

A review of the Far East Asian mirine plant bug genus *Loristes* (Hemiptera: Heteroptera: Miridae: Mirinae), with description of a new species from Japan

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Abstract. The little known mirine plant bug genus *Loristes* Josifov & Kerzhner, 1972 is reviewed. A species from Japan which was previously regarded conspecific with the continental *L. decoratus* (Reuter, 1908) is here described as *L. paveli* sp. nov.

Key words. Heteroptera, Miridae, Mirinae, *Loristes*, taxonomy, new species, Japan

Introduction

The mirine plant bug genus *Loristes* was proposed by JOSIFOV & KERZHNER (1972), to accommodate a single species, *Adelphocoris decoratus* Reuter, 1908, known from the continental Russian Far East and Korea. Subsequently, this species was documented from Japan (YASUNAGA 1991, 1993; YASUNAGA et al. 1993) and China (ZHENG et al. 2004). The Japanese members were considered to be conspecific with the continental populations.

Recently, I had an opportunity to carefully compare the Japanese specimens with Korean and Far East Russian material. This examination revealed significant differences between the Japanese and continental populations, and what previously was identified as *L. decoratus* from Japan is herein confirmed to represent an undescribed species.

In this paper, the genus *Loristes* is reviewed, including a discussion of the genitalic features of both sexes. A new species from Japan, *L. paveli* sp. nov., is described. The type species, *L. decoratus*, is diagnosed and its distribution is confirmed to be restricted to continental Eastern Asia.

Material and methods

Thirty-seven dried specimens deposited in the Seoul National University, Korea and the author's collection were examined. The holotype of new species will be deposited in the American Museum of Natural History, New York. Dorsal view photographs and genitalic images

were made with Olympus SZX10 stereoscopic microscope + Canon EOS Digital camera.

All measurements in the text are given in millimeters. Measurements in species descriptions are ranges of 3-5 specimens with necessary body parts. In the synonymous lists for known taxa, only selected references are cited, as comprehensive catalogs are available (KERZHNER & JOSIFOV 1999, SCHUH 1995).

Taxonomy

Loristes Josifov & Kerzhner, 1972

Loristes Josifov & Kerzhner, 1972: 162 (gen. nov.). Type species: *Adelphocoris decoratus* Reuter, 1908, original designation.

Loristes: YASUNAGA (1991): 2 (diagnosis); SCHUH (1995): 790 (catalog); KERZHNER & JOSIFOV (1999): 109 (catalog); YASUNAGA (2001): 234 (diagnosis); ZHENG et al. (2004): 304 (diagnosis).

