

RESEARCH PAPER

Three new species of the flower bug genus *Orius* (Hemiptera: Heteroptera: Anthocoridae) from Nepal

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Abstract. Three new species of the flower bug genus *Orius* Wolff, 1811 (Anthocorinae: Oriini) are described as new, namely *Orius (Orius) ekaii* sp. nov., *O. (Orius) nigromaritus* sp. nov., and *O. (Xylorius) paveli* sp. nov., all from Nepal. The plant association and habitat are documented for each new species. Habitus images of live individuals and scanning electron micrographs are also provided to aid in proper recognition of their identities. A checklist of *Orius* species known from South Asia (SAARC nations) is incorporated; *Orius indicus* (Reuter, 1884) is herein placed in the subgenus *Dimorphella* Reuter, 1884.

Key words. Hemiptera, Heteroptera, Anthocoridae, *Dimorphella*, *Orius*, *Xylorius*, new species, plant association, Nepal, Oriental Region

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Introduction

The flower bug genus *Orius* Wolff, 1811, including effective predators controlling various agricultural pests, attracts considerable attention from researchers as well as farmers and agribusiness companies worldwide. Several species, e.g. Asian *Orius strigicollis* (Poppius, 1915), South European *O. laevigatus* (Fieber, 1860), Nearctic *O. insidiosus* (Say, 1832), are commercially mass-produced and progressively used in the Integrated Pest Management programs (YASUNAGA 1997, LATTIN 2000, NAGAI & YANO 2000, YASUNAGA et al. 2018; and numerous references containing the relevant information are also available through internet search). Due to a fundamental difficulty in identification of the species, limited numbers of species (mostly temperate zone inhabitants) are currently utilized as biocontrol agents. Nonetheless, much broader survey in South and Southeast Asia will find out further effective candidates usable for biological control against the serious pesticide-resistant pest populations as predicted by YASUNAGA (1997).

Several works have partly revealed the Oriental fauna of *Orius* (e.g., GHOURI 1972, MURALEEDHARAN & ANANTHAKRISHNAN 1974, YASUNAGA & MIYAMOTO 1993,

YASUNAGA 1997, YAMADA et al. 2016, BALLAL et al. 2018), and about twenty species have been documented for the region. In Nepal only three species, *O. bifilarius* Ghauri, 1972, *O. gladius* Zheng, 1982, and *O. niger* (Wolff, 1811), were previously known (PÉRICART 1987, THAPA 2000, BU & ZHENG 2001, BALLAL et al. 2018). However, our subsequent efforts in different climate zones of this small but species-rich Himalayan nation have yielded more than 2,000 specimens referring to a dozen of undetermined species of the genus. This paper represents part of a recent attempt to document the Oriental fauna of *Orius* step-by-step, subsequent to YASUNAGA & MIYAMOTO (1993) and YAMADA et al. (2016). Our close examination on these Nepalese materials has positively confirmed three undescribed species that are herein described from Nepal as new to science. A checklist of South Asian *Orius* species is also provided.

Materials and methods

The depositories of the materials examined are abbreviated in the text as follows:



AMNH	American Museum of Natural History, New York, USA;
NMTU	Natural History Museum, Tribhuvan University, Kathmandu, Nepal;
TKPM	Tokushima Prefectural Museum, Tokushima, Japan;
TYCN	Tomohide Yasunaga Collection, Nagasaki, Japan.

Matrix code labels are attached to the holotype specimens, which uniquely identify each specimen, and are referred to as 'unique specimen identifiers' (USIs). The USI codes comprise an institution and project code (AMNH_PBI) and a unique number (beginning with 00). These data were digitized in the Arthropod Easy Capture (formerly the Planetary Biodiversity Inventory) database maintained by the American Museum of Natural History, New York, USA (<http://research.amnh.org/pbi/>) and are also searchable on the 'Heteroptera Species Pages' (<http://research.amnh.org/pbi/heteropterasespeciespage/>). Scanning electron micrographs were taken with a Hitachi Tabletop Microscope® TM3030; genitalic structures were also observed under a Nikon Eclipse-Ci upright microscope with a phase-contrast unit.

Measurements are given in millimeters in the text; for most SEM images and line drawings of the genitalia, scale bars are shown in micrometers (µm). Terminology follows mainly YASUNAGA (1997) and YAMADA et al. (2016); some terms employed for the scent efferent system are from KMENT et al. (2012). Identifications of the Nepalese plant species were based on YOSHIDA (2005) and SIWAKOTI & VARMA (1999). Only selected references are cited in the synonymic lists, as several catalogs are now available (e.g., HENRY 1988, CASSIS & GROSS 1995, PÉRICART 1996, CARPINTERO 2002, AUKEMA et al. 2013, AUKEMA 2018).

Taxonomy

Orius Wolff, 1811

Orius Wolff, 1811: iv (original description), type species by monotypy: *Salda nigra* Wolff, 1811: iv.

Orius: PÉRICART (1972): 160 (redescription); HENRY (1988): 18 (catalog); YASUNAGA (1993): 12 (diagnosis); CASSIS & GROSS (1995): 33 (catalog); PÉRICART (1996): 122 (catalog); YASUNAGA (1997): 358 (diagnosis, discussion); HERNÁNDEZ & STONEDAHN (1999): 548 (diagnosis); BU & ZHENG (2001): 185 (diagnosis); YASUNAGA (2001): 287 (diagnosis, note); CARPINTERO (2002): 37 (catalog); AUKEMA et al. (2013): 90 (catalog); YAMADA et al. (2016): 1108 (diagnosis, discussion).

Comments. This cosmopolitan genus is currently composed of approximately 90 species (cf. PÉRICART 1996, YAMADA et al. 2016). Only three representatives are known to occur in Nepal. However, our recent effort has revealed presence of more than ten unknown species; three of them were confirmed to be undescribed and are documented below.

Since WAGNER (1952) the subgeneric classification has been employed for *Orius*; currently six subgenera are present, namely *Dimorphella* Reuter, 1884 (= *Paraorius* Yasunaga & Miyamoto, 1993); *Microtrachelia* Blöte, 1929; *Orius* s. str.; *Heterorius* Wagner, 1952; *Trichorius* Yasunaga, 1997; and *Xylorius* Yasunaga, 1997. Nonetheless, this subgeneric classification system is perfectly applicable only to the Palaearctic species. Further comprehensive

revision on a global basis is required to establish more definitive subgeneric classification (YAMADA et al. 2016). Now twenty species are known from South Asia as listed below; the subgeneric position of five species is yet to be determined.

Checklist of *Orius* species known in South Asia

Subgenus *Dimorphella* Reuter, 1884

Orius (*D.*) *dravidiensis* Muraleedharan, 1977 – India, Cambodia, Thailand (BALLAL et al. 2018).

