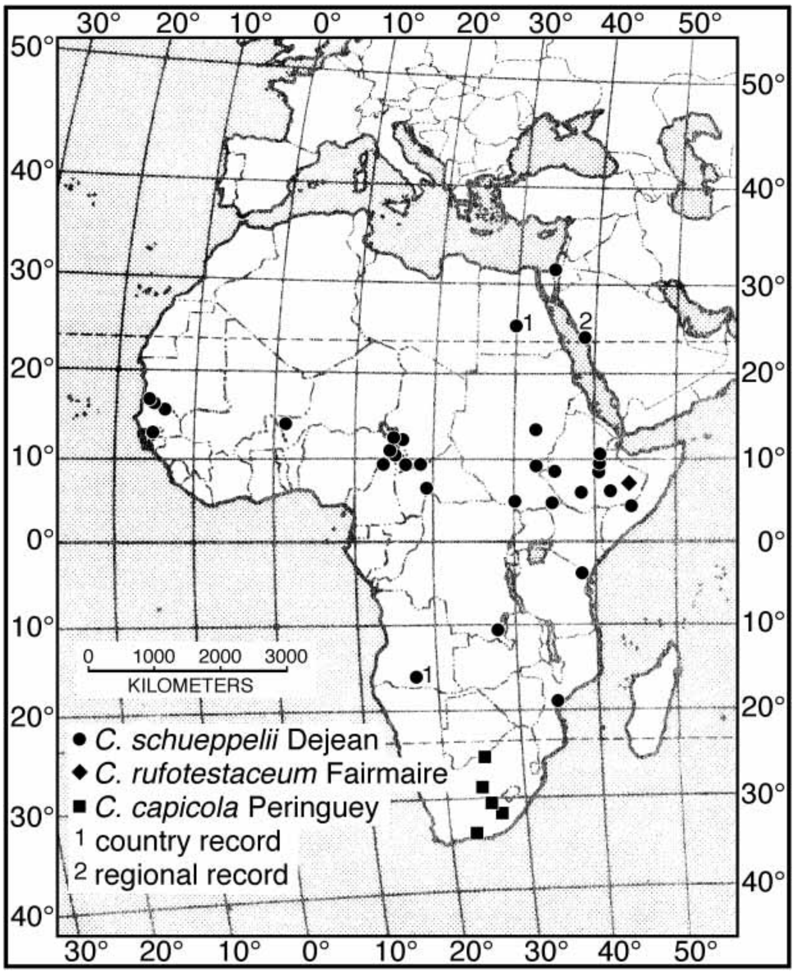

FIGURE 20. Geographical range of the species of *Cymbionotum (s. str.) schueppelii* superspecies illustrated with an outline map of southwestern Asia (Middle East), southern Europe and Africa.

Cymbionotum(sensu stricto) capicola (Péringuey 1908)
(Figs. 19D, 20)

Coscinia capicola Péringuey 1908: 276. TYPE MATERIAL: three specimens (SAMC), sex not determined, each double mounted, two on minuten pins, both then on a single plastic block, on a normal size pin; and a third pointed specimen, on a separate pin. Locality data same for all: "Willowmore/ Capland/ Dr. Brauns." LECTOTYPE (here selected) the minuten-mounted specimen closer to the normal size pin, with labels "Coscinia/ capicola/ Ty" [handwritten]; "Type" [red paper]; "Type/SAM/Ent/ 000578" [orange paper]. PARALECTOTYPES: one, the second of the minuten mounted specimens; and the point-mounted specimen, labeled: "Graniger/ capicola/ Pér."; "PARA/ TYPE" [orange paper]; "Type/SAM/Ent/ 000578" [orange paper]. Cochrane 1995: 258.

Graniger capicola; Csiki 1929: 477.

? *Graniger martini* Bedel 1908: 318. TYPE MATERIAL: not seen.—Basilewsky 1948: 57.

Graniger martinii; Csiki 1929: 477.
Cymbionotum c. capicola; Basilewsky 1948: 57.

Note about type material. In the original description (Péringuey 1908: 276), *C. capicola* was declared to be based on three specimens, which is the number noted above. The orange "type" labels were attached to the pins by A. J. Hesse, but these designations were not published (Cochrane 1995: 250). See Typification (above, under Methods) for justification of lectotype selection.

Although one of us (GEB) looked for it, the type material (probably in the MNHP collections) of *C. martini* Bedel (type area: East London, Cape Colony) was not located. According to Bedel (1908: 319), the original description was based on a single specimen, collected by Charles Martin.

Note about synonymy. Basilewsky (1948: 57) stated his belief that the types of *C. martini* and *C. capicola* were conspecific and that the names would be thus synonymous, but noted that examination of the types was required to establish the synonymy. The description of color of the type specimen (castaneous, with base of the elytra and legs more rufescent) is in agreement with the characteristics of the type series of *C. capicola*. However, since the Bedel type has not been located, and in spite of our agreement with Basilewsky in this matter, the synonymy is yet to be established unequivocally.

Type locality. Republic of South Africa: Cape of Good Hope Province: Willowmore.

Recognition. See the key to species, above. Adults of *C. capicola* are most like those of *C. schueppelii*. Males of the two species differ in phallic form and form of the microtrichial field of the endophallus: for *C. capicola* (Fig. 19D), shaft ventrally only slightly set off from basal lobe, preapical portion broader, and microtrichial field not forked apically (cf. Fig. 19C).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and superspecies, restricted as follows. Color of head and pronotum dark (rufopiceous to piceous) to rufous. Elytra slightly to markedly dimorphic: either obscurely bicolored (cf. Figs. 19A–B) dark (black piceous) posteriorly, slightly paler (rufopiceous) anteriorly, or markedly paler (rufous) anteriorly. Male genitalia with form of phallus and endophallic armature as in Fig. 19D.

Variation. Of 14 specimens from South Africa, the elytra of one are uniform piceous (Queenstown); of eight, indistinctly bicolored piceous and rufopiceous (Willowmore and Kimberley); of two, distinctly bicolored piceous and rufous (Kimberley and Aliwal North); and of three, concolorous rufous (Kimberley, probably teneral). Of 24 specimens from Botswana (near Good Hope), the dorsal surfaces of three are concolorous pale (rufous to rufotestaceous); 21 are distinctly bicolored, with head, pronotum and apical half of the elytra piceous to rufopiceous, and basal half of the elytra pale (rufous to rufotestaceous).

Habitat, habits, and seasonal occurrence. The members of *C. capicola* occur in the temperate and tropical deciduous forest and temperate grassland vegetation zones (Hall and Moreau 1970: xiii, Map B), (Table 17 and Fig. 24), and probably live on the ground (one specimen was found under a stone) at altitudes between 1000 and 2000 m. Adults of *C. capicola* have been collected in January–February, May, August and September. The samples are too few to suggest much of a pattern.

Geographical distribution (Fig. 20). Precinctive in the Afrotropical Region, *Cymbionotum capicola* is known only from the Republic of South Africa and southern Botswana and is the only species of the genus whose range is confined to an area south of the equator, and probably south of the Tropic of Capricorn.

Relationships and chorological affinities. See this topic for *C. schueppelii.*

Material examined. In addition to the type material noted above, we have seen 34 specimens from the following localities. **BOTSWANA:** Kgoto Pan nr. Good Hope, 19.II.1989, R.D. Ward, 24 (CMNH). **REPUBLIC OF SOUTH AFRICA. Cape Province:** Queenstown, 3500', 16.I–10.II.1923, R.E. Turner, 1 (BMNH). East Cape Province: Aliwal North, under stone, SAM-coll A009141, 22.VIII.1954 1 (SAMC). **North Cape Province:** Kimberley, Bro Potter collector (SAMC): SAM-coll A00 9138, 5.V.1912, 6; SAM-coll A00 9140, 21.IX..1912, 1; SAM-coll A00 9139, 1912, 1.

fasciatum superspecies

Descriptive notes. Size and ratios of body parts (Tables 3–9). For *schueppelii* species group, size, on average, larger, but SBL (Table 3) and EW (Table 4) overlapped broadly by *schueppelii* and *microphthalmum* superspecies (both smaller on average). Eyes moderately convex, values for ratio VW/HW (Table 8) overlapped broadly by *schueppelii* superspecies, narrowly (values higher on average) by *microphthalmum* superspecies.

Color. Dorsal surface bicolored: head and pronotum rufopiceous, elytra uniformly rufous; or head and pronotum rufous, elytra bicolored in various combinations of black and rufous, but all of anterior area and most of apical area rufous (Figs. 19E–F, 19I–J, 19L–N, 22A–C; and Table 16). Antennae rufopiceous to rufous; mandibles piceous to rufous; palpi and tarsi testaceous; femora and tibiae rufous to testaceous.

Microsculpture. Dorsal surface without microlines, smooth, or smooth except postocular transverse impression and anterior part of scutellum each with slightly transverse and slightly convex sculpticells.

Punctation and vestiture. Dorsal surface with setae short (Table 1 and Fig. 2B), elytral punctures relatively small, elytron with punctation moderately dense (Fig. 3D).

Head. Clypeus (Fig. 11C): anterior margin medially with distinct dentiform projection, either monomorphic or sexually dimorphic (larger in males) in development.

Included taxa. This superspecies includes five species: *C. helferi* Chaudoir, *C. fasciger* Chaudoir, *C. fluviale* Andrewes, *C. pictulum* Bates, and *C. fasciatum* Dejean.

TABLE 16. Data about variation in color pattern of elytra among the species of the *fasciatum* superspecies.

Color pattern[1]	*Cymbionotum* species and number of specimens									
	helferi		*fasciger*		*fluviale*		*pictulum*		*fasciatum*	
	No.	%	No.	%	No.	%	No.	%	No.	%
18E	76	**54**								
18F	49	**35**					9	**18**	5	1
18I			2	**25**	20	**83**				
18J			5	**62**	4	**17**				
18L			1	**13**			1	**2**		
18M							36	**74**		
18N							3	**6**		
21A									353	**87**
21B									4	**1**
21C									16	**4**
Concolor. rufous	16	**11**							12	**7**
Total	141		8		24		49		407	

[1] Designations of color pattern refer respectively to the similarly labeled illustrations in Figs. 18 and 21.

Habitat. The members of the *fasciatum* species group occupy all five vegetation zones characteristic of the genus *Cymbionotum* (Table 17 and Fig. 24).

Geographical distribution. The range of the precinctive Eastern Hemisphere *fasciatum* superspecies (Fig. 21) extends from Oriental Vietnam and southern India westward across southwestern Asia to northern Afrotropical Africa.

Relationships and chorological affinities. Based on color pattern (reduced extent of black pigment in the elytra), this superspecies may be the more generalized adelphotaxon of the more derived (exhibiting even less dark pigment) *microphthalmum* superspecies. The geographical ranges (Figs. 21, 23) of this pair of superspecies overlap broadly in southwestern Asia and the northern part of the Afrotropical Region.

TABLE 17. Association of the species of *Melaenus* Dejean and subgenus *Cymbionotum* Baudi di Selve with vegetation zones (after Newton (2003: 124, Fig. 5.2)).