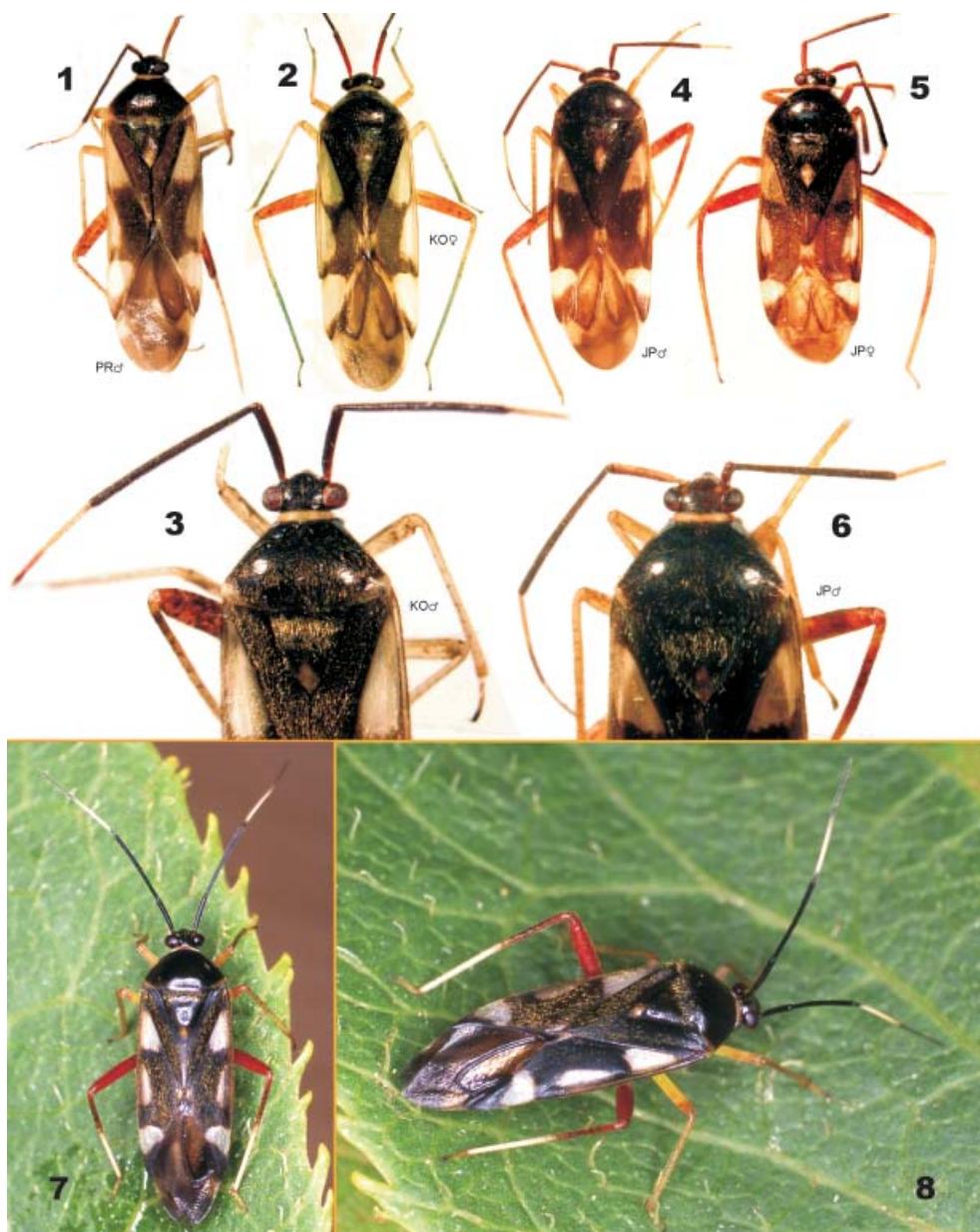
Diagnosis. Recognized by the large, parallel-sided body (7.5-9 mm in length), unique color pattern (dark, shiny body with the three pairs of characteristic, pale, semitransparent spots on the hemelytra, Figs. 1-2, 4-5), shiny dorsum, small eyes, weak transverse basal carina on the vertex, short antenna, incrassate antennal segment II that is subequal in length to the basal pronotal width, short labium that does not exceed the apex of the mesocoxa, impunctate pronotum with dense, pale, semierect setae, thick collar that is about as broad as the diameter of antennal segment II, tumid scutellum, scutellum and hemelytron with uniformly distributed, wooly, reclining setae, and the male and female genitalic structures described below.

Male genitalia (Figs. 9-16). Male genital segment simple, lacking notable additional structures dorsal to paramere insertions. Parameres with basic shape typical of tribe Mirini; left paramere long, semi-circularly curved; right paramere short and straight. Vesica with several spiculi and/or lobe-sclerites that are fundamentally homologous within congeners (Figs. 12, 16); seminal duct slightly expanded apically; phallotheca smooth.

Female genitalia (Figs. 17-24). Sclerotized ring narrow-rimmed, ovoid; dorsal structure membranous, more or less spinulate; interramal lobe wide, covered with minute spines, not heavily sclerotized.

