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A NEW CRYPTORHYNCHINE WEEVIL GENUS AND SPECIES, *VIRAKTAMATHIA SRINIVASA* GEN. AND SP. NOV. (COLEOPTERA: CURCULIONIDAE) FROM INDIA

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ABSTRACT

A new Cryptorhynchinae weevil *Viraktamathia* **gen. nov.** and *srinivasa* **sp. nov**. from India is described and illustrated. This genus is unique among the Cryptorhynchinae in the concavity of the ventrite 1 combined with the character of the pair of knobs on the uncus of the hind tibia.

Key Words: Oriental Region, Cryptorhynchinae, new genus, new species

RESUMEN

Se describe e ilustra *Viraktamathia* **gen. nov**, un nuevo género de picudo Cryptorhynchinae, por su especie tipo *Viraktamathia srinivasa* **sp. nov**. de la India. Este género es único entre los Cryptorhynchinae por la concavidad de su primer ventrito combinado con el carácter de un par de protuberancias en el uncus de la tibia posterior.

Palabras Clave: Región Oriental, Cryptorhynchinae, nuevo género, especie nueva

The subfamily Cryptorhynchinae is one of the largest weevil groups with around 581 genera and 6,500 species. There are 89 genera known from the Oriental Region with about 425 species of which nearly 95 species in 20 genera were reported from India (Alonso-Zarazaga & Lyal 1999). The classification of this group from India is in a complex state and detailed studies are required. Hence a study was undertaken on the Indian fauna, which has led to interesting results on some species. Out of these, the present study describes a new genus and species belonging to the tribe Cryptorhynchini, from Karnataka, India. This new genus is unique among the Cryptorhynchinae in its distinct, semicircular concavity on the ventrite 1 and the pair of knob-like structures on the uncus of the hind tibia. The *Ampagia* Pascoe 1870 of the New Zealand Cryptorhynchinae has been known to possess such a concavity on the ventrite 1. In *Ampagia* the ventrite 1 is described to have been modified to form a semicircular elevated concavity and this has been identified as a distinct and unique character (Lyal 1993), though it is valid only for few New Zealand species. The key to the Cryptorhynchinae genera given by Morimoto (1978) refrains from such a distinction for *Ampagia* and also for any other cryptorhynchine from the Oriental region. Detailed studies on the morphology along with other taxonomic characters of the present new species thus reveal that it does not fit under any of the known genera of the Cryptorhynchinae known so far. Hence, a new genus is described herein for this new species from specimens collected from Bangalore, Karnataka, India.

MATERIALS AND METHODS

The material for the study came from the field surveys conducted by the University of Agricultural Sciences, Bangalore, India as a part of Network Project on Insect Biosystematics (NPIB), Indian Council of Agricultural Research (ICAR), New Delhi. The morphological characters including the genitalia were examined with Leica EZ4 stereozoom microscope and photography was done with Leica DFC425C digital camera attached onto a Leica 205FA stereozoom microscope. Line diagrams were drawn using drawing tube attached to the Leica MZ16A stereozoom microscope, and additional details of the few critical characters were examined with Zeiss EVO MA10 Scanning Electron Microscope (SEM) at 20kV/EHT and 18 Pa between 100x to 1.58kx, except for sclerolepidia and stridulatory organs which were examined at high vacuum between 454x and 7kx after 36nm of gold/palladium coating. The terminology

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followed is after Lyal (1993). The measurements given are of the holotype and the range is given in parentheses in each. The type specimens are deposited in the National Pusa Collection, Division of Entomology, Indian Agricultural Research Institute, New Delhi, India (NPC).

VIRAKTAMATHIA GEN. NOV.

