Revision of *Tegyrius* (Coleoptera: Chrysomelidae: Galerucinae: Alticini), with descriptions of eight new species

K. D. PRATHAPAN¹* and C. A. VIRAKTAMATH²

¹Department of Entomology, Kerala Agricultural University, Vellayani P.O., Trivandrum – 695 522, Kerala, India
²Department of Entomology, University of Agricultural Sciences, GKVK P.O., Bangalore – 560 065, India

Received 22 March 2008; accepted for publication 25 July 2008

The flea beetle genus *Tegyrius* Jacoby, 1887 (Coleoptera: Chrysomelidae) associated with Piperaceae is revised. Eight new species, namely *Tegyrius agasthyai* sp. nov., *Tegyrius dalei* sp. nov., *Tegyrius nigrotibialis* sp. nov., *Tegyrius pucetibialis* sp. nov., *Tegyrius radhikae* sp. nov., and *Tegyrius tippui* sp. nov., from India, and *Tegyrius anupama* sp. nov. and *Tegyrius buddhai* sp. nov., from Sri Lanka, are described and illustrated. Key to species and host plant information are also provided. *Tegyrius piceus* Kimoto, 2001 is transferred to *Longitarsus* Latreille, 1829 (new combination); *Tegyrius antennatus* (Medvedev, 2001), *Tegyrius bicolor* (Medvedev, 2001) (both earlier *Lankaphthona*), and *Tegyrius keralaensis* (Doeberl, 2003) (earlier *Ogloblinia*) are proposed as new combinations.


INTRODUCTION

The plant family *Piperaceae* encompasses about 2000 species classified between five and ten genera. *Piper* L., the most speciose genus of the family, includes nearly 700 species. Members of *Piper* are mostly perennial woody climbers, herbs, or shrubs that are pantropical in distribution. The genus in South-East Asia is important, as spice and aromatic crops like *Piper nigrum* L. (black pepper), *Piper betle* L. (betel vine), *Piper longum* L. (long pepper), *Piper chaba* Hunter (Java long pepper), and *Piper cubeba* L. (cubeb) probably evolved in this region.

The flea beetle genera *Lanka* Maulik, 1926 and *Tegyrius* Jacoby, 1887 are specialist feeders on *Piperaceae* in the Indian subcontinent. Devasahayam (2000) was the first to record the host plant of *Tegyrius*. Excepting *Tegyrius keralaensis* (Doeberl, 2003) comb. nov., which feeds on both *Piper* and *Lepianthes* Rafinesque, all other known species of the above genera are restricted to the genus *Piper* in the subcontinent. *Lanka*, known for the larvae developing within the fruits of *Piper*, was recently redefined with three new species from India (Prathapan & Viraktamath, 2008). This work is a sequel to our studies on *Lanka*, which together form the culmination of our selective, but intensive, collection from *Piperaceae* in India and Sri Lanka.

*Tegyrius* was described by Jacoby (1887) to accommodate the lone species *Tegyrius metallicus* Jacoby, 1887 from Sri Lanka, and was considered monotypic until Kimoto (2001) placed a new species from Nepal in this genus; however, this generic placement is erroneous and is corrected here. In this paper, *Tegyrius* is redefined and 12 species are recognized.

The descriptive terminology used here follows Konstantinov (1998). The measurements are all in millimetres (mm) and the mean values are provided in brackets. In the case of the male and female genitalia, only a single specimen was measured. Other...
measurements were taken from four randomly selected specimens (two males and two females). If the number of specimens available was less than four, all specimens were measured. The holotypes have been deposited in the Natural History Museum, London (BMNH). The paratypes will be deposited in the following institutions: National Pusa Collection, Indian Agricultural Research Institute, New Delhi (NPC); University of Agricultural Sciences, Bangalore (UASB); National Museum of Natural History, Smithsonian Institution, Washington DC (USNM); Ehime University, Japan (EUJ); Kyushu University, Japan (KUJ); Naturhistorisches Museum, Basel (NHMB), personal collection of Dr L. Medvedev (LMC), and the personal collection of the first author (PKDC).

**GENUS TEGYRIUS JACOBY, 1887** (FIGS 1–116)


**Distribution:** India and Sri Lanka.

**Host plants:** *Piper* L. and *Leptianthes* Rafinesque (Piperaceae).

**Description:** Moderately small, length 1.5–2.6 mm, width 0.9–1.5 mm (Fig. 50). Colour light brown to red to black. Head (Fig. 51) hypognathous. In lateral view, frons and vertex convex, with frons distinctly more convex than vertex. Vertex slightly convex, minutely punctate. Supraorbital pore circular, not surrounded by shallow groove, with adjacent minute setiferous pores. Antennal callus well developed, transverse, 2.5–3.0 times wider than long; anteromesal ends angulate, curved, and entering into interantennal space (as in *Trachytyetra* Sharp, 1886). Antennal callus as high as vertex near post callinal sulcus, lower near antennal socket than near post-callinal sulcus. All sulci delimiting antennal callus (except supraorbital, which is variable) well developed. Post callinal sulcus slightly oblique, gently curved, deep, as strong as orbital sulcus, stronger than supraantennal and/or suprafrontal sulci. Midfrontal sulcus wider, shorter, and deeper than suprafrontal sulcus. Subgenal suture well developed along base of mandible. Midcralian suture absent. Orbit very narrow, less than half the diameter of the antennal socket. Eye anterolateral, inner margin weakly concave near antennal socket, vertical diameter 1.1–1.4 times transverse diameter. Distance between eyes 3.0–3.8 times the diameter of a socket, and 1.0–1.2 times the transverse diameter of an eye. Diameter of antennal socket 1.8–3.5 times the distance between the eye and the adjacent socket. Distance between antennal sockets 0.86–1.33 times the diameter of the socket.

Frontal ridge short, acutely narrowed, raised between antennal sockets, and widening anteriorly. Anterofrontal ridge triangular, anteriorly flat above clypeus, not distinct from frontal ridge, with frontal ridge forming indistinct denticle in the middle of the anterofrontal ridge. Frontal ridge together with anterofrontal ridge forming equilateral triangle. Frontoclypeal suture with row of setae. Antennae filiform, and reaching the middle of the elytra or slightly beyond. First antennomere slightly shorter than twice the length of the second antennomere; third antennomere thinner, longer than second, and more or less shorter than fourth antennomere (distinctly shorter than fourth in *Tegyrius nigrotibialis* sp. nov.). Labrum with four setiferous pores arranged in transverse row, with sensillum on either side of middle pair (Fig. 61). In *T. metallicus*, mandible with four large denticle besides a tiny denticles on the mesal side (Fig. 63); maxilla with lacinia wider than galea, and sensory patch on last palpomere nearly as long as broad, with about seven embedded sensillae (Fig. 62); labium with penultimate palpomere longer and wider than apical palpomere (Fig. 64).

Pronotum: 1.3–1.5 times wider than long; with or without simple, distinct antebasal transverse impression, never delimited laterally; anteriorly wider; lateral margin curved, widest near middle, posteriorly narrower. Anterolateral callosity concave (variable in *Tegyrius dalei* sp. nov.). Anterolateral callosity as long as one third of the lateral margin, including the anterolateral callosity (shorter in *Tegyrius pecetibialis* sp. nov.), with pore situated at posterodorsal face, and forms denticle at pore; anterolateral callosity anteriorly higher than posteriorly. Posteralateral callosity slightly protruding, with pore situated laterally. Posterior margin weakly but distinctly bisinuate. Pronotal punctures small yet stronger than those on vertex. Anterior coxal cavities open. Intercoxal prosternal process extending beyond coxa, apical margin convex, flat on top; apex slightly widened; punctate, with preapical depressions. Width of prosternal intercoxal process 1.4–6.2 times the distance between the anterior margin of prosternum and the coxal cavity (Fig. 65). Distance between anterior margin of prosternum to end of intercoxal prosternal process 1.7–8.7 times the width of the prosternal intercoxal process. Prosternum 1.0–2.9 times as long as the mesosternum, 0.5–0.8 times as long as metasternum (Fig. 66). Proendosternite in *T. metallicus* about as long as broad, with the top bluntly angulate laterally. Pro- and mesotibiae dorsally convex, without apical spine. Visible part of
mesoscutellum flat, triangular, and extremely minutely punctate. Mesosternal intercoxal process more or less transversely depressed in the middle. Width of mesosternal intercoxal process 2.0–4.8 times the distance between the anterior margin of the mesosternum and the coxal cavity (Fig. 66). Distance from anterior margin of mesosternum to end of intercoxal mesosternal process 0.6–1.1 times the width of the mesosternal intercoxal process. Mesendosternite in *T. metallicus* narrow basally, broadened in middle, and apically narrowed like a thread (Fig. 67).

Elytra with well-developed callous calus, punctures confused, often forming uncountable rows. Ventral surface of elytron with three sensilla patches in *T. metallicus*: anterior as well as middle near lateral margin, posterior near apex. Elytral epipleuron extending beyond three-quarters of elytron, not reaching apex, oblique, with maximum width subequal to that of the midfemur. Wings with full set of veins. Metanotum fully developed with allocrista as long as medial groove, ridge joins distal end of b1 in *T. metallicus* (Fig. 69).

Metasternum with anterior margin convexly arched, and raised sharply between mesocoxae, posterior margin bisinuate, and raised on either side of discrern, forming a pair of distinct protuberances distally raised far above the level of the metacoxa (Fig. 66). Metendosternite with short stalk, shorter than basal width of arm in *T. metallicus* (Fig. 68).

Metafemur robust with proximal third of anterior margin strongly convex, posterior margin not distinctly convex. Metatibia apparently straight in lateral view, characteristically curved, with ends towards lateral side in dorsal view, gradually widening from proximal end to distal end, dorsally more or less flat, distinctly marginated on either side, lateral as well as mesal margins bear row of thick bristles distally, lateral row longer than one-third of the metatibia, mesal edge with similar bristles along apex only, tarsal articulation on well-developed callosity visible in lateral view; proximal to tarsal articulation, circular concavity with a broad, flat denticile on either side. First metatarsomere as long as or longer than half of metatibia, more or less laterally flattened, subequal to or longer than the rest of the tarsomerones combined, ventral side densely covered with thin, pointed setae, different from those on dorsal side, with setae often sexually dimorphic. Metatibial spine articulated at middle of apex, thick, sharp, and dorsolaterally directed. Second metatarsomere longer than third, distally wider than proximally, setae on ventral side not as dense as in first metatarsomere, pointed, and crowded towards distal region of ventral side; third metatarsomere bilobed, setae on ventral side feather like and dense; claw tarsomere apparently two times as long as third metatarsomere. Claw appendiculate, and nearly as long as the metatibial spine. First abdominal ventrite with a pair of characteristic subparallel ridges medially, joining anteriorly in the intercoxal region of the ventrite to form a shape like ‘\n’. Apical tergite of female proximally with a pair of sensilla patches and a shallow longitudinal groove along the middle, not reaching the apex; the groove may be absent, and the sensilla patches may be poorly developed, in some species. Spermatheca with distinct pump, receptacle, and duct; receptacle longer than wide, longer than pump; duct long, convoluted; vaginal palpi with distinct anterior and posterior sclerotization beside lateral unsclerotized area, medial margin fused for a short distance. Tignum channelled along middle, posterior sclerotization broader than anterior sclerotization.