Distribution. *Loristes* now comprises two species which inhabit the deciduous forests in the temperate and cold temperate zones of eastern Asia – northeastern China, continental Russian Far East, Japan and Korean Peninsula (KERZHNER & JOSIFOV 1999, YASUNAGA 2001, ZHENG et al. 2004).

Discussion. Currently, no sister group hypotheses are proposed for *Loristes*. At first glance this genus appears to be allied to the large Holarctic genus *Adelphocoris* Reuter, 1896. However, based on the structures of the antenna, scutellum and male genitalia, this similarity is considered superficial. *Loristes* is probably most similar in overall appearance to the east Asian *Philostephanus* Distant, 1904, but the former genus has no synapomorphy shared by all members of the latter. *Philostephanus* species have distinctive structures particularly in the female genitalia as documented by YASUNAGA & SCHWARTZ (2007), not known from *Loristes*. Based on the general shape of the male and female genitalic structures, *Loristes* is assumed to have some relationship with *Polymerias* Yasunaga, 1997 (see YASUNAGA 1997).



Figs. 1-8. *Loristes* species, habitus. 1-3 – *L. decoratus* (Reuter, 1908). 1 – male from Primorskiy Kray, Russia; 2 – female from Korea; 3 – male from Korea. 4-8 – *L. paveli* sp. nov. 4, 6 – male from Honshu, Japan; 5 – female from Honshu, Japan; 7-8 – male from Shikoku, Japan.

In a wider geographical scale, *Loristes* is more or less similar to some genera of *Calocoris* Fieber, 1858 complex mostly known from the western Palaearctic Region. Higher classification of such superficially similar mirine plant bug genera is still in great need of investigation. Further world level supra-generic revision is required to correctly ascertain these complex groups in the tribe Mirini.

Loristes decoratus (Reuter, 1908)

(Figs. 1-3, 9-12, 17-19, 25)

Adelphocoris decoratus Reuter, 1908: 488 (sp. nov.).

Loristes decoratus: JOSIFOV & KERZHNER (1972): 164 (comb. nov., list); YASUNAGA (1993): 289 (description of final instar larva); SCHUH (1995): 790 (catalog); KERZHNER & JOSIFOV (1999): 109 (catalog); ZHENG et al. (2004): 304 (diagnosis).

Type locality. Russia, southern Primorskiy Kray, Ussuri.

Material examined. RUSSIA: PRIMORSKIY KRAY: Khasanskiy Dist., Ryazanovka, 12 km SW of Slavyanka, 29.v.1992, 1 ♂, T. Yasunaga lgt.; Anisimovka, 300 m alt., 5.vi.1992, 7 ♂♂ 5 ♀♀, T. Yasunaga lgt. SOUTH KOREA: KYONGI PROV.: Mt. Gwangmoek, 17.v.1998, 1 ♂ 1 ♀, C. Cheong lgt. KANGWON PROV.: Hungcheon, Maemyong, Undulyong, 11.vi.1997, 1 ♀, S. An lgt.; Inche, Hagang, Naelimcheon, 27.v.1993, 1 ♂, D. Gu lgt. JEOLLABUK PROV.: Samgeo, Mupung, Muju, GB, 18.v.2007, 1 ♂ 1 ♀, J. Seong lgt.; Samgong, Seolcheon, Muju, GB, 19.v.2007, 1 ♀, J. Seong lgt.

Redescription. Body widely fuscous, elongate. Head chocolate brown, shining, with pale, short, erect setae. Antennal segment I brown or pale brown, usually tinged with red, long, greater than head width across eyes; segment II entirely fuscous, longer than basal width of pronotum; segments III whitish brown, with reddish apical 1/3 and darkened extreme apex; segment IV dark brown, with pale extreme base. Labium shiny pale brown; ventral part of segment I sometimes infuscate; apex of segment IV dark brown. Pronotum shiny fuscous, with usually continuous, pale basal margin; collar always yellow; scutellum fuscous, with yellow apex; pleura widely darkened, more or less pruinosed or shagreened, with creamy yellow scent efferent system. Hemelytron chocolate brown, slightly shagreened; corium with two pale spots that are continuing to pale embolium; cuneus pale, with narrowly darkened apex and apical margin; membrane smoky brown, semitransparent. Leg, including coxa, yellowish brown; apical part of metafemur widely reddish brown; tibia with pale spines; tarsus pale brown, with more or less infuscate tarsomere III. Abdomen shiny dark brown, with widely yellow ventromedian part.