	Vegetation Zones[1]					Total
	A	B	C	D	E	Veg. Zones[2]
Melaenus						**3**
M. piger				X	X	2
M. elegans			X	X		2
Cymbionotum (s. str.)						**5**
Sp. group *basale*						**3**
C. semirubricum		X	X	X		3
C. basale		X		X		2
Sp. group *semelederi*						**2**
C. semelederi		X	X			2
C. *striatum*		X				1
C. mandli		X				1
Sp. group *schueppelii*						**5**
Supersp. *schueppelii*						**4**
C. schuepperlii		X	X	X		3
C. rufotestaceum				X		1
C. capicola	X	X				2
Supersp. *fasciatum*						**5**
C. helferi					X	1
C. fasciger				X		1
C. fluviale				X	X	2
C. pictulum	X	X	X			3
C. fasciatum			X	X		2
Supersp. *microphthalmum*						**3**
C. namwala				X		1
C. candidum		X				1
C. subcaecum		X				1
C. transcaspicum		X	X			2
C. microphthalmum		X		X		2
Total No. species/zone	2	12	7	11	3	
No. precinctive species	0	4	0	1	1	
No. shared species	2	8	8	9	2	
No. species groups of subgenus *Cymbionotum*	1	3	3	2	1	
No. of superspecies of *schueppelii* sp. group	2	3	3	3	1	

[1] Vegetation zones: A, temperate deciduous forest, subtropical evergreen forest; B, temperate grassland; C, desert and semi-desert; D, tropical deciduous forest and savannah; E, tropical rain forest.

[2] Bold font numbers are for taxa above species rank**.**

Cymbionotum (sensu stricto) helferi (Chaudoir 1850)

(Figs. 11C, 19E–G, 21)

Coscinia helferi Chaudoir 1850: 441. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "Helferi/ Chaudoir/ Birmanie." LECTOTYPE, here designated, female, point-mounted (MNHP), labeled: "Ex Musaeo/ Chaudoir" [red print].—Chaudoir 1876: 122.
Graniger helferi; Csiki: 1929: 477.
Cymbionotum helferi; Lorenz 1998b: 149**.**

Note about type material. Eleven specimens, labeled only "Ex Musaeo/ Chaudoir" were associated with the box label noted above. The original description (Chaudoir 1850: 441) did not specify the number of specimens seen by the author. Chaudoir (1876: 122) stated that Helfer had collected a single specimen (sex unspecified). In the absence of further details, we chose the first specimen in the series as lectotype, and declined to treat the others as type material. See Typification (above, under Methods) for justification of lectotype selection.

Type area. Burma: Martaban Province.

Recognition. See the key to species, above. Adults of *C. helferi* exhibit reduced dark color of the elytra (Figs. 19E–F, and Table 16). Males are distinctive in phallic form and form of the microtrichial field of the endophallus (Fig. 19G): shaft ventrally only slightly curved, preapical portion short and apex narrowly rounded, and microtrichial field broad and extended the entire length of the shaft.

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and *fasciatum* superspecies, restricted as follows. Color of head and pronotum rufous. Head, dorsally, as in Fig. 11C. Elytra slightly to markedly dimorphic: either distinctly bicolored (Figs. 19E–F) dark (black piceous) discally, dark mark not extended to lateral margin, or concolorous, uniformly rufous. Male genitalia with form of phallus and endophallic armature as in Fig. 19G.

Geographical variation. Color dimorphism in this species was known to Chaudoir (1876:122), who stated that Castelnau (de Laporte) had found many with both marked and unmarked elytra. Specimens with concolorous elytra, regarded by Chaudoir as the ordinary form of *C. helferi,* comprise 11 per cent of the total; they are spread throughout the range of the species but are particularly common in Thailand, but rare farther east in Vietnam.

Habitat, habits, and seasonal occurrence. The members of *C. helferi* occupy only the tropical rain forest vegetation zone (Table 17 and Fig. 24), at altitudes between sea level and 1000 m. Adults have been collected in every month of the year, but most in the period April–May (Thailand) or July–August (Vietnam). We infer, then, that maximum adult activity is during those two periods.

Geographical distribution (Fig. 21). A precinctive species in the Oriental Region, the geographical range of *C. helferi* extends from southernmost Vietnam and Thailand north of the Tropic of Cancer in eastern Burma, to an unspecified part of eastern India.

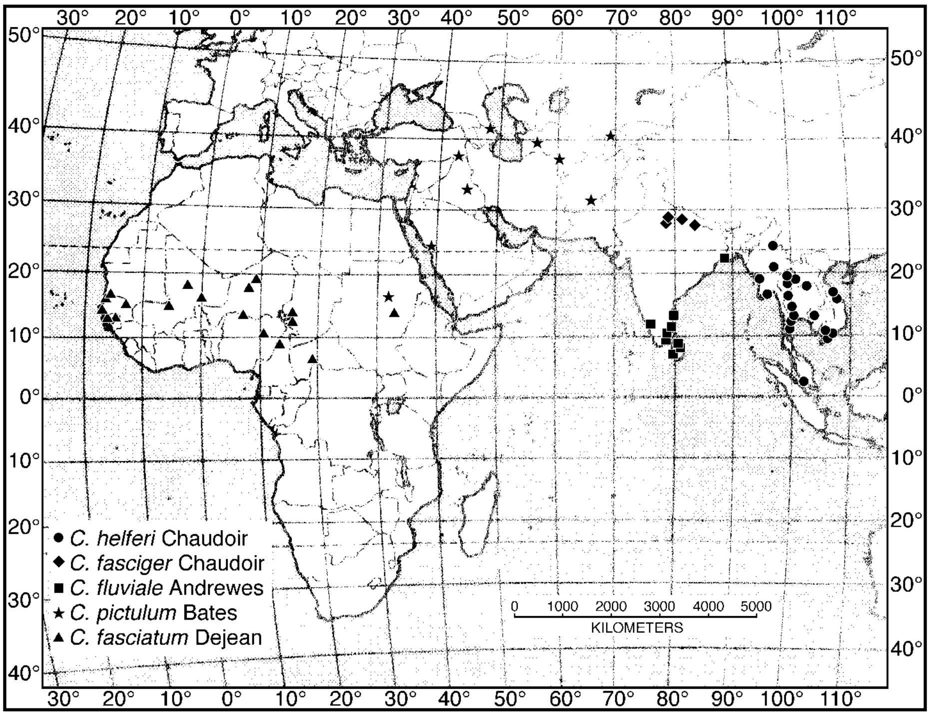

FIGURE 21. Geographical range of *Cymbionotum (s. str.) fasciatum* superspecies illustrated with an outline map of southern part of the Eastern Hemisphere.

Relationships and chorological affinities. The species *C. helferi, C. fluviale, C. fasciger,* and *C. pictulum* are markedly similar to one another in color pattern, and in the male genitalia, particularly the large microtrichial field of the endophallus (Figs. 19G–H, 19K, 19O). Further, the geographical ranges of these four species are in close proximity (Fig. 21), but without evidence of overlapping. Exactly how the four might fit together is not clear: the broad basal phallic lobes of *C. helferi* (Fig. 19G) and of *C. fluviale* (Fig.19K) might be taken as evidence of adelphotaxic relationship between these two species; or the small preapical portions of the phalli of *C. helferi* and *C. pictulum* may be interpreted as indicating close relationship of this species pair. Alternatively, the broad overlap in elytral color pattern exhibited by *C. fluviale* (Figs. 19I–J) and *C. fasciger* (Table 16) might indicate close relationship of that pair of species. Rather than pursuing this matter further, we propose to recognize these four species as forming an evolutionary quadritomy, the *helferi* complex, with the adelphotaxon being the Afrotropical *C. fasciatum*, the fifth member of the *fasciatu*m superspecies. The putative relative evolutionary remoteness of *C. fasciatum* from the *helferi* complex is based on the strikingly different male genitalia, with a very small microtrichial field, and phallus (Fig. 22D), which is slender, markedly curved, with a relatively long, narrow preapical portion.

Material examined. In addition to the type material and associated specimens noted above, we have seen 197 specimens of *C. helferi* from the following localities, all of which are in the Oriental Region.

BURMA (Myanmar): Bhamó, VIII.1885, 1 (Bates Coll. MNHP); same, X.1886, 1 (Bates Coll. MNHP); "Burma", 1 (BMNH); same, 1 (SAMC). Mandalay, VI.1885, L. Fea, 2 (Bates Coll., MNHP); same, 26.VII.1951, H.M. Smith, 1 (USNM); Prome, 1 (BMNH); Rangoon, 1886–1887, Fea, 2 (Bates Coll., MNHP); same, XII.1888, L. Fea, 2 (BMNH); same, R. J. Meggitt, 8 (USNM); Tenasserim, Helfer, 1 (USNM); same, 1 (BMNH); same, 2 (NMPC). **CAMBODIA:** Kampang, Kedey, III–V.1914, R.V. de Salvaza, 1 (BMNH); Phnom Penh, 20.XII.1964, K. Yoshikawa, 1 (NMPC). "**IND: ORIENTAL":** [no further details], Thorrey, 1 (USNM). **LAOS:** Vientiane, IV.1915, R.V. de Salvaza, 1 (BMNH). **THAILAND:** Ayutthaya, 3.IV.1989, Malicky, 13 (ZSMC); Bangkok, Hugh Smith (USNM) 21–31.XI.1921, 1; XI.1921, 1; 7–28.V.1925, 15; VI.1925, 3; Bangkok, Don Kier, 2 (Babault-Maindron Coll., MNHP); 3 km. W. Ban Rai, 120 km. NW Bangkok, II.1992, Thielen, 3 (ZSMC); Changmai, 1.V.1961, K. Iwata, 1 (NMPC); Chiengmai, 28.V.1952, D. & E. Thurman, 7 (USNM); Han-kha, 60 Km. N. Suphon-Bari, I.1992, Thielen, 1 (ZSMC); Kaen Municipality, 27.V.1954, R.E. Elbel, 1 (USNM); Lan-Sak, 65 km. NW Uthai Thani, VI.1989, Thielen, 2 (ZSMC);); Lom Sak, 40 km. N. Phetchabun, ca. 120 m, VIII.1987, W. Thielen, 1 (ACCT);.Nan, 22–24.V.1999, R. Grimm, 1 (ZSMC); Old Sukhothai, 26.V.1999, R. Grimm, 1 (ZSMC); Pai, 16.XI.1998, R. Grimm, 1 (ZSMC); Prae, II.VI.1951, R.E. Elbel, 1 (USNM); Rajburi Banpong, 15.IV.1954, R.E. Elbel, 2 (USNM); Sukhothai, 25–26.V.1999, R. Grimm,.1 (ZSMC); Tap Tan, 22–26.VI.1985, Thielen, 1 (ZSMC); Tap Tan, 20 km. W, 1986, Thielen, 1 (ZSMC). Tha Phra, 8.V.1968, Knapp, 3 (CMNH). **VIETNAM.** "Vietnam", 1 (L. Fairmaire Coll., MNHP). **Annam:** "Annam", 1 (Maindron-Babault Coll. MNHP); Phu Pheng, IV.1910 (Maindron-Babault Coll. MNHP).**"Cochin China":** Bien Hoa, XI–XII.1902, Fouquet, 3 (Maindron-Babault Coll. MNHP); Soc Trang (=Khanh Hung), X.1903, Fouquet, 2 (Maindron-Babault Coll. MNHP); **Gladinh Province:** Saigon, R. V. N., 4 & 10.VI.1970, W.H. Tyson, 7 (USNM); Saigon, 2 (Bates Collection, MNHP); same, V.1910, Fouquet, 1 (Maindron-Babault Coll. MNHP). **Quang Tri Province-** the following collected mostly at white or UV light by A. Gillogly during 1970 and 1971, and deposited in USNM**:** Cam Lo, 7 mi. W. Dang Ha, 20. VI,1; Da Nang, 2-3.XI, 2; Da Nang, Red Beach, 30.V, 1; 1.0 mi. N. Quang Tri, 1970- 1-2.III. 9; 27.V, 1; 18–29.VI, 4; 7–30.VII, 18; 15–30.VIII, 9; 12–14.IX, 3; 1971- 2.III, 2; 6–18.IV, 7; Quang Tri City, 2.VI.1970, 1. **NO LOCALITY:** 2 (OXUM).