Orius (*D.*) *indicus* (Reuter, 1884) – India (BALLAL et al. 2018). Based on our examination of the lectotype deposited in Zoological Museum, University of Helsinki, Finland (by the first author in March 1998), this species should be placed in the subgenus *Dimorphella* and is very similar in external appearance to *O. maxidentex* or *O. tantillus*; either of the two taxa may be synonymous with *O. indicus* but further verification is required.

Orius (*D.*) *latibasis* Ghauri, 1972 – India (BALLAL et al. 2018).

Orius (*D.*) *maxidentex* Ghauri, 1972 – India including Andaman Nicobar Islands, Iran, Pakistan, Sudan, Thailand, United Arab Emirates (BALLAL et al. 2018).

Orius (*D.*) *tantillus* (Motschulsky, 1863) – Known widely from subtropics and tropics of the Old World, including the Pacific Islands (BALLAL et al. 2018).

Subgenus *Heterorius* Wagner, 1952

Orius (*H.*) *bulgaconus* Ghauri, 1972 – Iran, Pakistan (GHAHARI et al. 2009).

Orius (*H.*) *gladius* Zheng, 1982 – Nepal, China (PÉRICART 1996).

Orius (*H.*) *minutus* (Linnaeus, 1758) – India, Thailand; widely distributed in the Palaearctic Region including North Africa (PÉRICART 1996, YASUNAGA 2001).

Subgenus *Orius* s. str.

Orius (*O.*) *bifilaris* Ghauri, 1972 – Nepal, India, Pakistan, China (BALLAL et al. 2018).

Orius (*O.*) *ekaii* sp. nov. — Nepal (this paper).

Orius (*O.*) *laevigatus* (Fieber, 1860) – Western Palaearctic Region, including Afghanistan and Pakistan (PÉRICART 1996, AUKEMA 2018).

Orius (*O.*) *lindbergi* Wagner, 1952 – Canary Islands, India, Mediterranean Africa, and Europe (PÉRICART 1996, BALLAL et al. 2018).

Orius (*O.*) *luridoides* Ghauri, 1972 – Pakistan (GHAURI 1972).

Orius (*O.*) *niger* Wolff, 1811 (ssp. *aegyptiacus* Wagner, 1952) – Nepal, India, Iran Pakistan; widespread in the Palaearctic Region and North Africa (PÉRICART 1996, GHAHARI et al. 2009, BALLAL et al. 2018).

Orius (*O.*) *nigromaritus* sp. nov. – Nepal (this paper).

Orius (*O.*) *shyamavarna* Muraleedharan & Ananthakrishnan, 1974 – India (BALLAL et al. 2018).

Orius (*O.*) *trivandrensis* Muraleedharan & Ananthakrishnan, 1974 – India (BALLAL et al. 2018).

Subgenus *Xylorius* Yasunaga, 1997

Orius (*X.*) *paveli* sp. nov. – Nepal (this paper).

Subgeneric status undefined

Orius (?) *amnesius* Ghauri, 1980 – India, Nigeria (GHAURI 1980).

Orius (?) *conchaconus* Ghauri, 1972 – Pakistan (PÉRICART 1996).

Orius (?) *ianthe* (Distant, 1910) – India (BALLAL et al. 2018).

Orius (?) *puncticollis* (Poppius, 1909) – Sri Lanka (POPPIUS 1909).

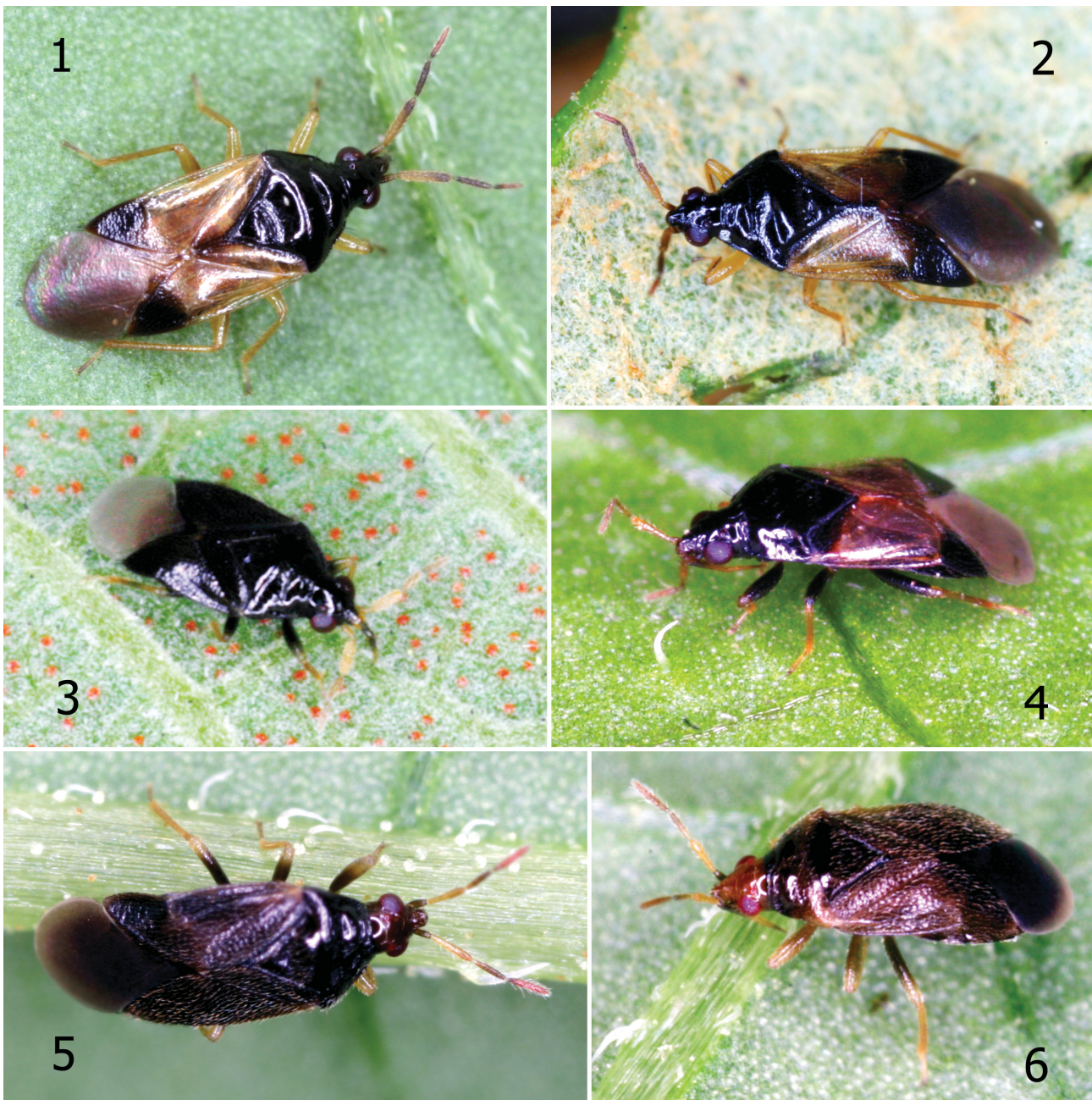
Orius (?) *sublaevis* (Poppius, 1909) – India, Indonesia, China (BALLAL et al. 2018).