Male genitalia (Figs. 9-12). Left paramere C-shaped. Vesica with three horn-like, slender spiculi (spc I-III).

Female genitalia (Figs. 17-19). Interramal lobe weak. Sclerotized ring oval.

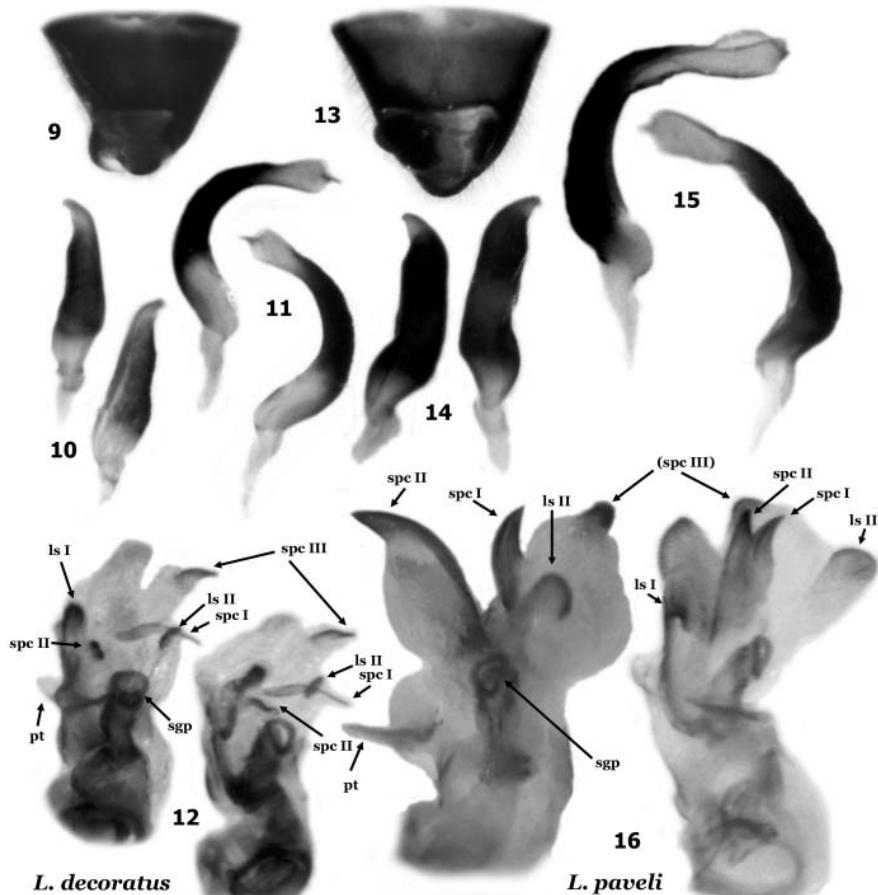
Measurements (♂/♀). Body length 8.0-8.3 / 8.4-8.9; head width across eyes 1.00-1.11 / 1.15-1.18; vertex width 0.49-0.52 / 0.52-0.56; lengths of antennal segments I – 1.15-1.20 / 1.17-1.23, II – 2.35-2.40 / 2.52-2.60, III – 1.46-1.49 / 1.48-1.66, IV – 0.93-1.01 / 0.88-0.92; total labial length 2.16-2.28 / 2.20-2.24; mesal pronotal length including collar 1.30-1.35 / 1.39-1.42; basal pronotal width 2.13-2.32 / 2.37-2.41; width across hemelytra 2.42-2.64 / 2.80-2.88; lengths of metafemur 2.30-2.86 / 2.97-3.12, tibia 4.08-4.13 / 4.27-4.32, and tarsus 0.67-0.70 / 0.67-0.72.

