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Description of *Nasocoris lautereri* sp. nov. from the Balkan peninsula, with a review of the genus *Nasocoris* (Hemiptera: Heteroptera: Miridae: Phylinae)

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Abstract

Nasocoris lautereri **sp. nov.**, from Greece and Croatia, is described and illustrated. This is the first record of the genus *Nasocoris* Reuter, 1879, in the Balkan peninsula, linking its two previously known disjunct areas of distribution (the Western Mediterranean and the area from Ukraine and Israel to Mongolia). All 15 known species of the genus are reviewed and information on their distribution, host plants, and life cycle is summarized. The first precise records of *Nasocoris platycranoides* Montandon, 1890 from Spain are added.

Key words: Insecta, Hemiptera, Heteroptera, Miridae, Phylinae, *Nasocoris*, taxonomy, new species, Balkan peninsula, Croatia, Greece, Spain, *Ephedra*, host plant, catalogue

Introduction

The genus *Nasocoris* was established by Reuter (1879) to accomodate a single species, *N. argyrotrichus* Reuter, 1879, from Central Asia. Several other species were described later from two disjunct distributional areas — the Western Mediterranean (northwestern Africa, the Iberian peninsula, Sardinia, and Sicily) and the area of steppes and semi-deserts from Ukraine and Israel to the Arabian peninsula, Central Asia, and Mongolia. Schuh (1995) and Kerzhner & Josifov (1999) catalogued the ten species known at that time. However, Linnavuori (1999, 2004) described additional four species from the Near and Middle East. In this paper, another new species – *Nasocoris lautereri* **sp. nov.** – is described, the first species known from the Balkan peninsula. This record thus links the two formerly disjunct areas of distribution of the genus. All the 15 currently known species of *Nasocoris* are reviewed here, including the relevant literature; and information on their distribution, host plants (various species of *Ephedra*), and life cycle is summarized.

Material and methods

The following collection acronyms are used in the text:

AMNH	American Museum of Natural History, New York, USA;
JBSC	Josef Bryja collection, Studenec, Czech Republic;
MGAB	Muzeul de Istoria Naturala „Grigore Antipa“, Bucureşti, Romania;

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MMBC	Moravian Museum, Brno, Czech Republic;
MNHN	Muséum National d'Histoire Naturelle, Paris, France;
MZHF	Zoological Museum, University of Helsinki, Helsinki, Finland;
NHMW	Naturhistorisches Museum, Wien, Austria;
NMPC	National Museum, Praha, Czech Republic;
RLRF	Rauno Linnavuori collection, Raisio, Finland (to be deposited in the National Museums and Galleries of Wales, Cardiff, United Kingdom);
ZMAN	Zoölogisch Museum, University of Amsterdam, Amsterdam, Netherlands;
ZMAS	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;
ZMUH	Zoologisches Museum, Universität Hamburg, Germany.

Locality labels of types are cited verbatim; a slash '/' is used to divide different rows on one label, a double slash '//' to divide the different labels; our remarks are given in square brackets '[]'. Other localities are cited in a standard arrangement.

Measurements. In addition to the holotype, additional specimens of each sex from two localities were measured. The images were scanned by a CCD camera (Color View IIIu) mounted on a stereomicroscope Olympus SZX12 and measurements were conducted in the MicroImage 3.01 software (analySIS auto ver.5.0). The values for the width of eye and the length of antennomeres are averages from two measurements made on each specimen (if not damaged). The effect of locality on measurements was analysed by one-way ANOVA in Statistica for Windows (StatSoft 1995).

Results

Nasocoris lautereri sp. nov.

(Figs. 1–4)

Type locality. Greece, Attica province, Poros Island, northern and northwestern margin of city of Poros (37°30'N 23°28'E), 2–50 m a.s.l. (P. Lauterer, in litt.).

Type material. HOLOTYPE: male, 'GREECE, Attiki (58/95) / POROS Isl., SW parts / pasture, macchia, *Pinus* wood / undergrowth, 2–50 m a.s.l. / 10.vi.1995, lgt. P. LAUTERER [white label, printed]' // '♂' [white label, printed] // 'HOLOTYPUS / *NASOCORIS* / *LAUTERERI* / sp. nov. / det. P.Kment & J.Bryja 2007' (MMBC). The specimen is glued on a piece of cardboard, apex of abdomen with genitalia is placed in a PVC microvial filled with glycerol and attached to the same pin. PARATYPES: 4 males, 8 females, the same locality and identification labels as holotype (only with 'paratypus' instead of 'holotypus') (3 females in MMBC; 3 males, 2 females in NMPC; 2 females in JBSC; 1 male, 1 female in ZMAS).

Additional material examined. CROATIA: Brač Island, Bol env., 43°16'N 16°39'E, Vidova Gora Mt., 780 m a.s.l., rocks on the mountain top, on *Ephedra distachya*, 4.ix.2004, 4 males, 4 females, P. Kment lgt., P. Kment & J. Bryja det. (NMPC, JBSC).

Description. Male (holotype, Fig. 1). Body small, slender, parallel-sided.