Cymbionotum (sensu stricto) fasciger (Chaudoir 1852)

(Figs. 19H, 21)

Coscinia fasciger Chaudoir 1852: 92 TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "fascigera/ Chaudoir/ Bengali bor./ Boys Bacon." LECTOTYPE female, and two PARALECTOTYPES, females, (here designated) (pointed), labeled: "Ex Musaeo/ Chaudoir" [red print].—Chaudoir 1876: 121.
Graniger fasciger; Csiki: 1929: 477.
Cymbionotum fascigerum; Lorenz 1998b: 149.

Notes about type material. According to the original description (Chaudoir 1852: 92), *C. fasciger* was based on three specimens, collected by Captain Boys and Mr. Bacon, in the northern part of "Hindostan." Information provided by the box label, noted above, is in essential agreement with the information provided in the original description. See Typification (above, under Methods) for justification of lectotype selection.

Type area. Northern India.

Recognition. See the key to species, above. Adults of *C. fasciger* exhibit bicolored elytra, with a complete dark fascia, and lateral margin more or less extensively darkened (cf. Figs. 19I–J, and Table 16). This pattern is shared with *C. fluviale*, the less extensive dark marking being more frequent in *C. fasciger* (Table 16). Males are distinctive in phallic form and form of the microtrichial field of the endophallus (Fig. 19H): preapical portion longer, more sharply set off, and apex broad and subtruncate; and microtrichial field longer and broader (cf. Fig. 19K).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and *fasciatum* superspecies, restricted as follows. Color of head and pronotum rufous. Elytra distinctly bicolored (cf. Figs. 19I–J) dark (black, piceous) discally, dark mark extended to lateral margin. Male genitalia with form of phallus and endophallic armature as in Fig. 19H.

Habitat, habits, and seasonal occurrence. The members of *C. fasciger* occupy only the tropical deciduous forest and savannah vegetation zone (Table 17 and Fig. 24), at altitudes between sea level and 400 m. Adults have been collected in May and October.

Geographical distribution (Fig. 21). The geographical range of *C. fasciger*, a species that is precinctive in the Oriental Region, seems to be restricted to northwestern India and southern Nepal.

Relationships and chorological affinities. See this topic for *C. helferi*, above.

Material examined. In addition to the type material noted above, we have seen four specimens of *C. fasciger* from the following localities, in the Oriental Region.

INDIA. Rajasthan: Ghana Bird Sanctuary, 24.X.1977, G. Hevel, 1 (USNM). **United Provinces:** Fyzabad, B.W.G. Hingston, 1 (BMNH). **Uttar Pradesh:** Morfadabad, 1 (Mnizech Coll., MNHP). **NEPAL:** Nepalgunj, Hotel Batika, 28º02'59"N, 81º36'56"E, 235 m, 18.V.1999, A. Weigel, 1 (ZSMC).

Cymbionotum (sensu stricto) fluviale Andrewes 1935

(Figs. 19I–K, 21)

Cymbionotum fluviale Andrewes 1935: 25. TYPE MATERIAL: HOLOTYPE (card-mounted; female) (BMNH), labeled: "Type" [circular label, ringed with red]; "Ex Sonneratia apetala"; "Narkeldanga/ Sanderbans Div./ Forest Ranger Coll. 24.II.1929"; "Cymbionotum/ fluviale/ Andr/ Type [handwritten]."

Note about type material. According to the original description (Andrewes 1935: 25), this species was based on a single specimen, here labeled as holotype of the species.

Type locality. India: Sanderbans Division: Narkeldanga (near Calcutta).

Recognition. See the key to species, above. Adults of *C. fluviale* exhibit bicolored elytra, with a complete dark fascia, and lateral margin more or less extensively darkened (Figs. 19I–J, and Table 16). This pattern is shared with *C. fasciger*, the less extensive dark marking being more frequent in that species (Table 16). Males are distinctive in phallic form and form of the microtrichial field of the endophallus (Fig. 19K): preapical portion shorter, hardly set off from the main portion of the shaft, and apex narrower, subtruncate; and microtrichial field shorter and narrower (cf. Fig. 19H).

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and *fasciatum* superspecies, restricted as follows. Color of head and pronotum rufous. Elytra distinctly bicolored (Figs. 19I–J) dark (black, piceous) discally, dark mark extended to lateral margin. Male genitalia with form of phallus and endophallic armature as in Fig. 19K.

Habitat, habits, and seasonal occurrence. The members of *C. fluviale* occupy the tropical rain forest and tropical deciduous forest and savannah vegetation zones (Table 17 and Fig. 24), at altitudes between sea level and 925 m. The holotype was collected on a mangrove tree. This, plus additional locality records, suggests that this species may occupy coastal habitats. Adults of *C. fluviale* have been collected in most months of the year, but specimens are too few to see any sort of a pattern of activity.

Geographical distribution (Fig. 21). We infer that the geographical range of *C. fluviale* is principally coastal in peninsular India, south of the Tropic of Cancer, to Sri Lanka. Although records are concentrated in southern India, the type locality is northward, near Calcutta. This species is precinctive to the Oriental Region.

Relationships and chorological affinities. See this topic for *C. helferi*, above.

Material examined. In addition to the type material noted above, we have seen 34 specimens of *C. fluviale* from the following localities, all of which are in the Oriental Region.

INDIA. "India": 8 (BMNH, MNHP, OXUM). **Coromandel:** Pondichéry (= Pondicherry), 1901 (Maindron-Babault Coll., MNHP) II, 1; VIII, 2. **Madras:** Karikal, T.R.S. Nathan (CMNH): VII.1977, 1; VIII.1988, 1; VII.1992, 3; VI.1996, 2;

Kurumbagaram, IX.1951- VI.1952, P.S. Nathan, 4 (UASM); Madras, 1 (OXUM); Nodungadu (= Nedungadu), 1 (BMNH); Ramnad, 3 (MNHP); S. Coorg, 3100', X.1952, P.S. Nathan, 1 (UASM). **SRI LANKA. Anu District:** Hunuwiligama, Wilpattu, Wildlife Society Bungalow, 200', 10–19.III.1970, Davis & Rowe, 2 (USNM). **Pol District:** Pimburettawa, 13 mi. S. Mannampitiya, 9–12.XI.1970, O.S. Flint, Jr., 2 (USNM). **Tri District:** China Bay, 200', 9–11.XI.1970, G.F. Hevel, R.E. Dietz, & S. Karunaratne, 1 (USNM); Parakrama, III.1980, Sohiemen, 1 (ZSMC).

Cymbionotum (sensu stricto) pictulum **(Bates 1874)**

(Figs. 2B, 3D, 19L–O, 21)

Coscinia pictula Bates 1874: 95. TYPE MATERIAL: two males, one female, lectotypic, here designated. LECTOTYPE male and PARALECTOTYPE female (MNHP), both attached to one card (male on left), labeled: "Mesopotamia"; "Coscinia/ pictula/ Bates" [handwritten]; "Ex Musaeo/ H. W. Bates/ 1892." PARALECTOTYPE male (BMNH) (similarly labeled as to locality and identity, but in addition "G. C. Champion Coll/ BM 1927-409").—Heyden 1876: 140.—Semenov 1903: 169.
Graniger pictulus; Csiki 1929: 478.
Cymbionotum pictulum; Lorenz 1998b: 149.—Casale and Vigna Taglianti 1999: 363.—Grebennikov and Bousquet 1999: 109.—Grebennikov 2001: 50 (misidentification).
Coscinia transcaucasica Chaudoir 1876: 120. TYPE MATERIAL: one specimen, point-mounted, in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "transcaucasica/ Chaudoir/ Daghestan/ Deyrolle." HOLOTYPE female, labeled: "Daghestan/ A. Deyrolle" [handwritten]; "Ex Musaeo/ Chaudoir" [red print].—Semenov 1890: 289.—1903: 169.
Graniger transcaucasicus; Csiki 1929: 478.
Cymbionotum transcaucasicum; Lorenz 1998b: 149.
Coscinia signata Semenov 1889: 394. TYPE MATERIAL: HOLOTYPE, card-mounted (ZMAS) labeled: "Trans-Caspi G./ Turcinmenien/ E. Köenig"; "4 1/2 mm" [handwritten]; "Coscinia/ signata m./ typ. un. A. Semenov 88" [handwritten]; "Coll. Semenov-Tian-Shansky"; "Holotypus" [red paper]; "Zoological Institute/ Russian Academy/ of Sciences/ St. Petersburg" [yellow paper].—Semenov 1903: 169.
Graniger signatus; Csiki 1929: 478.
Cymbionotum signatum; Lorenz 1998b: 149.

Notes about type material. In the original description of *C. pictula*, Bates (1874: 95) recorded by implication the type area as "Mesopotamia" and noted that he had seen "many examples" of this species. Evidently, he did not indicate one specimen as "type", and hence the need to designate a lectotype and paralectotypes. See Typification (above, under Methods) for justification of lectotype selection.

In the original description of *C. trancaucasica*, Chaudoir (1876: 120) recorded by implication the type area as "Daghestan" and noted that the species was based on a single specimen received from A. Deyrolle. This information coincides with the label data recorded above and justifies indication of the specimen as holotype.

In the original description of *C. signata*, Semenov (1889: 394) recorded by implication the type area as "Transcaspica" and noted that the species was based on a single specimen collected by E. Köenig. This information coincides with the label data recorded above and justifies indication of the specimen as holotype.

Note about synonymy. Semenov (1903: 169) synonymized the names *Coscinia pictula* Bates, *C. transcaucasica* Chaudoir, and *C. signata* Semenov. Based on examination of the type specimens of these taxa, we concur with Semenov's action.

Misidentification. Grebennikov and Bousquet (1999: 109–114) described what they believed to be the first instar larva of *C. pictulum*. Grebennikov (2001: 50) stated forthrightly that the previous publication was based on misidentified larvae of *Lebia scapularis* Geoffroy.

Type area. "Mesopotamia." We assume that this is Iraq, and probably more specifically, the vicinity of Baghdad.

Recognition. See the key to species, above. Adults of *C. pictulum* exhibit bicolored elytra, with a more or less extensive dark fascia, and lateral margin more or less extensively darkened (Figs. 19L–N, and Table 16; cf. Fig. 19F). Although most specimens have dark elytral margins, some (18% of sample) have the dark markings reduced appreciably, and these could be confused with similarly marked specimens of *C. helferi*. But these two species are widely separated geographically (Fig. 21). Males are distinctive in phallic form and form of the microtrichial field of the endophallus (Fig. 19O): preapical portion narrow, distinctly set off from the main portion of the shaft, and apex narrow, rounded; and microtrichial field less than length of shaft, but broad.

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and *fasciatum* superspecies, restricted as follows. Elytral setae and punctation as in Figs 2B and 3D. Color of head and pronotum rufous. Elytra distinctly bicolored (Figs. 19L–N) dark (black, piceous) discally, dark mark extended to lateral margin. Male genitalia with form of phallus and endophallic armature as in Fig. 19O.

Habitat, habits, and seasonal occurrence. The members of *C. pictulum* occupy three vegetation zones: temperate grassland, and marginally, temperate deciduous forest and desert/semi-desert (Hall and Moreau 1970: xiii, Map B) (Table 17 and Fig. 24), at altitudes between sea level and 2000 m. In southwestern Anatolia specimens of *C. pictulum* were collected on "wet soil, in coastal marshes, in an open dry area with scarce Mediterranean vegetation" (A. Casale, personal communication). Adults have been collected during five months of the year (January, February, May, July, and August). Records are too few and gaps too many for us to see any sort of a pattern of activity.