TYPE SPECIES: *VIRAKTAMATHIA SRINIVASA* SP. NOV., (FIGS. 1-45)

Diagnosis

Head not depressed above eyes; frons slightly narrower than narrowest part of the rostrum in dorsal view (Fig. 1); rostrum convex, curved (Fig. 2); scape slightly shorter than funicle and at most reaching eye, funiculus with seven segments, antennal club compact and only one segmented (Figs. 3 and 34). Pronotum simple and scutellum present (Figs. 4 and 33). Pectoral canal on prosternum open behind and passing anterior margin of mesocoxae, rostrum not touching middle coxa, but ending in receptacle on mesosternum, mesosternal process cavernous, forming receptacle, receptacle at least as long as wide, its inner margin U-shaped; mesosternum truncate between middle coxae, width of mesosternum separating middle coxae wider than the dorsal apex of the rostrum (Fig. 34); metasternum longer than ventrite 3, metepisterna distinct, sclerolepidia present (Fig. 45); elytrotergal stidulatory organs present (Figs. 42 and 43); abdominal process narrower than a coxa, ventrite 1 with a semicircular, elevated concavity delimited by a carina (Figs. 7, 23 and 36), ventrite 2 subequal to 3 or shorter than 3+4. Femora unidentate, sulcate beneath, the sulci bare (Fig. 40); outer margin of the tibia even, not serrate, tibia with the inner carina of the tibial apex not laminate, middle tibia with tibial apex 2 rows of outer setose (Fig. 39), and hind tibial uncus with knob-like structures (Fig. 41), and tarsal claws simple.

Remarks

This new genus is like *Shirahoshizo* Morimoto 1962 as regards its single femoral tooth, femora sulcate beneath, the sulci bare and the absence of the lamination in the inner carina of tibial apex (Morimoto 1962). However, it is distinct in view of the 2 rows of outer setose fringe in the apex of the middle tibia, semicircular elevated concavity on the ventrite 1, and presence of knob-like structures on the uncus of hind tibia. The genus *Ampagia* (Pascoe, 1870) is the only one to share this character of ventrite, but the present new genus is distinct due to its sclerolepidia, and pair of knobs on the uncus of the hind tibia as could be ascertained from Lyal (1993). However, more species of *Ampagia* remain to be studied to reach a conclusion in this regard.

In the key to the genera of Cryptorhynchinae of the United States by Kissinger (1964), this new genus runs to the *Cryptorhynchus* Illiger (1807). The status of the *Cryptorhynchus* has since undergone several changes; it is to be noted that it has never been shown to possess the unique character of concavity on the ventrite 1 and the pair of knob-like structures on the uncus of the hind tibia; moreover, all *Cryptorhynchus* have bidentate femora.

Further, this new genus shares some characters with the western Palearctic *Onyxacalles* Stüben 1999, like the curved apex (hook) of the aedeagus and presence of knob-like structures on the tibial uncus in some of its species; however, it is distinct in the semicircular elevated concavity on the ventrite 1; in *Onyxacalles*, the median lobe of the aedeagus seems to be not arcuate while herein, it is strongly arcuate (Stüben 1999).