Descriptions of new species***Orius* (*Orius*) *ekaii* sp. nov.**

(Figs 1–2, 7–8, 17, 21–33, 61)

Type material. HOLOTYPE: ♂, NEPAL: RASUWA DIST.: Langtang Himal National Park, Lama Hotel–Thomna, 2,340–2,800 m alt., 28°09'32"–10'54"N 85°25'48"–26'29"E, sweep-netting flowers of *Quercus semecarpifolia* Sm., 3 Jun 2006, T. Yasunaga (NMTU) (AMNH_PBI 00380638). PARATYPES: NEPAL: RASUWA DIST.: same data as for holotype, 3 ♂♂ (TYCN); Lama Hotel ~ Rimche, 2,400–2,500 m alt., 28°09'32"–41"N 85°25'17"–48"E, sweep-netting flowers of *Quercus semecarpifolia*, 8 Jun 2006, T. Yasunaga, 2 ♂♂ 1 ♀ (TKPM, TYCN).

Differential diagnosis. Recognized by its relatively large size among congeners belonging to the nominotypical subgenus; elongate body with developed forewing membrane;



Figs 1–6. Habitus images of Nepalese *Orius* species, live individuals. 1–2 – *O. ekaii* sp. nov., ♂; 3–4 – *O. nigromaritus* sp. nov. (3 – holotype ♂, AMNH_PBI 00380639; 4 – ♀); 5–6 – *O. paveli* sp. nov. (5 – ♂; 6 – ♀).

oily shiny, impunctate pronotum; wide peritreme of scent efferent system; uniformly yellowish brown legs; and broadened basal half of flagellum of paramere. Combination of these characters, in addition to its unique arboreal habitat, enables this new species to be distinguished from any other known congeners that belong to *Orius* s. str. Based on the similarly large size and basally thickened flagellum of the paramere, *O. ekaii* sp. nov. is most similar to *O. tomokunii* Yamada & Yasunaga, 2016 described from North Thailand (YAMADA et al. 2016); the former can be readily distinguished from the latter by more expanded posterior angle of the pronotum, darkened cuneus, and the shape of the paramere (e.g., denticule situated near the base of flagellum and basal half of flagellum thickened as in Fig. 61).

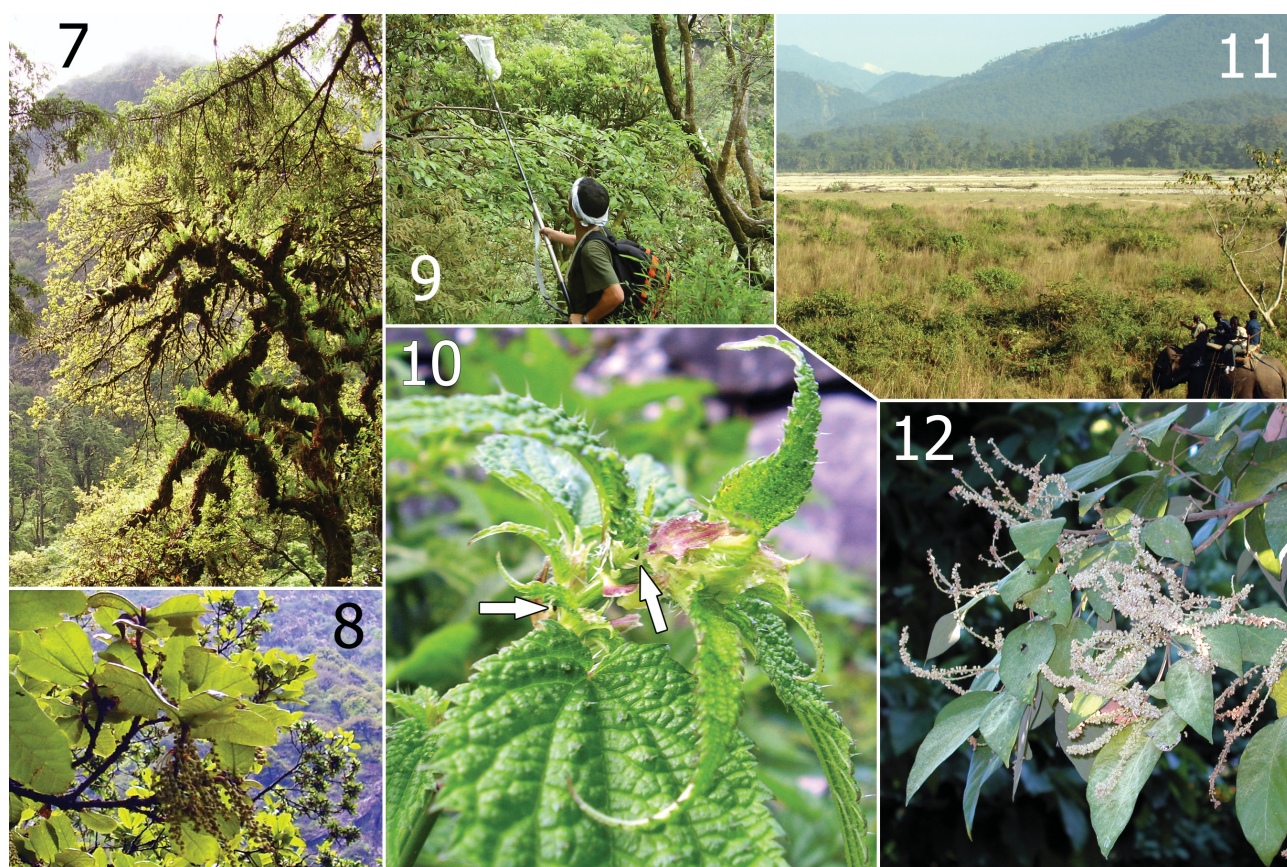
Description. Male. Macropterous. Body generally pale brown, large, elongate oval; dorsal surface shining, with uniformly distributed pale, simple, reclining setae. Head shiny fuscous, weakly porrect. Antenna pale brown, thickened; basal half of segment I, apical 1/4–1/3 of segment II, whole segment III, and base of segment IV more or less darkened; segment II slightly shorter than head width across compound eyes, about as thick as protibia. Labium somber brown, reaching but not exceeding apex of procoxa; apical 1/3 of segment III and base of segment IV yellowish brown. Pronotum polished, oily shiny, sparsely and minutely punctate posterior to calli, with distinct upright corner seta at each angle; scutellum uniformly shiny dark brown, flat; pleura dark brown; metathoracic scent efferent system

as in Figs 24, 33, with wide peritreme. Hemelytron shiny pale brown; cuneus almost entirely darkened (Figs 1–2); membrane pale grayish brown, developed, wider than hemelytron. Coxae and legs pale brown; apical part of each coxa slightly pale; protibial teeth reddish brown, rather blunt-tipped; pretarsal structures as in Figs 26–27. Abdomen shiny dark brown, generally elongate. Male genitalia (Figs 21, 28–29, 61): Paramere C-shaped, with denticule situated near base of flagellum (Figs 28, 61); conus tapered toward apex; flagellum short, with thickened basal half.

