

A Review of the Chrysomelid Genus *Hyperaxis* Gemm. et Har., 1874 (Coleoptera, Chrysomelidae: Eumolpinae) from Vietnam¹

A. G. Moseyko^a and L. N. Medvedev^b

^aZoological Institute, Russian Academy of Sciences, St. Petersburg, 199034 Russia

e-mail: chrysolesha@mail.ru

^bSevertsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, 119071 Russia

e-mail: lev.n.medvedev@mail.ru

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Abstract—A review of species of the genus *Hyperaxis* Gemminger et Harold from Vietnam is given. Five new species (*H. dentifemur* sp. n., *H. longipilosa* sp. n., *H. sonlana* sp. n., *H. phanrangi* sp. n. and *H. buonloica* sp. n.) and a new subspecies (*H. buonloica darlaki* subsp. n.) are described. A key to all the 11 species of the Vietnamese fauna is given. The genitalia are figured for all species. Lectotype is designated for *Hyperaxis pallidipes* Pic.

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The genus *Hyperaxis* Gemminger et Harold, 1874 (= *Metaxis* Baly, 1863, nec Chaudoir, 1850) as treated by Kimoto and Gressitt (1982) and Eroshkina (1992) is distributed in all the parts of the Indo-Malayan Region and in the extreme south-east of the Palaearctic Region. The type species, *H. sellata* (Baly, 1863), was described from Borneo. Classification of the tribe Adoxini is quite obscure but this genus can be identified by the following set of characters: lateral edge of pronotum not toothed; elytra with compound vestiture consisting of scales, small hairs, long setae, and occasionally includes additionally wax bloom; punctuation of elytra arranged in numerous almost regular rows; pro- and especially metafemur wider than mesofemur, all femora toothed ventrally; pygidium without longitudinal groove but occasionally with longitudinal rib; eyes comparatively large, subfabiform, their outer edge straight or slightly concave; ovipositor rather long, telescopic.

In this paper we give a review of the species of *Hyperaxis* occurring in Vietnam and describe new species from this country. In the course of the study we have found that coloration, pattern of scaly vestiture and wax bloom are too variable to be used for identification of the species. Proportions of the pronotum and elytra, and length of the elytral hairs have limited significance, while the most important characters are the shape of the hind femur, aedeagus, spermatheca, pygidium, and 5th ventrite in both sexes (the two latter structures are not or but slightly sexually dimorph in most species of *Hyperaxis*). In some species these

structures are also quite variable but mostly can be used for identification.

Ten species of *Hyperaxis* have been described from Indochina and neighboring parts of China and Myanmar. Two species, *Demotina fasciata* Baly, 1874 and *Fidia brancuccii* (L. Medvedev, 1993), described in *Hyperaxis* or placed in this genus by some authors, were transferred to other genera (Moseyko and Sprecher-Uebersax, 2010). Only three *Hyperaxis* species were described from Vietnam: *H. harmandi* Lefèvre, 1893; *H. pallidipes* (Pic, 1929) and *H. maculata* Kimoto et Gressitt, 1982. Also, *Demotina nigrita* Eroshkina, 1992 with its very short erect hairs on the elytra undoubtedly belongs to *Hyperaxis*. In our opinion, the fauna of Vietnam comprises 11 species, one of them with two subspecies, of which 5 species and 1 subspecies are new to science.

The list of abbreviations used for designation of the depositories of the material is as follows.

BM, Bishop Museum, Honolulu, Hawaii, U.S.A.;

CA, U. Arnold collection, Berlin, Germany;

GENOVA, Museo Civico di Storia Naturale Giacomo Doria, Genova, Italy;

IRSNB, Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium;

LM, collection of L.N. Medvedev, Moscow, Russia;

MNHN, Museum National d'Histoire Naturelle, Paris, France;

NHM, Natural History Museum, London, Great Britain;

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NHMB, Naturhistorisches Museum, Basel, Switzerland;

NME, Naturkundemuseum, Erfurt, Germany;

NMP, National Museum, Prague, Czech Republic;

SZ, Stefano Zoia's collection, Milano, Italy;

ZIN, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.

*A Key to Species of the Genus Hyperaxis
from Vietnam*

- 1 (2). Pronotum comparatively narrow, 1.25 times as wide as long, widest at mid-length. Pygidium with longitudinal rib; 5th ventrite without excavations of hind angles. Hind femur serrate between ventral tooth and apex. Hairs on elytra about 0.2 mm long. Body blackish, covered with white scales arranged in broken longitudinal rows and in ill-defined transverse bands at mid-length and in apical quarter of elytra. Body length 4.1 mm. Aedeagus as in Fig. 64. Northern Vietnam 1. *H. dentifemur* sp. n.
- 2 (1). Pronotum more than 1.25 times as wide as long, widest in basal third. If pygidium has longitudinal rib, then 5th ventrite with excavations of hind angles. Hind femur with one tooth only, not serrate.
- 3 (16). Pygidium without longitudinal rib; 5th ventrite without excavations of hind angles.
- 4 (5). Elytral hairs shorter than 0.05 mm, poorly visible. Antennomeres 4–7 only slightly longer than antennomeres 8–11. Body black, covered with white and black scales, producing pattern on elytra. Body length: males 2.9–3.1, females 3.9–4.2 mm. Vietnam, Thailand 2. *H. nigrita* (Eroshkina, 1992).
- 5 (4). Hairs on elytra well visible, at least 0.1 mm long.
- 6 (7). Margin of frontoclypeus angularly concave. Scales on elytra short, about twice as long as wide. In lateral view bend of prothorax situated closer to upper side: anterior setiferous pore of prothorax situated near upper quarter of eye; the bend not edged. Body fulvous. Spermatheca as in Fig. 82. Female body length 4.3 mm. Southern Vietnam 3. *H. harmandi* Lefèvre, 1893.
- 7 (6). Margin of frontoclypeus straight or arcuately concave. Scales on elytra longer, at least 2.5 times as long as wide. Bend of prothorax situated mostly closer to lower side; setiferous pore situated near middle of eye, if higher, then bend of prothorax in posterior third is much stronger.
- 8 (11). Elytra with very long hairs, 0.3–0.4 mm in length. Body fulvous to reddish brown, with darker pattern.
- 9 (10). Hind femur distinctly widened, with large and broad tooth (Fig. 20). Hairs on elytra very long, up to 0.4 mm long. Aedeagus as in Fig. 66, spermatheca as in Fig. 83. Body length: males 3.4–4.0, females 4.0–4.4 mm. Southern Vietnam 4. *H. longipilosa* sp. n.
- 10 (9). Hind femur moderately widened, with comparatively narrow short tooth (Fig. 21). Hairs on elytra shorter, about 0.3 mm long. Aedeagus as in Figs. 67, 68, spermatheca as in Fig. 84. Body length: males 3.8–4.1 (in northern populations 3.4–3.5), females 4.2–4.8 mm. Vietnam 5. *H. sonlanga* sp. n.
- 11 (8). Elytra with moderately long hairs, 0.1–0.2 mm in length.
- 12 (13). Body large, males 4.1–4.7 mm, females 4.8–6.3 mm, black with fulvous basal segments of antennae. Bend of pronotum very strong in basal third. Scales on pronotum arranged in 3 poorly delimited longitudinal stripes; elytra of males with scales mostly arranged in a few spots, often 1 near middle, 2 behind middle and 1 at apex; females with a chessboard pattern on elytra, or with same as in males. Aedeagus as in Fig. 69. Southern Vietnam 6. *H. maculata* Kimoto et Gressitt, 1982.
- 13 (12). Body usually less than 4 mm long (female maximal length 4.1 mm), fulvous to reddish brown with darker pattern, occasionally indistinct.
- 14 (15). Hind femur widened, with large tooth. Aedeagus as in Fig. 71, spermatheca as in Fig. 87. Body length: male 3.3 mm, female 3.2 mm. Southern Vietnam 7. *H. phanrangi* sp. n. [the specimen from Tonkin with different spermatheca (Fig. 88) probably belongs to a distinct species].
- 15 (14). Hind femur narrow, with small tooth. Body completely fulvous, or two-colored: pronotum brown with two longitudinal fulvous stripes, or fulvous with dark median and lateral stripes;