MEASUREMENTS. Body length 3.704 mm, length of pronotum 0.590 mm, width of pronotum 0.911 mm, ratio width / length of pronotum 1.544, width of vertex 0.323 mm, width of eye 0.209 mm, width of head 0.741 mm, ocular index 1.545, antennomere 1 0.607 mm, antennomere 2 1.485 mm, ratio antennomere 1 / width of head 0.819.

COLORATION. Mostly pale ochreous (Fig. 1). *Head.* Dorsally yellow to ochraceous, vertex with a large triangular reddish spot, divided by a thin pale median line (more distinct anteriorly); ventrally with irregular yellowish and reddish pattern. Eyes tinged with reddish-brown. Antennomere 1 pale reddish, antennomeres

2–4 ochraceous to pale brown, two apical segments generally darker. *Thorax.* Smaller anterior portion of pronotum dark brown, larger posterior portion pale ochraceous. Mesoscutum and scutellum brown. Propleuron pale ochraceous with a fuzzy reddish longitudinal stripe medially. Mesepisternum pale reddish, mesepimeron and metapleuron pale ochraceous, metathoracic scent gland peritreme ochraceous with slight reddish tinge. *Legs*. Coxae reddish, profemora and mesofemora reddish with ochraceous apices, metafemora pale ochraceous with indistinct small red spots and a basal reddish spot on anterior margin; tibiae ochraceous with more or less distinct dark brown punctures; tarsi ochraceous, slightly more infumated than tibiae, claws brown. *Hemelytra* pale ochraceous, basal portion of clavi (up to scutellar apex) and inner margin of corium between claval apex and membrane brownish. Membrane brownish fumous, veins concolorous. *Abdomen* pale ochraceous, pygophore apically slightly darker.

FIGURES 1–3. *Nasocoris lautereri* **sp. nov.**, habitus. 1 – Male, holotype (Greece, Poros Isl.) (3.7 mm); 2 – Female, paratype (Greece, Poros Isl.) (3.6 mm); 3 – Female (Croatia, Brač Isl.) (3.1 mm).

SURFACE AND VESTITURE. Body surface matt, mostly covered with long white to ochraceous semierect hairs (usually badly damaged in dead specimens). The most apparent (and usually best preserved) ones are the long, ochraceous to brownish hairs on antennomere 1 and on clypeus, and the whitish hairs on the ventral surface of head, lateral margins of pronotum, and bases of scutellum and hemelytra. Hairs on femora and hemelytra shorter than those on head and antennomere 1, mostly ochraceous and semierect. Tibiae with stout, white, semierect setae arising from dark punctures. Antennomeres 2–4 with very short semierect hairs (much shorter than the antennomere diameter). Membrane smooth.

Structure. *Head* length and width approximately equal; vertex relatively wide, slightly convex; frons slightly sloping; clypeus large, prominent, laterally flattened, in lateral view widely rounded. Eyes large, protruding laterally. Antennomere 1 distinctly swollen, slightly narrowing apicad, slightly more than twice as thick as antennomeres 2–4, these slender, filiform. Labium reaching procoxae. *Thorax*. Pronotum trapeziform, lateral margins only indistinctly concave, humeral angles rounded, posterior margin slightly convex; calli indistinct; posterior pronotal margin smooth, without humps or tubercles. Lateral margins of pronotum ventrally rounded. Scutellum triangular. *Legs* slender; hind legs markedly long, metafemora slightly swollen. *Hemelytra* parallel-sided, surpassing apex of abdomen (abdomen reaching middle of cuneus). *Genitalia*. Vesica very long and thin, S-shaped (Fig. 4).