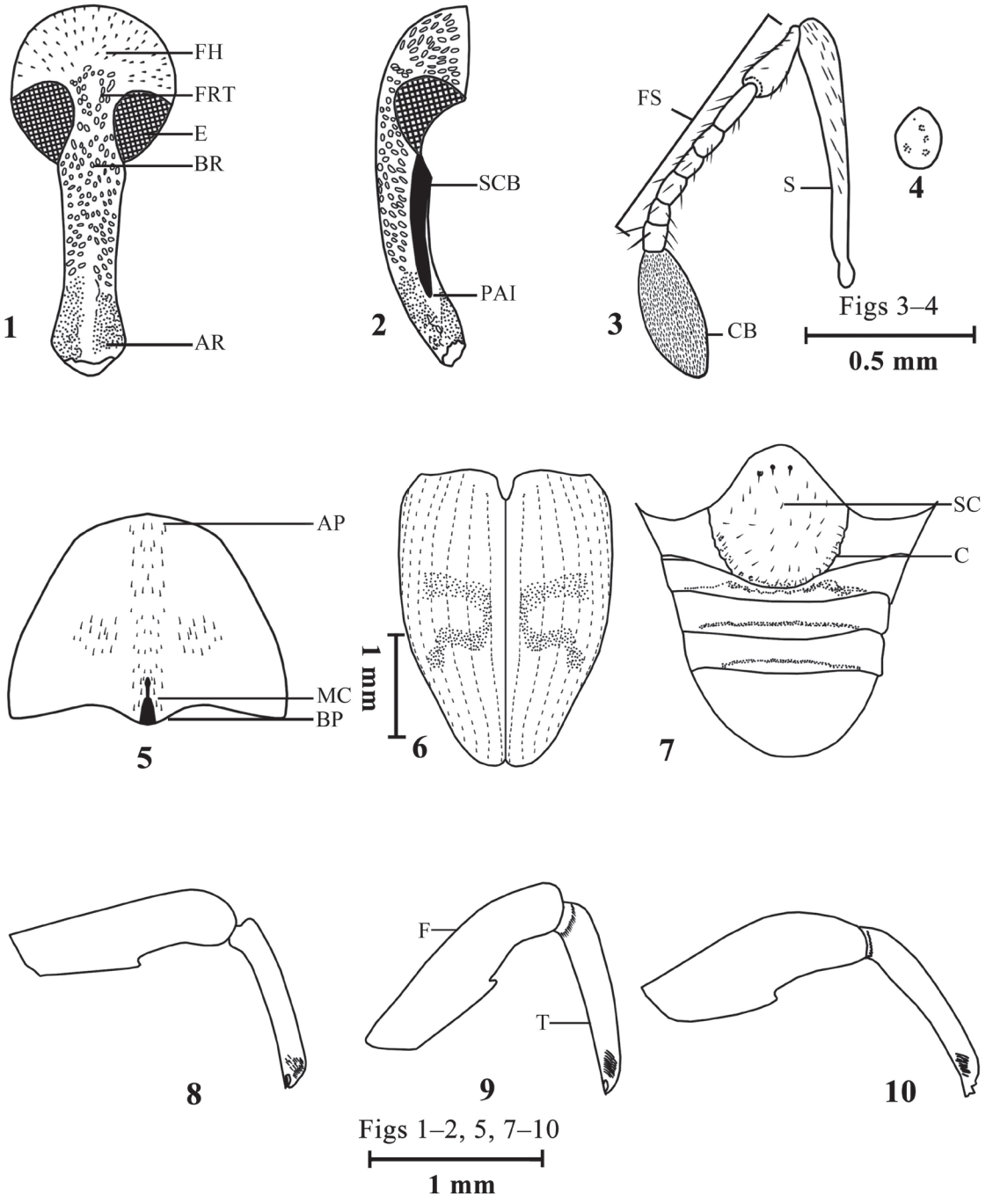
VIRAKTAMATHIA SRINIVASA SP. NOV. (FIGS. 1-45)

Integument reddish black, slightly paler at the apex of the rostrum and tibiae, and much paler in the antennae; and set with truncate, whitish, brown and dark brown recumbent scales, with the scales sparse, separate and not covering the entire surface (Figs. 20, 21 and 22).

Head slightly transverse, finely granulate, set with sparse, elongate, brown, recumbent scales (Fig. 37); frons set with whitish scales, with a small pit between the posterior margin of the eyes, 0.83 × (0.67-0.83 ×) as broad as narrowest portion of the rostrum; rostrum 3.26 × (3.26-3.60 ×) as long as broad, coarsely and densely punctate (Fig. 1), two thirds of rostrum set with whitish scales, rostrum curved (Fig. 2) and slightly dilated at the apical third, with a median carina distinct medially. Antennae (Fig. 34) inserted laterally at two thirds of the rostrum (Fig. 2); scape slightly shorter than funicular segments (Fig. 3) and at most reaching eye, 0.78 × (0.65-0.78 ×) as long as 1st-7th funicular segments combined, set with fine pubescence, and not touching the eyes; funicle 1 2.29 × (2.29–2.48 ×) as long as broad, 1.54 × (1.54-1.71 ×) as long as funicle 2; funicle 2, 2.74 × (2.59-2.79 ×) as long as broad; funicular segments 1st-7th progressively decreasing in length, and longer than broad, set with few, elongate setae; club compact, subcylindrical, and 2.58 × (2.40-2.62 ×) as long as broad.