- elytra with contrasting pattern; apices of femora dark. Antennae comparatively short, about 2/3 body length. Aedeagus evenly narrowing apically or subparallel-sided, with narrower tip (Figs. 72–75). Spermatheca as in Figs. 89–93. Body length: males 2.6–3.1, females 3.1–4.1 mm. China, Vietnam
 8. *H. yaosanica* Chen, 1940.
- 16 (3). Pygidium with thin longitudinal rib (except some females of *H. feae*); 5th ventrite with excavations of hind angles (Figs. 61–63). Hind femur widened, with large tooth.
- 17 (18). Coloration contrasting, body blackish with white or yellowish and blackish scales, forming a pattern; legs reddish with dark apices of tibiae. Aedeagus as in Fig. 76, spermatheca as in Fig. 94. Body length: males 2.8–3.2, females 3.6–4.2 mm. Myanmar, northern Thailand, northern Vietnam 9. *H. feae* (Jacoby, 1904).
- 18 (17). Coloration less contrasting, tibiae unicolorous. Dark scales on elytra reddish or brownish.
- 19 (20). Aedeagus narrower, its apex not bent ventrally (Fig. 77). Scales on elytra long, about 3.5 times as long as wide. Available specimens lacking wax spots. 5th ventrite with small excavations. Body length: males 3.2–3.4 mm, females 3.8–4.2 mm. Northern Vietnam
 10. *H. pallidipes* (Pic, 1929).
- 20 (19). Aedeagus wider, with apex bent ventrally (Figs. 79, 80), excavations of 5th ventrite larger. Elytra often with brownish pattern and whitish wax powder spots arranged in regular broken lines near apex of elytra. (One species with two subspecies in southern Vietnam).
- 21 (22). Color reddish. Body larger, body length: males 2.7–3.2, females 3.3–4.0 mm. Gia Lai Prov.
 ... 11a. *H. buonloica buonloica* sp. and subsp. n.
- 22 (21). Color dark grayish, elytra with weak brownish tint. Body smaller, body length: males 2.5–2.8, females 3.0–3.2 mm. Dac Lac Prov.
 11b. *H. buonloica darlaki* sp. and subsp. n.

1. *Hyperaxis dentifemur*

Moseyko et L. Medvedev, sp. n.
 (Figs. 1, 18, 64)

Material. Holotype, male: **Vietnam** (northern): NW of Dong-Hai, 300–800 m, 24.III.1963 (O.N. Kabakov) (ZIN).

Diagnosis. Pronotum comparatively narrow, 1.25 times as wide as long, widest at mid-length. Pygidium with longitudinal rib; 5th ventrite without excavations of hind angles. Hind femur serrate between ventral tooth and apex. Hairs on elytra about 0.2 mm in length.

Description. Body dark brown, with small spots of white and brown scales, arranged in broken lines. Coxae, base of femora and basal segments of antennae reddish brown. Elytral hairs long, about 0.2 mm in length.

Body elongate, 1.95 times as long as wide, with humeral calli, basal prominence and basal impression on elytra well developed. Pronotum evenly convex.

Head densely punctate and covered with scales, leaving shortened bald median line on frons. Frontoclypeus trapeziform, transverse, not separated from frons, with bend, before bend punctate, after bend finely microreticulate. Eyes medium-sized, not emarginate, prominent. Distance between eyes 2.8 times width of eye. Antennae dark brown with 2nd and 3rd segments reddish, nearly 3/4 as long as body. First segment robust, somewhat club-shaped. Ratio of segments lengths 1.8 : 1.2 : 2.6 : 2.7 : 2.7 : 2.5 : 3.0 : 2.3 : 2.2 (10th and 11th segments in the holotype missing). 7–9th segments slightly thickened.

Pronotum 1.25 times as wide as long, subparallel-sided, with slightly and evenly curved sides, widest in the middle. Surface densely punctate and densely covered with scales, distributed evenly but not concealing surface completely. Lateral edging absent; sides of prothorax almost vertical in anterior part and with smooth bend in posterior part. Prosternum between coxae longer than wide, densely punctate and covered with scales and short hairs. Notosternal sutures almost invisible, hypomera visually merged with lateral arms of prosternum, punctate and covered with scales. Mesepisternum, mesepimeron, metepisternum and lateral parts of metathorax quite densely covered with scales.

Scutellum subpentagonal, narrowed posteriorly, rounded at apex. Dorsum covered with scales similar to those on elytra.

Elytra 1.5 times as wide as pronotum, slightly narrowed behind humeri and rounded at apex. Dorsum strongly convex, with well-developed humeral calli, basal prominence and basal impression. Elytron subregularly punctate; 11 rows present between suture and humeral callus; punctation more confused in cen-



Figs. 1–4. *Hyperaxis* spp., general view: (1) *H. dentifemur* sp. n., holotype, male; (2) *H. nigrita* (Er.) (male, Thailand); (3) *H. harmandi* Lef., syntype, female; (4) *H. longipilosa* sp. n., male paratype.



Figs. 5–8. *Hyperaxis* spp., general view: (5) *H. longipilosa* sp. n., male paratype; (6, 7) *H. sonlanga* sp. n., male paratypes; (8) *H. phan-rangi* sp. n., holotype, male.