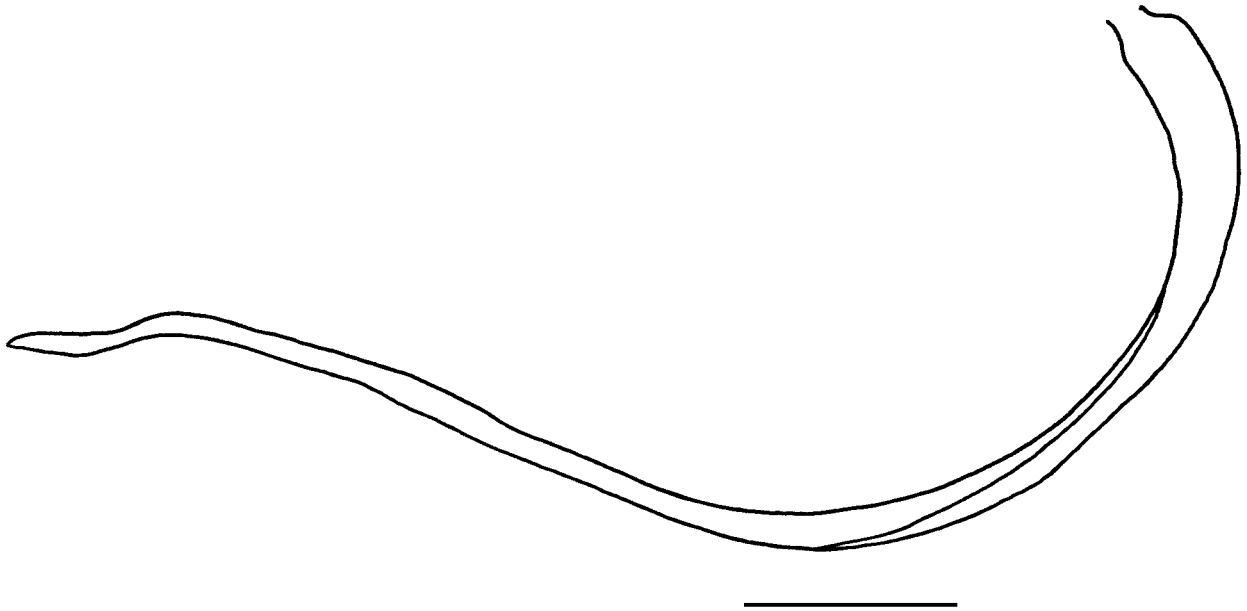

FIGURE 4. *Nasocoris lautereri* **sp. nov.**, aedeagus (paratype from Greece, Poros Isl.). Scale bar = 0.1 mm.

Female (Fig. 2). Similar to male in body shape but generally larger, with smaller eyes (see Table 1 for measurements). Coloration as in males, brownish spot on inner margin of corium and reddish anterobasal spot on metafemora generally larger.

Variability. Both males and females from Greece (Figs. 1–2) are significantly larger than those from Croatia in many aspects (Table 1). However, if the ratios of measurements (e.g., ocular index, width / length of pronotum) are taken into account, there are no differences between the localities. The only significant morphometric difference is the higher antennomere 1 / width of head ratio in males from Croatia, but this analysis is based on a very small sample size. Within the Greek population, the coloration is quite constant, the only apparent differences being in the size of the brownish spot on inner margin of corium and the size of the reddish anterobasal spot on metafemora. The Greek and Croatian populations share the general colour pattern (see Figs. 1–3), but the Croatian specimens are distinctly darker, the reddish and brownish coloration being more prominent (see Fig. 3). However, we found no difference in the genitalia structure between the both populations, so this variability is most probably caused by different life conditions and/or the fact that the samples belong to different generations (spring / autumn).

TABLE 1. Measurements of the available material of *Nasocoris lautereri* **sp. nov.** from the Balkan peninsula. M – males; F – females. Numbers in parentheses indicate the number of measured specimens. ANOVA was used to test the differences of means between the individuals from two localities. Significant differences ($p < 0.05$) are marked by M (differences between males) or F (between females).

Measurement		Greece		Croatia		ANOVA
		M (4)	F (8)	M (4)	F (4)	($p < 0.05$)
Body length	Mean ± SD	3.56 ± 0.102	3.58 ± 0.207	3.14 ± 0.067	3.10 ± 0.095	M, F
	Min - Max	3.47 - 3.70	3.27 - 3.80	3.10 - 3.21	3.02 - 3.21	
Length of pronotum	Mean ± SD	0.55 ± 0.049	0.63 ± 0.014	0.51 ± 0.026	0.54 ± 0.010	F
	Min - Max	0.48 - 0.59	0.61 - 0.65	0.48 - 0.53	0.53 - 0.55	
Width of pronotum	Mean ± SD	0.89 ± 0.026	0.97 ± 0.008	0.76 ± 0.043	0.83 ± 0.031	M, F
	Min - Max	0.85 - 0.91	0.96 - 0.98	0.71 - 0.79	0.81 - 0.88	
Width/Length of pronotum	Mean ± SD	1.61 ± 0.115	1.54 ± 0.032	1.48 ± 0.016	1.55 ± 0.081	-
	Min - Max	1.51 - 1.77	1.50 - 1.59	1.47 - 1.50	1.50 - 1.67	
Width of vertex	Mean ± SD	0.33 ± 0.006	0.34 ± 0.013	0.29 ± 0.008	0.31 ± 0.012	M, F
	Min - Max	0.32 - 0.33	0.32 - 0.36	0.28 - 0.30	0.30 - 0.33	
Width of eye	Mean ± SD	0.20 ± 0.007	0.19 ± 0.005	0.18 ± 0.003	0.18 ± 0.010	M, F
	Min - Max	0.20 - 0.21	0.19 - 0.20	0.18 - 0.18	0.17 - 0.19	
Width of head	Mean ± SD	0.73 ± 0.008	0.73 ± 0.013	0.65 ± 0.014	0.67 ± 0.015	M, F
	Min - Max	0.72 - 0.74	0.71 - 0.75	0.63 - 0.66	0.66 - 0.69	
Ocular index (vertex/eye)	Mean ± SD	1.61 ± 0.080	1.78 ± 0.090	1.62 ± 0.035	1.76 ± 0.152	-
	Min - Max	1.55 - 1.70	1.63 - 1.89	1.60 - 1.67	1.64 - 1.98	
Antennomere 1	Mean ± SD	0.59 ± 0.013	0.63 ± 0.015	0.57 ± 0.022	0.57 ± 0.014	F
	Min - Max	0.58 - 0.61	0.59 - 0.64	0.55 - 0.59	0.55 - 0.58	
Antennomere 1/ Width of head	Mean ± SD	0.80 ± 0.011	0.86 ± 0.015	0.87 ± 0.023	0.85 ± 0.020	M
	Min - Max	0.79 - 0.82	0.84 - 0.88	0.84 - 0.89	0.83 - 0.87	
Antennomere 2	Mean ± SD	1.45 ± 0.022	1.34 ± 0.029	1.21 ± 0.062	1.06 ± 0.012	M, F
	Min - Max	1.44 - 1.49	1.30 - 1.38	1.16 - 1.30	1.05 - 1.07	