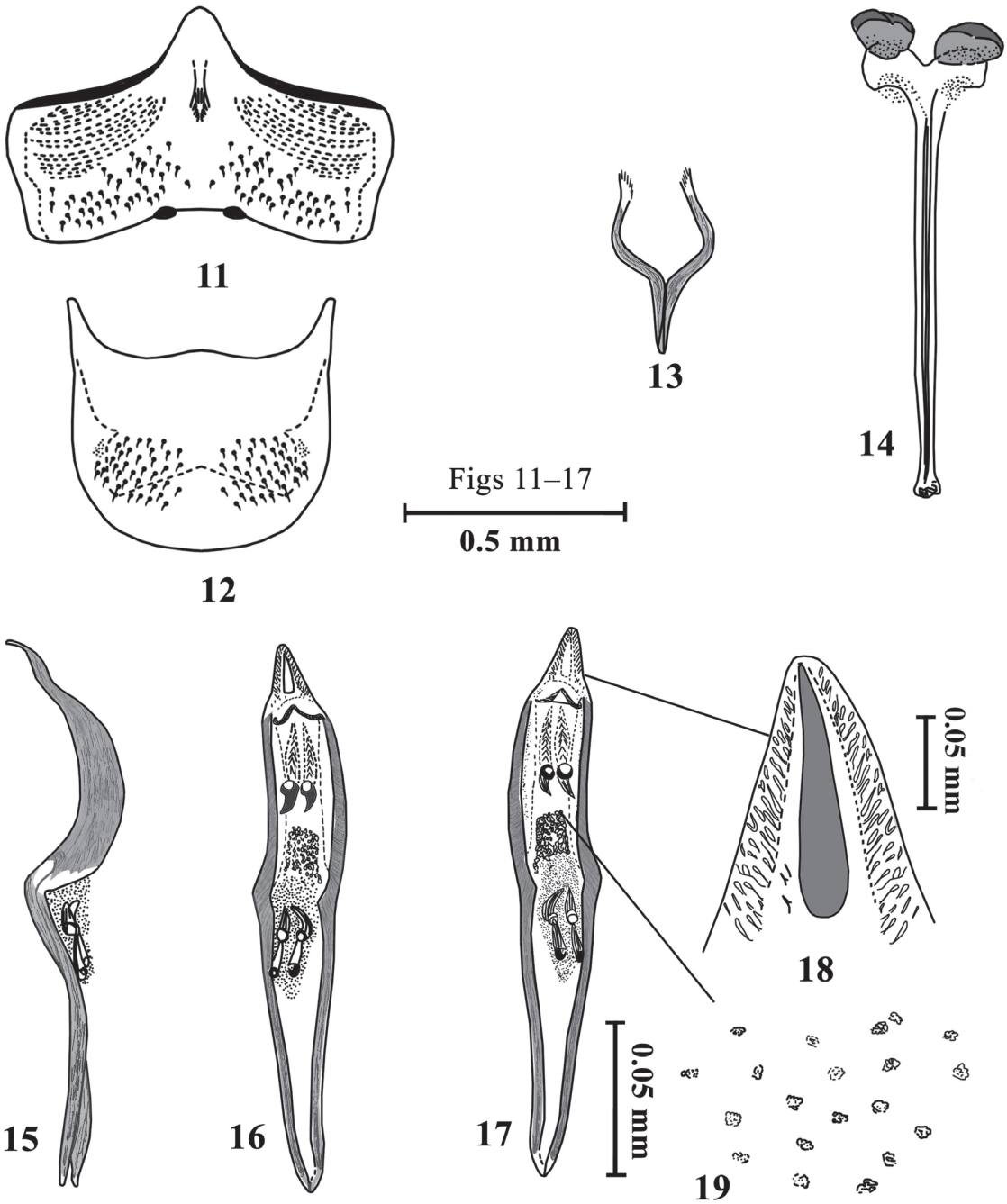
Pronotum slightly transverse (Figs. 5 and 31), 0.72 × (0.68-0.72 ×), as long as broad, broadest at the base, apical portion 0.57 × (0.54-0.57 ×) as broad as base, punctations small, deep and dense, semicircular, each punctation set with subtriangular scales (Fig. 32). Middle of the pronotum with 2 spots separated by longitudinal rows of pale brown scales

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Figs. 1-10. *Viraktamathia srinivasa* **gen.** et **sp. nov.**: (1) head, FH: forehead, FRT: frons, E; eye, BR: base of rostrum, AR: apex of rostrum; (2) lateral view, SCB: scrobe, PAI: point of antennal insertion; (3) antenna, FS: funicular segment, S: scape, CB: club; (4) scutellum; 5. pronotum, AP: apex of pronotum, BP: base of pronotum, MC: median carina; (6) elytra; (7) venter, SC: semicircular concavity, C: carina; (8) fore leg; (9) middle leg, F: femora, T: tibia; (10) hind leg.