In ventral view, median lobe of aedeagus with proximal end deeply cleft, ventral surface often convexly raised, apex broad or obtuse, never acutely pointed; in lateral view, moderately curved.

**Sexual dimorphism:** Members of *Tegyrius* exhibit unusual sexually dimorphic characters. Posterior margin of the last visible ventrite of males is bisinuate, with a lobe in the middle in all of the species. The posterior margin of the last ventrite in females is entire except in *Tegyrius anupama* sp. nov., which has a deep circular incision with an acute process in the middle (Fig. 17). The first pro- and mesotarsomerones are slightly wider in males than in females. The mesotibia is distally enlarged and curved in males in the two species from India. The first metatarsomere is sexually dimorphic in the Sri Lankan species. The colour of the fore- and middle legs and the last abdominal ventrite are sexually dimorphic in *T. keralensis* comb. nov.

**Larva:** Unknown.

**Remarks:** *Tegyrius* and *Lanka* belong to a group of genera with a pair of subparallel ridges along the middle of the first abdominal ventrite, and with a characteristically curved metatibia with a flat dorsal surface. This unique group, which is probably monophyletic, is represented in the Indian subcontinent by *Philogeus* Jacoby, *Bikasha* Maulik, and *Lankaphthona* Medvedev, besides *Lanka* and *Tegyrius*. Differential diagnoses and a key to these genera are provided in our work on *Lanka* (Prathapan & Viraktamath, 2008).

An antebasal transverse impression on the pronotum is a character commonly used at the generic level in the classification of flea beetles. Konstantinov (1998), using *Aphthona*, has shown that a simple antebasal transverse impression is of little value in separating genera. Our studies on *Tegyrius*...
underscore his contention that this character could be variable among congeneric species. Four species of Tegyrius completely lack the antebasal transverse impression that is present in other species at varying degrees of development.

Although Tegyrius is common in the Sri Lankan subregion, one of us (PKD) failed to collect them on Piper in the Himalayas. This is a strong indication of the Oriental origin of the genus. No flea beetle was observed on Peperomia Ruiz & Pavon, although they are common and next to Piper in diversity and abundance among the Piperaceae in the subcontinent.

TEGYRIUS AGASTHYAI SP. NOV. (FIGS 1–5)

Distribution: India (Kerala).

Figures 1–5. Tegyrius agasthyai sp. nov.: 1, elytra; 2, intercoxal ridges on the first abdominal ventrite; 3, spermatheca; 4, vaginal palpi; 5, tignum.
Host plant: The holotype was collected on an unidentified species of *Piper*.

Description: General colour straw brown, except anterior third of elytra piceous, with the piceous colour narrowly extending backwards along the lateral and sutural margin, but not reaching the apex (Fig. 1); distal six antennomeres gradually turn dark piceous, with the last antennomere with a light-brown apex; metafemora dark brown in distal half; all sternites light brown. Head darker than pronotum.

Supraorbital sulcus indistinct. Third antennomere slightly shorter than fourth; fifth equal to fourth; sixth shorter than fifth; sixth to ninth each subequal, tenth slightly shorter than ninth, and last subequal to first; distal five antennomeres indistinctly thicker than preceding ones; antennae reach half of the elytra over the pronotum.

Antebasal transverse impression on pronotum absent, except for a very faint impression evident laterally on either side. Punctures in antebasal transverse impression not stronger than those on rest of pronotum. Intercoxal prosternal process with preapical depressions, apical margin convex. Prosternal intercoxal process 2.0 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from anterior margin of prosternum to end of intercoxal prosternal process 2.5 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, apex rounded. Mesosternum flat on top, lateral edges raised, posterior margin concave. Elytra with maximum width at the middle; elytral apex convex, moderately broad; elytral punctures weak, not forming rows, distance between adjacent punctures 0.33–2.5 times the diameter of a puncture. First metatarsome harder as long as half of the metatibia. Subparallel ridges on the first abdominal ventrite extend beyond one-third of the ventrite, but do not reach the middle of the ventrite, and apparently converge distally (Fig. 2).

Male unknown.

Last female tergite with longitudinal groove. Vaginal palpus with distal sclerotization shorter than proximal sclerotization, lateral membranous area subequal to proximal sclerotization (Fig. 4). Spermatheca with horizontal part of pump longer than vertical part; receptacle slightly longer than twice the width, with the inner and outer sides convex; duct originates along the long axis, and is highly convoluted (Fig. 3). The distal sclerotization of the tignum is broader than long (Fig. 5).

Measurements \((n = 1)\): Length, 2.18; width, 1.27; length of pronotum, 0.58; width of pronotum, 0.79; width of head across eyes, 0.57; transverse diameter of one eye, 0.22; distance between eyes, 0.24; distance between eye and antennal socket, 0.04; distance between antennal sockets, 0.07; diameter of one antennal socket, 0.07; length of receptacle, 0.21; length of vaginal palpus, 0.47.

Types: Holotype ♀. Labels: (1) India, Kerala, Neyyar Wildlife Sanctuary (WLS), 8 February 2002, collected by (coll.) K. D. Prathapan; (2) *Tegyrius agasthyai* sp. nov. Prathapan & Viraktamath, 2007; (3) holotype (BMNH).

Etymology: This species is named after the mythical saint-healer Agasthya, after whom the Agashthyalai Hills are named. The type locality forms the core area of the Agashthyalai Biosphere.

Remarks: *Tegyrius agasthyai* sp. nov. is unique in having bicoloured elytra. Among the Indian *Tegyrius*, this is the only species without a well-developed antebasal transverse impression on the pronotum. Most probably this is an endemic species of the Agashthyalai Hills, where the extent of endemism is the highest in mainland India.

**TEGYRIUS ANTENNATUS** (MEDVEDEV, 2001) **COMB. NOV.** (FIGS 6–14)


Distribution: Sri Lanka.

Host plant: *Piper* sp. *nr. trioicum*. This is the most common wild *Piper* in Sri Lanka.

Description: Reddish brown. General colour of head, pronotum, antennae, and legs, black, with the following exceptions: apex of first, fourth, and last antennomere light brown; second and third antennomere light brown; all other antennomeres piceous; lateral and posterior margins of pronotum tainted reddish brown; maxillary palps dark brown; labium light brown; legs dark red–brown to piceous; all coxae, proximal and distal ends of femur, hind tibia, and tarsi brown; elytra and all sternites reddish brown.

Supraorbital sulcus distinct. The relative lengths of antennomeres vary significantly: third antennomere subequal to fourth or shorter; fourth and fifth subequal or fifth longer; sixth shorter than fifth, seventh longer than sixth, eighth subequal to sixth, tenth shorter than ninth, or fifth to ninth subequal; tenth
shorter than ninth; last longer than first; distal five or six antennomeres thickened; antennae reach the middle of the elytra over the pronotum.

Pronotum without antebasal transverse impression. Apex of prosternal intercoxal process convex, with two preapical depressions. Prosternal intercoxal process 3.7 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prothorax to the end of the intercoxal prosternal process 2.0 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, with narrowly rounded apex. Mesosternal intercoxal process depressed in anterior half, posterior margin concave. Elytra with maximum width at middle; elytral apex

Figures 6–14. Tegyrius antennatus (Medvedev, 2001) (specimens from the Knuckles Range); 6, intercoxal ridges on the first abdominal ventrite; 7, male last abdominal ventrite; 8, aedeagus, ventral view; 9, aedeagus, lateral view; 10, distal opening; 11, tegmen; 12, spermatheca; 13, vaginal palpi; 14, tignum. 
convex, moderately broad; elytral punctures indistinct, shallow, tend to form rows, distance between adjacent punctures 0.5–3.0 times the diameter of a puncture in the anterior half of the elytron.

Subparallel ridges on first abdominal ventrite extend beyond three-quarters of its length, and diverge distally (Fig. 6). Last visible tergite of females with a longitudinal groove along the middle. Last visible ventrite of males with middle lobe infolded with concave apical margin, and with a characteristic, flat denticle proximal to the middle lobe (Fig. 7).

Aedeagus nearly straight in distal two-thirds, with acute apex in lateral view (Fig. 9); in ventral view, slightly narrowed at distal third, and ventral surface with a pair of longitudinal ridges enclosing a transparent window; apex obtuse, without angular extremities (Fig. 8); distal opening partially covered with lamina (Fig. 10); arm of tegmen much longer than stem (Fig. 11).

Spermatheca with curved pump bearing a denticle at the apex, with horizontal part of pump longer than vertical part. Receptacle nearly three times as long as broad, tapering towards the duct, and with the outer side more strongly convex than the inner side. The duct forms an acute angle with the receptacle, and is highly convoluted (Fig. 12). Vaginal palpus with posterior sclerotization shorter than anterior sclerotization, and with membranous lateral area shorter than posterior sclerotization (Fig. 13). Tignum with posterior sclerotization wider than long (Fig. 14).

Sexual dimorphism: First protarsomere of males slightly longer and wider than in females, ventrally flat, without long setae, and with bud-like sensilla arranged in close transverse lines in the middle. In females, ventral side flat with short setae instead of bud-like sensilla. The modification of the first meta-tarsomere in males is similar to that of T. metallicus.

Measurements (n = 4): Length, 2.36–2.56 (2.46); width, 1.44–1.52 (1.49); length of pronotum, 0.61–0.66 (0.64); width of pronotum, 0.82–1.02 (0.89); width of head across eyes, 0.56–0.60 (0.58); transverse diameter of one eye, 0.22–0.24 (0.23); distance between eyes, 0.22–0.24 (0.23); distance between eye and antennal socket, 0.02–0.04 (0.03); distance between antennal sockets, 0.06 (0.06); diameter of one antennal socket, 0.06 (0.06); length of aedeagus, 1.13; length of receptacle, 0.31; length of vaginal palpus, 0.43.

Type material examined: Holotype ♂. Labels: (1) Sri Lanka, Beluhil Oya, coll. V. Zaitzev, 24 October 1982; (2) Holotypus, Lankaphthona antennata, m. L. Medvedev determined (det.) 1998; (3) Tegyrius antennata (Medvedev) K. D. Prathapan det. 2007 (LMC).