Differential diagnosis. In the key to the Mediterranean species by Linnavuori (1968) *N. lautereri* **sp. nov.** groups with species with antennomere 1 incrassate, at least 0.75 x as long as diatone (0.79–0.88 in *N. lautereri* **sp. nov.**) and covered with yellowish, rather adpressed hairs, which are not longer than the greatest breadth of the joint, i.e., *N. platycranoides* Montandon, 1890, and *N. artemis* Linnavuori, 1968. However, these species differ from *Nasocoris lautereri* **sp. nov.** in coloration: *N. artemis*: pronotum pale yellowish with slighly darkened lateral and hind margins, hind margin of corium and inner margin of cuneus narrowly yellowish red; *N. platycranoides*: pronotum pale ochraceous with two longitudinal reddish stripes near lateral margins; entire hemelytra concolorous, pale ochraceous (Fig. 8). According to the key of Wagner (1974), *N. ephedrae* Reuter, 1902 must also be taken into account; however, this species of similar size and coloration differs in having the antennomere 1 shorter (0.52–0.63 as long as diatone – see Linnavuori 1968), as well as ocular index (1.8–1.9 in males, 2.2–2.3 in females of *N. ephedrae* – see Wagner 1974). Using Linnavuori's (1999) key to the species of the Middle East and Central Asia, *N. lautereri* **sp. nov.** groups with six species having the lateral pronotal margins ventrally rounded. However, five of these species are characterised by the presence of humps or tubercles on the posterior pronotal margin, which are completely missing in *N. lautereri* **sp. nov.** The only remaining species lacking such humps or tubercles, *N. convexicollis* Linnavuori, 1999, differs by the basal margin of pronotum being strongly convex in apicodorsal view, and its coloration (pronotum whitish ochraceous with a faint orange pattern, scutellum reddish with pale midline, hemelytra uniformly pale – see Linnavuori 1999). Among the species with lateral margins of pronotum ventrally acute, *N. lautereri* **sp. nov.** ressembles in coloration *N. tesquorum* Kerzhner, 1970. Both these species share the pronotal pattern with anterior portion dark brown and posterior part pale, and the basal parts of clavi around scutellum brownish (Figs. 1-3, 9); but *N. tesquorum* differs by the reddish scutellum, the antennomere 1 slightly longer than diatone (ratio ca 1.1), the larger body size (4.4–4.8 mm in males, 3.4–4.0 mm in females), and the shape of vesica (apex not bent, thus vesica not S-shaped) (see Kerzhner 1970, Linnavuori 1999).

Based on the shape of pronotum and vesica, Linnavuori (1999) discussed the existence of two species groups within *Nasocoris*. *Nasocoris lautereri* **sp. nov.** seems to belong to the same group as *N. artemis*, *N. platycranoides*, *N. serratus*, and *N. tesquorum*; however, the phylogeny of the genus needs further study.

Bionomics. According to the locality database of MMBC (locality number G58/95), the collecting site of the type series from Greece was described as follows: northern and northwestern margin of city of Poros, 2–50 m a.s.l., habitat: '*Tamarix* at sea shore (with *Chenopodium*); maquis on southern slope and undergrowth of pine forest, halophilous plants on sea shore', vegetation: Poaceae, *Cistus salvifolius*, *Cistus* sp., *Genista acanthocnemis*, *Carduus*, ?introduced Poaceae from Africa, *Chenopodium*; *Ephedra* paras.[itic] on ?*Juniperus*, *Pistacia lentiscus*, *Quercus coccifera*, *Phyllirea media*, *Pyrus amygdaliformis*; *Pinus*, coastal *Tamarix*' (P. Lauterer, in litt.). It follows from this account, that *N. lautereri* **sp. nov.** was collected on a vine-like *Ephedra* species climbing on a shrub of (very probably) *Juniperus* sp. There is only one species of *Ephedra* fitting this description and growing in Greece, *Ephedra campylopoda* (C. A. Meyer) (see Markgraf 1964, as *Ephedra fragilis* subsp. *campylopoda* (C. A. Meyer) Ascherson et Graebner). The Croatian specimens were swept from *Ephedra distachya* Linnaeus growing on the rocky top of a coastal mountain at an altitude of ca 780 m a.s.l., exposed to sunlight and sea winds (Fig. 5–6). The Greek specimens were collected on July 10, whereas the Croatian ones on September 9. Compared to the known life cycle of *N. desertorum* (Kaplin 1993), it can be concluded that *N. lautereri* **sp. nov.** overwinters in the egg stage and has at least two generations per year.