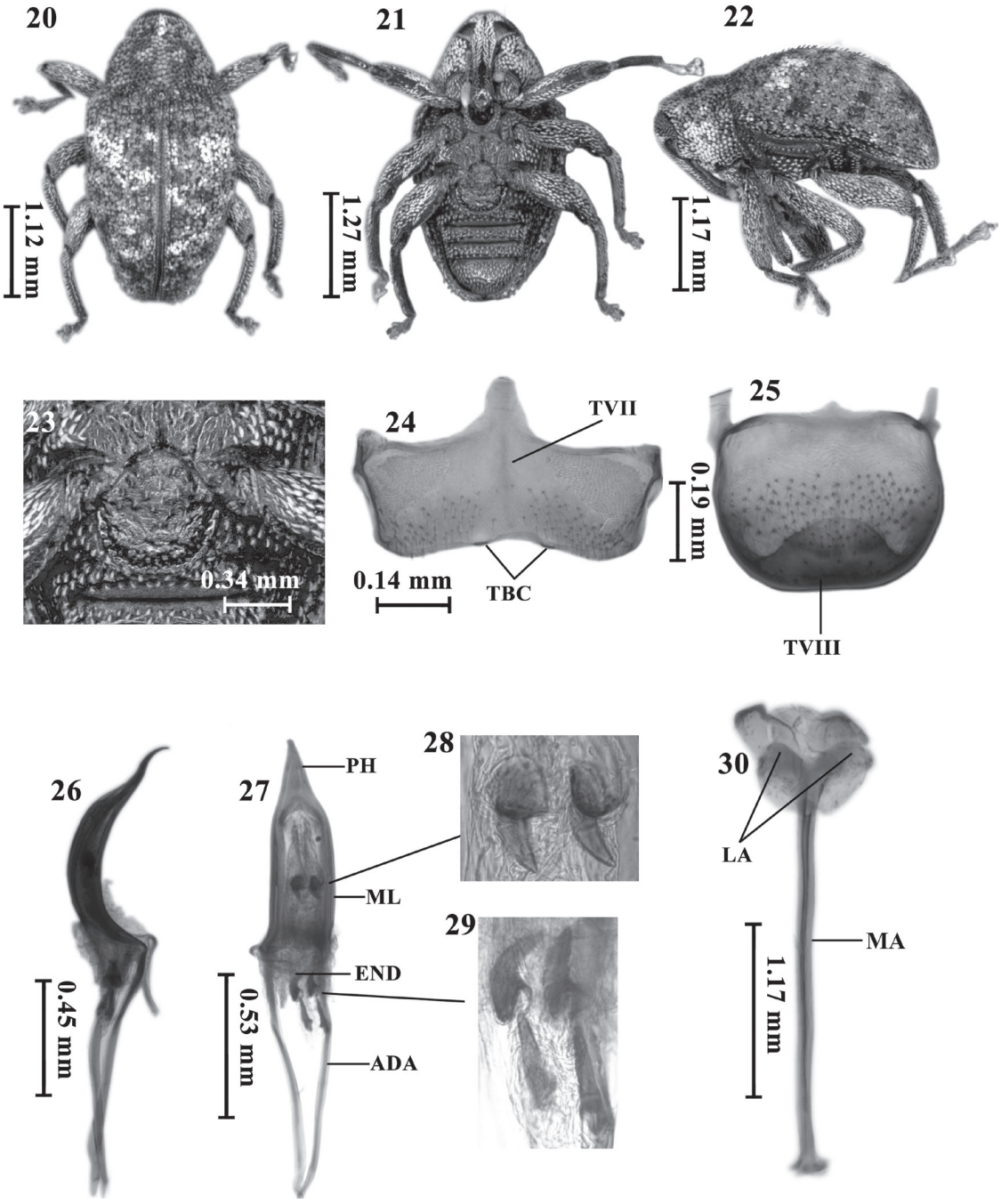
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Figs. 11-19. *Viraktamathia srinivasa* **gen.** et **sp. nov.**: male genitalia: (11) tergite VII; (12) tergite VIII; (13) tegmen; (14) spiculum gastrale; (15) aedeagus, lateral view; (16) ventral view; (17) dorsal view; (18) phallobase; (19) median lobe, enlarged membranous portion.