Other material examined: 1♂ and 2♀, Udawattekele Sanctuary, Kandy, 4 January 1974, coll. A. Otake; 1♂, with the same data, except that the date was 21 February 1974 (EUJ); 30♂ and 1♀, Sri Lanka, Knuckles Range, Atanwala, 7–8 March 2006, coll. K.D. Prathapan; 1♂, Adam’s Peak, 17 March 2006, PKDC (4 BMNH, 4 EUJ, 4 KUJ, 2 LMC, 4 NHMB, 4 NPC, 8 PKDC, 2 UASB, and 4 USNM).

Remarks: Lankaphthona differ from Tegyrius in having six setiferous pores on the labrum (four in Tegyrius), and antennal calli delimited by indistinct sulci (sulci delimiting antennal calli deep in Tegyrius). Tegyrius antennatus comb. nov. has all the salient features of Tegyrius. The pronotum lacks an antebasal transverse impression, which has led to its misidentification as Lanka in the past (Kimoto, 2003); however, the structure of the head and genitalia provide unequivocal evidence for its placement under Tegyrius. Tegyrius antennatus comb. nov. externally resembles Tegyrius bicolor (Medvedev, 2001), but they can be separated, as discussed under T. bicolor. Tegyrius antennatus comb. nov. can be differentiated from all other species of the genus by its unique coloration: black pronotum and red-brown elytra. Another unique feature on the last visible sternite of males is the denticle near the posterior margin.

TEGYRIUS ANUPAMA SP. NOV. (FIGS 15–24)

Distribution: Sri Lanka.

Host plant: Piper nigrum L.

Description: General colour shiny black. Head piceous, with brownish tinge. Pronotum and elytra shiny black. Sternites dark brown to black. Antennae and legs yellowish brown, except pro- and mesofemora, which are dark brown in the proximal two-thirds, and metafemora, which are dark brown with a lighter apex.

Supraorbital sulcus weak, but distinct. Third antennomere slightly shorter than fourth; fifth slightly longer than fourth; sixth shorter than fifth; seventh longer than sixth; eighth to tenth each slightly shorter than preceding one; last subequal to or slightly shorter than first. Distal five antennomeres slightly thickened. Antennae reach half of the elytra over the pronotum.

Antebasal transverse impression absent. Apex of prosternal intercoxal process convex, preapical depressions indistinct. Prosternal intercoxal process 4.3 times wider than distance between anterior margin of prosternum to coxal cavity; distance from anterior
margin of prosternum to end of intercoxal prosternal process 2.0 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, with broadly rounded apex. Mesosternal intercoxal process depressed on top, posterior margin concave. Elytra with maximum width at anterior two-thirds. Elytral apex convex, and moderately broad. Elytral punctures minute, tend to form rows, with the distance between adjacent punctures 1.5–3.5 times the diameter of a

**Figures 15–21. Tegyrius anupama sp. nov.** 15, intercoxal ridges on the first abdominal ventrite; 16, male last abdominal ventrite; 17, female last abdominal ventrite; 18, aedeagus, ventral view; 19, aedeagus, lateral view; 20, distal opening; 21, tegmen.

puncture in the anterior half of the elytron. First metatarsomere distinctly longer than half of metatibia.

Subparallel ridges along first abdominal ventrite well developed, extending beyond two-thirds of ventrite, nearly parallel with converging ends (Fig. 15). Last visible tergite of females with a short groove. Last visible ventrite in males with a group of microsetae on each side laterally, lobe in middle of last male ventrite with a convex apical margin (Fig. 16).

Aedeagus laterally compressed, moderately curved in lateral view, with a transverse depression preapically (Fig. 19). In ventral view, apex without angulate extremities, with a narrow transparent window along the middle, sharply raised along the middle, and forming an acute preapical ridge (Fig. 18). Distal opening partially covered with lamina (Fig. 20). Arm of tegmen much shorter than stem (Fig. 21).

Spermatheca with horizontal part of pump shorter than vertical part, receptacle nearly three times longer than wide, outer and inner sides slightly convex in middle, and narrowed towards duct; duct folded three or four times (Fig. 22). Proximal sclerotization of vaginal palpus subequal to distal sclerotization, with each sclerotization being shorter than the unsclerotized lateral area (Fig. 23). Tignum curved with broad distal sclerotization (Fig. 24).

Sexual dimorphism: First pro- and mesotarsomeres slightly enlarged in males. First metatarsomere of males modified as in *T. antennatus* comb. nov., but to a lesser extent. Posterior margin of last visible ventrite in females deeply incised, the incision with an acute process in the middle (Fig. 17).

Figures 22–24. *Tegyrius anupama* sp. nov.: 22, spermatheca; 23, vaginal palpi; 24, tignum.
Measurements (n = 4): Length, 2.00–2.21 (2.10); width, 1.10–1.30 (1.24); length of pronotum, 0.49–0.62 (0.57); width of pronotum, 0.74–0.82 (0.79); width of head across eyes, 0.55–0.60 (0.57); transverse diameter of one eye, 0.21–0.24 (0.22); distance between eyes, 0.21–0.26 (0.23); distance between eye and antennal socket, 0.02–0.03 (0.03); distance between antennal sockets, 0.07–0.08 (0.07); diameter of one antennal socket, 0.06–0.07 (0.07); length of aedeagus, 0.07–0.08 (0.07); diameter of one eye, 0.21–0.26 (0.23); distance between eye and posterior margin of one eye, 0.21–0.24 (0.22); distance between pronotum and mouth parts with dark-brown tinge. In the holotype, except the locality was Siripagama and the date was 6 March 2006 from Piper nigrum, 2009.


Paratypes (17 specimens): 6♂ and 9♀, with the same data as for the holotype, except the locality was Kandy and the date was 6 March 2006 from Piper nigrum; 1♂ and 1♀, with the same data as for the holotype, except the locality was Siripagama and the date was 17 March 2006 (3 BMNH, 2 EUJ, 2 KUJ, 1 LMC, 2 NHMB, 3 NPC, 1 PKDC, 1 UASB, and 2 USNM).

Etymology: Anupama literally means ‘unique’ in Sanskrit, and refers to the unique features of the species. The name is a noun in apposition.

Remarks: Tegyrius anupama sp. nov. is unique among the species of the genus in having the last female ventrite with a deep incision bearing an acute process in the middle. Among the Oriental flea beetles, Trachyaphthona bidentata Chen & Wang (1980) from China exhibits a similar sexual dimorphism. A laterally compressed aedeagus, with a transverse preapical depression in lateral view, is another unique feature of this species. Tegyrius anupama sp. nov. is a common pest of black pepper, P. nigrum, in Sri Lanka, feeding on the underside of mature leaves as T. keralaensis comb. nov. does in southern India.

TEGYRIUS BICOLOR (MEDVEDEV, 2001) COMB. NOV. (FIGS 25–31)


Distribution: Sri Lanka.

Host plant: Collected on Piper sp.

Description: Head and pronotum piceous; basal area of pronotum and mouth parts with dark-brown tinge. Elytra, meso- and metathoracic, and abdominal sternites red–brown. Suture slightly darker than the rest of the elytra. Antennae and all legs yellow, except for metafemora, which are red–brown.

Supraorbital sulcus distinct. The relative lengths of antennomeres vary significantly: third antennomere subequal to fourth and fifth; sixth shorter than fifth; seventh longer than sixth; eighth and ninth subequal, each shorter than seventh; tenth shorter than ninth; last longer than first; distal fourth and fifth antennomeres slightly thickened; antennae extend beyond the middle of the elytra over the pronotum.

Pronotum without antebasal transverse impression. Apex of prosternal intercoxal process convex, with two preapical depressions. Prosternal intercoxal process 2.4 times wider than the distance between the anterior margin of the pronotum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 2.3 times the minimum width of the prosternal intercoxal process.

Mesoscutellum as long as broad, with narrowly rounded apex. Mesosternum depressed in the middle, with raised anterior and posterior margins; posterior margin concave. Elytra with maximum width at anterior third; elytral apex distinctly convex, moderately broad; elytral punctures minute to moderately strong, confused, and tend to form rows, with the distance between adjacent punctures 0.1–1.8 times the diameter of a puncture in the anterior half of the elytron.

Subparallel ridges on first abdominal ventrite extend beyond three-quarters of its length, and converge distally (Fig. 25). Last visible tergite of females with a longitudinal groove along the middle. Last visible ventrite of males with the middle lobe infolded, and distally widening, with concave apical margin; with a denticle proximal to the middle lobe (Fig. 26), middle lobe infolded, widening anteriorly, distal margin concave (Fig. 27).

Aedeagus moderately curved with apical knob, proximal end crooked in lateral view (Fig. 29); in ventral view, slightly widened at the middle, ventral surface with a deep furrow, and apex deeply emerging (Fig. 28); distal opening partially covered with lamina (Fig. 30); arm of tegmen subequal to stem (Fig. 31).

Female unknown.

Sexual dimorphism: First protarsomere is slightly wider, and the first metatarsomere has a patch of apically flat setae ventromesally. These are probably secondary male sexual characters, as found in the other Sri Lankan species.

Measurements (n = 4): Length, 1.87–2.04 (1.94); width, 1.00–1.08 (1.04); length of pronotum, 0.51–0.58

(0.54); width of pronotum, 0.65–0.71 (0.67); width of head across eyes, 0.49–0.54 (0.52); transverse diameter of one eye, 0.18–0.24 (0.20); distance between eyes, 0.20–0.22 (0.21); distance between eye and antennal socket, 0.02 (0.02); distance between antennal sockets, 0.06 (0.06), diameter of one antennal socket, 0.06–0.07 (0.06); length of aedeagus, 0.72.

Type material examined: Holotype ♂. Labels: (1) Sri Lanka, Beluhil Oya, coll. V. Zaitzev 24 October 1982; (2) Holotypus Lankaphthona bicolor m. L. Medvedev

Figures 25–31. Tegyrius bicolor comb. nov. (specimen from Knuckles Range): 25, intercoxal ridges on first abdominal ventrite; 26, male last abdominal ventrite, ventral view; 27, male last abdominal ventrite, posterior view, showing the infolded middle lobe; 28, aedeagus, ventral view; 29, aedeagus, lateral view; 30, distal opening; 31, tegmen.
T. bicolor are yellow in tus nov. The apex of the elytra is strongly convex in brown to piceous portions. Antennomeres are thicker comb. nov., antennae and legs are black, with red–brown to piceous portions. Antennomeres are thicker in T. antennatus comb. nov. than in T. bicolor comb. nov. The apex of the elytra is strongly convex in T. bicolor comb. nov. compared with T. antennatus comb. nov. Subparallel ridges on first abdominal ventrite distally diverge in T. antennatus comb. nov. (subparallel ridges distally converge in T. bicolor comb. nov.). The shape of the aedeagus can be used to readily differentiate these two species. In T. antennatus comb. nov., the apex of the aedeagus is smoothly rounded in ventral view (deeply emarginated in T. bicolor comb. nov.), the middle region is slightly narrowed (slightly widened in T. bicolor comb. nov.), and the ventral surface has a pair of ridges enclosing a transparent window (ventral side is transparent and deeply furrowed in T. bicolor comb. nov.). The stem of the tegmen of T. antennatus comb. nov. is shorter than the arm (stem is as long as arm in T. bicolor comb. nov.).