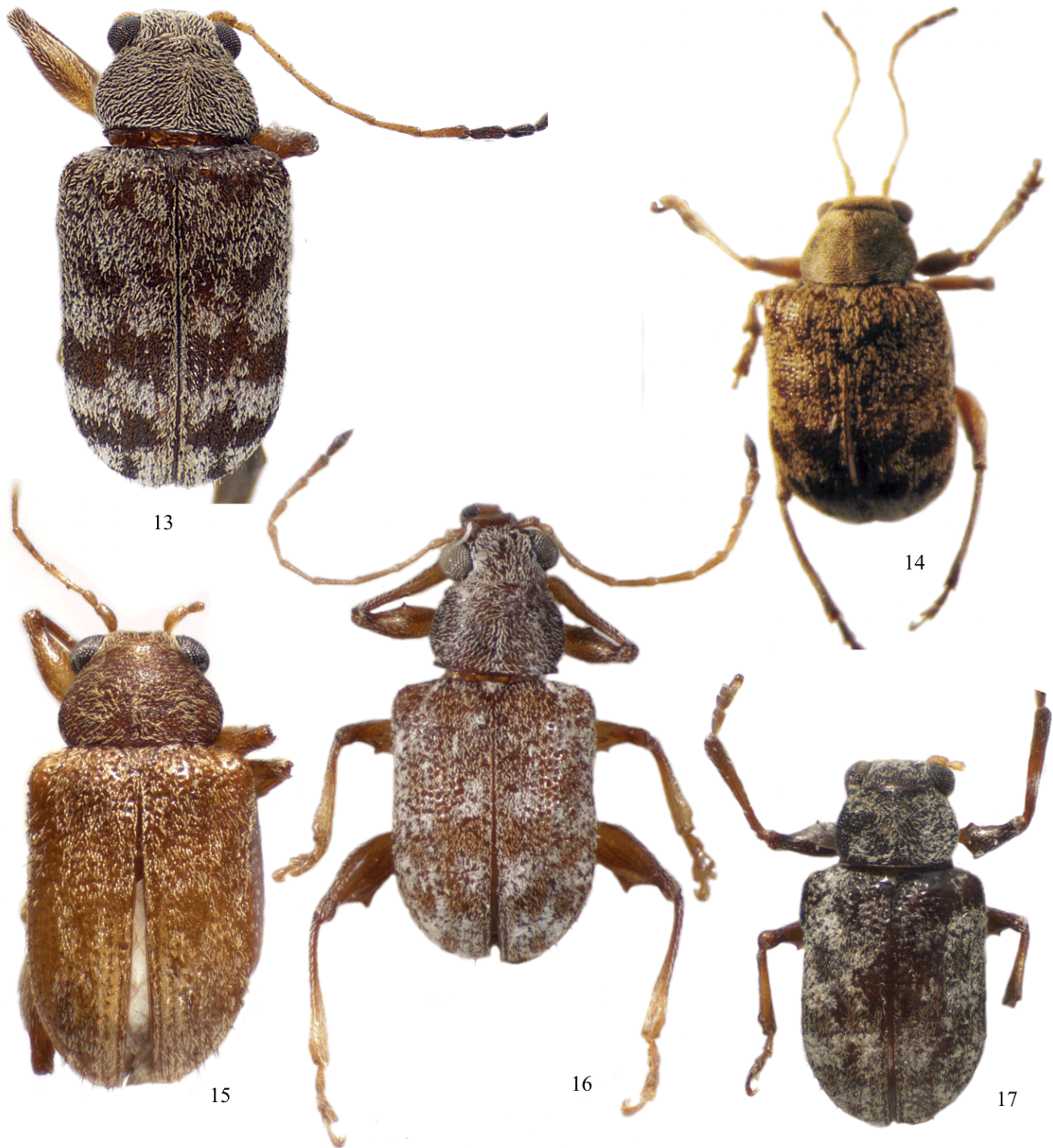


Figs. 9–12. *Hyperaxis yaosanica* Chen, males, general view: (9) northern Vietnam, (10–12) southern Vietnam.

tral part of elytron. Interstices between rows covered with whitish and brownish scales partly arranged in broken lines and in several larger whitish spots, organized in ill-defined transverse bands. Scales about

3 times as long as wide. Elytra also covered with erect hairs.

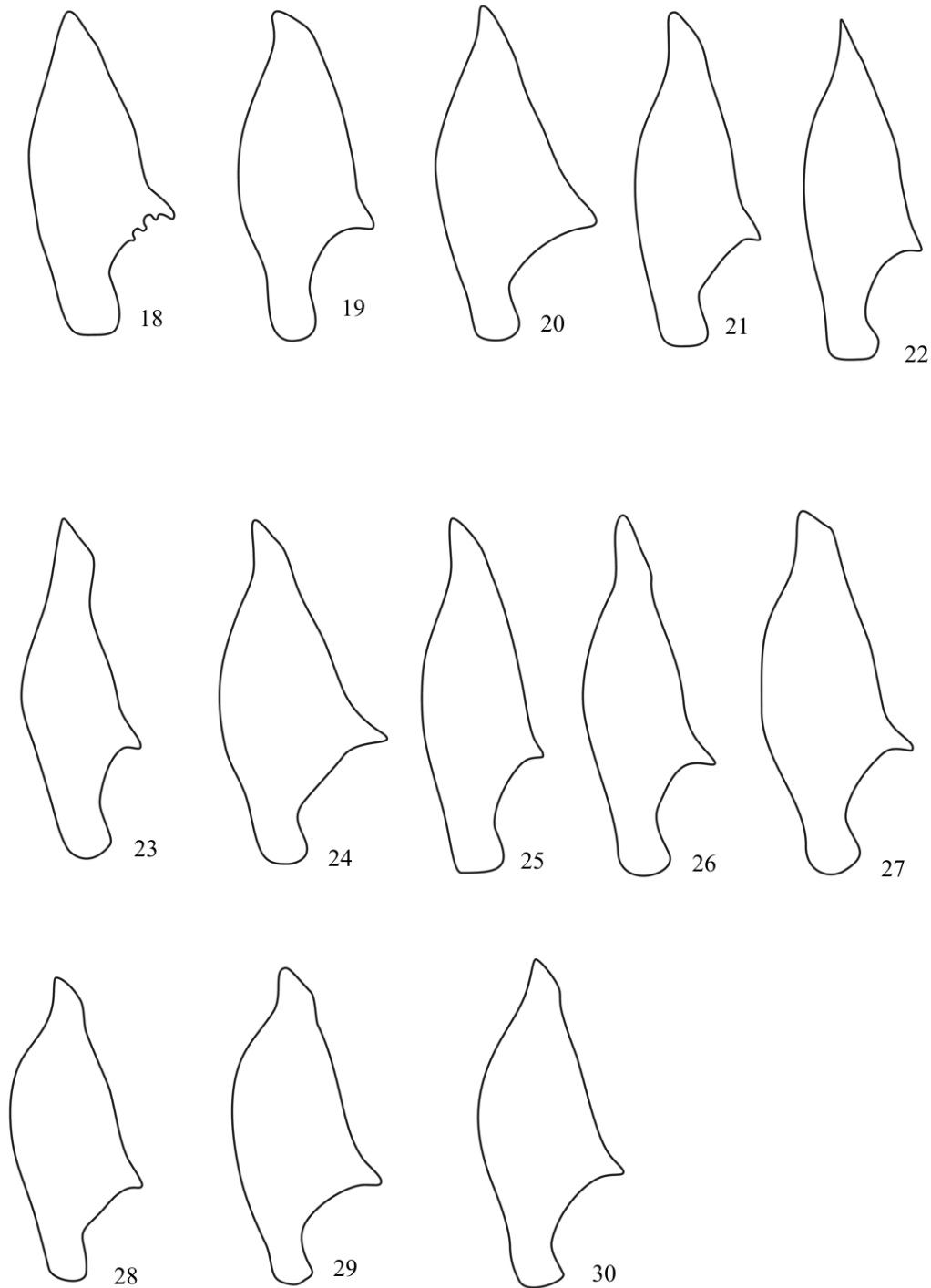
Legs robust, all of subequal length; ratio of width of fore, middle, and hind femora 3.0 : 2.5 : 3.5. Fore



Figs. 13–17. *Hyperaxis* spp., general view: (13, 14) *H. feae* Jac. [(13), male, northern Thailand; (14), female, syntype]; (15) *H. pallidipes* Pic, male, northern Vietnam; (16, 17) *H. buonloica* sp. n., male holotypes: (16) *H. buonloica buonloica* subsp. n., (17) *H. buonloica darlaki* subsp. n.

and middle femora with very small, hind femur with large tooth, latter with apical slope dentate (Fig. 18). Excavation on middle tibia very well developed, on hind tibia barely visible. Tarsi of male not widened.

Abdomen ventrally covered with scales smaller than those on dorsum. Lateral margins of 5th ventrite simple, posterior margin with small denticles, without excavations. Pygidium with longitudinal rib.



Figs. 18–30. *Hyperaxis* spp., hind femur of male: (18) *H. dentifemur* sp. n.; (19) *H. nigrita* (Er.); (20) *H. longipilosa* sp. n.; (21) *H. sonlanga* sp. n., paratype, northern Vietnam; (22) *H. sonlanga* sp. n., holotype; (23) *H. maculata* Kim. et Gr.; (24) *H. phanrangi* sp. n.; (25–27) *H. yaosanica* Chen [(25) northern Vietnam, (26, 27) southern Vietnam]; (28) *H. feae* Jac., northern Thailand; (29) *H. pallidipes* Pic; (30) *H. buonloica buonloica* sp. and subsp. n.

Male genitalia. Aedeagus as in Fig. 64, with angle between basal and apical parts noticeably more than 90°.

Length of male 4.1 mm.

Comparative notes. This species is quite similar to *H. maculata* Kimoto et Gressitt and *H. ariyani* Chûjô, 1964 but has a slightly narrower prothorax, longer hairs on the elytra, serrate femora, and pygidium with rib.