Female. Macropterous. Similar in general coloration and shape to male, but body ovoid, antenna slender and hemelytron not significantly infusate. Female genitalia: Not examined as only a single teneral specimen is available.

Measurements (mm). *Male* (n = 4). Total length of body 2.25–2.40; head width across compound eyes 0.38–0.41; lengths of antennal segments I – 0.09–0.11, II – 0.30–0.36, III – 0.21–0.25, IV – 0.19–0.20; basal width of pronotum 0.85–0.95; maximum width across hemelytron 0.93–0.96; and lengths of metafemur 0.58–0.67, metatibia 0.71–0.76, and metatarsus 0.20–0.22.

Female (n = 1). Total length of body 2.25; head width across compound eyes 0.39; lengths of antennal segments I – 0.10, II – 0.29, III – 0.19, IV – 0.20; basal width of pronotum 0.85; maximum width across hemelytron 1.01; and lengths of metafemur 0.65, metatibia 0.71, and metatarsus 0.19.

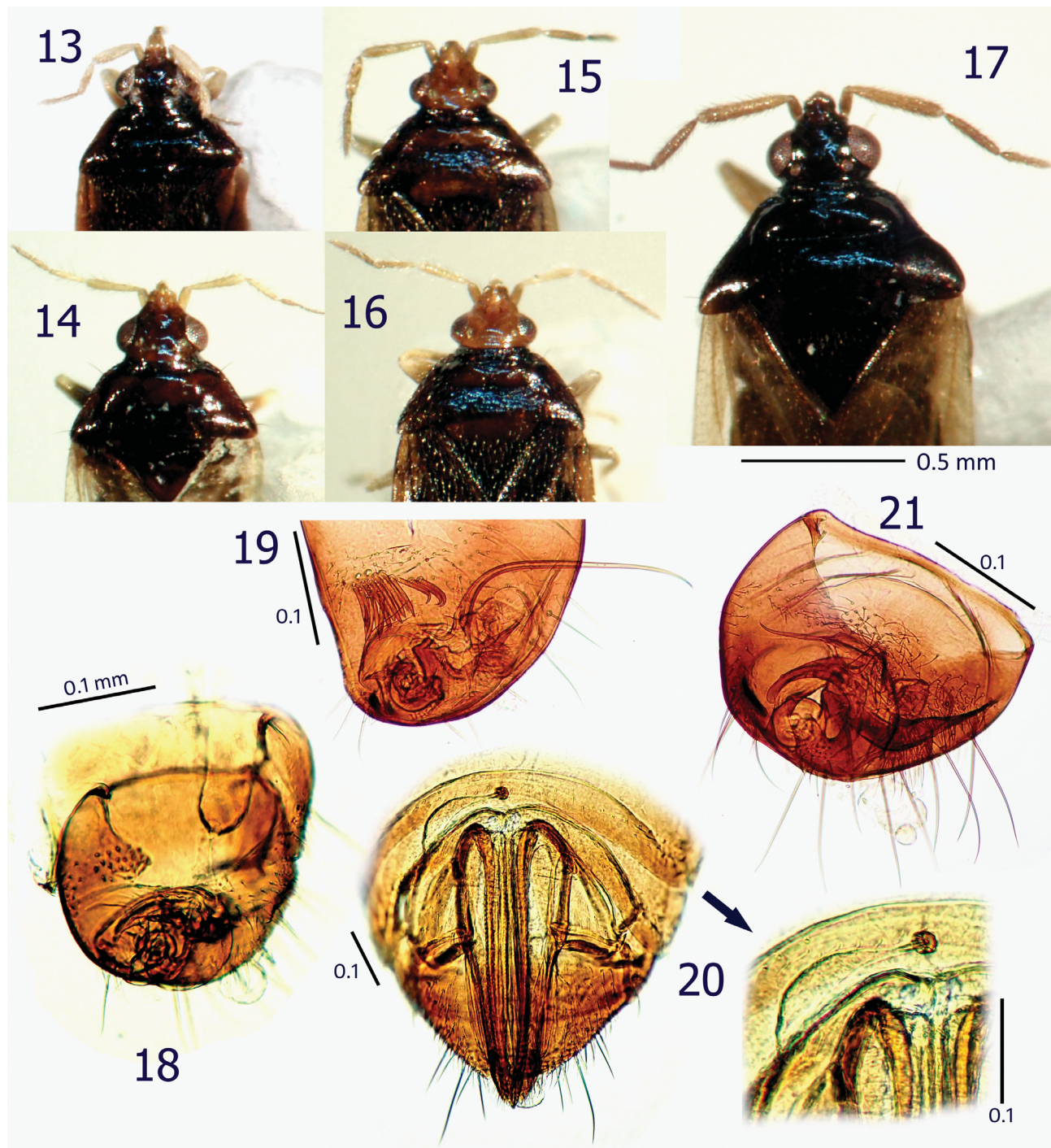


Figs 7–12. Habitats of Nepalese *Orius* species. 7–8 – full blossom of *Quercus semecarpifolia*, on which *O. ekaii* sp. nov. was found, 9 – sweeping inflorescence of *Q. semecarpifolia*, 10 – *Urtica dioica*, with two adults of *O. paveli* sp. nov. (arrows), 11 – Chitwan National Park in southern Nepal, type locality of *O. nigromaritus* sp. nov., 12 – male flowers of *Mallotus philippensis*, considered to be breeding host of *O. nigromaritus* sp. nov.

Etymology. Named after [the Shramana] Ekai Kawaguchi (1866–1945), a Japanese Buddhist monk and pathfinder famed for his amazing fantastic pilgrimage from India via Nepal to Tibet across the Himalayas, seeking Sanskrit and Tibetan Buddhism scriptures (cf. KAWAGUCHI 1909). He also is known as the first Japanese visitor to Nepal and Tibet. Noun in genitive case standing in apposition.

Biology. This unique arboreal new species was discovered from inflorescence of *Quercus semecarpifolia* Sm. (Fagaceae), on which two undetermined species of *Anthocoris*

Fallén, 1814 and more than five species of the Miridae co-occurred, such as *Castanopsides katsutai* Yasunaga & Duwal, 2008, *C. michaili* Yasunaga & Duwal, 2008, *Liocapsus langtang* Yasunaga & Schwartz, 2007, and *Psallomorpha quercicola* Duwal, Yasunaga & Lee, 2010 (cf. YASUNAGA & SCHWARTZ 2007, YASUNAGA & DUWAL 2008, DUWAL et al. 2010). *Orius ekaii* most probably fed on a few undetermined thysanopteran species found simultaneously and/or the oak pollen (T. Yasunaga, personal observation).