Differential diagnosis. Distinguished from *L. paveli* sp. nov. by the larger size, longer antennal segment I that is greater than the head width across eyes, longer antennal segment II that is

greater than basal width of the pronotum, shorter mesal pronotal length that is less than the antennal segment III, larger pale spots on the hemelytra, and structures of the genitalia.

Bionomics. More than 20 final instar immatures were collected from *Lonicera maarckii* (Caprifoliaceae) during my expedition in southern Primorskiy Kray including the type locality, Ussuri area. KERZNER (1988) also reported the plant association as *Lonicera* spp. A univoltine life cycle is assumed for this mirid, and the newly emerged adults appear in early June. The final instar larva was documented and described by YASUNAGA (1993).

Distribution. This species is now confirmed to be restricted to the continental Far East Asia: Northeastern China (Heilongjiang, Jilin and Liaoning provinces), Russian Far East (Primorskiy Kray and S. Khabarovskiy Kray provinces), and Korea (Fig. 25). The record from 'Amur' (SCHUH 1995) is presumably based on an incorrect citation.



Figs. 9-16. Male genitalia of *Loristes* species. 9-12 – *L. decoratus* (Reuter, 1908). 13-16 – *L. paveli* sp. nov. 9, 13 – genital segment. 10, 14 – right paramere. 11, 15 – left paramere. 12, 16 – vesica. Abbreviations: ls – lobal sclerite, or lobe-sclerite; pt – phallotheca; sgp – secondary gonopore; spc – spiculum.

Loristes paveli sp. nov.

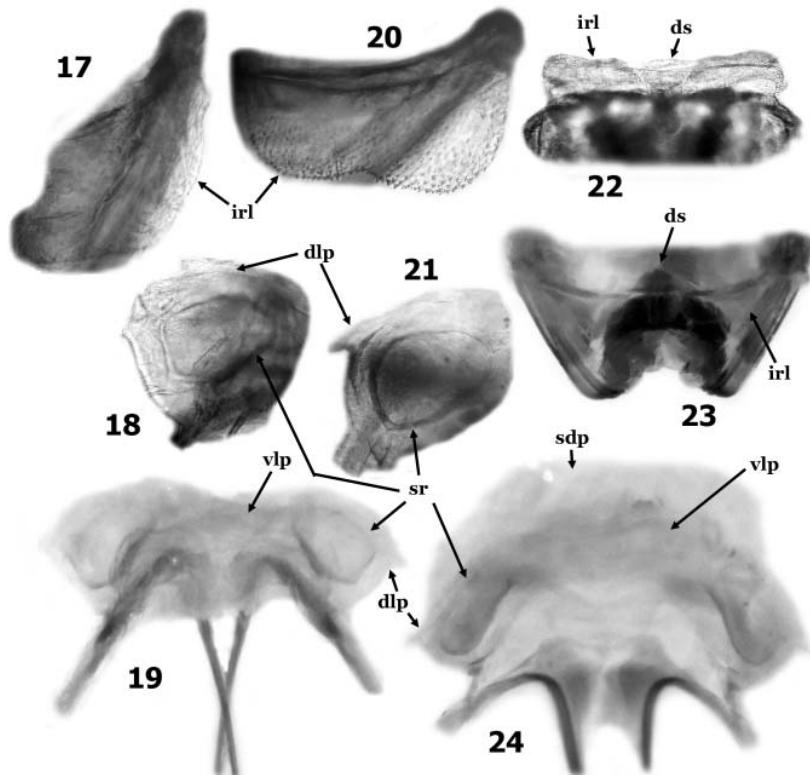
(Figs. 4-8, 13-16, 20-25)

Loristes decoratus (nec Reuter, 1908): YASUNAGA (1991): 4 (redescription); YASUNAGA et al. (1993): 160 (diagnosis); YASUNAGA (2001): 235 (list).