2. *Hyperaxis nigrita* (Eroshkina, 1992), comb. n.
(Figs. 2, 19, 31, 50, 65, 81)

Demotina nigrita: Eroshkina, 1992 : 98.

Material. Vietnam. *Dac Lac Prov.*, ca. 40 km NW of Buon Ma Thuot, Buon Ya Wam, 450 m, 2–3.V.1986 (L. Medvedev et al.), 1 female (holotype) (LM); as holotype, 1 female (paratype): (LM); “upper Khe-Oi,” 21.IV.1962 (O.N. Kabakov), 1 male (paratype) (LM). Thailand. *Prov. Tak*: Doi Mussoi, 800 m, 16°45.309'N, 98°55.404'E, V.2010 (T. Ihle), 3 males (NME); Thanong Thon Chai, Umphang River, 1000 m, 16°07'N, 99°00'E, 28.IV–06.V.1991 (V. Kubáň), 1 male, 3 females (NHMB); Pai, Soppong, 28.V–05.VI.1997 (M. Snizek), 1 male, 3 females (SZ).

This species was described in the genus *Demotina* but has short and poorly visible erect hairs on the elytra, which requires transferring it to the genus *Hyperaxis*. Also, the species has elytral punctures arranged in dense rows (11 rows between suture and humeral callus), as in all Indochinese *Hyperaxis*. Body of *Hyperaxis nigrita* is noticeably shorter than that in the congeners, and elytral scales are very short, 1.5–1.7 times as long as wide, which makes this species similar to representatives of the genus *Pseudometaxis* in general shape, but it differs in the simple sides of prothorax. *Hyperaxis nigrita* can be easily separated from all congeners by black color with black and white scales, and very short erect hairs on the elytra. The hind femur as in Fig. 19, aedeagus as in Fig. 65, spermatheca as in Fig. 81.

3. *Hyperaxis harmandi* Lefèvre, 1893, stat. n.
(Figs. 3, 32, 51, 82)

Hyperaxis harmandi: Lefèvre, 1893 : 122.

Material. Only a female syntype from the MNHN was examined.

This species was described from southern Vietnam (Chaudoc, Mekong River), but Kimoto and Gressitt (1982) erroneously stated that it was described from Tonkin (northern Vietnam) and synonymized it with *H. scutellata* (Baly, 1863). *Hyperaxis scutellata* was described from a specimen erroneously labeled as if from Northern China. It is similar to *H. albostrigata* (Motschulsky, 1866) from Ceylon and probably is conspecific with it. There is no true *Hyperaxis* in Northern China.

We resurrect this species from synonymy but it is still known only from the syntype female. It can be

recognized by the comparatively steep sides of prothorax, angularly excavated labrum and characteristic shape of the spermatheca (Fig. 82) similar to that of *H. maculata*. Pygidium as in Fig. 32.

4. *Hyperaxis longipilosa*

Moseyko et L. Medvedev, sp. n.
(Figs. 4, 5, 20, 33, 34, 52, 53, 66, 83)

Material. Holotype, male: Vietnam, *Dac Lac Prov.*, 10 km SW of Buon Ma Thuot, Eakao, on glade, 24.VI.1985 (L. Medvedev et al.) (ZIN).

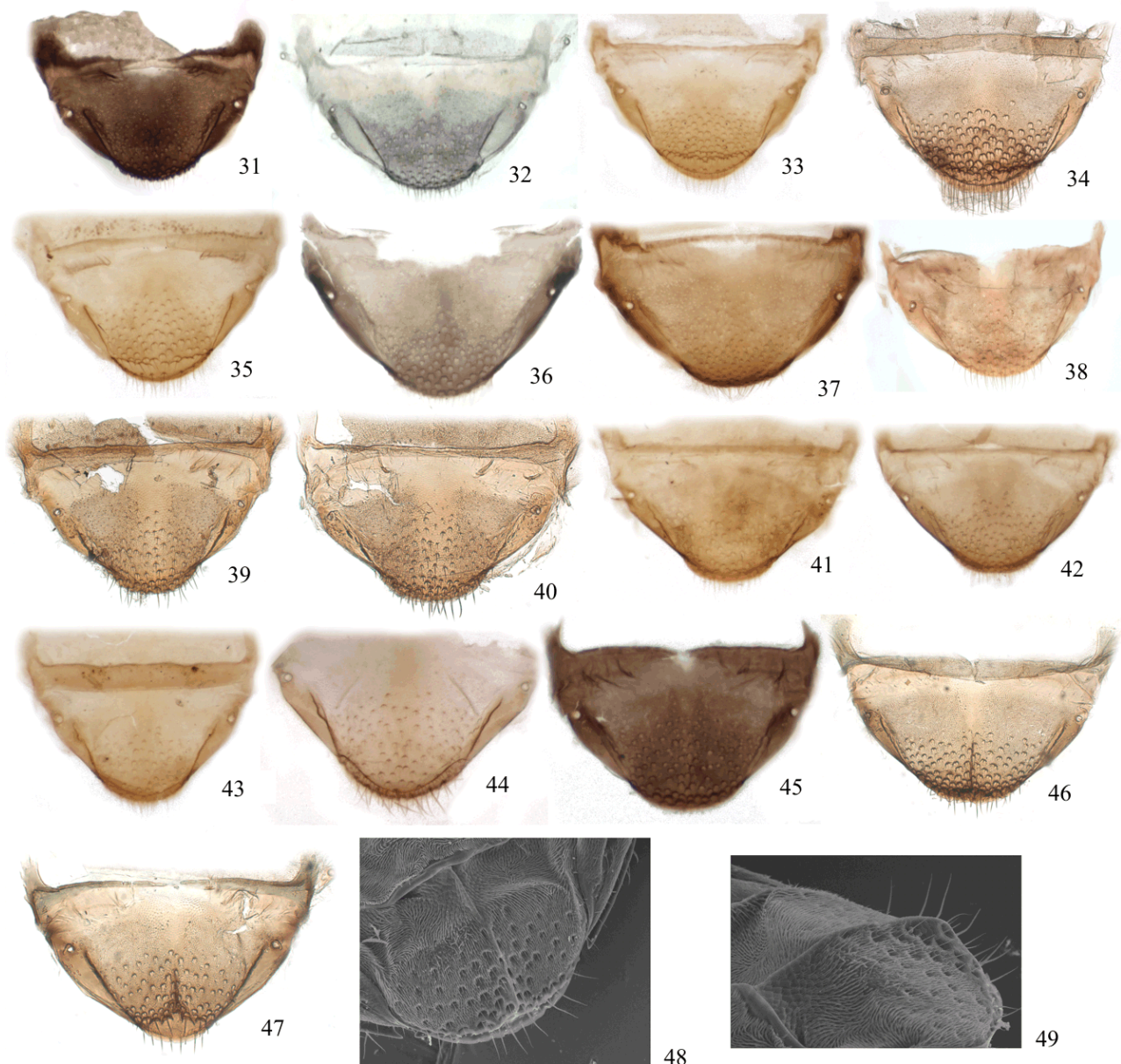
Paratypes: as holotype, 2 spms. (ZIN), 8 spms. (LM). Vietnam. *Gia Lai Prov.*: Pleiku, 700 m, Malaise trap, 8–14.V.1960 (L.W. Quate), 1 female [photo of this specimen published in Kimoto and Gressitt, 1982, as *H. pallidipes*] (BM); 20 km N of Pleiku, 650 m, 9.V.1960 (S. Quate leg.), 1 male (BM); “Cochinchine, Cap St. Jacques (E. Cordier),” 2 females (NMP).

Diagnosis. Pronotum widest in basal third. Pygidium and 5th ventrite simple. Frontoclypeus with margin not angularly concave. Elytra with very long hairs. Hind femur distinctly widened, with large and broad tooth.

Description. Body reddish to brown, with or without 10 small darker spots, arranged in 5 indistinct transverse bands (1 + 3 + 3 + 2 + 1). In dark specimens 11th antennal segment, and partly tibiae and femora darker. Elytral hairs very long, up to 0.4 mm in length.