Figs 13–21. Dorsal habitus (13–17), and male (18–19, 21) and female (20) genitalia of Nepalese *Orius* species. 13–14, 18 – *O. nigromaritus* sp. nov.: 13 – holotype ♂ (AMNH_PBI 00380639); 14 – ♀; 18 – pygophore with paramere. 15–16, 19–20 – *O. paveli* sp. nov.: 16 – holotype ♂; 17 – ♀; 19 – pygophore with paramere; 20 – female genital segments with copulatory tube, dorsal view. 17, 21 – *O. ekaii* sp. nov.: 17 – holotype ♂; 21 – pygophore with paramere. Scale bars: 0.5 mm for 13–17; 0.1 mm for 18–21.

***Orius (Orius) nigromaritus* sp. nov.**

(Figs 3–4, 11–14, 18, 34–45, 62)

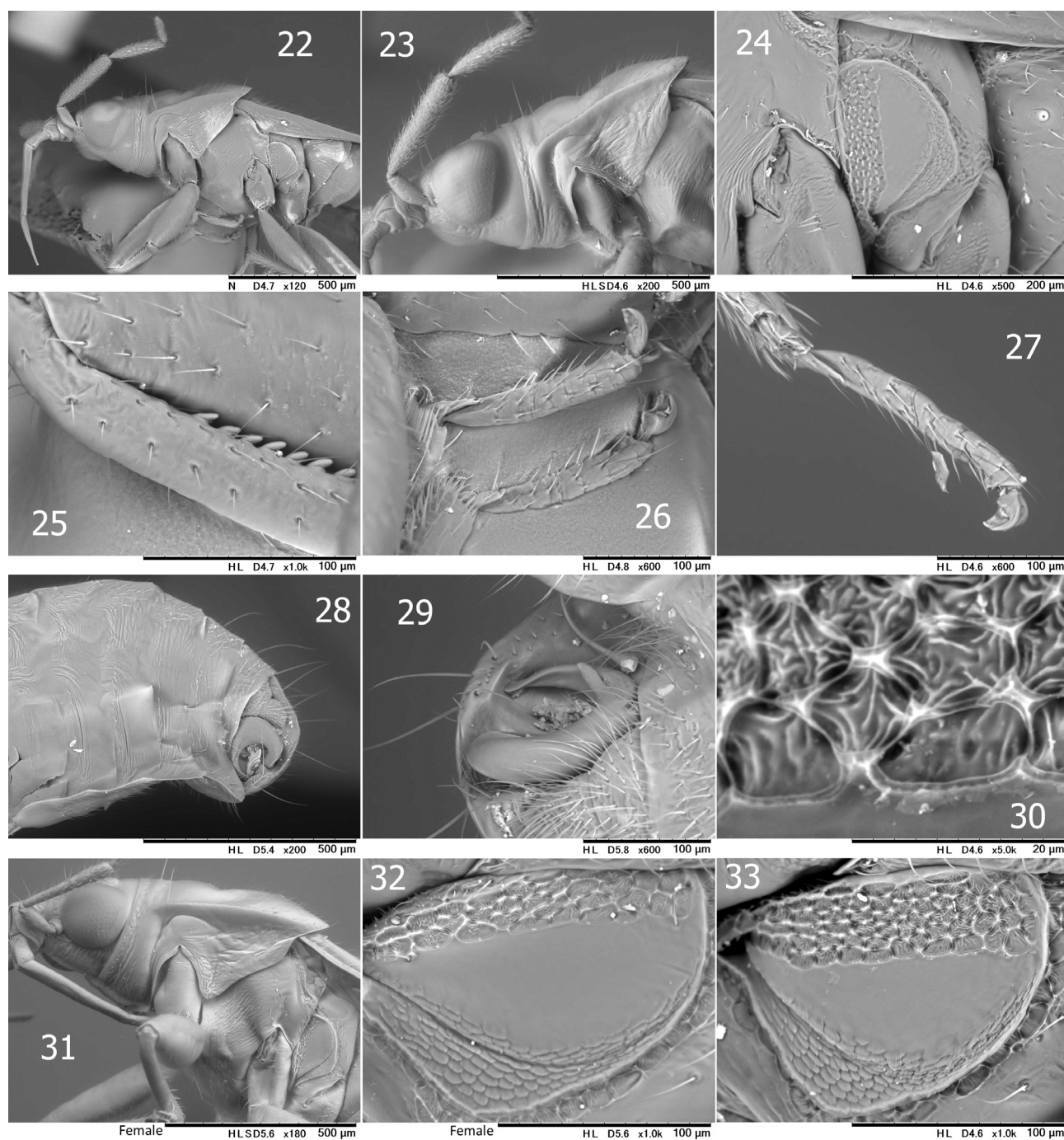
Type material. HOLOTYPE: ♂, NEPAL: MAKAWANPUR DIST.: Chitwan National Park, Machan Wildlife Resort, 27°32'07"N 84°44'17"E, sweep-netting male flowers of *Mallotus* sp. (probably *M. philippensis*), 7–9 Nov. 2006, T. Yasunaga et al. (NMTU) (AMNH_PBI 00380639).

Additional material examined. NEPAL: same data as for holotype, 2 ♀♀ (TYCN).

Differential diagnosis. Recognized by its distinct sexual dimorphism (Figs 3 vs. 4); very tiny size and shiny black body in male (Fig. 3); bulbous male antennal segment II; dark femora except for pale extreme apex of metafemur; and generally slender paramere lacking denticule. Similar in

tiny size and shape of paramere to *O. takaii* Yasunaga, 2000 currently known only from Okinawa Island of the Japanese Ryukyus; however, this Ryukyuan species has larger body and slender antennal segment II, and does not exhibit sexual dimorphism in coloration and size (YASUNAGA 2000).