**TEGYRIUS BUDDHAI SP. NOV.** (FIGS 32–40)

**Distribution:** Sri Lanka.

**Host plant:** The types were collected on unidentified Piper sp.

**Description:** Head, pronotum, and elytra, shining black. Sternites black, except last sternite of male dark-brown distally; mouth parts, antennae, and all legs except metatibiae brown with rufous tinge. Metatibiae piceous, with brown apex.

Supraorbital sulcus indistinct. Third antennomere subequal to fourth; fifth slightly longer than fourth; sixth shorter than fifth; seventh to ninth each subequal and longer than sixth; tenth slightly shorter than ninth; last subequal to first; distal five antennomeres slightly thickened. The antennae reach half of the elytra over the pronotum.

Pronotum with antebasal transverse impression distinct laterally, faint in middle, and impression not strongly punctate compared with the rest of the pronotum. Apex of prosternal intercoxal process convex, with preapical depressions. Prosternal intercoxal process 2.9 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 2.0 times the minimum width of the prosternal intercoxal process.

Mesosternum broader than long, with narrowly rounded apex. Mesosternal intercoxal process depressed on top, but appears flat, with raised anterior and lateral margins, and with posterior margin concave. Elytra with maximum width at the middle. Elytral apex convex, and moderately broad. Elytral punctures weak, and tend to form confused rows, with the distance between the adjacent rows 1–4 times the diameter of a puncture in the anterior half of the elytron. First metatarsomere as long as half of the metatibia.

Subparallel ridges on first abdominal ventrite well developed, extending beyond half of the ventrite, converging distally to form a single ridge (Fig. 32). Lobe in the middle of the last ventrite of males sparsely setose, with a concave apical margin, proximal to middle lobe, and with a knob-like convexity (Fig. 33).

Aedeagus nearly straight in lateral view with a crooked proximal end (Fig. 35); in ventral view, apex broad without angulate extremities, and ventral surface slightly depressed along the middle (Fig. 34); distal opening completely covered with lamina, which extend well beyond the apex of the aedeagus (Fig. 36). Tegmen with stem shorter than arm (Fig. 37). Spermheca with a strongly curved pump, receptacle about 2.5 times longer than broad, inner side almost straight, outer side convex, narrowing towards duct, and with duct highly knotted (Fig. 38).

Vaginal palpus with distal sclerotization shorter than proximal sclerotization, which is shorter than the lateral unsclerotized area (Fig. 39). Tignum with distal sclerotization broader than long (Fig. 40).

**Sexual dimorphism:** Pro- and mesotibiae slightly enlarged in males. First metatarsomere of males with a longitudinal patch of capitate sensillae, ventromesally, instead of hair-like setae. Such a patch is absent in females, but instead they have a patch of long setae ventrally. The colour of the last visible ventrite posteriorly is lighter in males.

**Measurements** ($n = 4$): Length, 2.03–2.51 (2.21); width, 1.15–1.32 (1.23); length of pronotum, 0.50–0.63 (0.57); width of pronotum, 0.67–0.82 (0.74); width of head across eyes, 0.54–0.62 (0.58); transverse
diameter of one eye, 0.21–0.25 (0.23); distance between eyes, 0.24–0.26 (0.25); distance between eye and antennal socket, 0.03–0.04 (0.04); distance between antennal sockets, 0.06–0.08 (0.07); diameter of one antennal socket, 0.06–0.07 (0.07); length of aedeagus, 0.58; length of receptacle, 0.24; length of vaginal palpus, 0.41.


Paratypes (three specimens): 1♂ and 2 ♀, with the same data as for the holotype (1 NHMB, 1 PKDC, and 1 USNM).

Figures 32–40. Tegyrius buddhai sp. nov.: 32, intercoxal ridges on first abdominal ventrite; 33, male last abdominal ventrite; 34, aedeagus, ventral view; 35, aedeagus, lateral view; 36, distal opening; 37, tegmen; 38, spermatheca; 39, vaginal palpi; 40, tignum.
Etymology: This species is named after the Gautam Buddha, as Adam’s Peak, the type locality, is the most venerated Buddhist destination in Sri Lanka. This fascinating and beautiful peak is locally known as Sri Pada, after the ‘Sacred Foot Print’ left by Buddha as he headed towards paradise.

Remarks: This species resembles *T. metallicus* in colour and other external features, but can be differentiated easily from it, as discussed for *T. metallicus*.

**TEGYRIUS DALEI SP. NOV.** (FIGS 41–49)

Distribution: India (Kerala).

Host plant: *Piper trioicum* Roxb.

Figures 41–46. **Tegyrius dalei** sp. nov.: 41, intercoxal ridges on first abdominal ventrite; 42, male last abdominal ventrite; 43, aedeagus, ventral view; 44, aedeagus, lateral view; 45, distal opening; 46, tegmen; 43b, aedeagus of **Tegyrius tippui** sp. nov., apex in ventral view.
Description: General colour black. Antennae, mouthparts, tibiae, and tarsi pitch brown to black.

Supraorbital sulcus indistinct. Third antennomere shorter than fourth; fourth and fifth subequal; sixth apparently shorter than fifth; seventh apparently longer than sixth; eighth shorter than seventh; eighth to tenth each apparently shorter than preceding segment; first and last subequal; last six antennomeres slightly thickened; antennae not extending beyond half of the elytra over the pronotum.

Pronotum with antebasal transverse impression, with punctures in the antebasal transverse impression being stronger than those on the rest of the pronotum. Apex of prosternal intercoxal process convex, with preapical depressions that may be indistinct in some specimens. Prosternal intercoxal process 2.2 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 2.3 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, with broad apex. Mesosternum depressed on top, with slightly concave posterior margin. Elytra with maximum width at anterior two-fifths; elyral apex convex and moderately broad; elytral punctures forming uncountable rows, moderately bold, with the distance between the adjacent punctures in the anterior half of the elytron 0.5–2.5 times the diameter of a puncture. First metatarsomere slightly longer than half of the metatibia.

Subparallel ridges on first abdominal ventrite reach the middle of the ventrite, and converge distally (Fig. 41). Last female tergite with short, indistinct groove along the middle. Lobe in the middle of the last ventrite of males with convex distal margin (Fig. 42).

Distal two-thirds of the aedeagus nearly straight in lateral view, with an acute apex (Fig. 44). In ventral view with acute, wedge-like preapical longitudinal ridge; distal end tridentate (Fig. 43); distal opening partially covered with lamina (Fig. 45); arms of tegmen shorter than stem (Fig. 46).

Spermatheca with horizontal part of pump subequal to vertical part; receptacle about three times longer than wide, outer side convex, inner side apparently convex, and not appreciably tapering towards the duct; duct with a knot at the base (Fig. 47). Vaginal palpus with lateral unsclerotized area, longer than proximal or distal sclerotization, and with proximal sclerotization subequal to distal sclerotization (Fig. 48). Tignum with arrow-shaped distal sclerotization (Fig. 49).

Sexual dimorphism: First pro- and mesotarsomeres slightly enlarged in males compared with females. Mesotibia and first metatarsomere of males unmodified.

Figures 47–49. Tegyrius dalei sp. nov.: 47, spermatheca; 48, vaginal palpi; 49, tignum.
Measurements \((n = 4)\): Length, 1.58–2.02 (1.80); width, 0.90–1.08 (0.97); length of pronotum, 0.40–0.47 (0.43); width of pronotum, 0.58–0.68 (0.62); width of head across eyes, 0.47–0.52 (0.49); transverse diameter of one eye, 0.17–0.20 (0.18); distance between eyes, 0.19–0.22 (0.2); distance between eye and antennal socket, 0.02 (0.02); distance between antennal sockets, 0.06–0.07 (0.06); diameter of one antennal socket, 0.06 (0.06); length of aedeagus, 0.76; length of receptacle, 0.22; length of vaginal palpus, 0.39.

Types: Holotype \(\varphi\). Labels: (1) India, Kerala, Ponmudi, March 2003, coll. K. D. Prathapan; (2) Tegyrius dalei sp. nov. Prathapan & Viraktamath, 2007; (3) holotype (BMNH).

Paratypes (79 specimens): 6\(\varphi\) and 7\(\varphi\), with the same data as for the holotype; 1\(\varphi\) and 1\(\varphi\), with the same data as for the holotype, except that the date was 29 February 2002; 2\(\varphi\) and 1\(\varphi\), with the same data as for the holotype, except that the date was 4 August 2002; 1\(\varphi\), with the same data as for the holotype, except that the date was 2 September 1999; 3\(\varphi\), Ponmudi-Kallar, 20 March 2005; 2\(\varphi\), Aripa, 8 February 2004; 6\(\varphi\) and 3\(\varphi\), with the same data, except that the date was 2 June 2005; 1\(\varphi\) and 4\(\varphi\), Neyyar WLS, 12 February 2004; 2\(\varphi\) and 1\(\varphi\), Sasthamnanda, 14 February 2004; 2\(\varphi\), Periyar Tiger Reserve, 15 February 2004; 1\(\varphi\), Palaruvi, 22 June 2006; 6\(\varphi\) and 2\(\varphi\), Pampa, 28 June 2006, from \(Piper hapnium\) Ham. (10 BMNH, 4 EUIJ, 4 KUJ, 4 LMC, 10 NHMB, 10 NPC, 19 PKDC, 4 UASB, and 10 USNM).

Etymology: This species is named after Dr D. Dale, Kerala Agricultural University, for being a talented and affectionate teacher of insect science.

Remarks: Tegyrius dalei sp. nov. is similar to T. tippui sp. nov. (see below) in the structure of the male and female genitalia, as well as in external features. Both of them feed on \(Piper triocicum\) Roxb. They differ in the following features: proximal antennomeres 6–8 are yellowish brown in T. tippui sp. nov. (dark brown to black in T. dalei sp. nov.), distal antennomeres 5–6 are distinctly thickened in T. tippui sp. nov. (last six antennomeres are only slightly thickened in T. dalei sp. nov.); the antennae extend well beyond half of the elytra over the pronotum in T. tippui sp. nov. (the antennae do not extend beyond half of the elytra over the pronotum in T. dalei sp. nov.); apex of aedeagus with lateral angles less prominent in T. tippui sp. nov. than in T. dalei sp. nov. However, the structure of spermatheca, aedeagus, and the last visible ventrite of males are unusually similar in both of the species. Tegyrius dalei sp. nov. is confined to the extreme south of the Western Ghats, and never occurs north of the Palghat Gap, whereas T. tippui sp. nov. occurs only north of the Palghat Gap. The Palghat Gap is a break in the Western Ghats mountain range of about 26 km, and there is no significant difference in the climate between the mountains north and south of the gap. Yet the gap has a significant sway on the distribution of the biota on either side of it (Bhimachar, 1945). This is yet another lucid illustration of the influence of the Palghat Gap on speciation and the zoogeography of the Western Ghats.