Body elongate, males 1.78–1.96, females 1.74–1.86 times as long as wide, with humeral calli well developed, basal prominence and basal impression on elytra moderately developed. Pronotum with feeble transverse impression at anterior edge, this impression better visible on lateral parts of disc.

Head densely reticulate and covered with scales, occasionally leaving extremely narrow shortened bald median line on frons. Frontoclypeus trapeziform, slightly wider than long, separated from frons by feeble transverse impression, microreticulate and finely punctate. Eyes medium-sized, not emarginate, rather feebly prominent. Distance between eyes 2.0 times width of an eye (male). Antennae reddish, about 4/5 (male) or 3/4 (female) as long as body; in dark specimens 11th segment darker. First segment robust, somewhat club-shaped. Ratio of segments lengths of male: 2.0 : 1.4 : 3.0 : 3.0 : 2.9 : 2.9 : 3.0 : 2.4 : 2.4 : 2.4 : 2.7. 7–11th segments not thickened.



Figs. 31–49. *Hyperaxis* spp., pygidium of female: (31) *H. nigrita* (Er.); (32) *H. harmandi* Lef., syntype; (33, 34) *H. longipilosa* sp. n.; (35) *H. sonlanga* sp. n.; (36) *H. maculata* Kim. et Gr.; (37) *H. ariyani* Chûjô; (38) *H. phanrangi* sp. n.; (39–44) *H. yaosanica* Chen [(39, 40) China, (41, 42) southern Vietnam, (43, 44) northern Vietnam]; (45) *H. feae* Jac., northern Thailand; (46–49) *H. buonloica* sp. and subsp. n. [(48, 49) (photo from SEM)].

Pronotum 1.5–1.7 times as wide as long, with rounded sides, widest in hind third. Surface densely reticulate and closely covered with scales differently oriented and denser on lateral parts of pronotum. Lateral edging present along entire length of side but very narrow and occasionally concealed by scales; sides of prothorax convex and smoothly curved. Prosternum between coxae longer than wide, microreticulate, finely punctate and covered with hairs. Notosternal sutures visible, hypomera and lateral arms or prosternum cov-

ered with scales. Mesepisternum, mesepimeron, metepisternum and lateral parts of metathorax covered with scales not very densely.

Scutellum subtrapeziform, narrowed posteriorly, slightly rounded at apex. Dorsum covered with scales similar to those on elytra.

Elytra 1.35–1.45 times as wide as pronotum, slightly narrowed behind humeri and rounded at apex. Dorsum strongly convex, with well-developed humeral

calli, and visible basal prominence and basal impression. Elytron subregularly punctate; 11 or 12 rows present between suture and humeral callus; punctation almost regular in all parts of elytron. Scaly vestiture not arranged in rows, darker spots on elytron covered with darker scales. Darker spots, occasionally absent, forming 5 irregular transverse bands. Scales about 3.5 times as long as wide. Elytra also covered with very long erect hairs.

Legs robust, hind legs considerably longer than rest pairs; ratio of widths of fore, middle, and hind femora (without tooth) 3.1 : 2.6 : 4.4. Fore and middle femora with medium-sized, hind femur with very large tooth about 1/3 of width of the rest of femur. Tibiae slightly S-curved. Excavation on middle tibia well developed, hind tibia dilated proximal to excavation. Fore tarsus of male slightly widened.

Abdomen ventrally sparsely covered with scales, 3rd and 4th ventrites also with transverse row of long hairs. Margins of 5th ventrite simple, without excavations. Pygidium without longitudinal rib.

Male genitalia. Aedeagus as in Fig. 66, with angle between basal and apical parts slightly more than 90°.

Female genitalia. Spermatheca as in Fig. 83.

Length of males 3.4–4.0, of females 4.0–4.4 mm.

Comparative notes. This species is close to *H. songlana* sp. n. sharing with it very long hairs on the elytra, simple pygidium and 5th ventrite, but *H. longipilosa* has the hind femur widened and armed with a big tooth.

5. *Hyperaxis sonlana* Moseyko et L. Medvedev,
sp. n.
(Figs. 6, 7, 21, 22, 35, 54, 67, 68, 84)

Material. Holotype, male: **Vietnam**, *Gia Lai Prov.*, Son Lang, 50 km N of Ankhe, Ha-Nung, tropical forest, glade, on *Melastoma* sp. (Melastomataceae), 30–31.X.1979 (L. Medvedev et al.) (ZIN).

Paratypes: as holotype, but 5–20.XI.1979, 1 female (LM). **Vietnam**. *Lam Dong Prov.*, Dalat, 1500 m, 26–27.IX.1960 (C.M. Yoshimoto), 1 female (BM); Dalat, 1550 m (J.L. Gressitt), 1 male, 1 female (BM and ZIN). *Ha Giang Prov.*, mountains N of Ha-Giang, 900 m, 7.VII.1963 (O.N. Kabakov), 2 males (ZIN).

Diagnosis. Pronotum widest in basal third. Pygidium and 5th ventrite simple. Frontoclypeus with margin not angularly concave. Elytra with very long

hairs. Hind femur moderately widened, with comparatively narrow short tooth.

Description. Body reddish to brown, with or without dark pattern. In dark specimens 11th antennal segment darker than other segments. Elytral hairs long, up to 0.3 mm in length.

Body elongate, males 2.0–2.06, females 1.89–1.94 times as long as wide, with humeral calli well developed, basal prominence and basal impression on elytra feebly developed. Pronotum with feeble transverse impression at anterior edge, this impression better visible on lateral parts of disc.

Head densely reticulate and covered with scales, occasionally leaving extremely narrow shortened bald median line on frons. Frontoclypeus trapeziform, slightly wider than long, separated from frons by feeble transverse impression, microreticulate and finely punctate. Eyes of medium size, not emarginate, feebly prominent. Distance between eyes 2.0 times width of an eye (male). Antennae reddish, about as long as body (male) or 4/5 as long as body (female); in dark specimens 11th segment darker. First segment robust, somewhat club-shaped. Ratio of segments lengths of male: 1.7 : 1.1 : 2.5 : 2.6 : 2.6 : 2.6 : 2.7 : 2.0 : 2.0 : 1.8 : 2.2. 7–11th segments not thickened.