(Figs. 5 and 20), median carina only at the basal portion; pronotum smoothly rounded at the dorsum and shallowly constricted towards the apex; apex slightly rounded and base bisinuate (Fig. 5); with postocular lobe on anterior margin of pronotum immediately behind eyes. Scutellum (Figs. 4 and 33)

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Figs. 20–30. *Viraktamathia srinivasa* **gen.** et **sp. nov.**: (20) dorsal view; (21) ventral view; (22) lateral view; (23) ventrite 1; (24) male tergite VII (TVII), TBC: tubercle; (25) male tergite VIII (TVIII); (26) aedeagus, lateral view; (27) aedeagus, dorsal view, PH: phallobase, ML: median lobe, END: endophallus, ADA: aedeagal apodeme; (28 and 29) enlarged structures of endophallus; (30) spiculum gastrale, LA: lateral arm, MA: median arm.

shining, trapezoidal, 1.15 × (1.15-1.20 ×), as long as broad, and set with few fine pubescence.

Elytra 1.43× (1.34-1.43 ×) as long as broad (Fig. 6), with reduced humeri, parallel upto the middle, then shallowly constricted towards the apex, roundly convex at the middle, trisinuate at the base and subtruncate at the apex; protuberances on interstria absent, interstria 2.61 ×

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(2.61-3.30×) as broad as stria (Fig. 35), and at little higher level than stria, stria very narrow with punctations oblong; and scales on the sutural margin comparatively smaller than the other. Elytrotergal stridulatory organs present, with elytral strigil (file-like structures) on the apical portion of the ventral sides of the elytra (Figs. 42 and 43), with distinct peg-like structures on the middle of the posterior ends of the tergite VII (Figs. 11 and 24); structures on left elytra more prominent than those on the right side; and other structures (layers of short file-like structures) on the sutural margin of the ventral side (Fig. 42).

Ventrally the prosternal canal ends at the middle of the middle coxae, width of mesosternum at the separation between middle coxae wider than the dorsal apex of the rostrum, and 1.25 × (1.22-1.29 ×) as long as width of the apex of the rostrum, mesosternal receptacle U-shaped and nearly as long as broad and cavernous (Fig. 34). Metasternum concave, with a deep vertical sulcus from the middle of the anterior portion to that of the posterior portion, and longerthan ventrite 3; metepisternite distinct, not concealed by elytra; mesepisternum complete, reaching the marginal line of the metasternum. Abdominal process narrower than a coxa, ventrite 1 feebly fused with ventrite 2 medially and with an elevated, semicircular concavity delimited by a carina (Figs. 7, 23 and 36). Sutures between the ventrite laterally deep; ventrite 1, 1.59 × (1.55-1.62 ×) as long as ventrite 5, ventrite 2 0.51 × (0.36-0.51 ×) as long as ventrite 3+4 combined, ventrite 3 nearly as long as ventrite 4 and 0.37 × (0.33-0.39×) as long as metasternum; and ventrite 3+4 with a transverse, feeble carina at their middle portion.

Sclerolepidia distinct (Figs. 44 and 45) with a row of yellowish scales, called "plumose sclerolepidia" ('type 4' of Lyal et al. 2006) (Fig. 45), between metepisterna and metasternum; and this sclerolepidia raised among the reticulations in the reflexed wall of the metasternal groove, into which fits the ventral margin of the metepisternum (Fig. 44).

Legs with the femora unidentate, dentation at the middle, sulcate beneath with the sulci bare (Fig. 40), middle femora longer than the other two, 1.17 × (1.17-1.21 ×) as long as fore femora and 1.05 × (1.00-1.10×) as long as hind femora, fore and middle femora sublinear dorsally (Figs. 8 and 9), while the hind femora clavate (Fig. 10); trochanter oblique; tibiae broader at the base and smoothly tapering towards the apex, with outer margin even, not serrate, inner carina of the tibial apex not laminate, middle tibia 1.12 × (1.12-1.19 ×) as long as fore tibia and 0.93 × (0.89-0.93 ×) as long as hind tibia; fore tibia set with a row of comb-like outer setose fringes at apex (Fig. 38), while the middle and hind tibia with 2 rows of comb-like, outer setose fringes (Figs. 39 and 41), of which the proximal one is weak and less regular than the distal one, inner flange of the tibial apex largely exposed; hind tibial uncus with a pair of knob-like structures, while fore and middle tibia with only a feeble knob (Figs. 41, 38 and 39); first tarsal segment longer than the others (Fig. 40), 0.89 × (0.89-0.93 ×) and as long as the remaining segments combined, with tarsal claws simple.