Geographical distribution (Fig. 21). The geographical range of *C. pictulum*, probably a Palaearctic indigenous species, extends across the southwestern Asian part of the Palaearctic Region, from Afghanistan and Kazakhstan westward to eastern Anatolia, and in the eastern Afrotropical Region from Saudi Arabia on the Arabian Peninsula to the eastern part of the Sudan.

Relationships and chorological affinities. See this topic for *C. helferi*, above.

Material examined. In addition to the type material noted above, we have seen 54 specimens of *C. pictulum* from the following localities.

PALAEARCTIC REGION. AFGHANISTAN: Kandahar-Kuna, 7.II.1953, J. Klapperich, 1 (HNHM). **IRAN:** Beluchistan, 40 km. NW Chah, 2–6.I.1963, L. H. Heran, 1 (USNM). **IRAQ:** Baghdad, 25 1 (BMNH), 1 (HNHM), 19 (MNHP), 2 (MNPC), 2 (ZSMC); "Mesopotamia", 1 (MNHP). **KAZAKHSTAN:** Tashkent, 1 (NMPC). **TURKEY. Kurdistan:** Turcoma, 1 (BMNH). **TURKMENISTAN:** Kara-Bogaz, 40 km N Kizyl-Arfwat, 3.VII.1953, O. Kryzhanovskij, 1 (ZMAS). Oose Tedschen, 1903, Hauser V.1903, 2 (NMPC), and 1 (NHMW), VIII, 4 (Reitter Coll., HNHM) and 1 (NHMW). **Locality not found: - "Gr. Balachan"**, 1908, F. Hauser, 1 (HNHM); **[in Cyrillic**] 1 (HNHM).

AFROTROPICAL REGION. SAUDI ARABIA: El Hajaz, Millinger, 1 (BMNH). **SUDAN: Haut Kharoum:** Kaemenogra, V.1899, Escalera, 12, (**MNHP**).

Cymbionotum (sensu stricto) fasciatum (Dejean 1831)

(Figs. 21, 22A–D)

Coscinia fasciata Dejean 1831: 479. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "fasciata/ Dejean/ Sénegal infer/ Coll. Dejean." HOLOTYPE (pinned, sex not determined) labeled: "fasciata mih/ in Sénegal super"; "Buquet" (both preceding labels handwritten on blue paper]; "Ex Musaeo/ Chaudoir" [red print].Chaudoir 1876: 121.
Graniger fasciatus; Csiki 1929: 477.
Cymbionotum fasciatum; Lorenz 1998b: 149.
Graniger volkonskyi Colas 1943. TYPE MATERIAL: not seen. **NEW SYNONYMY.**

Note about type material. The original description for this species records a single specimen collected in Upper Sénégal by M. Buquet. The box label, quoted above, gives lower Sénégal as the place of collection. But the label on the holotype is in agreement with Dejean’s text. We judge the discrepancy to be insignificant. This specimen was damaged severely by dermestid feeding, which removed the internal organs.

In the original description of *Graniger volkonskyi*, Colas (1943: 102) stated that this species was based on a single male, collected by M[ichel] Volkonsky in September, 1941, in the Kerchoval Valley of Tilemsi, in Adrar des Iforas (central Sahara Desert). The holotype was sought in the Guy Colas Collection (MNHP), and in other collections in the Paris Museum housing African material, but it was not located.

Note about synonymy. From its original description and useful illustration of its phallus, we infer that the type of *C. volkonskyi* is the pale colored morph of *C. fasciatum*, and hence the synonymy proposed above.

Type locality. Upper Sénégal.

Recognition. See the key to species, above. Most adults of *C. fasciatum* exhibit bicolored elytra (bicolored morph), with a more or less extensive dark fascia, and lateral margin more or less extensively darkened (Figs. 22A–C and Table 16). This feature is sufficient to distinguish them from adults of other Afrotropical species. However, a concolorous morph occurs principally in the eastern part of the Sahara area, and females are indistinguishable from pale females of *C. schueppelii*. Males are distinguishable by genitalic features: in *C. fasciatum* (Fig. 22D), the phallus is markedly curved, and the microtrichial field is very small; for *C. schueppelii*, in contrast (Fig. 19C), the phallus is less curved, and microtrichial field is much longer and bifurcate apically.

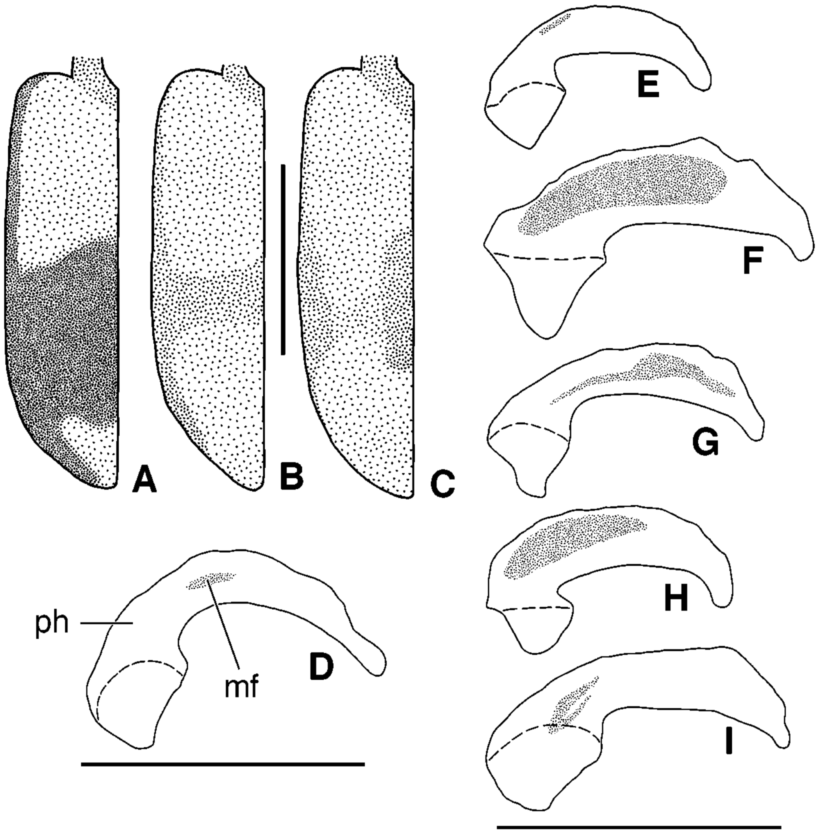

FIGURE 22. Structural features of *Cymbionotum* species illustrated with line drawings. A-C, left elytron, dorsal aspect, showing color pattern. D-I, male genitalia, left lateral aspect (phallus and endophallic armature). A-D, *C. fasciatum* Dejean; E, *C. namwala*, new species; F, *C. candidum* Andrewes; G, *C. subcaecum*, new species; H, *C. transcaspicum* Semenov; and I, *C. microphthalmum* Chaudoir. Legend: **mf**, microtrichial field of endophallus; **ph**, phallus. Scale bars: A-C = 1.0 mm; and D-I = 0.5 mm.

Descriptive notes. See Tables 3–9 for data about approximate variation in size and proportions**.** With recognition features as recorded above, and other details specified in the subgeneric description, and in description of *schueppelii* species group and *fasciatum* superspecies, restricted as follows. Color of head and pronotum dimorphic: dark (black to piceous), or rufous. Elytra dimorphic: either bicolored (Figs. 22A–C; cf. Fig. 19F) with dark (black to piceous) fascia mediad, pale (rufous) anteriorly and posteriorly; or completely rufous. Male genitalia with form of phallus and endophallic armature as in Fig. 22D.

Variation. Of 234 specimens collected at Niamey, Niger, five exhibited a color pattern charactertistic of *C. helferi* (Fig. 19F). These specimens were teneral; with maturity, their color pattern may have developed to one of those typical of *C. fasciatum*.

Habitat, habits, and seasonal occurrence. The members of *C. fasciatum* occupy extensively tropical deciduous forest and savannah, and marginally, desert/semi-desert (Hall and Moreau 1970: xiii, Map B), (Table 17 and Fig. 24), at altitudes between sea level in western Sénégal, and 1600 m, in the desertic Baguezans Mountains of Niger. Adults have been collected throughout most of the year, excluding December–February, and April, with most specimens collected during the period August–November.

Geographical distribution (Fig. 21). The geographical range of *C. fasciatum* is northern Afrotropical, between the Tropic of Cancer and the Equator, extending from the eastern part of the Sudan to the vicinity of the Atlantic coast, in Sénégal. This species is probably precinctive in the Afrotropical Region.

Relationships and chorological affinities. See this topic for *C. helferi*, above.

Material examined. In addition to the type material noted above, we have seen 419 specimens of *C. fasciatum* from the following localities, all of which are in the Afrotropical Region.

CAMEROON: Fort Crampel, Ubunghi, VIII–IX.1953, 1 (MRAC); Garoua, 2.VIII.1966, P. Bruneau de Miré, 5 (MNHP); Koze, Guétalé, VI.1970, P. Bruneau de Miré, 1 (MNHP). **CHAD. Kanem Dist.:** N'Gouri, P. Renaud, 1958 (MRAC) VIII, 1 IX, 1, and X–XI, 2; Bas Chari, Fort Lamy, Mission Chari-Chad, J. Decourse, 1 (MRAC). **GAMBIA:** Kiang West National Park Ranger Station, 17.X.1999, W. Schacht, 27 (ZSMC); **Lower Fulladu District:** Central River Division (S. bank), Sapo Government Rest House, MV light, 27.III.1997, Mann & Woodcock, 1 (0XUM). **GUINEA-BASSAU.** Serrano (1996). **MALI:** Adrar des Iforas District, Tilemsi Valley, Kerouchal, (17°12'N, 0° 20'E), IX.1941, 1 (holotype of *G. volkonskyi*; probably MNHP; Kogoni, X.1966, G. Schmutz, 1 (MRAC). **MAURITANIA:** Bafrechie, IFAN-1953, 15.IX–10.X.1953, A. Villiers, 47 (MRAC); Boghé, 1962, A. Villiers, 10 (MRAC); Rosso, J.L. Amiet, 4 (MRAC). **NIGER:** Agadez, Aïr Sud, 525 m., 2.VIII.1947, L. Chopard, A. Villiers, 1 (MNHP); Aïr Tebehiz, 21.XI.1950, 1 (MNHP); Marachi, IFAN 1947, L. Chopard, A. Villiers, 1 (MRAC); Mtns. Baguezans, 1500–1600 m., 31.VIII–4.IX.1947, L. Chopard, A. Villiers, 1 (MNHP); Niamey, at light, 19.VI–9.X. 1984–1985, T.J. McNary, 234 (CMNH); S.E. Kano, Azare, V.1925, L. Lloyd, 2 (BMNH); Tombouctou, 1911, F. de Zeltner, 2 (MRAC). **NIGERIA.** Maiduguria, at light, V.1962, D.C. Eidt, 4 (CMNH). **SÉNÉGAL:** Bambey, Risbee, 1

(MRAC); Dakar, V. Allard, 2 (MRAC); Haut Sénégal, Khayes, 1882, Dr. Nodier, 1 (MNHP); Libreville, Grand Bassam, 1 (MRAC); Matam, 2 (MRAC); Poder R. Reg., 26.III.1966, 1 (USNM); Richard Toll XI.1967, Mission IFAN-Museum, XI.1967, A. Descarpentries, A. Villiers, T. Leye, 13 (MNHP); Mission IFAN- 1948, IX, A. Villiers, 1 (MRAC); UV light, 8.X.1978, G. Hevel, J. Fortin, 38 (USNM); "Sénégal" 1 (BMNH); A. Thery, 5 (MRAC). **SUDAN:** Wad Medani, at light 11.VI.1928, H.B. Johnston, 1 (BMNH), 18.X.1979, F. Hieke, 4 (MRAC).