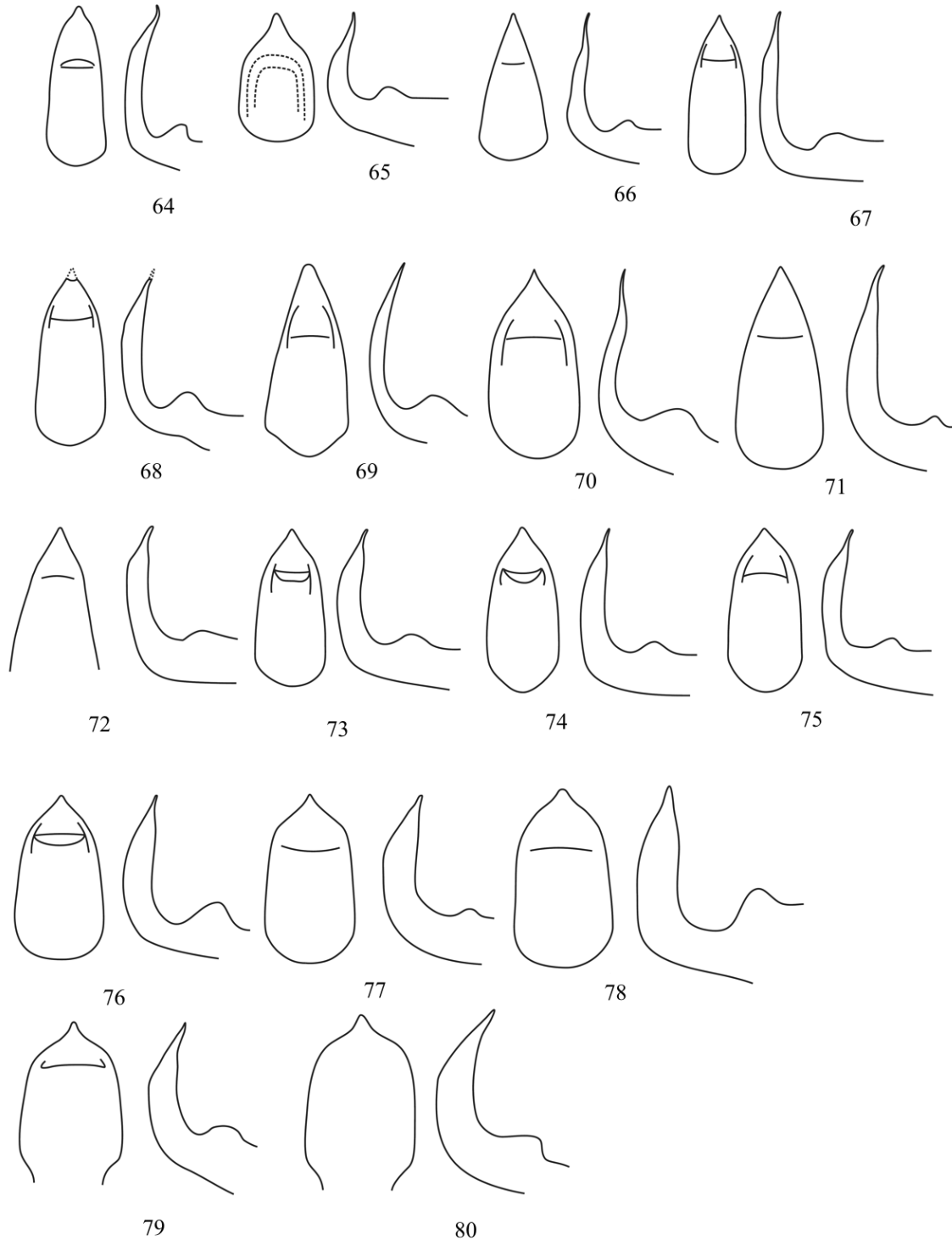
Pronotum 1.39–1.44 (males) and 1.54–1.65 (females) times as wide as long, with rounded sides, widest in hind third. In some specimens impressions on posterior part of pronotum present in addition to anterior transverse impression. Surface densely reticulate and closely covered with scales, differently oriented and denser on lateral parts of pronotum. Lateral edging well developed in posterior half of prothorax and broken or absent in anterior half; sides of prothorax convex and smoothly curved. Prosternum between coxae longer than wide, microreticulate, finely punctate and covered with hairs. Notosternal sutures visible, but occasionally concealed by scales; hypomera and lateral arms or prosternum covered with scales. Mesepisternum, mesepimeron, metepisternum and lateral parts of metathorax covered with thin scales not very densely.

Scutellum subtrapeziform or almost triangular, narrowed posteriorly, slightly rounded at apex. Dorsum covered with scales similar to those on elytra.

Elytra 1.40–1.45 (males) and 1.48–1.55 (females) times as wide as pronotum, slightly narrowed behind humeri and rounded at apex. Dorsum strongly convex,



Figs. 50–63. *Hyperaxis* spp., 5th ventrite of female: (50) *H. nigrita* (Er.); (51) *H. harmandi* Lef., syntype; (52, 53) *H. longipilosa* sp. n.; (54) *H. sonlanga* sp. n.; (55) *H. phanrangi* sp. n.; (56–60) *H. yaosanica* Chen [(56, 57) China, (58, 59) southern Vietnam, (60) northern Vietnam]; (61) *H. feae* Jac., northern Thailand; (62, 63) *H. buonloica buonloica* sp. and subsp. n.



Figs. 64–80. *Hyperaxis* spp., aedeagus: (64) *H. dentifemur* sp. n., holotype; (65) *H. nigrita* (Er.); (66) *H. longipilosa* sp. n.; (67, 68) *H. sonlanga* sp. n. [(67) paratype, northern Vietnam; (68) holotype]; (69) *H. maculata* Kim. et Gr.; (70) *H. ariyani* Chûjô; (71) *H. phanrangi* sp. n., holotype; (72–75) *H. yaosanica* Chen [(72) northern Vietnam, (73–75) southern Vietnam]; (76) *H. feae* Jac., northern Thailand; (77) *H. pallidipes* Pic; (78) *H. pallidicornis* (Jac.), holotype; (79) *H. buonloica buonloica* sp. and subsp. n.; (80) *H. buonloica darlaki* sp. and subsp. n.

with well-developed humeral calli, and feeble but visible basal prominence and basal impression. Elytron with 11 rows of punctures between suture and humeral callus, some of them completely confused. Scaly vestiture irregular, but darker spots on elytron covered with darker scales. Darker spots, occasionally absent, in some specimens separate and partly arranged in transverse bands, or merging into longitudinal lines in anterior half of elytron. Scales about 2.5–3.0 times as long as wide. Elytra covered also with long erect hairs.

Legs moderately robust, hind legs considerably longer than rest ones; ratio of widths of fore, middle, and hind femora (without tooth) 2.5 : 2.5 : 3.2. All femora armed with medium-sized tooth. Excavation on middle tibia well developed, on hind tibia in form of dilation. Fore tarsus of male almost not widened.

Abdomen ventrally covered with sparse scales, 3rd and 4th ventrites also with few long hairs. Margins of 5th ventrite simple, without excavations. Pygidium without longitudinal rib.

Male genitalia. Aedeagus as in Figs. 67, 68, with angle between basal and apical parts about 90°.

Female genitalia. Spermatheca as in Fig. 84.

Length of males 3.4–4.1 mm; females 4.2–4.8 mm.

Comparative notes. This species is close to *H. longipilosa* sp. n., both having the hairs on elytra very long, pygidium and 5th ventrite simple, but *H. songlana* has hind femur not widened and with a small tooth.

6. *Hyperaxis maculata* Kimoto et Gressitt, 1982
(Figs. 23, 36, 69, 85)

Hyperaxis maculatus: Kimoto and Gressitt, 1982 : 77.

Material. Vietnam. *Lam Dong Prov.*, 7 km SE of Dilinh (Djiring), 990 m, 2.V.1960 (R.E. Leech), 1 female (paratype) (BM). *Gia Lai Prov.*, K'Bang Distr., Buon Luoi, ca. 14°16'N, 108°34'E, 3, 12.VI.1980; 9, 12–19.VII.1981; 14.VI.1982; 2–28.VI.1983; 10–14.VI.1985 (L. Medvedev et al.), 13 males, 16 females, 3 unsexed spms. (LM).

This species was described from Lam Dong Province. In addition to the usual color form, blackish with white scaly spots, there are females covered with dirty-whitish scales with spots of blackish scales.

7. *Hyperaxis phanrangi* Moseyko et L. Medvedev,
sp. n.
(Figs. 8, 24, 38, 55, 71, 87)

Material. Holotype, male: **Vietnam**, *Ninh Thuan Prov.*, 55 km NW of Phan Rang, 8–16.XI.1960 (C.M. Yoshimoto) (BM).

Paratype, female: **Vietnam**, *Ninh Thuan Prov.*, 15–35 km NW of Phan Rang, 8–16.XI.1960 (C.M. Yoshimoto) (BM).

Diagnosis. Pronotum widest in basal third. Pygidium and 5th ventrite simple. Frontoclypeus with anterior margin not angularly concave. Elytra with moderately long hairs. Hind femur widened, with large tooth.

Description. Body reddish to brown, with or without darker cuticular, and darker and dense white scaly pattern. Legs and antennae yellow. Elytral hairs about 0.2 mm in length.