TEGYRIUS KERALAENSIS (DOEBERL, 2003) COMB. NOV. (FIGS 50–60)

Ogloblinia keralaensis Doeberl 2003: 302 [type locality: India, Kerala; holotype (Texas A.&M. University) not examined; paratypes examined].

Distribution: India (Karnataka, Kerala, and Tamil Nadu).


Figure 50. Tegyrius keralaensis comb. nov., habitus.
Description: Uniformly black. Antennae, all tibiae, and tarsi brownish yellow, all trochanters brownish; fore- and midfemora with dark tinge in proximal two-thirds in females, but only in proximal third in males. Hind femora piceous, with yellowish brown apex; mesoventral side lighter in colour. All sternites black; last abdominal ventrite of males lighter in colour. Mouth parts similar to last ventrite of males in colour.

Supraorbital sulcus indistinct. Third antennomere shorter than fourth; fourth subequal to fifth; sixth shorter than fifth; seventh to ninth subequal, slightly longer than sixth; tenth shorter than ninth; eleventh subequal to first; last five to six antennomeres slightly thickened; the antennae extend beyond half of the elytra over the pronotum.

Figures 51–60. *Tegyrius keralaensis* comb. nov.: 51, head; 52, intercoxal ridges on first abdominal ventrite; 53, male last abdominal ventrite; 54, aedeagus, ventral view; 55, aedeagus, lateral view; 56, distal opening; 57, tegmen; 58, spermatheca; 59, vaginal palpi; 60, tignum.
Pronotum with antebasal transverse impression, and with the punctures in the antebasal transverse impression stronger than those on the rest of the pronotum. Intercoxal prosternal process with indistinct preapical depressions; apical margin convex. Prosternal intercoxal process 3.0 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from anterior margin of pronotum to end of intercoxal prosternal process 8.7 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, with broadly rounded apex. Mesosternum depressed in anterior half, posterior margin concave. Elytra with maximum width at the middle. Elytral apex concave near sutural margin, moderately broad. Elytral punctures moderately fine, and forming uncountable rows, with the distance between the adjacent punctures 0.5–4 times the diameter of a single puncture. First metatarsome slightly longer than half of the metatibia.

Subparallel ridges on first abdominal ventrite reach the middle of the ventrite, and converge distally (Fig. 52). Last visible tergite of females with groove. Posterior margin of lobe in the middle of the last male ventrite nearly straight (Fig. 53).

Aedeagus gently curved, with acute apex in lateral view (Fig. 55); in ventral view, distinctly widened in distal third; ventral surface convex proximally, but depressed in distal third; apex broad, and obtusely angulate in the middle (Fig. 54); distal opening partially closed with lamina (Fig. 56); arm of tegmen shorter than stem (Fig. 57).

Spermathecal duct with horizontal part longer than vertical; receptacle about 2.75 times longer than wide, with both sides convex, and narrowed towards the pump; the duct forms an obtuse angle with the long axis of the receptacle (Fig. 58). Vaginal palpus with distal sclerotization longer than proximal sclerotization, and with proximal sclerotization subequal to the distal sclerotization longer than proximal sclerotization and the axis of the receptacle (Fig. 59). Distal sclerotization of tignum triangular, and as long as wide (Fig. 60).

Sexual dimorphism: The first pro- and mesotarsomeres are slightly wider in males than in females. The proximal third of the fore- and midfemora are piceous in males, whereas the proximal two-thirds have a dark tinge in females. The last visible ventrite is lighter distally in males.

Measurements (n = 4): Length, 1.78–2.04 (1.94); width, 0.96–1.15 (1.05); length of pronotum, 0.45–0.53 (0.48); width of pronotum, 0.64–0.77 (0.71); width of head across eyes, 0.50–0.59 (0.55); transverse diameter of one eye, 0.19–0.22 (0.21); distance between eyes, 0.19–0.24 (0.21); distance between eye and antennal socket, 0.02 (0.02); distance between antennal sockets, 0.07–0.09 (0.08); diameter of one antennal socket, 0.06–0.07 (0.06); length of aedeagus, 0.66; length of receptacle, 0.21; length of vaginal palpus, 0.33.

Type material examined: Paratypes: 1♂ and 1♀.

Labels: (1) India, Kerala, Neyyar WLS, 8 February 2002, coll. K. D. Prathapan; (2) Ogooblina keralesen mihi det. Doeberl, 2002; (3) Paratypus (PKDC).

Other material examined: 14♂ and 5♀, with the same data as for the paratypes; 5♂ and 7♀, Kerala, Kottarakkara, 26 November 2000, from P. nigrum; 1♂, Shendurney, Kattalapara, 12 April 2002; 2♂ and 1♀, Vallana, 21 August 2002; 2♂, Munnar-Kallar, 29 November 2002; 1♂ and 5♀, Munnar-Vattayar, 29 November 2002; 2♂ and 3♀, Ala, 1 August 2002, from P. nigrum; 2♂, Vellayani, 28 October 2002; 1♂, Vellayani, 15 July 2003; 1♀, Vellayani, 4 June 2005; 3♂ and 1♀, Ponmudi, 30 August 2002; 2♂, Ponmudi, 24 December 2002; 1♂, Periyar Tiger Reserve, 15 February 2004; 2♂, Silent Valley National Park, Sairandhri, between 28 November and 1 December 2006 (all collected by K. D. Prathapan); 1♀ and 1♂, Kerala No. 3, no data, CIE A 12026, Hermaeophaga sp. det. M. L. Cox, 1980, Pres by Comm. Inst. Ent., BM 1980–1, acc open, 129; 2♂, Karnataka, 18 km south of Virajpet, Brahmani Wildlife Reserve, 20 November 2003, 977 m a.s.l., 12°28′26″N, 75°47′33″E (A. S. Konstantinov, K. D. Prathapan & S. Saluk); 5♂ and 2♀, Tamil Nadu, Buriar Hills, 25 October 2003 (K. D. Prathapan) (10 BMNH, 10 EUJ, 10 KUJ, 2 LMC, 10 NHMB, 10 NFC, 8 PKDC, 2 UASB, and 10 USNM).

Remarks: Tegyrius keralaensis comb. nov. can be separated from all other Indian species of Tegyrius by the colour of the antennae, which are uniform yellow brown, whereas all other Indian species have at least the distal antennomeres in black. Tegyrius anupama sp. nov. from Sri Lanka, another species feeding on black pepper, has entirely yellow antennae, but this differs from all other species of Tegyrius, as discussed for T. anupama sp. nov. Tegyrius dalei sp. nov. can be separated from T. keralaensis comb. nov. based on the colour of the antennae and the structure of the aedeagus. The antennae of T. keralaensis comb. nov. are entirely yellow (dark brown to black in T. dalei sp. nov.), and the aedeagus lacks a preapical wedge-shaped longitudinal ridge in T. keralaensis comb. nov., but such a ridge is present in T. dalei sp. nov.

Tegyrius keralaensis comb. nov. is unique among the black Indian species in having an aedeagus without a preapical longitudinal ridge or a transparent window on the ventral side. The shape of the receptacle of the spermatheca is also unique, as its
inner side is highly convex and narrows towards both ends. The host plant selection of *T. keralaensis* comb. nov. is intriguing. Among the several sympatric species of *Piper*, it is confined to *P. nigrum*, but it feeds profusely on the unrelated – both chemically and morphologically – *L. umbellatum*. Although no economic loss was observed, this is a common, potential pest of black pepper in India.

It is most likely that *T. keralaensis* comb. nov. is the *Hermaeophaga* sp. reported by Premkumar & Nair (1987) on *P. nigrum* in Kerala. This is evidenced by the specimens of *T. keralaensis* comb. nov., labelled as *Hermaeophaga* sp. in the Natural History Museum, London, and examined by PKD, as Premkumar and Nair acknowledge M. L. Cox for identifying the beetles.

**TEGYRIUS METALLICUS JACOBY**

*Figures 61–78*


**Distribution:** Sri Lanka.

---

**Figures 61–64.** *Tegyrius metallicus:* 61, labrum; 62, maxilla; 63, mandible; 64, labium.
Host plant: *Piper* sp. near *P. nigrum*: this species very much resembles black pepper in habit, but the berries are larger and are not pungent in taste.

Description: General colour black. Antennae and legs light brown, with or without rufous tinge; metafemora, and often ventral side of metatibia, piceous. Elytra with indistinct green metallic reflection.

Supraorbital sulcus distinct. Third antennomere slightly shorter than fourth; fourth shorter or subequal to fifth; sixth shorter than fifth, and subequal to third; antennomeres 7–10 each slightly shorter than the preceding one; first subequal to last. Distal antennomeres not appreciably thickened; antennae reach half of the pronotum over the elytra or beyond.

Pronotum with antebasal transverse impression, and with punctures in the antebasal transverse impression not stronger than those on rest of the pronotum. Apex of intercoxal prosternal precess convex, with two preapical depressions. Prosternal intercoxal process 3.1 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal

process 2.0 times the minimum width of the proster-
nal intercoxal process.
Mesoscutellum broader than long, with broadly
rounded apex. Mesosternal intercoxal process trans-
versely depressed in anterior half, posterior margin
concave. Elytra with maximum width at middle;
elytral apex concave, moderately broad; elytral punctures weak, and tend to form rows, with the distance
between the adjacent punctures 1–3 times the
diameter of a puncture in the anterior half of
the elytra. First metatarsomere longer than half of
the metatibia.

Figures 69–75. Tegyrius metallicus: 69, metanotum; 70, intercoxal ridges on first abdominal ventrite; 71, male last
abdominal ventrite; 72, aedeagus, ventral view; 73, aedeagus, lateral view; 74, distal opening; 75, tegmen.
Subparallel ridges on the first abdominal ventrite well developed, with a row of setae, extending beyond two-thirds of the ventrite, and almost parallel to each other distally (Fig. 70). Lobe in middle of last visible ventrite of males unique in being granulate, without long setae, and bearing longitudinal ridges on either side, with a concave apical margin (Fig. 71). Last female tergite without a longitudinal groove.

Aedeagus distinctly curved in the middle, with straight ends in lateral view (Fig. 73); in ventral view, apex broad, without angulate extremities, and with lateral edges distinctly raised, with a depressed area in between (Fig. 72); distal opening partially covered by lamina (Fig. 74); arms of tegmen slightly longer than stem (Fig. 75).