Etymology. This species is dedicated to its collector, Pavel Lauterer (Moravian Museum, Brno, Czech Republic), a well-known specialist in Psylloidea and Auchenorrhyncha, and (first of all) an astonishing man.

Distribution. Known only from Greece (the Poros Island near the Peloponnesos peninsula) and Croatia (the Brač Island in central Dalmatia).

FIGURES 5–6. 5 (above) – Vidova Gora Mt. (top with the broadcaster; Croatia, Brač Is., 780 m a.s.l.) (Photo: Jitka Schlägelová, September 2005), 6 (below) – *Ephedra distachya* L. growth under the top of Vidova Gora Mt., the second known locality of *Nasocoris lautereri* **sp. nov.** (Photo: P. Kment, September 2004).

FIGURES 7–9. 7 – *Nasocoris argyrotrichus* Reuter, 1879, habitus. Female (Kazakhstan, Dzhambul region, Karasay env.) (3.3 mm); 8 – *N. platycranoides* Montandon, 1890, habitus. Female (Spian, Pizarra) (4.9 mm); 9 – *N. tesquorum* Kerzhner, 1970, habitus. Male, paratype (Kazakhstan, Dzhungarsky Alatau, Topolevka) (4.6 mm).

Nasocoris platycranoides Montandon, 1890

Material examined. MOROCCO: High Atlas Mts., Ijjoukak, on *Ephedra fragilis* Desf., 20.v.1973, 1 male, 1 female, Eckerlein lgt., P. Kment det. (ZMAS). SPAIN: PROVINCIA DE ALICANTE, Altea, 13.–20.v.1982, 1 male, J. H. Woudstra lgt., P. Kment det. (ZMAN); Callosa de Ensarriá, Fuentes del Algar, 15.x.1989, 3 males, 1 female, J. H. Woudstra lgt., P. Kment det. (ZMAN); Calpe, 17.–31.x.1987, 1 male, J. H. Woudstra lgt., P. Kment det. (ZMAN). PROVINCIA DE ALMERÍA, Lubrín, Sa. de los Filabres, 7.v.1988, 1 male, 1 female, H. Günther lgt. & det. (MMBC); Villaricos, Sra. Almagrera, 17.iv.1995, 1 male, 2 females, M. J. Gijswijt lgt., P. Kment det. (ZMAN). PROVINCIA DE MÁLAGA, Pizarra, 5.vi.1967, 2 males, 13 females, M. J. & J. P. Duffels lgt., E. Wagner 1967 det. (ZMAN, NMPC). TUNISIA: 3–7 km south of Korbous [= Qurbuş], 0–100 m a.s.l., 26.v.1984, 1 male, 2 females, 2 larvae (instar 5), J. P. Duffels lgt., P. Kment det. (ZMAN).
Note. First exact records from Spain (see Review below).

Review of the *Nasocoris* species

Nasocoris albipennis Lindberg, 1939

Lectotype. Male, 'Egypt., Min. Agric., W.[adi] Feiran, 17.V.1934, coll. Prof Priesner' (MZHF) (Huldén *et al.* 1996).

Nasocoris albipennis sp. nov.: Lindberg (1939): 18–20. Description, key, figure, bionomics, host plant, faunistics (Egypt: Sinai).
Nasocoris albipennis: Priesner and Alfieri (1953): 97. Host plant, bionomics, faunistics (Egypt: Sinai).

Nasocoris albipennis: Stichel (1956): 210. Diagnosis, key, distribution.
Nasocoris albipennis: Carvalho (1958): 77. Catalogue.
Nasocoris albipennis: Stichel (1958): 800. Distribution.
Nasocoris albipennis: Linnavuori (1964): 329. Host plant, distribution, bionomics, faunistics (Egypt: Sinai).
Nasocoris albipennis: Linnavuori (1968): 201–202. Redescription, key, host plant, bionomics, faunistics (Egypt: Sinai).
Nasocoris albipennis: Wagner (1968): 299–301. Key, figures, distribution.
Nasocoris albipennis: Wagner (1974): 402, 404–405. Redescription, key, figures, host plant, distribution.
Nasocoris albipennis: Ribes and Goula (1986): 277. Catalogue of Wagner's collection.
Nasocoris albipennis: Schuh (1995): 359. Catalogue.
Nasocoris albipennis: Huldén *et al.* (1996): 96. Lectotype designation.
Nasocoris albipennis: Kerzhner and Josifov (1999): 375. Catalogue, type depository, distribution.
Nasocoris albipennis: Linnavuori (1999): 52–55, 59–62. Redescription, key, figures, bionomics, host plant, ecology, distribution, faunistics (Egypt: Sinai; Iran).
Nasocoris albipennis: Linnavuori and Modarres (1999): 224. Bionomics, host plant, faunistics (Iran).
Nasocoris albipennis: Linnavuori (2004a): 12–13. Key, figures.