Type locality. Japan, central Honshu, Yamanashi Pref., Mt. Mitsu-toge, 1,260-1,380 m alt.

Type material. HOLOTYPE: ♂, ‘Japan: HONSHU: Mt. Mitsu-toge / 1,260-1,380 m / Yamanashi Pref. / 23. vii. 1988 / M. HAYASHI et al.’ (deposited in the collection of American Museum of Natural History, New York). PARATYPES: HONSHU: 4 ♂♂ 5 ♀♀, same data as for holotype; 4 ♂♂ 1 ♀, ‘Mt. Naeba / Yuzawa-machi / Niigata, Japan / Jun. 30, 2001 / light trap / T. Naito leg.’; 2 ♀♀, ‘Mt. Hohki-daisen / Tottori, Japan / 9-10. v. 1981 / M. T. Chujo leg.’ (paratypes deposited in author’s collection, Nagasaki, Japan).

Description. Similar to *L. decoratus* but differs by the following characters: Body darker and smaller. Antennae generally shorter; segment I pale brown to fuscous, usually reddish, shorter than head width across eyes; segment II less than basal width of pronotum; segment III widely yellowish, with narrowly infuscate apex, as long as or shorter than mesal pronotal



Figs. 17-24. Female genitalia of *Loristes* species. 17-19 – *L. decoratus* (Reuter, 1908). 20-24 – *L. paveli* sp. nov. 17, 20 – interramal lobe. 18, 21 – sclerotized ring. 19, 24 – sclerotized rings and adjacent structures. 22-23 – posterior wall of bursae. Abbreviations: dlp – dorsal labiate plate; ds – dorsal structure; irl – interramal lobe; sdp – seminal depository; sr – sclerotized ring; vlp – ventral labiate plate.



Fig. 25. Map of the distribution of *Loristes* species.

length; segment IV dark brown, with yellow extreme base. Labial segment I usually shiny chocolate brown. Pronotum long, shiny fuscous, with narrowly pale posterolateral angles that are usually separated and not continuous with one another; collar yellow, sometimes with dark mesial part or entirely darkened; apex of scutellum narrowly pale. Corium with smaller, pale spots that are usually not continuing to embolium; cuneus pale, with darkened apical half.

Male genitalia (Figs. 13-16). Generally larger in size. Left paramere less curved. Vesical spiculi I and II noticeably broadened; spiculum III reduced, represented by a weakly sclerotized, spinulate lobe (Fig. 16).

Female genitalia (Figs. 20-24). Interramal lobe a little concaved medially. Dorsal structure and sclerotized ring somewhat widened.

Measurements (δ/φ). Body length 7.6-8.0 / 8.2-8.4; head width across eyes 1.08-1.16 / 1.15-1.18; vertex width 0.50-0.58 / 0.56-0.62; lengths of antennal segments I – 0.96-1.08 / 0.97-1.07, II – 2.16-2.40 / 2.32-2.40, III – 1.44-1.52 / 1.48-1.53, IV – 0.84-0.87 / 0.79-0.92; total labial length 2.08-2.19 / 2.17-2.21; mesal pronotal length including collar 1.45-1.59 / 1.56-1.58; basal pronotal width 2.25-2.40 / 2.44-2.57; width across hemelytra 2.64-2.86 / 2.85-2.91; lengths of metafemur 2.54-2.88 / 2.85-3.05, tibia 4.00-4.08 / 3.84-4.08, and tarsus 0.64-0.67 / 0.60-0.64.

Differential diagnosis. Distinguished from *L. decoratus* by the darker and smaller body, shorter antennal segment I that is less than the head width across eyes, shorter antennal segment II that is equal to or less than basal width of the pronotum, longer mesal length of the pronotum that is equal to or greater than antennal segment III, and smaller pale spots on the hemelytron.

Etymology. Named in honor of Prof. Pavel Štys, celebrating his 75th birthday; a noun in the genitive case.