Spermatheca with smoothly curved pump, receptacle about 2.5 times longer than broad, inner side convex, outer side concave, gradually narrowing towards duct, and with the duct highly knotted (Fig. 76). Vaginal palpus with distal sclerotization longer than proximal sclerotization, and with proximal sclerotization subequal to the lateral membranous area (Fig. 77). Tignum with broad distal sclerotization (Fig. 78).

Sexual dimorphism: First pro- and mesotarsomeres slightly enlarged in males. Ventrally, first protarsomere with minute, bud-like sensilla in males, and with short, pointed setae in females. Ventromesal side of first metatarsomere with a shiny patch of short, capituate setae in males; in females, only pointed plumose setae present on ventral side of first metatarsomere.

Measurements (n = 4): Length, 2.26–2.62 (2.42); width, 1.28–1.51 (1.37); length of pronotum, 0.52–0.65 (0.57); width of pronotum, 0.78–0.94 (0.84); width of head across eyes, 0.59–0.68 (0.63); transverse diameter of one eye, 0.24–0.27 (0.26); distance between eyes, 0.27–0.30 (0.28); distance between eye and antennal socket, 0.02–0.04 (0.03); distance between antennal sockets, 0.07–0.09 (0.08); diameter of one antennal socket, 0.07–0.08 (0.08); length of aedeagus, 0.95; length of receptacle, 0.26; length of vaginal palpus, 0.42.

Type material examined: Lectotype ♀. Labels: (1) Ceylon, Lewis; (2) 1° Jacoby coll.; (3) type 19043; (4)

Other material examined: 4♂ and 5♀, Sri Lanka, Horton Plains National Park, 14 March 2006, coll. K. D. Prathapan; 1♀, Nuwara Eliya, Hakgala, 12 March 2006, coll. K. D. Prathapan (1 BMNH, 1 EUJ, 1 KUJ, 1 NHMB, 1 NPC, 3 PKDC, 1 UASB, and 1 USNM).

**Remarks:** **Tegyrius metallicus** sp. nov. from Sri Lanka, and **T. keralaensis** comb. nov. from India, in both colour and other external features. **Tegyrius buddhai** sp. nov. can be differentiated easily from **T. metallicus** by the structure of the subparallel ridges on the first abdominal ventrite, and by the genitalia. Subparallel ridges converge and completely fuse distally in **T. buddhai** sp. nov. (whereas the ridges are nearly parallel in **T. metallicus**). The aedegus in ventral view in **T. buddhai** sp. nov. lacks ridges along the lateral margins (the lateral margins are raised, forming distinct ridges in **T. metallicus**), and the outer side of the spermathecal receptacle is convex (concealed in **T. metallicus**). The antebasal transverse impression on the pronotum is indistinct in the middle in **T. buddhai** sp. nov. (but is stronger in the middle in **T. metallicus**). **Tegyrius metallicus** can be separated from **T. keralaensis** comb. nov. by the structure of the aedegus, the spermatheca, and the male last abdominal ventrite.

**TEGYRIUS NIGROTIBIALIS** SP. NOV. (FIGS 79–89)

**Distribution:** India (Tamil Nadu).

**Host plant:** *Piper mullesua* Buch.-Ham.

**Description:** General colour shiny black; antennae piceous, except segments 2–5, which are light brown to piceous; fore- and midfemora piceous, hind femur black, with apex tainted brown ventrally; all tibiae and tarsi dark brown.

Supraorbital sulcus indistinct. The antennae do not extend beyond half of the elytra over the pronotum. Third antennomere distinctly shorter than fourth, fourth slightly longer than fifth; fifth and sixth each shorter than preceding antennomere; seventh to ninth subequal, each longer than sixth; tenth slightly shorter than ninth; last subequal to first; last four or five antennomeres slightly thickened; the antennae reach half of the elytra over the pronotum.

Pronotum with antebasal transverse impression, and with punctures in the antebasal transverse impression stronger than those on the rest of the pronotum. Apex of intercoxal prosternal process nearly straight, with a pair of preapical depressions: in some specimens these depressions join to form a transverse depression. Prosternal intercoxal process 2.0 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 4.3 times the minimum width of the prosternal intercoxal process.

Mesoscutellum as broad as long, with an acute apex. Mesosternum depressed on top, with a nearly straight posterior margin. Elytra with maximum width at posterior two-thirds. Elytral apex concave near sutural margin, broad. Elytral punctures do not form rows, are moderately strong, with the distance between adjacent punctures 0.5–2.5 times the diameter of a puncture in the anterior half of the elytron. First metatarsomere slightly longer than half of the metabasitibia.

Subparallel ridges on first abdominal ventrite poorly developed, evidenced by rows of setae reaching the middle of the ventrite, and with rows of setae parallel with each other (Fig. 81). Posterior margin of lobe in middle of last male ventrite apparently convex (Fig. 82).

In lateral view, aedegus nearly straight in distal two-thirds, with obtuse apex (Fig. 84); unusual in ventral view, being bifid at apex, ventral side convex with a longitudinal depression along apex (Fig. 83); distal opening completely covered with lamina (Fig. 85); arm of tegmen shorter than stem (Fig. 86).

Spermatheca with horizontal part of pump subequal to vertical part; receptacle about 3.5 times longer than wide, with the outer side slightly concave at a distance of one-third of receptacle from the origin of the duct, inner side convex, narrowing towards duct; duct with multiple coils (Fig. 87). Vaginal palpus narrowed near middle; distal sclerotization subequal to proximal sclerotization, and with each being subequal to the lateral membranous area (Fig. 88). Distal sclerotization of tignum arrow-head shaped, and longer than wide (Fig. 89).

**Sexual dimorphism:** First pro- and mesotarsomeres slightly enlarged in males compared with females. Mesotibia in lateral view distinctly curved and enlarged distally in males (Fig. 79), straight and not enlarged distally in females (Fig. 80). First metatarsomere of males unmodified.

**Measurements** (n = 4): Length, 1.97–2.35 (2.18); width, 1.06–1.22 (1.15); length of pronotum, 0.43–0.51 (0.47); width of pronotum, 0.66–0.74 (0.70); width of head across eyes, 0.52–0.58 (0.56); transverse diameter of one eye, 0.20–0.21 (0.21); distance between eyes, 0.22–0.27 (0.25); distance between eye and antennal socket, 0.02–0.04 (0.03); distance between
antennal sockets, 0.06–0.07 (0.06); diameter of one antennal socket, 0.06–0.08 (0.07); length of aedeagus, 0.95; length of receptacle, 0.26; length of vaginal palpus, 0.42.

Types: Holotype ♂. Labels: (1) India, Tamil Nadu, Naduvattam, 26 October 1998, coll. K. D. Prathapan; (2) Tegyrius nigrotibialis sp. nov. Prathapan & Virak-tamath, 2007; (3) holotype (BMNH).

Paratypes (22 specimens): 1♂ and 2♀, with the same data as for the holotype; 6♂ and 5♀, with the same data as for the holotype, except that the date was 19 October 2003; 5♂ and 3♀, South India, Western Ghats, Tamil Nadu, Naduvattam, 27 June

2004, 11°28′24.2″N, 76°33′04″E coll. K. D. Prathapan (4 BMNH, 2 EUJ, 2 KUJ, 2 LMC, 2 NHMB, 2 NPC, 4 PKDC, 2 UASB, and 2 USNM).

Etymology: The name nigrotibialis refers to the black colour of the beetle, and the modified mesotibia.

Remarks: Tegyrius nigrotibialis sp. nov. can be distinguished from all other black species of Tegyrius by the sexually dimorphic mesotibia, as well as by the apically bifid aedeagus.

**TEGYRIUS PUCETIBIALIS** SP. NOV.

**(FIGS 90–98)**

**Distribution:** India (Tamil Nadu).

**Host plant:** Piper mullensua Buch.-Ham.

**Description:** Entirely chestnut brown; head, pronotum, and all sternites apparently darker than the elytra.

Supraorbital sulcus distinct. Third antennomere shorter than fourth; fifth subequal to or slightly longer than fourth; sixth shorter than fifth; seventh subequal to fifth; eighth to ninth each slightly shorter than preceding one; tenth subequal to or shorter than ninth; last subequal to first; distal three to four antennomeres thickened or not; the antennae extend well beyond half of the elytra over the pronotum.

Pronotum with antebasal transverse impression, and with punctures in the antebasal transverse impression stronger than those on the rest of the pronotum. Apex of prosternal intercoxal process, with preapical depressions. Prosternal intercoxal process 1.4 times wider than the distance between the anterior margin of the pronotum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 3.3 times the minimum width of the prosternal intercoxal process.

Scutellum as broad as long, apex acute. Mesosternum depressed on top, with concave posterior margin. Elytra with maximum width at posterior two-fifths. Elytral apex convex, and broad. Elytral punctures do not form rows, and are moderately strong, with the distance between adjacent punctures 1–3 times the diameter of a puncture in the anterior half of the elytron. First metatarsomere distinctly longer than preceding one; distal three to four antennomeres thickened or not; the antennae extend well beyond half of the elytra over the pronotum.

Elytra with maximum width at posterior two-fifths. Elytral apex convex, with preapical depressions. Prosternal intercoxal process 3.3 times the minimum width of the prosternum to the end of the intercoxal prosternal process 1.4 times wider than the distance between the anterior margin of the pronotum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 3.3 times the minimum width of the prosternal intercoxal process.

Scutellum as broad as long, apex acute. Mesosternum depressed on top, with concave posterior margin. Elytra with maximum width at posterior two-fifths. Elytral apex convex, and broad. Elytral punctures do not form rows, and are moderately strong, with the distance between adjacent punctures 1–3 times the diameter of a puncture in the anterior half of the elytron. First metatarsomere distinctly longer than half of the metatibia.

Subparallel ridges on the first abdominal ventrite do not reach the middle of the ventrite, and converge distally (Fig. 90). Last visible tergite of females with a shallow groove. Lobe in the middle of the posterior margin of the last male ventrite with convex posterior margin (Fig. 91).

Aedeagus gently curved in lateral view, with acute apex (Fig. 93); in ventral view, ventral surface convex, with a transparent window, apex obtuse, with a tiny denticule in the middle (Fig. 92); distal opening partially covered with lamina (Fig. 94). Arms of tegmen shorter than stem (Fig. 95).

Spermatheca with horizontal part of pump longer than vertical part, receptacle about three times longer than wide, outer side convex, inner side indistinctly concave in middle, not narrowing towards duct; duct twisted several times (Fig. 96). Vaginal palpus distinctly narrowed at distal two-thirds; lateral unsclerotized area shorter than distal or proximal sclerotization; proximal sclerotization longer than distal sclerotization (Fig. 97). Distal sclerotization of tignum longer than wide (Fig. 98).

**Sexual dimorphism:** First pro- and mesotarsomeres slightly enlarged in males compared with females. Mesotibia in lateral view distinctly curved and distally enlarged in males, slightly curved and distally not enlarged in females. First metatarsomere of male unmodified.