Description. Male. Macropterous. Body almost entirely black, very tiny in size; dorsal surface shining, with densely distributed pale, simple, semierect setae. Head shiny fuscous, rather short. Antenna yellowish brown, very short; segment II somewhat bulbous, much shorter than head width across compound eyes, about as long as eye height in lateral view (as in Fig. 35); segment III slightly shorter than IV. Labium shiny fuscous, reaching but not exceeding

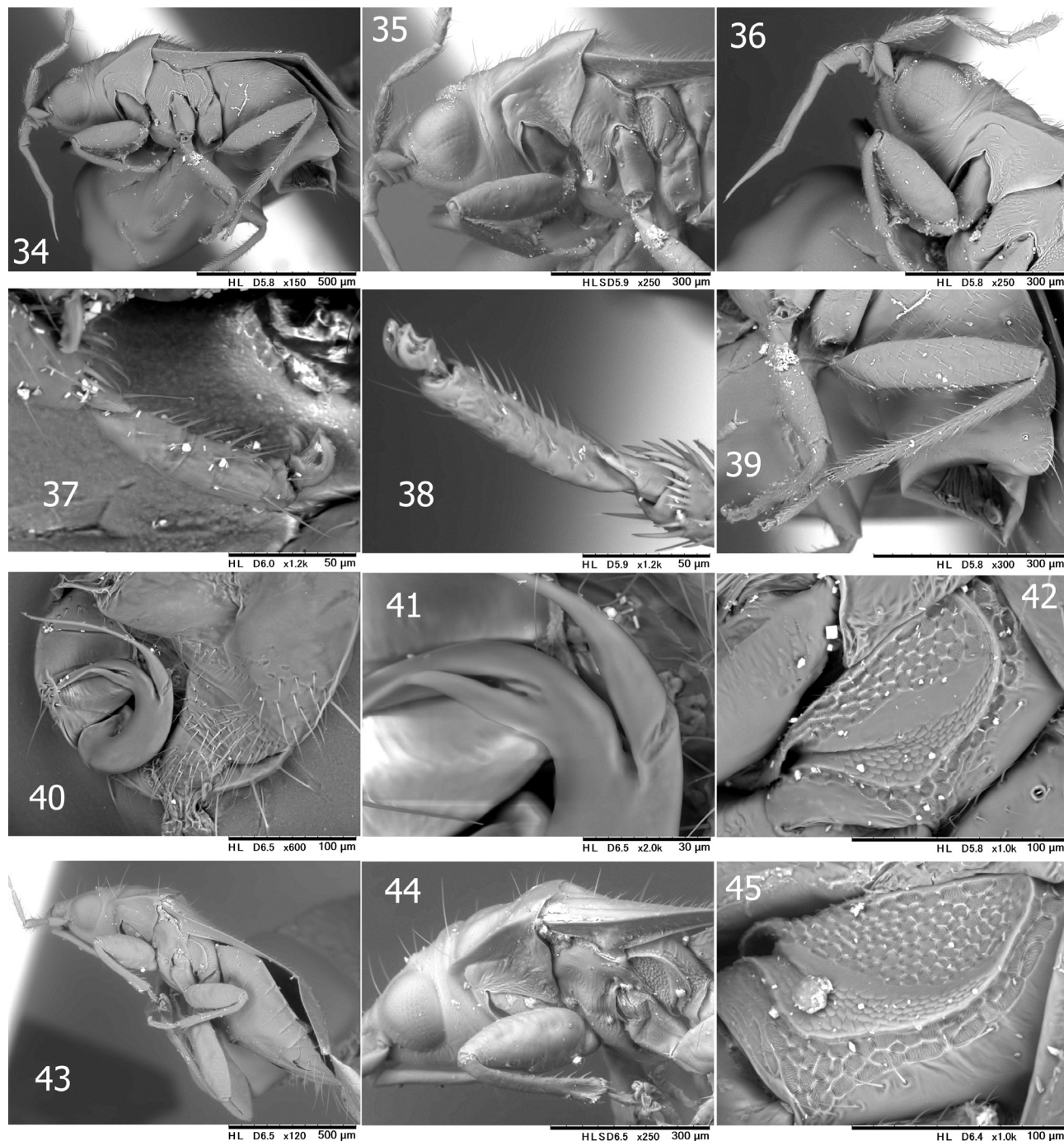


Figs 22–33. Scanning electron micrographs of *Orius ekaii* sp. nov. (22–30, 33 – ♂; 31–32 – ♀). 22–23, 25 – anterior body, left lateral view; 24, 32–33 – metathoracic scent efferent system: 25 – protibia, 26 – protarsi, 27 – metatarsus; 28–29 – male genital segment with paramere, 30 – evaporative area of scent efferent system.

apex of procoxa. Pronotum and scutellum uniformly shiny fuscous, with distinct upright corner seta at each angle; calli rather narrow; pleura blackish brown; metathoracic scent efferent system as in Fig. 42, with narrow peritreme. Hemelytron uniformly shiny fuscous; membrane pale smoky brown, semitransparent. Coxae and legs almost completely fuscous; protibial teeth rather sparsely and partly irregularly arranged; apex of metafemur narrowly yellow; pretarsal structures as in Figs 37–38. Abdomen shiny fuscous. Male genitalia (Figs 18, 40–41): Paramere C-shaped, lacking denticule (Fig. 40); conus sulcate apically (Figs 41, 62); basal 1/4 of flagellum thickened.

Female. Macropterous. Color pattern as in conventional *Orius* species and body generally paler and obviously larger than male; antenna slender; labium shiny pale brown; peritreme of metathoracic scent efferent system narrow (Fig. 45; hemelytron widely pale brown except for fuscous cuneus. Female genitalia (Fig. 63): Copulatory tube tiny, rather bulbous, with apical segment cleft, or grooved.

Measurements (mm). *Male* (holotype). Total length of body 1.29; head width across compound eyes 0.30; lengths of antennal segments I – 0.07, II – 0.17, III – 0.11, IV – 0.13; basal width of pronotum 0.58; maximum width across hemelytron 0.59; and lengths of metafemur 0.37, metatibia



Figs 34–45. Scanning electron micrographs of *Orius nigromaritus* sp. nov. (34–42 – ♂; 43–45 – ♀). 34–36, 44 – anterior body, left lateral view; 37 – protarsus; 38 – metatarsus; 39 – hind leg; 40 – male genital segment with paramere; 41 – basal parts of conus and flagellum; 42, 45 – scent efferent system, 43, left lateral habitus.

0.38 and metatarsus 0.11.

Female (n=1). Total length of body 1.62; head width across compound eyes 0.32; lengths of antennal segments I – 0.10, II – 0.19, III – 0.17, IV – 0.18; basal width of pronotum 0.66; maximum width across hemelytron 0.71; and lengths of metafemur 0.46, metatibia 0.48, and metatarsus 0.11.

Etymology. From Latin, *niger* (black) combined with *maritus* (husband, man, male), indicating the black male adult of this new species; noun in apposition.

Biology. This anthocorid was found from inflorescence of *Mallotus* sp. (Euphorbiaceae), most probably identical to *M. philippensis* (Lam.) Muell.Arg. (Fig. 12) grown in southern plain (subtropical climate zone) of Nepal (Fig. 11). No other information on its feeding habit or life cycle is available.

Comments. Two available female specimens (collected together with the holotype male but herein excluded from the type series) are currently regarded to represent this new species, based on a concordance in shape of the metathoracic scent efferent system (Fig. 45) and color pattern of the legs (Fig. 4). Nonetheless, a definitive treatment will depend on acquisition of sufficient material and evidence through further field investigation.