Distribution. Egypt (Sinai peninsula) (Lindberg 1939; Linnavuori 1968, 1999; Priesner and Alfieri 1953), Iran (Linnavuori 1999, Linnavuori and Modarres 1999). Records from Iraq (Linnavuori 1993) belong to *N. tuberculicollis*, from Israel (Linnavuori 1961, 1962) to *N. artemis*, and from Saudi Arabia (Linnavuori 1986) to *N. arabicus*.

Host plants. *Ephedra alata* (Egypt: Sinai) (Linnavuori 1964, 1968, 1999), *Ephedra* sp. (Iran) (Linnavuori and Modarres 1999). Records from *Haloxylon schweinfurthi* (Chenopodiaceae) from Sinai by Lindberg (1939), Priesner and Alfieri (1953), and Stichel (1956) seem to be sitting records.

Bionomics. Adults were collected in May (Lindberg 1939, Priesner and Alfieri 1953, Linnavuori and Modarres 1999, Linnavuori 1999), June (Linnavuori and Modarres 1999, Linnavuori 1999) and September (Linnavuori 1964, 1968, 1999).

Ecology. In desert habitats (Linnavuori 1999).

Nasocoris arabicus Linnavuori, 1999

Holotype. Female, 'Saudi Arabia: N. Jubbah, 20–21.XI.1977, Linnavuori' (RLRF).

Nasocoris albipennis: Linnavuori (1986): 154. Bionomics, faunistics (Saudi Arabia).
Nasocoris arabicus sp. nov.: Linnavuori (1999): 52–53, 55, 59–61. Description, key, figures, bionomics, host plant, ecology, faunistics (Saudi Arabia).
Nasocoris arabicus: Linnavuori (2004a): 12–13. Key, figures.

Distribution. Saudi Arabia (Linnavuori 1986, 1999).

Host plant. *Ephedra* sp. (Saudi Arabia) (Linnavuori 1999).

Bionomics. The adults were collected in November (Linnavuori 1986, 1999).

Ecology. In desert habitats (Linnavuori 1999).

Nasocoris argyrotrichus Reuter, 1879

(Fig. 7)

Lectotype. Male, 'Chiburgan, Fedchenko' [= Kyrgyzstan, Hodzha–Chiburgan river, Fedtschenko lgt.] (MZHF) (Kerzhner 1970).

= *Nasocoris argyrotrichus* f. *badia* Stichel, 1956 (unavailable name, no type material designated)

= *Nasocoris brevicornis* Linnavuori, 1968 (syn. Kerzhner 1970)

Holotype. Male, 'Turkestan, Kara-kum'. Holotype data later made more precise by Kerzhner (1970): male, Kazakhstan: 'Dzhimbara-Kum, Priaral'skie Kara-Kumy, 7 IX 1930, na *Ephedra*, Luppova' (ZMAS).

Note. Linnavuori (1968) ascribed *N. brevicornis* to Kiritshenko. However, the manuscript name *N. brevicornis* was used in 1963 by I. M. Kerzhner for specimens not conspecific with the Reuter's syntype of *N. argyrotrichus* from Sarepta, which in fact belong to *N. tesquorum* (see Kerzhner 1970).