**Measurements** (n = 4): Length, 2.30–2.64 (2.55); width, 1.15–1.37 (1.29); length of pronotum, 0.54–0.57 (0.55); width of pronotum, 0.75–0.84 (0.81); width of head across eyes, 0.58–0.63 (0.61); transverse diameter of one eye, 0.21–0.24 (0.23); distance between eyes, 0.26–0.27 (0.26); distance between eye and antennal socket, 0.02–0.03 (0.03); distance between antennal sockets, 0.08–0.09 (0.09); diameter of one antennal socket, 0.07–0.08 (0.08); length of aedeagus, 1.10; length of receptacle, 0.30; length of vaginal palpus, 0.49.

**Types:** Holotype ♂. Labels: (1) South India, Western Ghats, Tamil Nadu, Avalanchi, 2030 m a.s.l., 25 June 2004, 11°18′0.003″N, 76°35′42.8″E, coll. K. D. Prathapan; (2) *Tegyrius pucetibialis* sp. nov. Prathapan & Viraktamath, 2007; (3) Holotype (BMNH).

Paratypes (53 specimens): 21♂ and 24♀, with the same data as for the holotype; 3♂ and 3♀, with the same data as for the holotype, except that the date was 26 June 2004; 1♂, India, Tamil Nadu, Avalanchi, 21 October 2003, coll. K. D. Prathapan; 1♀, with the same data except for the locality, Emerald-Avalanchi, and the date, 22 October 2003 (10 BMNH, 2 EUJ, 2 KUJ, 2 LMC, 10 NHMB, 10 NPC, 5 PKDC, 2 UASB, and 10 USNM).
Etymology: Puce means ‘flea’ (coloured) in French. The name refers to the brown colour of the beetle, and the modified mesotibia.

Remarks: Tegyrius pucetibialis sp. nov. is confined to the upper reaches of the Nilgiri mountains. It can be separated from the closely related T. nigrotibialis sp. nov. by colour, and by the structure of the aedeagus. The general colour of T. pucetibialis sp. nov. is brown, whereas that of T. nigrotibialis sp. nov. is black. The apex of the aedeagus in ventral view is unidentate in T. pucetibialis sp. nov., whereas it is bifid in

Figures 90–98. Tegyrius pucetibialis sp. nov.: 90, intercoxal ridges on first abdominal ventrite; 91, male last abdominal ventrite; 92, aedeagus, ventral view; 93, aedeagus, lateral view; 94, distal opening; 95, tegmen; 96, spermatheca; 97, vaginal palpi; 98, tignum.

T. nigrotibialis sp. nov. Although both of them share the same host plant, they are not sympatric, as T. nigrotibialis sp. nov. is confined to the lower reaches of the Nilgiri Hills. Tegyrius pucetibialis sp. nov. closely resembles T. nigrotibialis sp. nov. in having sexually dimorphic mesotibia, a broad elytral apex, the same host plant, and a narrow and close, but parapatric, range of distribution. The two species can be separated from the other species of Tegyrius based on the sexually dimorphic mesotibiae and the structure of the aedeagus, besides the broad elytral apex.

**TEGYRIUS RADHIKAЕ SP. NOV.**

(FIGS 99–107)

**Distribution:** India (Karnataka).

**Host plant:** Piper nigrum L.

**Description:** Entirely black, except for third antennomere, which is entirely brown; labrum, apex of first and second antennomeres, apex of metafemora, all tarsi, and metatibia with brown tint.

Supraorbital sulcus indistinct. Third antennomere shorter than fourth; fourth and fifth subequal, sixth...
shorter than fifth; seventh longer than sixth; eighth to tenth each apparently shorter than preceding one, last subequal to first; last four or five antennomeres gradually thickened; the antennae reach half of the elytra over the pronotum.

Pronotum with antebasal transverse impression, and with punctures in the antebasal transverse impression stronger than those on rest of pronotum. Apex of prosternal intercoxal process convex, with a pair of preapical depressions. Scutellum as broad as long, and with a narrowly rounded apex. Prosternal intercoxal process 6.2 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from anterior margin of the prosternum to the end of the intercoxal prosternal process 1.7 times the minimum width of the prosternal intercoxal process.

Mesosternum transversely depressed in the middle, with straight posterior margin. Elytra with maximum width at the middle; elytral apex concave, and moderately broad; elytral punctures moderately strong, and forming uncountable rows, with the distance between adjacent punctures in the anterior half of the elytron 0.25–2.5 times the diameter of a single puncture. First metatarsomere half as long as the metatibia.

Subparallel ridges on first abdominal ventrite hardly reach the middle of the ventrite, and converge distally (Fig. 99). Posterior margin of lobe in the middle of the last male ventrite convex (Fig. 100). Last visible tergite of females with indistinct groove along the middle.

In lateral view, the aedeagus is gently curved, with an abruptly narrowed apex (Fig. 102); the ventral side is convex, with a sharply raised, wedge-shaped, preapical ridge, and is widened near the distal two-thirds, and the apex appears to be tridentate, with a preapical constriction in ventral view (Fig. 101); distal opening partially closed by a pair of laminae (Fig. 103); arms of tegmen much shorter than stem (Fig. 104).

Spermathecal pump with horizontal part longer than vertical; receptacle about three times longer than wide, with the outer side concave near the middle, with the inner side convex near middle, and not narrowed towards the duct; duct twisted and

Figures 105–107. *Tegyrius radhikae* sp. nov.: 105, spermatheca; 106, vaginal palpi; 107, tignum.

coiled (Fig. 105); vaginal palpus with lateral membranous area longer than proximal sclerotization; distal sclerotization about as long as lateral membranous area (Fig. 106). Tignum with distal sclerotization oval shaped, and longer than wide (Fig. 107).

Sexual dimorphism: First pro- and mesotarsomeres slightly enlarged in males compared with females. Mesotibia and first metatarsomere of males unmodified.

Measurements (n = 4): Length, 1.91–2.18 (2.07); width, 1.06–1.22 (1.13); length of pronotum, 0.49–0.53 (0.51); width of pronotum, 0.68–0.74 (0.72); width of head across eyes, 0.56–0.58 (0.57); transverse diameter of one eye, 0.20–0.22 (0.21); distance between eyes, 0.23–0.27 (0.26); distance between eye and antennal socket, 0.07–0.08 (0.07); length of antennal sockets, 0.07–0.08 (0.07); diameter of antennal socket, 0.03–0.04 (0.03); distance between antennal sockets, 0.07–0.08 (0.07); diameter of one antennal socket, 0.07–0.08 (0.07); length of aedeagus, 0.90; length of receptacle, 0.25; length of vaginal palpus, 0.39.

Types: Holotype ♂. Labels: (1) India, Karnataka, Sakaleshpur, 10 January 2005, coll. N. S. Radhika from pepper; (2) Tegyrius radhikae sp. nov. Prathapan & Viraktamath, 2007; (3) Holotype (BMNH).

Paratypes (19 specimens): 8♂ and 7♀, with the same data as for the holotype; 2♂ and 2♀, with the same data as the holotype, except that the date was 23 September 2004 (2 BMNH, 2 EUJ, 2 KUJ, 1 LMC, 2 NHMB, 2 NPC, 4 PKDC, 2 UASB, and 2 USNM).

Etymology: This species is named after N. S. Radhika, who collected the types.

Remarks: Tegyrius radhikae sp. nov. can be separated from all other species of the genus based on the tridentate, and preapically narrowed, aedeagus. Tegyrius radhikae sp. nov. can be separated from T. keralaensis comb. nov., which looks similar, by the colour of the antennae (entirely yellow in T. keralaensis comb. nov., whereas it is black, except for the third antennomere, which is brown, in T. radhikae sp. nov.). In T. dalei sp. nov. and T. tippui sp. nov., the apex of the aedeagus appears tridentate in ventral view, but is preapically broadened, and not constricted as in T. radhikae sp. nov. This is a minor pest of black pepper in Karnataka.

TEGYRIUS TIPPUI SP. NOV. (FIGS 108–116)

Distribution: India (Karnataka).

Host plant: Piper trioicum Roxb.

Description: General colour shining black. Proximal six to eight antennomeres yellowish brown, with the rest gradually turning piceous to black. Mouth parts brown. Fore- and middle legs yellowish brown, except with proximal third to two-thirds of the femora being darker. Metafemora piceous, with lighter apex; rest of hind leg yellow brown. Last ventrite of males lighter posteriorly.

Supraorbital sulcus indistinct. Third antennomere distinctly shorter than fourth; fifth subequal to fourth or longer; fifth to seventh subequal; eighth to tenth each slightly shorter than the preceding one; eleventh subequal to or longer than first; distal five to six antennomeres gradually but distinctly thickened. The antennae extend well beyond half of the elytra over the pronotum.

Antebasal transverse impression present on pronotum, with the punctures in the antebasal transverse impression being stronger than those on the rest of the pronotum. Apex of prosternal intercoxal process concave, with a weak preapical transverse depression. Prosternal intercoxal process 2.5 times wider than the distance between the anterior margin of the prosternum and the coxal cavity; distance from the anterior margin of the prosternum to the end of the intercoxal prosternal process 5.8 times the minimum width of the prosternal intercoxal process.

Mesoscutellum broader than long, with narrowly rounded apex. Mesosternum depressed in anterior half, with posterior margin concave. Elytra with maximum width at the middle; elytral apex convex, and moderately broad; elytral punctures moderately bold, forming uncountable rows, with the distance between adjacent punctures 0.5–2.5 times the diameter of a puncture in the anterior half of the elytron. First metatarsomere slightly longer than half of metatibia.

Intercoxal ridges on first abdominal ventrite extend slightly beyond a third of the length of the ventrite, and converge slightly posteriorly (Fig. 108). Lobe in the middle of the posterior margin of the last visible ventrite of males with convex posterior margin (Fig. 109). Last visible tergite of females with shallow groove.

In lateral view, aedeagus with distal two-thirds nearly straight, and with an acute apex (Fig. 111); ventral surface with an acute, wedge-like, preapical longitudinal ridge, with the distal end triangular, but with the lateral angles not being prominent (Fig. 110); distal opening partially covered with lamina (Fig. 112); stem of tegmen longer than arm (Fig. 113).

Spermatheca with horizontal part of pump subequal to vertical part; receptacle about 2.5 times longer than wide, with the outer side convex, and with the inner side apparently convex, with the recep-
tacle not tapering towards the duct, and the duct with a knot at the base (Fig. 114); vaginal palpus with proximal sclerotization shorter than distal sclerotization, and with the lateral unsclerotized area being longer than the distal sclerotization (Fig. 115); tignum with oval-shaped distal sclerotization, which is longer than wide (Fig. 116).