***Orius (Xylorius) paveli* sp. nov.**

(Figs 5–6, 10, 15–16, 19–20, 46–60, 64–65)

Type material. HOLOTYPE: ♂, NEPAL: RASUWA DIST.: Langtang Himal National Park, Lama Hotel, 2,500 m alt., 28°09'43"N 85°25'49"E, leaves and stems of *Urtica* (prob.) *dioica* L., 8 June 2016, T. Yasunaga (NMTU) (AMNH_PBI 00380640). PARATYPES: NEPAL: RASUWA DIST.: Langtang Himal National Park, same data as for holotype, 2 ♂♂ 16 ♀♀ (AMNH, TKPM, TYCN); Syabru Besi–Bamboo, 28°09'56"N 85°20'34"E ~ 28°09'18"N 85°23'52"E, sweep-netting *Urtica* (prob.) *dioica*, 2 June 2006, T. Yasunaga, 2 ♂♂ 3 ♀♀ (TYCN).

Differential diagnosis. Recognized by its chocolate brown general coloration; a distinct spine on posterior margin of episternum (Fig. 50); developed evaporative area widely occupying metathoracic scent efferent system (Figs 51, 54); dark femora with pale apices (Figs 5–6); unique shape of pygophore (with a bundle of remarkable spines as in Figs 19, 59, 64); long flagellum of paramere (Figs 59, 64); and subapically inflated, gourd-like copulatory tube with a bottle-lid-shaped apex (Figs 20, 65). Externally similar to species of the subgenus *Trichorius*; this new species can be distinguished by reduced corner seta at posterior angle of pronotum, presence of a spine on the episternum, developed evaporative area of the scent efferent system, and long flagellum of the paramere. *Orius paveli* is easily distinguished from *O. (X.) miyamotoi* Yasunaga, 1997 by the totally chocolate brown dorsum, reduced posterior corner setae on the pronotum and long flagellum of the paramere.

Description. Male. Macropterous. Body generally chocolate brown, oval and slightly elongate, small to moderate in size; dorsal surface moderately shining, with uniformly distributed pale, simple, semierect setae. Head shiny reddish brown, sometimes yellowish or paler brow in some specimens. Antenna dark brown, not thickened throughout; whole segment II and base of segment III yellow; segment II about 2/3 as

long as head width across compound eyes; segment IV often tinged with red. Labium shiny reddish brown, reaching but not exceeding apex of procoxa. Pronotum shiny fuscous, sparsely and roughly punctate posterior to calli, with weak corner seta at anterior angle (posterior corner seta reduced); scutellum uniformly shiny dark brown, flat; pleura dark brown, partly reddish; posterior margin of episternum with spine (Fig. 53); metathoracic scent efferent system as in Figs 53–54, widely occupied by evaporative area. Hemelytron chocolate brown, weakly shining; membrane smoky brown. Coxae dark brown; legs pale brown; all femora dark brown, except for each apex yellowish brown; protibial teeth rather developed (Fig. 55); pretarsal structures as in Figs 56–57. Abdomen shiny chocolate brown. Male genitalia (Figs 19, 58–60, 64): Paramere disk-like, with folded process in middle, lacking denticule situated near base of flagellum (Figs 28, 64); conus tapered apically; flagellum very long, with thickened basal half.

Female. Macropterous. Similar in general coloration and shape to male; body ovoid, tumid; antenna slender and hemelytron not significantly infusate. Female genitalia (Figs 20, 65): Copulatory tube subapically inflated, gourd-like, with bottle-lid-shaped apex.

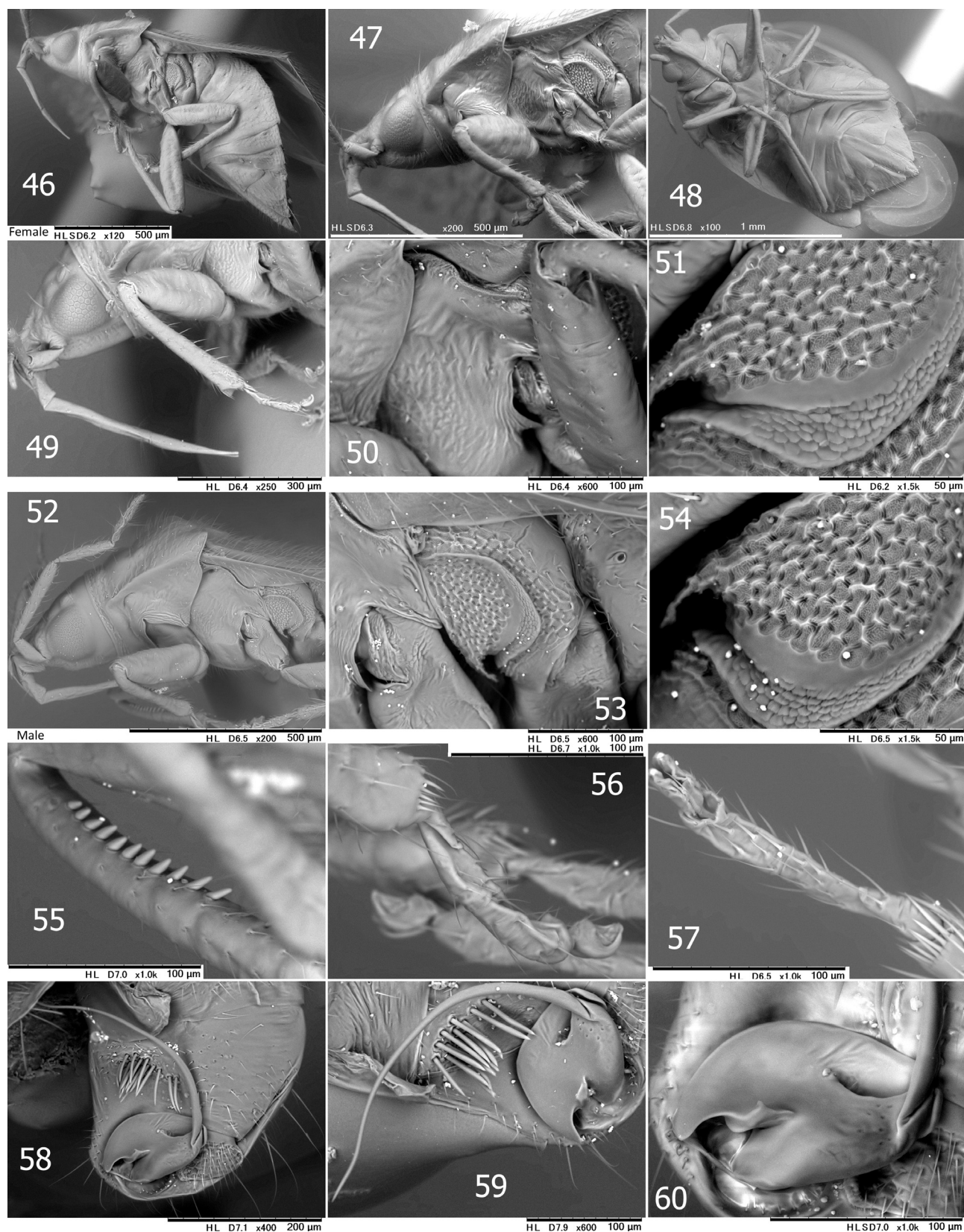
Measurements (mm). **Male** (n = 4). Total length of body 1.66–1.68; head width across compound eyes 0.30–0.32; lengths of antennal segments I – 0.08–0.10, II – 0.21–0.23, III – 0.15–0.17, IV – 0.19–0.20; basal width of pronotum 0.67–0.69; maximum width across hemelytron 0.75–0.76; and lengths of metafemur 0.47–0.48, metatibia 0.51–0.56, and metatarsus 0.16–0.18.