Nasocoris argyrotrichus: Reuter (1879): 206 (partim, specimens from Chiburgan – see Kerzhner 1970). Description, distribution.
Nasocoris argyrotrichus: Reuter (1884): 318–319 + Fig. 1 on Tab. 1 (partim, specimens from Chiburgan). Redescription, figures, distribution.
Nasocoris argyrotrichus: Reuter (1887): 32–33 (partim, specimens from Chiburgan). Redescription (as sp. n.!), faunistics (Kyrgyzstan).
Nasocoris argyrotrichus: Atkinson (1890): 144. Catalogue.
Nasocoris argyrotrichus: Puton (1899): 71. Catalogue, distribution.
Nasocoris argyrotrichus: Reuter (1902): 103. Differential diagnosis, distribution.
Nasocoris argyrotrichus: Horváth (1904): 578. Faunistics (Kazakhstan) (not revised).
Nasocoris argyrotrichus: Oshanin (1909): 77. Catalogue, distribution (partim, specimens from Khodzha-Chiburgan – see Kerzhner 1970).
Nasocoris argyrotrichus: Reuter (1910): 83. Host plant.
Nasocoris argyrotrichus: Oshanin (1912): 77. Catalogue, distribution.
Nasocoris argyrotrichus: Kiritshenko (1938): 96. Bionomics, distribution, faunistics (Azerbaijan: Nakhichevan).
Nasocoris argyrotrichus: Lindberg (1939): 18–19. Key, figure, distribution.
Nasocoris argyrotrichus: Lindberg (1951): 26. List of types in Reuter's collection.
Nasocoris argyrotrichus: Carvalho (1952): 64. Catalogue of genera, type species.
Nasocoris argyrotrichus: Stichel (1956): 209. Diagnosis, key, distribution.
Nasocoris argyrotrichus f. *badia*: Stichel (1956): 209. Key.
Nasocoris argyrotrichus: Carvalho (1958): 77–78. Catalogue.
Nasocoris argyrotrichus: Stichel (1958): 800. Distribution.
Nasocoris argyrotrichus: Asanova (1962): 120. Faunistics (Kazakhstan).
Nasocoris argyrotrichus: Kiritshenko (1964): 228 (partim, specimens from Khodzha-Obi-Garm and Rushan – see Kerzhner 1970: 641). Bionomics, faunistics (Tadjikistan).
Nasocoris argyrotrichus: Sienkiewicz (1964): 22. Faunistics (Kyrgyzstan).
Nasocoris brevicornis Linnavuori (1968): 201–202. Description, key, faunistics (Kazakhstan). (See note above).
Nasocoris argyrotrichus: Kerzhner (1970): 639–642. Redescription, lectotype designation, taxonomy, key, figure, bionomics, host plant, ecology, faunistics (Azerbaijan (incl. Nakhichevan), Georgia, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Russia (South European Territory), Tadjikistan, Uzbekistan).
Nasocoris brevicornis: Kerzhner (1970): 640. Synonymy.
Nasocoris argyrotrichus: Asanova (1971): P. 4 of the table. Host plant, faunistics (Kazakhstan).
Nasocoris argyrotrichus: Childibaev (1980): 56–57. Host plant, ecology, distribution (Kazakhstan).
Nasocoris argyrotrichus: Ribes and Goula (1986): 277. Catalogue of Wagner's collection.
Nasocoris argyrotrichus: Kerzhner and Matocq (1994): 57. List of types.
Nasocoris argyrotrichus: Schuh (1995): 359. Catalogue.
Nasocoris argyrotrichus: Kerzhner and Popov (1996): 271. List of types, bionomics.
Nasocoris argyrotrichus: Kerzhner and Josifov (1999): 375. Catalogue, type depository, distribution.
Nasocoris argyrotrichus: Linnavuori (1999): 54–55, 61–63. Redescription, key, figures, bionomics, host plant, ecology, distribution, faunistics (Iran, Mongolia, Tadjikistan).
Nasocoris argyrotrichus: Linnavuori and Modarres (1999): 224. Bionomics, host plant, faunistics (Iran).
Nasocoris argyrotrichus: Heiss and Linnavuori (2002): 629. Bionomics, distribution, faunistics (Iran).
Nasocoris argyrotrichus: Linnavuori (2004a): 12–13. Key, figures.
Nasocoris argyrotrichus: Linnavuori (2007): in press. Bionomics, host plant, ecology, faunistics (Iran).

Distribution. Russia (South European Territory) (Reuter 1879, Kerzhner 1970), Azerbaijan (incl. Nakhichevan) (Kiritshenko 1938, Kerzhner 1970), China (Northern Territory) (Kerzhner and Josifov 1999, no published record known to us), Georgia (Kerzhner 1970), Iran (Kerzhner 1970; Linnavuori 1999, 2007; Linnavuori and Modarres 1999), Kazakhstan (Asian part) (Asanova 1962, 1971; Kerzhner 1970; Childibaev 1980), Kyrgyzstan (Reuter 1879, Sienkiewicz 1964, Kerzhner 1970), Mongolia (Kerzhner 1970, Linnavuori

1999), Tadjikistan (Kiritshenko 1964, Kerzhner 1970, Linnavuori 1999), Uzbekistan (Kerzhner 1970). The record from Turkmenistan (Sahlberg 1904) belongs to *N. desertorum*.

Host plants. *Ephedra* sp. (Kazakhstan, 'Turkestan') (Reuter 1910, Childibaev 1980), *Ephedra distachya* (Kazakhstan, Russia) (Asanova 1971, Kerzhner 1970, Linnavuori 1999), *E. fedtschenkoae* (as *E. fedtschenkoi*) (Tian-Shan, Pamir) (Kerzhner 1970), *E. procera* (Iran) (Linnavuori & Modarres 1999, Linnavuori 2007), *E. przewalskii* and *E. sinica* (cited as *E. sinensis*) (Mongolia) (Kerzhner 1970).

Bionomics. According to Kerzhner (1970), it overwinters in the egg stage and probably has two generations per year. The adults were collected in May (Kerzhner 1970, Heiss and Linnavuori 2002, Linnavuori 2007), June (Kerzhner and Popov 1996, Linnavuori and Modarres 1999; Linnavuori 1999, 2007), July (Linnavuori and Modarres 1999; Linnavuori 1999, 2007), August (Kiritshenko 1938, 1964; Linnavuori 2007), and September (Kiritshenko 1964, Kerzhner 1970, Linnavuori 2007).

Ecology. According to Kerzhner (1970), this species inhabits semi-desert regions as well as foothills and lower mountains in the deserts of Central Asia. Childibaev (1980) classified it as a characteristic species of sandy as well as stony deserts in southeastern Kazakhstan. In dry habitats (Linnavuori 1999); in hilly steppes (Linnavuori 2007).

Nasocoris artemis Linnavuori, 1968

Holotype. Female, 'Israel, Rehovot, 28. VII. 1958, Linnavuori' (AMNH).