Male genitalia with aedeagus 7.04 × as long as broad (Figs. 15, 16, 17, 26 and 27) and aedeagal apodeme nearly as long as median lobe, broader at their joining; median lobe subcylindrical for some part beyond the middle and then abruptly pointed towards the apex (Fig. 18), strongly sclerotised, slightly membranous at the middle, internally with a pair of strongly sclerotised, pointed hooks, with points facing towards the aedeagal apodeme (Figs. 27 and 28), covered with a thin, transparent layer (Fig. 19); endophallus between aedeagal apodeme with 2 pairs of pointed, sclerotised structures, one pair with curved, hollow, cone-like structure in which another pair is placed (Fig. 29); aedeagus in profile strongly arcuate, abruptly narrowed and hooked at the apex (Figs. 15 and 26); tegmen with Y-shaped structure (Fig. 13); spiculum gastrale 3.52× as long as broad at the base, with thick and Y-shaped symmetrical arms (Figs. 14 and 30).

Tergite VII strongly transverse, subrectangular, 0.35× as long as broad, with a pair of spinose patches on the anterior portion, with a pair of setiferous tubercles on the middle of the posterior end (Figs. 11 and 24). Tergite VIII rounded much convex, 0. 94× as long as broad, with few scales only at the median portion (Figs. 12 and 25).

Measurements

Length: 3.0-3.5 mm; breadth: 1.5-2.0 mm.

Type Material

HOLOTYPE 1 Male, INDIA: Karnataka, Coorg; Makut. N 12° 04' 39" E 75°43' 33", 909 m, 5-IV-2005, Coll. Y.B. Srinivas, (NPC); PARATYPES, 2 males, data same as of holotype (NPC).