We have not seen the specimens from Guinea- Bassau, recorded by Serrano (1996).

***microphthalmum* superspecies**

Descriptive notes. Size and ratios of body parts (Tables 3–9). For *schueppelii* species group, size, on average, smaller, SBL (Table 3) and EW (Table 4) overlapped broadly by *schueppelii* and *fasciatum* superspecies (both larger on average). Eyes moderately convex (one species) to relatively flat (four species), values for ratio VW/HW (Table 8) overlapped by *schueppelii* and *fasciatum* superspecies.

Color. Dorsal surface and appendages pale, approximately concolorous, rufous to testaceous.

Microsculpture. Dorsal surface without microlines, smooth, or mostly smooth except postocular transverse impression and anterior part of scutellum with slightly transverse and slightly convex sculpticells.

Punctation and vestiture. Dorsal surface with punctures small (Fig. 11B), elytral punctation very sparse (one species) to moderately dense (cf. Figs. 3C–D, 3F), setae short (cf. Figs. 2B–C).

Head. Clypeus: anterior margin medially with or without distinct dentiform projection.

Included taxa. This superspecies includes five species: *C. namwala* new species, *C. candidum* Andrewes, *C. subcaecum* new species, *C. transcaspicum* Semenov, and *C. microphthalmum* Chaudoir.

Habitat. The members of the superspecies *microphthalmum* occupy three vegetation zones, with concentration in the temperate grassland and tropical deciduous forest/ savannah, and marginally, in desert/semi-desert (Table 17 and Fig. 24).

Geographical distribution. The range of the *microphthalmum* superspecies (Fig. 23), a precinctive Eastern Hemisphere group, extends from Pakistan in Palaearctic southwestern Asia to the central part of the Afrotropical Region.

Relationships and chorological affinities. Based on markedly reduced dark color, this superspecies may be the derived adelphotaxon of the more generalized *fasciatum* superspecies. The geographical ranges (Figs. 21, 23) of this pair of superspecies overlap broadly in Palaearctic southwestern Asia and the northern part of the Afrotropical Region.

Cymbionotum (sensu stricto) namwala, Ball and Shpeley, n. sp.

(Fig. 22E, 23)

Type material. Three specimens, card-mounted (BMNH), as follows. HOLOTYPE male, labeled: "N. W. Rhodesia/ [blue horizontal line]/ Namwala/ 1.iv.1913 [handwritten]/ H. C. Dollman"; " H. C. Dollman/ Coll. 1919-79." PARATYPE male, labeled same as holotype, except: date of collection, "28.iii.1913"; and "Graniger/ sp [handwritten]/ E.B. Britton/ det. 193". PARATYPE female, labeled same as holotype, except: date of collection: "8.iii.1913."

Specific epithet. Based on the name of the type locality, a word treated as a noun in apposition.

Type locality. Namwala, Zambia (= Northern Rhodesia), in the western part of the country.

Recognition. A combination of small size, prominent eyes, absence of a clypeal tooth, and elytral punctation confined to strial rows, distinguish adults of *C. namwala* from all other species of *Cymbionotum*. In appearance, specimens of this species are most like those of *C. subcaecum,* but the two differ strikingly in their eyes (prominent in *C. namwala,* reduced in *C. subcaecum*). Males differ in phallic form and in size of the endophallic microtrichial field (Fig. 22E; cf. Fig. 22G); additionally, the two species are widely separated geographically (Fig. 23). Within the Afrotropical Region, specimens of *C. namwala* are most like those of *C. rufotestaceum,* but specimens of the latter have a clypeal tooth and the entire scutellum is virtually smooth, without microsculpture. In the small size of the endophallic microtrichial field (Fig. 22E), males of *C. namwala* resemble those of *C. fasciatum* (Fig. 22D), but specimens of the latter are larger and have a clypeal tooth.

Description. Size (mm) small: SBL, 2.98–3.14 (3.06); EW, 0.94–0.99 (0.97). Proportions: VW/HW, 0.81–0.82 (0.815); HW/PWM, 0.94–0.96 (0.95); PL/PWM, 0.88–0.91 (0.89); PWB/PWA, 0.64–0.65 (0.645); and PL/EL 0.42–0.43 (0.425).

Color. Dorsal surface of head and pronotum, antennae and mandibles rufous; palpi and legs testaceous.

Punctation and vestiture. Dorsal surface with sparse covering of intermediate size punctures, each elytron with punctures very sparse, confined to seven rows, each row evidently representative of a stria; setae short (cf. Figs. 2B–C).

Microsculpture. Dorsal surface mostly smooth, without microlines; postocular transverse impression and basal part of scutellum with mesh pattern slightly transverse, sculpticells rather wide, or scutellum entirely smooth.

Head. Clypeus with anterior margin shallowly concave, without median tooth.

Pronotum and appendages (including elytra) average for subgenus *Cymbionotum.*

Male genitalia (Fig. 22E). Phallus with shaft markedly curved ventrad, preapical portion gradually narrowed apicad, apex rounded; endophallus with microtrichial field very small.

Habitat, habits, and seasonal occurrence. The area for the type locality is indicated as being in the tropical deciduous forest/savannah vegetation zone (Table 17 and Fig. 24), or moist woodland (Hall and Moreau, 1970: xiii, Map B), at altitudes between 1000 and 1500 m. The three type specimens were collected in March.

Geographical distribution (Fig. 23). This species, precinctive in the Afrotropical Region, is known from the type locality, only, in southeastern Africa.

Relationships and chorological affinities. Because of its relatively large eyes, *C. namwala* is postulated to be the adelphotaxon of the other four members of the *microphthalmum* superspecies. Its geographical range seems to be widely separated from the ranges of the other members of the *microphthalmum* superspecies. The only other species whose range likely overlaps that of *C. namwala* is *C. schueppelii* (Fig. 20).

Material examined. Type specimens only. For details, see "type locality", above.

Cymbionotum (sensu stricto) candidum Andrewes 1935
(Figs. 22F, 23)

Cymbionotum candidum Andrewes 1935: 24. TYPE MATERIAL: HOLOTYPE male (card-mounted) (BMNH), labeled: "Type" [circular, ringed with red] "Chichawatni/ Pltn. Punjab/ R.N. Mathur/ 11.VII.1928"; "Cymbionotum/ candidum/ Typ Andr [handwritten]/ H.E. Andrewes det [printed]."

Note about type material. According to the original description (Andrewes 1935: 24) this species was based on a single specimen.

Type locality. The Chichawatni Plantation, where the holotype was collected, is 40.2 km. WSW Montgomery, Montgomery District, in the Punjab Province of Pakistan.

Recognition. A combination of small size, reduced eyes, pale concolorous dorsal surface, presence of a clypeal tooth, and fine elytral punctation distinguish adults of *C. candidum* from most other species of *Cymbionotum*. Markedly similar in external features to *C. subcaecum,* the holotype of *C. candidum* exhibits a scutellum the surface of which is covered with an isodiametric mesh pattern of microsculpture, whereas the scutellum of *C. subcaecum* is without microlines; further, the punctures of the dorsal surface are coarser than are those of *C. subcaecum*. Males differ in development of the endophallic microtrichial field: very broad in *C. candidum* (Fig. 22F), and narrow in *C. subcaecum* (Fig. 22G); the preapical portion of the phallus is more sharply bent in *C. candidum* than it is in *C. subcaecum*.

Description. Size (mm) small: SBL, 3.42; EW, 1.09. Proportions: VW/HW, 0.96; HW/PWM, 0.85; PL/PWM, 0.95; PWB/PWA, 0.67; and PL/EL, 0.47.

Color. Dorsal surface, mandibles and antennae rufotestaceous, palpi and legs slightly paler.

Punctation and vestiture. Punctures of dorsal surface about average (*i.e.*, small; cf.

Figs. 2B–E) for genus, punctation sparser than average (cf. Fig. 3B); elytral punctures about evenly distributed, not restricted to strial rows. Setae short (cf. Figs. 2B–C).

Microsculpture. Dorsal surface mostly smooth, without microlines; postocular transverse impression with mesh pattern slightly transverse, sculpticells rather wide; scutellum with mesh pattern isodiametric, sculpticells slightly convex.

Head. Clypeus with anterior margin straight, except rather prominent tooth medially. Pronotum and appendages (including elytra). Average for subgenus *Cymbionotum.*

Male genitalia (Fig. 22F). Phallus with shaft moderately curved ventrad, preapical portion rather sharply set off, apex broadly rounded; endophallic microtrichial field about as long as shaft, and very broad.

Habitat, habits, and seasonal occurrence. The type locality is in a broad drainage basin in the temperate grassland vegetation zone (Table 17, Fig. 24), at an altitude between sea level and 200 m, during July. Evidently, *C. candidum* is a lowland species.

Geographical distribution (Fig. 23). This species, precinctive in the Palaearctic Region, is known from the type locality, only, in eastern Pakistan.

Relationships and chorological affinities. The known geographical ranges of the four small-eyed species, *C. candidum*, *C. subcaecum*, *C. transcaspicum*, and *C. microphthalmum* are allopatric in relation to one another. They form a transformation series in the endophallic microtrichial field, from large in *C. candidum* to small in *C. microphthalmum*, a series that parallels the distribution pattern, east to west (*C. candidum-subcaecum-transcaspicum-microphthalmum;* cf. Figs. 22F–I). Possibly these parallel patterns represent a phylochorological series of adelphotaxic relationships, or *C. candidum* + *C. subcaecum* may be the adelphotaxon of *C. transcaspicum* + *C. microphthalmum*.

Material examined. Holotype only. For details, see "type locality", above.

***Cymbionotum (sensu stricto) subcaecum* Ball & Shpeley, n. sp.**

(Figs. 22G, 23)

Type material. HOLOTYPE male, labeled: "15.V.1965. 80 km/ NW v. Quetta,/ 2100 m. Pakistan/ Kasy & Vartian"; "Graniger transcaucasicus/ Chd. [handwritten]/ det. ING. JEDLIČKA" (NHMW).

Specific epithet. Small eyes provide the basis for the Latin adjective subcaecum, meaning imprecisely less than (*sub*) blind (*caecus*).

Type locality. Quetta, Pakistan, in the northwestern part of the country.

Recognition. Small body size, small eyes, toothed clypeus, and smooth scutellum (without microsculpture mesh pattern) distinguish adults of *C. subcaecum* from all other species of *Cymbionotum.* In appearance, the single specimen of *C. subcaecum* is most like that of the geographically proximate *C. candidum.* The two differ in the surface of the scutellum (microsculpture mesh pattern evident in *C. candidum*; not so, in *C. subcaecum*). Males differ slightly in phallic form, and in development of the endophallic microtrichial field (Fig. 22G; cf. Fig. 22F).

Description. Size (mm) small: SBL, 3.14; EW, 0.98. Proportions: VW/HW, 0.94; HW/PWM, 0.93; PL/PWM, 0.91; PWB/PWA, 0.59; and PL/EL, 0.45.

Color. Dorsal surface, mandibles and antennae rufous, palpi and legs slightly paler.

Punctation and vestiture. Punctures of dorsal surface somewhat finer than average (*i.e.*, small; cf. Figs. 2B–E) for genus, punctation sparser than average (cf. Fig. 3B), elytral punctures about evenly distributed, not restricted to strial rows. Setae short (cf. Figs. 2B–C).

Microsculpture. Dorsal surface, including scutellum, mostly smooth, without microlines; postocular transverse impression with mesh pattern slightly transverse, sculpticells rather wide.