Body subelongate, male 1.48, female 1.44 times as long as wide, with humeral calli well developed, basal prominence and basal impression on elytra almost absent. Pronotum with feeble transverse impression at anterior edge, this impression better visible on lateral parts of disc.

Head superficially reticulate, covered with scales, leaving extremely narrow shortened bald median line on frons. Frontoclypeus trapeziform, slightly wider than long, separated from frons by feeble transverse impression, microreticulate and finely punctate. Eyes medium-sized, not emarginate, prominent. Distance between eyes 2.35 times width of an eye (male). Antennae reddish, about 2/3 as long as body. First segment somewhat club-shaped. Ratio of male antennal segments lengths: 1.6 : 1.0 : 2.4 : 2.4 : 2.4 : 2.3 : 2.4 : 1.9 : 1.8 : 1.8 : 2.2. 7–11th segments slightly thickened.

Pronotum 1.51 (male) and 1.55 (female) times as wide as long, with rounded sides, widest in basal third. Surface superficially reticulate and closely covered with scales, directed differently and slightly denser along midline. Lateral edging thin, broken by punctures but recognizable; sides of prothorax convex and smoothly curved. Prosternum between coxae longer than wide, microreticulate only in posterior half, sparsely punctate and covered with hairs. Notosternal sutures visible, but occasionally concealed by scales; hypomera and lateral arms or prosternum covered with

scales. Mesepisternum, mesepimeron, metepisternum and lateral parts of metathorax densely covered with short and thin scales.

Scutellum narrow, subtrapeziform, slightly rounded at apex. Dorsum covered with scales similar to those on elytra.

Elytra 1.38 (male) and 1.46 (female) times as wide as pronotum, slightly narrowed behind humeri, widened in apical 2/3 and rounded at apex. Dorsum strongly convex, with well-developed humeral calli, and poorly recognizable basal prominence and basal impression. Elytra with partly confused (especially in central part) rows of punctures; about 11 rows present between suture and humeral callus. Scaly vestiture almost uniform in the holotype while in female 2 distinct and 3 indistinct transverse broken brown bands present. Scales about 3 times as long as wide. Elytra covered also with moderately long erect hairs.

Legs robust, hind legs considerably longer than rest pairs; ratio of widths of fore, middle, and hind femora (without tooth) 2.4 : 2.1 : 3.2. Fore and middle femora with medium-sized tooth; hind femur with large tooth, about 1/3 of the femur width. Excavation on middle tibia well developed, that on hind tibia in form of feeble dilation. Fore tarsus of male not widened.

Abdomen ventrally covered with very thin hair-like scales, 3rd and 4th ventrites also with few long hairs. Margins of 5th ventrite simple, without excavations. Pygidium without longitudinal rib.

Male genitalia. Aedeagus as in Fig. 71, with angle between basal and apical parts about 90°.

Female genitalia. Spermatheca as in Fig. 87.

Length of male 3.3, of female 3.2 mm.

Comparative notes. This species is very close to *H. yaosanica* but has a wide hind femur with a large tooth.

8. *Hyperaxis yaosanica* Chen, 1940

(Figs. 9–12, 26, 27, 39–44, 56–60, 72–75, 89–93)

Hyperaxis yaosanica Chen, 1940 : 508.

Material. China. Fujian Prov., Jianyang, Huangheng, 290 m, 20.VI.1960 (Jiang Ch. Q.), 1 female (Tan J.-J. det.) (NHM). Hupeh and Sichuan provinces border, Sang-Hou-Ken, 19.VII.1948 (Gressitt & Djou), 1 female (compared with type by Kimoto in 1959) (BM). **Vietnam.** Hoa Binh Prov., Mai Chau Pa Co,

1100 m, 20–21.IV.2002 (S. Belokobylskij), 1 male, 1 female (ZIN). “Haut Tonkin, Ladkay” (Vitalis de Salvaza / A. Vuillet), 1 female (MNHN). *Huong Son Prov.*, Ha Son Binh, 26–29.IV.1991 (J. Strnad), 1 female (CA). *Vinh Phuc Prov.*, NW of Tam Dao, Son Duong, 200 m, 4.IV and 20.V.1962 (O.N. Kabakov), 2 females (ZIN). *Nghe An Prov.*: Quy-Chau, Mountains, 12.I.1963 (O.N. Kabakov), 1 spm. (ZIN). *Dac Lac Prov.*: 10 km NE of Buon Ma Thuot, on glade, 23.VI.1985 (L. Medvedev et al.), leg. 1 male (ZIN); 1 male, 1 female (LM); 10 km SW of Buon Ma Thuot, Eakao, on glade, 24.VI.1985 (L. Medvedev et al.), 1 male, 3 females (ZIN, LM); 65 km N of Buon Ma Thuot, 21.VI.1985 (L. Medvedev et al.), 1 male (LM). *Gia Lai Prov.*: 15 km N of Plei Ku, 17.XI.1979 (L. Medvedev et al.), 1 female (LM); Plei Ku, savanna, 12.X.1979 (L. Medvedev et al.), 1 female (ZIN); Buon Luoi, 40 km N of Ankhe, 24.VI.1980 (L. Medvedev et al.), 1 male (LM); as above, but 7.VI.1983, 1 female (LM); 28.VI–2.VII.1983, 1 female (LM); Ha Nunt, tropical forest, 14–16.VI.1980 (L. Medvedev et al.), 1 female (LM). *Lam Dong Prov.*, Di Linh, 1200 m, grasses, 22–28.IV.1960 (L.W. Quate), 4 males, 2 females (BM, ZIN). “Cochinchine, Song Haconh, Cap Fouquet, VI.1903,” 1 male (NMNH: M. Pic coll.). Saigon, 1 male (NMNH: M. Pic coll.).

We have not examined the type material of *H. yaosanica*, but 2 specimens from China, identified by Tan J.-J. and S. Kimoto, were available and they are conspecific with the Vietnamese material. The aedeagus is quite variable (Figs. 72–75) as well as the spermatheca (Figs. 89–93) but these variations do not correlate with the geographical origin of the specimens and external morphology and are insufficient for splitting *H. yaosanica* into several species.

9. *Hyperaxis feae* Jacoby, 1904

(Figs. 13, 14, 28, 45, 61, 76, 94)

Demotina semifasciata: Jacoby, 1892 : 906 (non *Demotina semifasciata* Baly, 1863).

Hyperaxis semifasciata (Jacoby, 1892): Jacoby, 1904 : 384 (as a homonym)

Hyperaxis feae: Jacoby, 1904 : 385 (replacement name)

Material. Myanmar: Carin Cheba, 900–1100 m, V–XII.1888 (L. Fea), 2 females (syntypes), (NHM GENOVA). **Thailand:** Loei Prov., Na Hao (biological station), light trap, 5–12.V.2001, 15–19.V.2003

(Constant and Grootaert), 10 spms. (IRSNB); as above, Malaise trap, 1–8.IV.2001, 1 spm. (IRSNB). **Vietnam** (northern): mountains near upper Niam-Ma, near Dong-Pao, 28.V.1963 (O.N. Kabakov), 1 male (ZIN). *Son La Prov.*, Song Ma, 3.V.1986 (A.V. Gorokhov), 1 female (ZIN).

This species was described from Myanmar (Carin Cheba). Scales covering elytra and pronotum of this species are more elongate than in *H. buonloica* sp. n., about 3.5 times as long as wide. Aedeagus as in Fig. 76, spermatheca as in Fig. 94. *Hyperaxis semifasciata* is the earliest described species from the group with longitudinal rib on pygidium and excavated 5th ventrite, and we propose to name this species group as the *feae* group. Some females of *H. feae* lack noticeable longitudinal rib on the pygidium and the latter looks simple on slide in glycerin, but excavations of 5th ventrite are always present.

10. *Hyperaxis pallidipes* (Pic, 1929)
(Figs. 15, 29, 77)

Pseudometaxis pallidipes Pic, 1929 : 147.