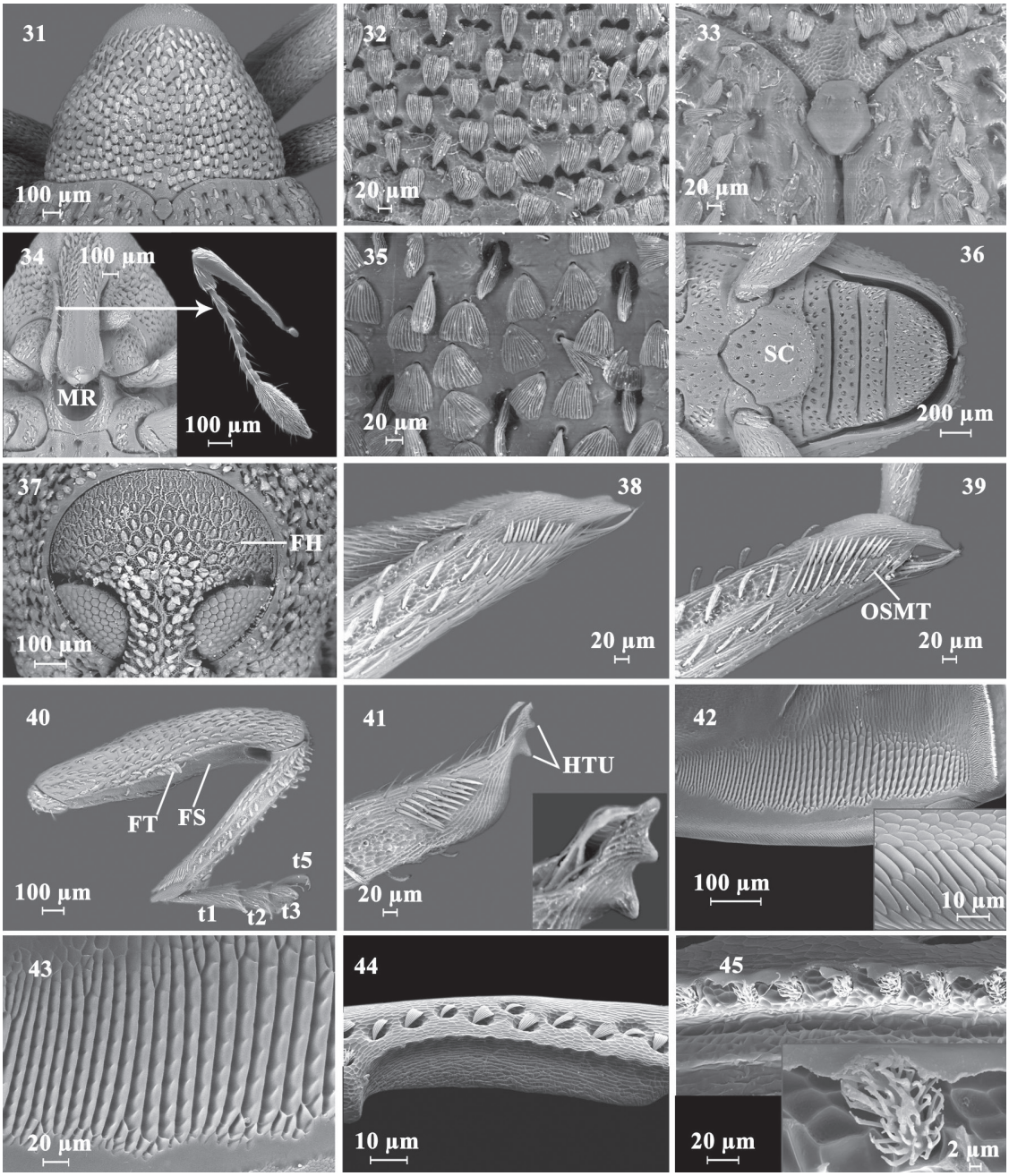
Etymology

This new genus and species are named after Prof. C. A. Viraktamath, University of Agricultural Sciences, GKVK, Bangalore and Mr. Y. B. Srinivas, Institute of Wood Science and Technology, Bangalore, India.

Remarks

In addition to the characters given in the genus description, this new species is unique and distinct in the following combination of charac-

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Figs. 31–45. *Viraktamathia srinivasa* **gen.** et **sp. nov.**: SEM images: (31) pronotum; (32) pronotum, scales and punctation; (33) scutellum; (34) rostrum mesosternal receptacle and antennae; (35) elytra, striae and intervals; (36) venter, SC: semicircular concavity; (37) forehead, dorsal surface, FH: forehead; (38) fore tibial apex; (39) mid tibial apex, OSMT: outer setose aspect of middle tibia; (40) middle leg, FT: femoral tooth, FS: femoral sulcus, t1: I tarsal segment, t2: II tarsal segment, t3: III tarsal segment, t5: V tarsal segment; (41) hind tibial apex, HUT: hind tibial uncus; (42) left elytra, ventral, file-like structures and portion of sutural margin; (43) elytra, ventral, stridulatory structures; (44) metepisternum; (45) sclerolepidia, with one enlarged.

ters: rostrum coarsely and densely punctate, with a median carina distinct medially; pronotum at the middle with 2 spots separated by longitudinal rows of pale brown scales; interstria broader than stria; aedeagus with the median lobe in profile strongly arcuate, abruptly narrowed and slightly

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hooked at the apex, endophallus with a pair of hook-like structures, and with 2 pairs of pointed sclerotized structures between apodeme.

Pending the conclusion of the detailed studies being undertaken on the Indian Cryptorhynchinae and formulation of a key to the genera, Morimoto (1978) is the most relevant key so far available. In this key, the new genus will reach the couplet 11 in which it can be distinguished as follows:

11. Tibiae with the inner carina of the corbels strongly laminate, with 2 rows of outer setose fringes. Femora not or weakly sulcate beneath, the sulci covered with scales . . . . *Sternochetus* Pierce

11'. Tibiae with the inner carina of the corbels not laminate. Femora sulcate beneath and the sulci bare 12

12. Tibiae with 2 rows of outer setose fringe. Ventrite 1 and 2 completely fused medially or with medial suture apparent, and modified to form an elevated concave area. Hind tibial uncus with a knob-like structures . . . . . *Viraktamathia* **gen. nov.**

12'. Tibiae with a row of outer setose fringe. Ventrite 1 and 2 without any elevated concave area. Hind tibial uncus without knob-like structures . . . . . *Shirahoshizo* Morimoto

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