Female (n = 3). Total length of body 1.50–1.62; head width across compound eyes 0.30–0.31; lengths of antennal segments I – 0.07–0.09, II – 0.19–0.20, III – 0.15–0.17, IV – 0.19–0.20; basal width of pronotum 0.66–0.74; maximum width across hemelytron 0.76–0.78; and lengths of metafemur 0.47–0.49, metatibia 0.48–0.51, and metatarsus 0.14–0.18.

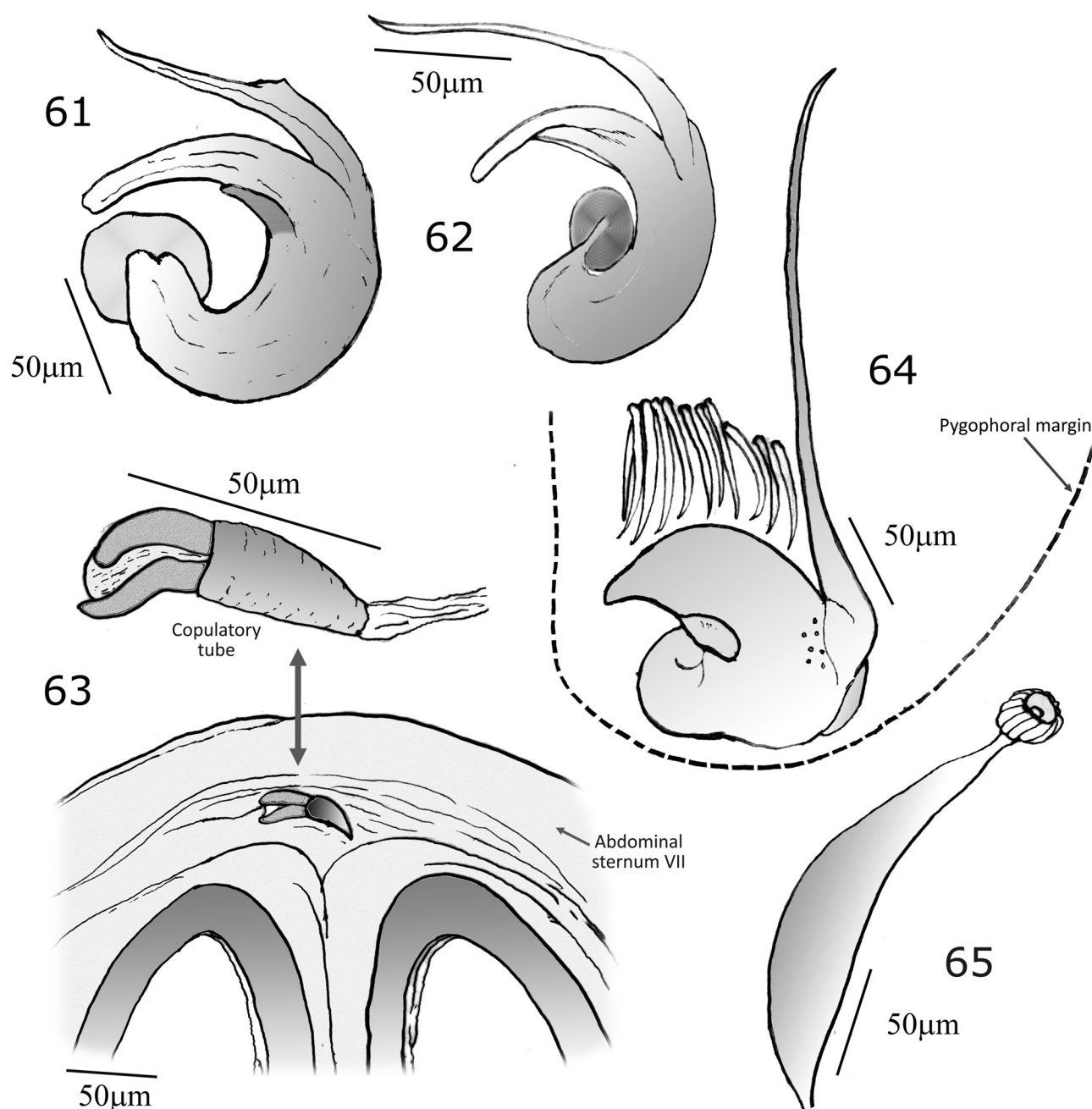
Etymology. This new species is named in honor of the eminent Czech heteropterist, Prof. Pavel Štys, who regrettably passed away in August 2018; noun in genitive case standing in apposition.

Biology. This new species was confirmed to be associated with a stinging nettle, most similar to *Urtica dioica* L. (Urticaceae). Although its life cycle is unknown, *Orius paveli* was found on leaves and stems (Fig. 10) covered with stinging hairs (secreting formic acid) causing skin irritation (cf. YOSHIDA 2005), which presumably provides *O. paveli* a secure habitat. On the same plant, an unidentified species of thrips (Thysanoptera) co-occurred with the anthocorid which is assumed to prey on the thrips.

Comments. Subgeneric position of *Orius paveli* is currently not well elucidated, although at first sight it is reminiscent of a member of *Trichorius*. Nonetheless, the preponderance of the current evidence (i.e. the male genital segment bearing a bundle of strong spines on its dorsal surface [Figs 19, 58–59, 63] and similarity in shape of the female copulatory tube [Figs 20, 65]) argues in favor of the provisional placement of this new species in the subgenus *Xylorius*.



Figs 46–60. Scanning electron micrographs of *Orius paveli* sp. nov. (46–51 – ♀; 52–60 – ♂). 46 – whole body, left lateral view, 47–49, 52 – anterior body, left lateral view, 50 – pleura, left lateral view, 51, 53–54 – metathoracic scent efferent system, 55 – protibia, 56 – protarsus, 57 – metatarsus, 58–59 – pygophore with paramere, 60 – conus and base of flagellum.



Figs 61–65. Male (61–62, 64) and female genitalia (63, 65) of Nepalese *Orius* species. 61 – *O. ekaii* sp. nov., 62–63 – *O. nigromaritus* sp. nov., 64–65 – *O. paveli* sp. nov.

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