Sexual dimorphism: Pro- and mesotarsomeres indistinctly widened in males compared with females. Mesotibia and first metatarsomere of males unmodified. Last ventrite of males posteriorly lighter.

Measurements \( (n = 4) \): Length, 1.81–1.99 (1.87); width, 0.94–1.06 (1.01); length of pronotum, 0.46–0.54 (0.50); width of pronotum, 0.62–0.71 (0.66); width of head across eyes, 0.47–0.54 (0.51); transverse diameter of one eye, 0.17–0.21 (0.19); distance between eyes, 0.19–0.23 (0.21); distance between eye and antennal socket, 0.02 (0.02); distance between antennal sockets, 0.06–0.07 (0.06); diameter of one antennal socket, 0.07–0.08 (0.07); length of aedeagus, 0.82; length of receptacle, 0.23; length of vaginal palpus, 0.34.

Types: Holotype \( \sigma \). Labels: (1) India, Kerala, Peruvannamuzhy, 20–21 April 2003, coll. K. D. Prathapan; (2) Tegyrius tippui sp. nov. Prathapan & Viraktamath, 2007; (3) holotype (BMNH).

Paratypes (75 specimens): Kerala, 13\( \sigma \) and 6\( \varphi \), with the same data as the holotype; 1\( \varphi \), with the same data as for the holotype, except that the date

Figures 108–113. Tegyrius tippui sp. nov. 108, intercoxal ridges on first abdominal ventrite; 109, male last abdominal ventrite; 110, aedeagus, ventral view; 111, aedeagus, lateral view; 112, distal opening; 113, tegmen.
was 22 October 2000; 2♂ and 3♀, with the same data as for holotype, except that the date was 24 April 2004; 1♂ and 1♀, with the same data as for the holotype, except that the date was 27 April 2004; 1♂, with the same data as for the holotype, except that the date was 4 September 2004; 1♂ and 1♀, Wynad, 25 April 2002; 4♂ and 2♀, Vythiri Pass, 17 April 2003; 2♀, Ambalavayal, 19 April 2003; 13♂ and 4♀, Aralam, 26 April 2004; 5♂ and 1♀, Silent Valley National Park, Sairandhri, between 28 November and 1 December 2006; 1♂, Silent Valley National Park, Poochippara, 3–4 December 2006 (all collected by K. D. Prathapan); Karnataka, 1♂, 7 km north of Chikmaglur, 15 November 2003, 1800 m a.s.l., in an alpine meadow, 13°23′23″N, 75°43′09″E (A. S. Konstantinov, K. D. Prathapan & S. Saluk); 1♂, environment of (env.) Madikeri, 19 November 2003, 1100 m a.s.l., dry forest, 12°28′20″N, 75°42′30″E (A. S. Konstantinov, K. D. Prathapan & S. Saluk); 1♀, env. Madikeri Temple Forest, 21 November 2003, 1138 m a.s.l., 12°27′31″N 75°41′30″E (A. S. Konstantinov, K. D. Prathapan & S. Saluk); 6♂ and 3♀, Kottigehara Alekhan Estate, 11 November 2004 (K. D. Prathapan); 1♀, with the same data, except that the date was 19 September 2004 (10 BMNH, 4 EUJ, 4 KUJ, 5 LMC, 10 NHMB, 18 NPC, 10 PKDC, 4 UASB, and 10 USNM).

Etymology: Named after Tippu Sultan, the valiant ruler of the former Mysore, who conquered the former Malabar (northern Kerala). The distributional range of the species roughly corresponds with the range of influence of Tippu Sultan.

Remarks: Tegyrius tippui sp. nov. is extremely similar to T. dalei sp. nov., but can be differentiated as described under T. dalei sp. nov.

**LONGITARSUS PICEUS** (KIMOTO) COMB. NOV.

**KEY TO THE SPECIES OF *TEGYRIUS***

1. Elytra straw brown, with the anterior third piceous: the piceous colour extending backwards along the lateral and sutural margins (Fig. 1) ................................................................. *T. agasthyai* sp. nov.
   - Elytra unicolorous: black, brown, or red ................................................................. 2
2. Pronotum black, elytra red-brown ........................................................................... 3
   - Pronotum and elytra concolorous ........................................................................... 4
3. Antennae yellow; apex of aedeagus deeply emarginate in ventral view (Fig. 28) ................................................................. *T. bicolor* (Medvedev, 2001) comb. nov.
   - Antennae black with last and basal antennomeres tawed brown; apex of aedeagus smoothly rounded in ventral view (Fig. 8) ......................................................................... *T. antennatus* (Medvedev, 2001) comb. nov.
4. Mesotibia sexually dimorphic: distinctly curved and distally enlarged in males (Fig. 79); straight in females (Fig. 80). Feed on *Piper mullesua* Buch., with globose female spikes. Restricted to Nilgiri Hills  .......................................................................................................................... 5
   - Mesotibia not sexually dimorphic; feed on *Piperaceae* with elongate spikes; not occurring in Nilgiri Hills (except *T. keralaensis* comb. nov., which occurs throughout southern India) .......................................................................................................................... 6
5. General colour brown; apex of aedeagus in ventral view broad, with a denticle (Fig. 92); receptacle of spermatheca neither narrowed towards duct nor broadened towards pump (Fig. 96) ......................................................................... *T. pucetibialis* sp. nov.
   - General colour black; apex of aedeagus in ventral view bifid (Fig. 83); receptacle of spermatheca distinctly narrowed towards duct and broadened towards pump (Fig. 87) ......................................................................... *T. nigrotibialis* sp. nov.
6. Pronotum without antebasal transverse impression; posterior margin of last visible ventrite of females with a deep circular incision, bearing an acute process in the middle (Fig. 17) ......................................................................... *T. anupama* sp. nov.
   - Pronotum with antebasal transverse impression; posterior margin of last visible ventrite of females complete .......................................................... 7
7. Punctures in antebasal transverse impression not stronger than those on the rest of the pronotum; first metatarsomere sexually dimorphic, with ventrolateral side thickly adorned with short capitate setae or bud-like sensillae in males, and thin hair-like setae in females; lobe in the middle of the last visible ventrite of males with concave posterior margin (Fig. 27, 33, 71); restricted to Sri Lanka .......................................................................................................................... 8
   - Punctures in the antebasal transverse impression stronger than those on the rest of the pronotum; first metatarsomere not sexually dimorphic, ventral side with thin hair-like setae in both sexes; lobe in the middle of the last visible ventrite of males with straight or convex posterior margin (Figs 42, 53, 82, 100); restricted to India .......................................................................................................................... 9
8. Subparallel ridges on first abdominal ventrite nearly parallel with each other (Fig. 70); aedeagus in ventral view with ridge along lateral margins (Fig. 72); outer side of spermathecal receptacle concave (Fig. 76) .................................................................................... *T. metallicus* Jacoby, 1887
   - Subparallel ridges on first abdominal ventrite converge distally and fuse together (Fig. 32); aedeagus in ventral view without ridge along lateral margins (Fig. 34); outer side of spermathecal receptacle convex (Fig. 38) ........................................................................... *T. buddhai* sp. nov.
9. Antennae yellow; aedeagus in ventral view without wedge-like preapical ridge (Fig. 54) ............................................................................... *T. keralaensis* (Doeberl, 2003) comb. nov.
   - At least three or four distal antennomeres piceous; aedeagus in ventral view with wedge-like preapical ridge (Figs 43, 101, 110) .................................................................................... 10
10. Apex of aedeagus preapically constricted in ventral view (Fig. 101) ............................................................................. *T. radhikae* sp. nov.
    - Apex of aedeagus preapically widened in ventral view (Figs 43, 110) ............................................................................. 11
11. Antennae extend beyond half of the elytra over the pronotum; basal six to eight antennomeres, and fore and middle legs yellow brown; lateral angulation of apex of aedeagus in ventral view not prominent (Fig. 110) .................................................................................... *T. tippui* sp. nov.
    - Antennae extend up to half of the elytra over the pronotum; basal antennomeres, and fore and middle legs dark brown to piceous; lateral angulation of apex of aedeagus in ventral view prominent (Fig. 43) ............................................................................. *T. dalei* sp. nov.

**Remarks:** This species lacks all the salient characters of *Tegyrius*, especially those of the head and the subparallel ridges on the first abdominal ventrite. The fact that the first metatarsomere is half as long as the metatibia, a feature common to both *Longitarsus* and *Tegyrius*, was probably the source of the temptation for placing it in *Tegyrius*. Undoubtedly, this is a member of the cosmopolitan *Longitarsus*, as it has all the characters of the genus, including the serrulations on the dorsolateral edge of the metatibia.

**Type material examined:** Paratype. Labels: (1) (E. Nepal) Gupa Pokali (2900 m a.s.l.) 27°18′N, 87°30′E, Gurza (2100 m a.s.l.) 27°18′N, 87°33′E; (2) 23 June 1972, H. Makihara leg. Kyushu Univ. Coll.; (3)
Paratype; (4) *Tegyrius piceus* Kimoto sp. nov., det. S. Kimoto, 19; (5) examined by K. D. Prathapan 2007 (KU).

ACKNOWLEDGEMENTS

We are extremely happy to acknowledge our indebtedness to Ms S. L. Shute (Natural History Museum, London), Dr L. N. Medvedev (Russian Academy of Sciences, Moscow), Dr N. Ohbayashi (Ehime University, Japan), Dr M. Brancucci (Naturhistoriches Museum, Basel), and Dr H. Shima (Kyushu University, Japan) for loaning material under their care. Dr P. N. Ravindran and Mr K. V. Saji, Indian Institute of Spices Research, Calicut, identified *Piper mullesua*. Dr P. J. Mathew, Tropical Botanic Garden and Research Institute, Palode, identified *Piper triovium*. We are indebted to Dr M. L. Cox (Natural History Museum, London) for kindly helping us in our studies on flea beetles, especially those of *Tegyrius* and *Lanka*. One of us (PKD) is grateful to Drs K. V. Peter and Y. R. Sarma, former Directors of the Indian Institute of Spices Research, Calicut, for granting study leave, and to the Indian Council of Agricultural Research, New Delhi, for awarding a Senior Research Fellowship. PKD’s work on pepper flea beetles was supported by the Kerala State Council for Science, Technology and Environment, Trivandrum. An Ernst Mayr travel grant from Harvard University enabled PKD to study the types of flea beetles in the Natural History Museum, London. PKD is grateful to Ms Sharon L. Shute for various courtesies extended to him during a research visit to the Natural History Museum, London. Dr M. Döberl, Germany, kindly sent us literature and his unpublished catalogue of flea beetles. The Chief Wildlife Wardens of Kerala and Tamil Nadu are gratefully acknowledged for granting permits to collect flea beetles in the protected areas under their care. Critical reviews by Drs J. Poorani, A. S. Konstantinov, and M. Döberl greatly improved the manuscript.

REFERENCES