Head. Clypeus with anterior margin straight, except small short tooth medially.

Pronotum and appendages (including elytra). Average for subgenus *Cymbionotum.*

Male genitalia (Fig. 22G). Phallus with shaft moderately curved ventrad, preapical portion gradually narrowed apicad, apex subtruncate; endophallic microtrichial field about as long as shaft, mostly very narrow.

Habitat and habits. The type locality is at 2100 m, in the temperate grassland vegetation zone (Table 17, Fig. 24), indicating that *C. subcaecum* may be a lower montane species.

Geographical distribution (Fig. 23). This species, precinctive in the Palaearctic Region, is known from the type locality, only, in western Pakistan. Both *C. subcaecum* and *C. striatum* (*semelederi* species group) occur at this locality, where they may be microsympatric.

Relationships and chorological affinities. See this topic for *C. candidum*, above. We postulate that this species is the adelphotaxon of *C. transcaspicum* + *C. microphthalmum*, but the relationships may be *C. candidum* + *C. subcaecum* is the adelphotaxon of *C. transcaspicum* + *C. microphthalmum.*

Material examined. Holotype only. For details, see "type locality", above.

***Cymbionotum (sensu stricto) transcaspicum* (Semenov 1891)**
(Figs. 22H, 23)

Coscinia transcaspica Semenov 1891: 287, 289. TYPE MATERIAL: two specimens, in ZMAS, sex not determined, both labeled identically. LECTOTYPE and PARALECTOTYPE (here designated), labeled: "Tedzhen [handwritten, in Cyrillic]/ 23.V.89/ A. Semenov [handwritten, in Cyrillic]"; "Coscinia transcaspica/ m./ typ. A.S. X.90" [handwritten]; "Syntypus" [handwritten, on red paper]; "Coll. Tian-Shansky"; "Zoological Institute/ Russian Academy/ of Sciences/ St. Petersburg" [yellow paper].

Cymbionotum transcaspicum; Lorenz 1998b: 149.

Graniger rufotestaceus Pic 1904: 89 (not Fairmaire 1893). In the box labeled "Asie Mineure", Maurice Pic Collection (MNHP), two card-mounted specimens, with all labels handwritten, as follows: LECTOTYPE (here selected), sex unknown, labeled "Bagdad"; "type"; "Graniger (Coscinia)/ rufotestaceus Pic." PARALECTOTYPE, sex unknown, labeled "Bagdad"; "rufotestaceus/ Pic"; "Bedel/ vid." **NEW SYNONYMY.**

Graniger mesopotamicus Csiki 1929: 478 [new name]. **NEW SYNONYMY.**

Cymbionotum mesopotamicum; Lorenz 1998b: 149**.**

Notes about type material. The original description (Semenov, 1891: 288, 289) records, in Latin, three specimens. According to Pic (1904: 89), *G. rufotestaceus* is based on at least two specimens (an inference based on a range of measurements in the original description) housed in the Pic collection. See Typification (above, under Methods) for justification of lectotype selection.

Homonymy. Because the generic names *Coscinia* Dejean 1831 and *Graniger* Chaudoir 1871 (not Motschulsky 1864) are synonymous, the specific names *Coscinia rufotestacea* Fairmaire and *Graniger rufotestaceus* Pic are secondary homonyms. Accordingly the junior homonym (*G. rufotestaceus* Pic) must be replaced, as Csiki (1929: 478) did, with *G. mesopotamicus* (see International Code of Zoological Nomenclature, 1999: 59; Art. 57.3.2).

Synonymy. In the original description of *G. rufotestaceus*, Pic (1904: 93) noted that this species should be placed near *G. transcaspicus* Semenov. Comparison of types amplifies Pic's opinion about the structural proximity of these two nominal species.

Type locality. Tedzhen, in western Turkmenistan, near the northeastern border of Iran.

Recognition. Small body size, small eyes, absence of a clypeal tooth, and fine, sparse dorsal punctation distinguish adults of *C transcaspicum* from all other species of *Cymbionotum.* Most similar are specimens of *C. microphthalmum*, but they exhibit denser elytral punctation. Males of these two species are readily distinguished by phallic form (preapical portion more sharply curved ventrad in *C. transcaspicum)*, and in size of the endophallic microtrichial field (much larger in *C. transcaspicum*; Fig. 22H; cf. Fig. 22I).

Description. Measurements and proportions based on the Baghdad sample, of seven specimens; means in parentheses. Size (mm) small: SBL, 2.74–3.04 (2.90); EW, 0.85–0.93 (0.89). Proportions: VW/HW, 0.87–0.91 (0.90); HW/PWM, 0.87–0.98 (0.92); PL/PWM, 0.90–0.96 (0.93); PWB/PWA, 0.58–0.67 (0.61); and PL/EL, 0.43–0.46 (0.44).

Color. Dorsal surface, antennae and mandibles rufous, palpi and legs testaceous.

Punctation and vestiture. Punctures of dorsal surface somewhat finer than average (*i.e.*, small, cf. Figs. 2B–E) for genus, punctation sparser than average (cf. Fig. 3B), especially posteriorly on elytra; more or less restricted to strial rows. Setae short (cf. Figs. 2B–C).

Microsculpture. Dorsal surface, including apical portion of scutellum, mostly smooth, without microlines; postocular transverse impression and basal portion of scutellum with mesh pattern slightly transverse, sculpticells rather wide.

Head. Clypeus with anterior margin straight, tooth absent.

Pronotum and appendages (including elytra). Average for subgenus *Cymbionotum.*

Male genitalia (Fig. 22H). Phallus with shaft markedly curved ventrad, preapical portion gradually narrowed apicad, apex rounded; endophallic microtrichial field shorter than shaft, broad medially, tapered at each end, more so anteriorly.

Habitat, habits, and seasonal occurrence. The range of *C. transcaspicum* extends across mountainous terrain, as well as lowland basins, principally in the temperate grassland vegetation zone, and marginally, in the desert/semi-desert zone (Table 17 and Fig. 24), at altitudes between sea level and 500 m. Months of collection are April-June.

Geographical distribution (Fig. 23). Precinctive in the Palaearctic Region, the range of *C. transcaspicum* extends in western Asia from Tajikistan, westward to Egypt, in North Africa.

Relationships and chorological affinities. See this topic for *C. candidum*, above. Based on the shared absence of a clypeal tooth, we postulate that this species and *C. microphthalmum* are adelphotaxa. The ranges of these two species overlap in the Middle East, though we do not have any syntopic records for them.

Material examined. In addition to the four type specimens noted above, we have seen 11 specimens of this species, from the following localities, in the Palaearctic Region.

AZERBAIJAN: Shorsula, border between Neftechaly and Dzhalibad Districts, 11.V.1983, I. Belousov, 1 (ZMHS). **EGYPT**: Cairo, 1 (HNHM). **IRAQ:** Baghdad, 5 (Bates Coll., MNHP). **TAJIKISTAN:** Pr. Dushanbe, Nishni Piandsh, VI.1986, 1 (ZSMC). **TURKMENISTAN:** Farab Station, Middle Asian Railway, 22.VI.1907, 22.VI.1907, G. G. Sumakov, 1 (ZMHS); 45 km. SE Gaur, 3.IV.1983, B. Korotyev, 1 (ZMHS).

***Cymbionotum (s. str.) microphthalmum* (Chaudoir 1876)**
(Figs. 11B, 22I, 23)

Coscinia microphthalma Chaudoir 1876: 122. TYPE MATERIAL: in Oberthür/ Chaudoir Collection (MNHP), associated with the following box label: "microphthalmum/ Chaudoir/ Senégal/ Galam Vuillefroy." HOLOTYPE male (point-mounted; head and prothorax missing) (MNHP), labeled: "Ex Musaeo/ Chaudoir" [red print].
Graniger microphthalmus; Csiki 1929: 478.
Cymbionotum microphthalmum; Lorenz 1998b: 149.

Note about type material. The original description (Chaudoir, 1876: 122) records a single specimen, collected at Galam in Sénégal, presented to the author by M. de Vuillefroy-Cassidni. These data appear also on the box label, noted above. Accordingly, we indicated as holotype the specimen associated with the box label.

A second pin associated with that same box label bears the handwritten label "Algerie/ Tugg….."[illegible]. The specimen itself is missing from the card that bore it. But it would have no nomenclatural status anyway, for it was not noted in the original description.

Type locality. "Galam", an old fiefdom, located on the eastern border of Sénégal.

Recognition. Small body size, small eyes, absence of a clypeal tooth, and average dorsal punctation distinguish adults of *C microphthalmum* from all other species of *Cymbionotum.* Most similar are specimens of *C. transcaspicum*, but they exhibit finer elytral punctation. Males of these two species are readily distinguished by phallic form (preapical portion more gradually curved ventrad in *C. microphthalmum)*, and by size of the endophallic microtrichial field (much smaller in *C. microphthalmum* Fig. 22I; cf. Fig. 22H).

Description. Measurements and proportions based on a composite sample of eight individuals, from Yemen, Ethiopia, Niger and Turkey; means in parentheses. Size (mm.) small: SBL, 2.99–3.88 (3.54); EW, 0.90–1.18 (1.08). Proportions: VW/HW, 0.87–0.95 (0.92); HW/PWM, 0.86–0.91 (0.88); PL/PWM, 0.84–0.96 (0.92); PWB/PWA, 0.63–0.74 (0.69); and PL/EL, 0.40–0.48 (0.45).

Color. Dorsal surface of head and pronotum, antennae and mandibles rufous, palpi and legs testaceous; elytra uniformly paler rufous than head and pronotum, or bicolored, rufous in basal two thirds, piceous apically, piceous area in broad U-form.

Punctation and vestiture. Punctures of dorsal surface about average size (*i.e.*, small; cf. Figs. 2B–E) for genus, punctation average density (cf. Fig. 3B), punctures not restricted to strial rows. Setae short (cf. Figs. 2B–C).

Microsculpture. Dorsal surface, including apical part of scutellum mostly smooth, without microlines; postocular transverse impression and basal part of scutellum with mesh pattern slightly transverse, sculpticells rather wide.

Head. Clypeus with anterior margin straight, thickened or not medially, tooth absent.

Pronotum and appendages (including elytra). Average for subgenus *Cymbionotum.*

Male genitalia (Fig. 22I). Phallus with shaft moderately curved ventrad, preapical portion abruptly narrowed apicad, apex rounded; endophallic microtrichial field about one quarter length of shaft, located near basal lobe, with endophallus infolded.

Variation. Of the 27 specimens examined, six from Yemen exhibit bicolored elytra: five (of 11) from Al Kowd, and one (of five) from Al Kadan.

Habitat, habits, and seasonal occurrence. The geographical range of *C. microphthalmum* is within the tropical deciduous forest/savannah (dry and moist woodlands zones [Hall and Moreau, 1970: xiii, Map B]) and in temperate grassland (Table 17 and Fig. 24), at altitudes between sea level and 2000 m. Continuous months of collection (July–December) indicate maximum adult activity then; nonetheless, two adults were collected in April.

Chaudoir (1876: 124) sugggested that *C. microphthalmum* might be myrmecophilous, based on the small eyes of the adults. We agree that microphthalmy is likely an adaptation for life in dark places, such as an ant nest, but we think it more likely that the microphthalmous species of *Cymbionotum* are on the path to a subterranean existence, with its terminus being life in the endogeous zone.

Geographical distribution (Fig. 23). The range of *C. microphthalmum* extends from the Palaearctic Middle East (Turkey) and Afrotropical Yemen, in the Arabian Peninsula, westward in the northern part of the Afrotropical Region to eastern Sénégal. This species is probably an Afrotropical indigene.