Hyperaxis pallidipes (Pic, 1929): Kimoto and Gressitt, 1982 : 78.

Material. Lectotype (designated here), male: **Vietnam:** *Hoa Binh Prov.*, Tonkin (MNHN). *Hoa Binh Prov.*, Tonkin, 1928 (A. de Cooman), 1 male (MNHN). *Hoa Binh, Ky Song, Cuc Phuong*, 25–29.X.1990, 1 male, 2 females (ZIN).

This species is known only from 5 specimens from northern Vietnam. Morphological characteristics and distributional data given by Kimoto and Gressitt (1982) are incorrect; the photo in their paper actually refers to *H. longipilosa* sp. n. (see above). The species belongs to the *feae* group and is very similar to *H. pallidicornis* (Jacoby, 1892; as *Pseudopiomera*) (aedeagus, see Fig. 78) known only from a male from Myanmar (Carin Cheba). The holotype of *H. pallidicornis* has a much narrower tip of the aedeagus. It is very probable that these two names belong to one species, but solution of this problem requires additional material from the intermediate areas.

11a. *Hyperaxis buonloica buonloica* Moseyko
et L. Medvedev, sp. and subsp. n.
(Figs. 16, 30, 46–49, 62, 63, 79, 95)

Material. Holotype, male: **Vietnam, Gia Lai Prov.**, K'Bang District, Buon Luoi, ca. 14°16'N, 108°34'E, 02.VI.1983 (L. Medvedev et al.) (ZIN).

Paratypes (84 in total): as holotype, 5 spms. (ZIN, LM); as holotype, but 12.VI.1980, 2 spms.; 23–24.VI.1980, 6 spms.; 28.VI.1981, 8 spms.; 5.VII.1981, 1 spm.; 1.VI–2.VII.1983, 59 spms.; 10–13.VI.1985, 1 spm. (LM and ZIN); 20 km N of Plei Ku, 650 m, 9.V.1960 (L.W. Quate), 2 spms. (BM).

Diagnosis. Pronotum widest in basal third. Pygidium with thin longitudinal rib; 5th ventrite with large excavations of hind angles. Hind femur widened, with large tooth. Aedeagus comparatively wide. Color reddish brown.

Description. Body reddish to brown, covered with whitish and reddish brown scales, usually with dark pattern, at least with spots of brownish scales. Legs and antennae reddish, 11th antennal segment darker only in dark specimens. Elytral hairs moderately long, up to 0.2 mm in length.

Body elongate, males 1.83–1.95, females 1.82–1.88 times as long as wide, with humeral calli well developed, basal prominence and basal impression on elytra moderately developed. Pronotum of females with feeble transverse impression at anterior edge, this impression better visible on lateral parts of disc; in males this impression indistinct.

Head reticulate and covered with scales, occasionally leaving narrow shortened bald median line on frons. Frontoclypeus trapeziform, transverse, separated from frons by feeble transverse impression, microreticulate and finely punctate. Eyes medium-sized, not emarginate, prominent. Distance between eyes 1.70–1.82 times width of eye (males). Antennae reddish, slightly shorter than body (male) or 3/4 as long as body (female); in dark specimens 11th or 10th and 11th segments darker. First segment robust, somewhat club-shaped. Ratio of segment lengths of male: 1.3 : 1.0 : 2.3 : 2.4 : 2.3 : 2.1 : 2.2 : 1.6 : 1.7 : 1.6 : 2.1. 7–11th segments slightly thickened.

Pronotum 1.40–1.47 (males) and 1.51–1.61 (females) times as wide as long, with rounded sides, widest in posterior third. Surface reticulate and closely covered with scales, directed differently and considerably denser in three longitudinal stripes.

Lateral edging usually visible in posterior half of prothorax and broken or absent in anterior half; sides of prothorax convex and smoothly curved. Prosternum between coxae longer than wide, in males slightly narrower than in females, partly microreticulate, finely punctate and covered with hairs. Notosternal sutures visible but occasionally concealed by scales; hypomera and lateral arms or prosternum covered with



Figs. 81–95. *Hyperaxis* spp., spermatheca: (81) *H. nigrita* (Er.); (82) *H. harmandi* Lef., syntype; (83) *H. longipilosa* sp. n.; (84) *H. sonlanga* sp. n.; (85) *H. maculata* Kim. et Gr.; (86) *H. ariyani* Chûjô; (87) *H. phanrangi* sp. n.; (88) *Hyperaxis* sp.; (89–93) *H. yaosanica* Chen [(89) China, (90) northern Vietnam, (91–93) southern Vietnam]; (94) *H. feae* Jac., northern Thailand; (95) *H. buonloica buonloica* sp. and subsp. n.

scales. Mesepisternum, mesepimeron, metepisternum and lateral parts of metathorax quite densely covered with thin scales.

Scutellum subtrapeziform, narrowed posteriorly, slightly rounded at apex. Dorsum covered with scales similar to those on elytra.

Elytra 1.40–1.50 (males) and 1.46–1.53 (females) times as wide as pronotum, slightly narrowed behind humeri and rounded at apex. Dorsum strongly convex, with well-developed humeral calli, and moderate basal prominence and basal impression. Elytron with mostly regular 11 rows of punctures between suture and humeral callus. Scaly vestiture dense, in some specimens surface also covered with waste coating. Scales and waste arranged in spots on elytra; dark spots formed by darker areas of integument and brownish scales. Darker spots, occasionally feeble, can be separate or arranged in transverse bands. Scales about 2.5 times as long as wide. Elytra covered also with erect hairs.

Legs robust, hind legs considerably longer than rest pairs; ratio of widths of fore, middle, and hind femora (without tooth) 2.0 : 1.9 : 2.8. Fore and middle femora with small tooth, hind femur with large tooth about 1/3 of the femur width. Excavation on middle tibia well developed, on hind tibia in form of slightly concave dilation. Fore tarsus of male almost not widened.

Abdomen ventrally covered with sparse scales and hairs, 4rd and 5th ventrites with much longer hairs. Margins of 5th ventrite with large excavations. Pygidium with longitudinal rib.

Male genitalia. Aedeagus as in Fig. 79, with angle between basal and apical parts more than 90°.

Female genitalia. Spermatheca as in Fig. 95.

Length of males 2.7–3.2, of females 3.3–4.0 mm.

Comparative notes. *Hyperaxis buonloica* belongs to the *feae* species group having the pygidium with a rib and 5th ventrite excavated. It differs from other species in the larger excavations of the 5th ventrite, wider and shorter scales on the elytra, and wider aedeagus. The nominotypical subspecies differs from *H. b. darlaki* subsp. n. in lighter color and larger body.

11b. *Hyperaxis buonloica darlaki* Moseyko
et L. Medvedev, sp. et subsp. n.
(Figs. 17, 80)

Material. Holotype, male: Vietnam, *Dac Lac Prov.*, 65 km N of Buon Ma Thuot, 21.VI.1985 (L. Medvedev) (ZIN).

Paratypes: as holotype, 1 male, 5 females (LM, ZIN).

Diagnosis. Color dark brownish gray. Body smaller than in the nominotypical subspecies.

Description. Body dark reddish to black, elytra dark brown, covered with greyish and brownish scales forming a pattern; antennae yellow. Elytral hairs moderately long, up to 0.2 mm in length.

Body elongate, males 1.87–1.96, females 1.89–1.93 times as long as wide.

Pronotum 1.46–1.50 (males) and 1.55–1.58 (females) times as wide as long.

Elytra 1.41–1.47 (males) and 1.42–1.51 (females) times as wide as pronotum.

Length of males 2.5–2.8, of females 3.0–3.2 mm.

Comparative notes. The southernmost population of *H. buonloica* looks very different from the northern one and thus we describe it as a subspecies but the final decision on its rank requires examination of additional material.

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