Bionomics. Adults of this new species were collected from inflorescences of *Hydrangea paniculata* (Hydrangeaceae) but the strict host association remains unclear. Some individuals were taken by light trap. A univoltine life cycle is assumed for this mirid; no other biological information is known.

Distribution. Japan (Honshu, Shikoku) (Fig. 25); restricted to temperate deciduous forests.

Remarks. This new species is easily distinguished from *L. decoratus* by the external and genitalic characters mentioned above. The Japanese populations are considered to have speciated from the continental populations (*L. decoratus*), due to isolation by the strait, or Sea of Japan (East Sea), after the Würm Glaciation (Fig. 25).

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References

- JOSIFOV M. & KERZHNER I. M. 1972: Heteroptera aus Korea. I. Teil (Ochteridae, Gerridae, Saldidae, Nabidae, Anthocoridae, Miridae, Tingidae und Reduviidae). *Annales Zoologici (Warszawa)* **29**: 147-180.
- KERZHNER I. M. 1988: Sem. Miridae (Capsidae) – Slepniaki. Pp. 778-857. In: LER P. A. (ed.): *Operedelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomakh. Tom II. Ravnokrylye i poluzhestkokrylye. [Keys to the insects of the Soviet Far East in six volumes. Vol. II. Orthoptera and Hemiptera]*. Nauka, Leningrad, 972 pp (in Russian).
- KERZHNER I. M. & JOSIFOV M. 1999: Miridae Hahn, 1833. Pp. 1-577. In: AUKEEMA B. & RIEGER Ch. (eds.): *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 3. Cimicomorpha II*. The Netherlands Entomological Society, Amsterdam, xiv + 577 pp.
- REUTER O. M. 1908: Capsidae novae palaearcticae. *Ezhegodnik Zoologicheskago Muzeya Imperatorskoi Akademii Nauk* **12** (1907): 484-499.
- SCHUH R. T. 1995: *Plant bugs of the world (Insecta: Heteroptera: Miridae). Systematic catalog, distributions, host list and bibliography*. The New York Entomological Society, New York, xii + 1329 pp.
- YASUNAGA T. 1991: A new record of Miridae from Japan (Heteroptera). *Akitu (N. S.)* **123**: 1-5.
- YASUNAGA T. 1993: Descriptions of the last-instar nymphs of four mirid species (Heteroptera, Miridae) found in the Southern Primorskij Kraj, Russia. *Japanese Journal of Entomology* **61**: 285-292.
- YASUNAGA T. 1997: A new mirine plant bug (Heteroptera: Miridae) found in Kyushu Island, Japan and the southern Primorskij Kraj, Russia. *Entomologist (London)* **116**: 116-121.
- YASUNAGA T. 2001: Family Miridae, plant bugs. Pp. 112-276, figs. 2-331. In: YASUNAGA T., TAKAI M. & KAWASAWA T. (eds.): *A Field Guide to Japanese Bugs II*. Zenkoku Noson Kyoiku Kyokai Publ. Co. Ltd., Tokyo, 350 pp (in Japanese).
- YASUNAGA T. & SCHWARTZ M. D. 2007: Revision of the mirine plant bug genus *Philostephanus* Distant and allies (Heteroptera: Miridae: Mirinae: Mirini). *Tijdschrift voor Entomologie* **150**: 101-180.
- YASUNAGA T., TAKAI M., YAMASHITA I., KAWAMURA M. & KAWASAWA T. 1993: *A Field Guide to Japanese Bugs. Terrestrial Heteropterans*. Zenkoku Noson Kyoiku Kyokai Publ. Co. Ltd., Tokyo, 380 pp (in Japanese).
- ZHENG L., LU N., LIU G. & XU B. 2004: *Hemiptera, Miridae, Mirinae. Fauna Sinica, Insecta* Vol. 33. Science Press, Beijing, xix + 797 pp., 8 pls. (in Chinese, with English keys and descriptions of new taxa).