Relationships and chorological affinities. See this topic for *C. candidum*, above. Based on the shared absence of a clypeal tooth, we postulate that this species and *C. transcaspicum* are adelphotaxa.

Material examined. In addition to the holotype noted above, we have seen 25 specimens of this species, from the following localities. **PALAEARCTIC REGION**. **TURKEY:** Kalin, N. Turkana, IX.1941, T.H.E. Jackson, 1 (BMNH). **AFROTROPICAL REGION. ETHIOPIA:** Nanoropus, margin of Lake Rudolphe, 565 m, Mission de l'Omo, C. Arambourg, P.-A. Chappuis and R. Jeannel, 1 (MRAC); Riv. Boule-Boulo, P. Basilewsky, 1 (MRAC). **NIGER:** Aïr, Piedmont Boquezans, 12.XI.1950, 1 (MNHP). **YEMEN. Abyan:** Al Kowd, light trap, A. van Harten, S.A. Harruri (RFFC): XII.2000, 2; 5759, 08–12.VII.2001, 3; 6772, 07–09.2001, 6. **Al Hudaydah:** Al Kadan light trap, A. van Harten, T.A. Haq (RFFC): 6081, 01–03.X.2001, 2; 6457, 11.2001, 1; 6700, 04.2002, 2. Sokna, 200 m, 20.VIII.1965, G. Scortecoi, 1 (MRAC). Wadi Zabid, 1969, A. Szalgy-Marszó (HNHM) X, 1; XI, 2. **Lahij**: Lahej, 14–15.VII.1963, Linnavouri, 1 (MRAC).

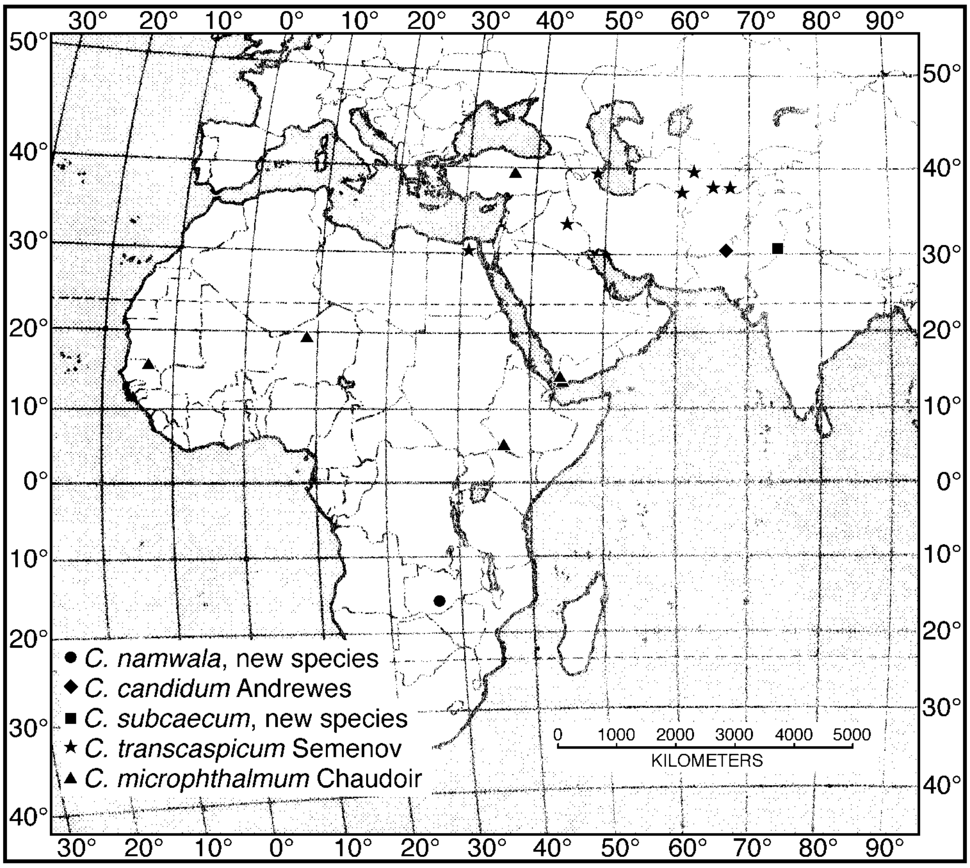

FIGURE 23. Geographical range of the species of *Cymbionotum (s. str.) microphthalmum* superspecies illustrated with an outline map of southwestern Asia, southern Europe and Africa.

Evolutionary Aspects

Undertaking a detailed evolutionary analysis of the Melaeniniis is counterindicated. at present because of limited material: only 13 of the 22 known melaenine species are represented by more than 10 specimens; of these, only seven species are known from more than 10 localities, six species by no more than three specimens, and for one, the male genitalia are unknown. Further, a detailed study of structural features remains to be done: as stated elsewhere, we used only a few examples on which to base our tribal and generic characterizations. Nonetheless, we would be remiss in our obligations to the scientific community if we failed to offer a preliminary synthesis about morphological, ecological, and chorological features leading toward understanding of the evolution of the Melaenini.

Trends in morphological features

Based on generalized outgroup comparisons**,** the body plan of *Melaenus* is the more generalized of the two genera and thus may be used to orient the transformation series that we have inferred and then used to organize the classification of *Cymbionotum*. However, not all features of *Melaenus* are inferred to be plesiotypic, leading to the conclusion that an unknown common ancestor exhibited a body plan more generalized than that of the two extant genera.

Intergenerically, the following reductive changes are postulated, from *Melaenus* to *Cymbionotum*: size reduction, as reflected by Standardized Body Length (Table 3); shortening of elytra (higher values for ratio PL/EL, Table 6); body depression, or flattening; loss of elytral striae and flattening of intervals (Figs. 1A, 5E; cf. Figs. 1B, 2A); reduction in antennal length (Fig. 1A, cf. Fig. 1B; Figs. 11F–G, cf. Fig. 5C); reduction in complexity of wing venation (Fig. 8A, cf. Fig.15A); reduction of endophallic sclerite x (Fig. 8B; cf. Fig. 15B); loss of parameral setae (Figs. 8C–D; cf. Figs. 15C–D); and reduction of the rami of the ovipositor. These reductive changes are apotypic features for *Cymbionotum.* Additional apotypic changes for that genus, but that are interpreted as gains are the following: a more or less dense integumental pelage (Figs. 2, 3), microtrichiate paraglossae (Fig. 13B; cf. Fig. 7C), and males with four fixed setae apically on sternum VII.

Evolutionary losses for *Melaenus*, with retention of the plesiotypic states in the body plan of *Cymbionotum*, include the reduced number of supraorbital and pronotal setae (each with single pair), males without setae on abdominal sternum VII, and females with a shortened gonocoxite 2 (Fig. 7H; cf. Fig. 13F). Gains for *Melaenus* are quadrifurcate setae of the elytra (Fig. 5G), markedly transverse microsculptural mesh pattern of the dorsal surface (Figs. 5F–G), fimbriate sculpticells (Fig. 6I), and subdentiform elytral humeri (Figs. 1A, 5E). Dimorphism in eye size is postulated to have occurred in *M. elegans*, in the East African part of the range of this species.

Within *Cymbionotum*, the following (principally reductive) changes are postulated: size reduction (Table 3; cf. sequence *basale* group to *microphthalmum* superspecies);

reduction (nearly complete loss) of integumental microlines; reduction in eye size (Table 8, *microphthalmum* superspecies; Fig. 11B), or increase in head width (Table 8, *semelederi* group, Fig. 11A); constriction of the pronotum posteriorly, so that the proepipleura are evident from a dorsal perspective; reduction in size and ultimately loss of endophallic sclerite x (Figs. 8B, 15F; cf. Figs. 17D–E, 17I–K).

The clypeal tooth exhibits a complex pattern. Initially edentate (cf., *Procoscinia*), in the *semelederi* group a blunt thickening developed medially on the anterior margin, which, in the *schueppelii* group became a small sharp tooth (Fig. 11C), that is postulated to have been lost, at least once in the *microphthalmum* superspecies. Similarly, beading of the posterior margin of the pronotum is gained (subgenus *Cymbionotum*) and lost in one of the included species (*C. striatum*).

Evolution of color is especially complex. We postulate reduction from a general dark (melanized) dorsal surface *(semelederi* species group) to one that is concolorous pale (rufotestaceous-testaceous; *microphthalmum* superspecies). Intermediate stages in elytral decoloration are seen in all species groups of *Cymbionotum (sensu stricto)* (Figs. 17A–C, 17F–H, 19A–B, 19E–F, 19I–J, and 19L–N; and 22A–C). Further, the complete loss of melanin from the dorsal surface of the elytra is seen both interspecifically and/or intraspecifically in the *schueppelii* and *fasciatum* superspecies.

Ecological features

Very little is known about this topic, but by plotting positions of localities for the melaenines on a map of the major vegetation zones of the world (Fig. 24; Table 17), we are able to offer a few generalizations. The melaenines live under either tropical or temperate conditions, with those in the tropics (Neotropical, Afrotropical and Oriental regions) being either in drier (temperate grasslands, tropical deciduous forest/savannah, marginally desert/semi-desert vegetation zones) or moister (tropical rain forest- riparian) conditions, but the details of microhabitat are unknown. The temperate-based Palaearctic species live in drier (primarily grassland-steppe) habitats. We postulate a moist tropical origin (exemplified by at least *Melaenus piger* and the subgenus *Procoscinia*), followed by entry into drier habitats, and possibly a return to life in moister habitats (Oriental species of the *fasciatum* superspecies).

Chorological features

Distribution patterns provide the background for reconstructing the geographical history of a taxon. For the Melaenini, Figs. 4, 10, 16, 18, 20, 21, 23 and 24 illustrate the known geographical ranges of the taxa, and Table 18 summarizes in terms of zoogeographical regions the distributions of the species of the Eastern Hemisphere.

Figure 4 illustrates the general pattern, of which the most remarkable feature of melaenine distribution is the occurrence of the tribe on both sides of the Atlantic Ocean, with the subgenus *Procoscinia* in the Neotropical Region of the Western Hemisphere, and the other taxa of the group in the Eastern Hemisphere. This is an Inabresian pattern, suggesting a Gondwanian-age taxon, whose range was divided by Cretaceous age continental drift (Axelrod and Raven 1978: 80). If *Melaenus* and *Cymbionotum* are adelphotaxa, as we believe they must be, that suggests that they had differentiated before *Cymbionotum* differentiated into two major lineages: the Western Hemisphere *Procoscinia* and the Eastern Hemisphere *Cymbionotum (sensu stricto)*. Further, it implies that *Melaenus,* as well as *Cymbionotum*, was extant by Cretaceous time. That begs the question as to why *Melaenus* is not also represented in the Western Hemisphere. Perhaps it was, and became extinct, or perhaps its geographical range, at the time of continental splitting, was farther to the east, and thus ancestral *Melaenus* did not have access to the region that became South America.

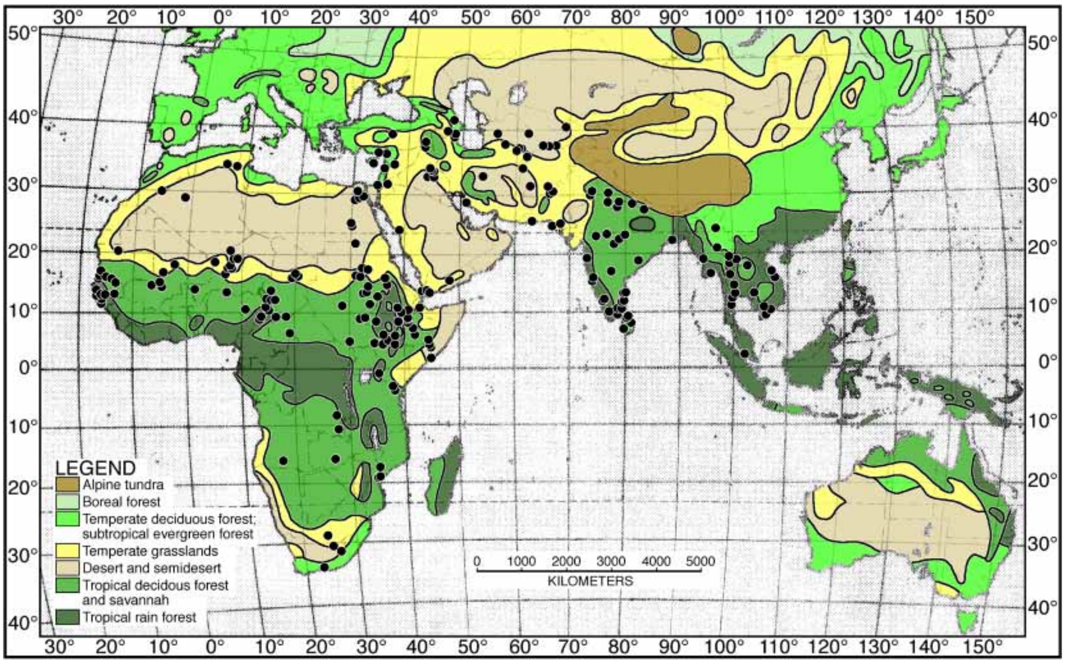

FIGURE 24. Distribution of vegetation zones (based on Newton, 2003: 124, FIGURE 5.2) illustrated with an outline map of a southern part of the Eastern Hemisphere. Black dots indicate positions of localities in which specimens of Melaenini have been collected.

The two Neotropical species (subgenus *Procoscinia*) are apparently allopatric, their ranges seemingly being separated by the Oriental Sierra of the Colombian Andes. Conceivably, the range of their ancestral stock could have been disrupted by the development of the northeastern Andean uplift, or perhaps a simple dispersal event around the northern end of the eastern Sierra, followed by range interruption, led to isolation and eventual differentiation of the surviving allopatric stocks.

TABLE 18. Zoogographic regions of the species of *Melaenus* Dejean, and subgenus *Cymbionotum* Baudi di Selve.

	Zoogeographic Region		
	Oriental	Palaearctic	Afrotropical
Melaenus			
M. piger	X		
M. elegans			X
Cymbionotum (s. str.)			
Sp. group *basale*			
C. semirubricum		X	X
C. basale			X
Sp. group *semelederi*			
C. semelederi		X	X
C. *striatum*		X	
C. mandli		X	
Sp. group *schueppelii*			
Supersp. *schueppelii*			
C. schuepperlii		X	X
C. rufotestaceum			X
C. capicola			X
Supersp. *fasciatum*			
C. helferi	X		
C. fasciger	X		
C. fluviale	X		
C. pictulum		X	X
C. fasciatum			X
Supersp. *microphthalmum*			
C. namwala			X
C. candidum		X	
C. subcaecum		X	
C. transcaspicum		X	
C. microphthalmum		X	
Total No. species/zone	4	10	11
No. precinctive species	4	5	6
No. shared species	0	5	5
No. species groups of subgenus *Cymbionotum*	1	3	3
No. of superspecies of *schueppelii* sp. group	1	3	3

In the Eastern Hemisphere, melaenines occupy three zoogeographic regions (Table 18). The Oriental Region, with half the number of species, exhibits twice the amount of precinction (4/4= 100%) as the other two regions (precinction = 50 and 54%). These numbers suggest three centers of differentiation, but much easier access, post-isolation, between the Palaearctic and Afrotropical regions than between the Oriental Region and either of the other two regions.

The distribution pattern of the melaenines includes extensive sympatry at the level of species groups and among superspecies, and by definition, allopatry within superspecies, although some or most of the observed allopatry could be artifact, owing to inadequate samples. Within widespread species, allopatric geographical variation is evident. The allopatric distributions seem to indicate relatively recent differentiation in isolation, with sympatry indicating older differentiation in isolation, followed by extensive range interpenetration.

The causative agent of range disruption of the biota in Africa and presumably elsewhere in the tropics and subtropics is postulated to have been a sequence of repeating wet and dry cycles associated most recently with the glacial cycles: wet periods occurred during glacial minima with dry periods occurring during glacial maxima (Moreau 1966: 59–60; Hall and Moreau 1970: ix; and Newton 2003: 323–334). We postulate that these cycles predated the Plio-Pleistocene climatic vicissitudes, caused, perhaps, by environmental fluctuations associated with mountain building and major tectonic movements (Çiplak, 2004: 358), which were prominent features of earlier Tertiary time. For example, Axelrod and Raven (1978: 84–95) discuss the Paleogene drying of Africa.

Differing species distributions may be interpreted as temporal stages in relative ages of differentiation. Beginning with intraspecific allopatric differentiation of a single species (stage 1, the earliest in species multiplication), stage 2 is represented by superspecies (allopatric complexes of species postulated to be monophyletic, the contiguous distribution of whose members indicates sufficient time to have differentiated in isolation to species, but insufficient time to have penetrated one another's ranges to a significant extent), and stage 3, that of species groups, is represented by monophyletic assemblages of sympatric species or of superspecies (these have had time for range penetration) (Hall and Moreau, 1970: x, xi–xii). As stated by Newton (2003: 326) "superspecies and their component allospecies reveal information on the nearest relatives, on the likely locations of past refuges, and potential zones of contact, and on any deviation in habitat shown by specific members."

In the Eastern Hemisphere, ancestral *Melaenus* was either more widely distributed than at present, or was a resident of the West Asian Palaearctic Region and spread from there into the Afrotropical and Oriental Regions (Fig. 10). With drying in the West Asian Palaearctic Region, the tropical deciduous forest was extirpated, surviving in the Afrotropical and Oriental Regions, and with the disappearance of the forests went the remnants of ancestral *Melaenus*, but with its survivors giving rise to the extant Oriental *M. piger*, and Afrotropical *M. elegans*. The latter species exhibits on an east-west axis marked monomorphic/dimorphic differentiation in eye size and punctation density, and slight differentiation in size. We postulate an earlier Pleistocene glacial (or dry period) range disruption of ancestral *M. elegans,* that produced in separate refugia in the northern Afrotropics a euphthalmous morph in western Africa, and a microphthalmous morph in the east. This differentiation was followed in an interglacial by range extension of the ancestral euphthalmous morph into the range of the microphthalmous morph.

In contrast to the woodland-adapted *Melaenus,* the more broadly adapted dry woodland-grassland subgenus *Cymbionotum* exhibits a more complex pattern that requires in one lineage (superspecies *fasciatum)* evolution of adaptations for life in the wet tropics. Comparatively recent (later Pleistocene) intraspecific allopatric differentiation is postulated for three species.

Cymbionotum semirubricum and *C. semelederi* (Figs. 16 and 18, respectively) exhibit similar patterns, with more or less readily recognizable morphs, based on differences in setation, and/or color pattern: one, southeast of the Himalaya, in northern India and Pakistan; one, in Western Asia, northwest of the Himalaya; and one in the northern Afrotropical Region. Such similarity suggests a similar history, each species having survived unfavorable climatic change (probably during an interglacial pluvial period) in three separate refugia.

In the Oriental Region, *C. helferi* (Fig. 21) exhibits slight differentiation (in color pattern), with a paler morph predominating in the west (Burma and Thailand), and a bicolored morph predominant in the east (Vietnam). We postulate glacial (dry period) range disruption to explain this intraspecific differentiation.

Earlier (possibly Pliocene or late Miocene) species-level differentiation is postulated for members of all superspecies and species groups. Some of the differentiation is interregional, paralleling more or less the slighter differentiation of the widespread species noted above (in part the superspecies *fasciatum* [Fig. 21] and *microphthalmum* [Fig. 23]). Surely, these parallel patterns of differentiation must imply similar climatic tolerances, and possibly long-standing refugia, wherever these may have been precisely situated.

Additionally, each of the zoogeographic regions has supported species-level differentiation. In the Afrotropical Region, the *basale* species group (Fig. 16) differentiated on an east-west axis, possibly the ancestral range having been broken by a Pliocene wet period and the consequent enlargement of Lake Chad serving as a barrier (Newton, 2003: 331), with the eastern segregate of the ancestral stock becoming *C semirubricum*, and the western segregate becoming *C. basale*. Following differentiation and the return of a drier climate the range of *C. semirubricum* was extended farther west.

The *schueppelii* superspecies differentiated on both east-west and north-south axes, to produce its three extant species (Fig. 20). From what is known of the geographical ranges of these species, those of *C. rufotestaceum* and *C. schueppelii* overlap, so these two species are likely at least parapatric. The ranges of *C. schueppelii* and *C. capicola* are adjacent, the former continuity of their drier habitats having been interrupted by incursion of wet forest (Newton, 2003: 328, Fig. 11.2).

The ancestral stock of the superspecies *microphthalmum* may have split on a north-south axis to produce the more southern *C. namwala* and a more northern ancestor of the informal *microphthalmum* complex (including *C. candidum, C. subcaecum, C. transcaspicum,* and *C. microphthalmum).*

In the Palaearctic Region, the *semelederi* group has differentiated at the species level (Fig. 18), with the allopatric ranges of the species pair *C. striatum*-*C. mandli* overlapped by that of *C. semelederi*. The species pair *C. candidum*-*C. subcaecum* differentiated in an area similar to the one occupied by *C. striatum* and *C. mandli* (Fig. 23; cf. Fig. 18).

In the Oriental Region, distribution of the three allopatric species of the informal *helferi* complex suggests differentiation on a north-south axis in India, and on an east-west axis between India and the Burma-Vietnam area (Fig. 21), with refugia similarly located. Also, ecological change seems to have occurred, with the range of *C. fluviale* extending from dry forest into the rain forest area (southwestern India, and Sri Lanka), and the range of *C. helferi* confined to the rain forest vegetation zone.

In conclusion, perhaps the most remarkable feature of melaenine distribution is evidence of a pre-Cenozoic origin of the tribe, as contrasted with the patterns of the extant Eastern Hemisphere taxa that suggest late Tertiary and even Quaternary differentiation. But we have no idea of the events that led to the origin of the supraspecific stocks (species groups and superspecies) that we have recognized. Probably the taxonomic evidence that we wish for was destroyed during the tectonically intensely active Paleogene period that saw the meeting of Eastern Asia and India, followed by the meeting of Africa and Eurasia (Çiplak, 2004: 358).

We emphasize that the ideas presented above are based on limited geographical and ecological data, and on ideas of relationships that are not very well founded. As Hall and Moreau (1970: xi–xii) noted in their magisterial treatment of African bird distribution, some superspecies are less "super" than others, meaning that other relationships than those favored may be postulated, and with such changes other geographical histories must be postulated. Nonetheless, we have offered a consistent outline that forms a base for further work on evolution of melaenines. Such work must begin not with acceptance of our offering, but with its critical examination, based in part on much additional material.

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One of the great pleasures of taxonomic endeavor is visiting and working in the institutions that house the great beetle collections of the world. Our melaenine study required a prolonged stay in the Entomology Department of the Muséum National d'Histoire Naturelle, Paris. This is one of the favorite entomological haunts of the senior author, in part due to the outstanding holdings of the Coleoptera Section, but in part due to the opportunity of associating with the coleopterists there, and particularly with Thierry Deuve and Jean Menier. Their generosity and cordiality are appreciated very much.

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