Nasocoris albipennis: Linnavuori (1961): 11. Redescription, bionomics, host plant, faunistic (Israel).
Nasocoris albipennis: Linnavuori (1962): 89. Zoogeography, distribution (Israel).
Nasocoris argyrotrichus: Wagner (1968): 299–301. Key, figures, distribution (see Linnavuori 1968).
Nasocoris artemis sp. nov.: Linnavuori (1968): 201, 204. Description, key, bionomics, host plant, faunistics (Israel).
Nasocoris artemis: Wagner (1974): 402, 406. Redescription, key, distribution.
Nasocoris artemis: Linnavuori (1984): 41. Comparative note, figure.
Nasocoris artemis: Ribes and Goula (1986): 277. Catalogue of Wagner's collection.
Nasocoris artemis: Schuh (1995): 359. Catalogue.
Nasocoris artemis: Kerzhner & Josifov (1999): 375. Catalogue, type depository, distribution.
Nasocoris artemis: Linnavuori (1999): 54–57. Redescription, key, figures, bionomics, host plant, ecology, faunistics (Israel).
Nasocoris artemis: Carapezza (2002): 54. Bionomics, host plant, distribution, faunistics (Jordan).

Distribution. Israel (Linnavuori 1961, 1968), Jordan (Carapezza 2002).

Host plant. *Ephedra* sp. (Linnavuori 1961, 1968, 1999; Carapezza 2002).

Bionomics. Adults collected in May (Linnavuori 1999, Carapezza 2002), June (Linnavuori 1961), July (Linnavuori 1961, 1968), and October (Linnavuori 1961, Carapezza 2002).

Ecology. Hilly habitats (Linnavuori 1999).

Nasocoris breviceps Wagner, 1968

Holotype. Male, Algeria: '100 km N of Quargla, 22. 4. 1966, on Ephedra alata, leg. Dr H. Eckerlein' (ZMUH).

Nasocoris breviceps sp. nov.: Wagner (1968): 297–299. Description, key, figures, bionomics, host plant, faunistics (Algeria).
Nasocoris breviceps: Linnavuori (1968): 201. Key.
Nasocoris breviceps: Wagner (1974): 402–404. Redescription, key, figures, host plant, distribution.
Nasocoris breviceps: Ribes and Goula (1986): 277. Catalogue of Wagner's collection, bionomics.
Nasocoris breviceps: Schuh (1995): 359. Catalogue.
Nasocoris breviceps: Kerzhner and Josifov (1999): 375. Catalogue, type depository, distribution.

Distribution. Algeria (Wagner 1968, Ribes and Goula 1986).

Host plant. *Ephedra alata* (Wagner 1968, Ribes and Goula 1986).

Bionomics. Adults were collected in April (Wagner 1968, Ribes and Goula 1986).

Nasocoris convexicollis Linnavuori, 1999

Holotype. Female, 'Israel: S.Distr. Nahal Ze'elim, 23.VII.1986, Linnavuori' (RLRF).

Nasocoris convexicollis sp. nov.: Linnavuori (1999): 52–55, 58–59. Description, key, figures, bionomics, host plant, ecology, faunistics (Israel).
Nasocoris convexicollis: Linnavuori (2004a): 12–13. Key, figures.

Distribution. Israel (Linnavuori 1999).

Host plant. *Ephedra* sp. (Linnavuori 1999).

Bionomics. The type series was collected in July and August (Linnavuori 1999).

Ecology. In sandy habitats (Linnavuori 1999).

Nasocoris desertorum Kerzhner, 1970

Holotype. Male, Turkmenistan: 'Turkmenskaya SSR, Ispas, 70 km sev.-zap. Chardzhou, 31 V, 1965, na Ephedra strobilacea Bge. (Kerzhner)' (ZMAS).

Nasocoris argyrotrichus: Sahlberg (1904): 36. Faunistics (Turkmenistan).
Nasocoris argyrotrichus: Oshanin (1909): 77 (partim, specimens from Repetek – see Kerzhner 1970). Catalogue, distribution.
Nasocoris argyrotrichus: Kiritshenko (1964): 228 (partim, specimens from Ayvadzh – see Kerzhner 1970: 643). Bionomics, faunistics (Tadjikistan).
Nasocoris argyrotrichus: Linnavuori (1968): 201, 203–204. Redescription, key, host plant, distribution ('Turkestan').
Nasocoris desertorum sp. nov.: Kerzhner (1970): 640–643. Description, taxonomy, key, figure, bionomics, host plant, ecology, faunistics (Uzbekistan, Tadjikistan, Turkmenistan).
Nasocoris desertorum: Kaplin (1993): 133, 166, 168. Bionomics, host plant, ecology, faunistics (Turkmenistan).
Nasocoris desertorum: Schuh (1995): 360. Catalogue.
Nasocoris desertorum: Kerzhner *et al.* (1997): 127. List of types.
Nasocoris desertorum: Kerzhner and Josifov (1999): 375. Catalogue, type depository, distribution.
Nasocoris desertorum: Linnavuori (1999): 52–55, 61–62. Redescription, key, figures, bionomics, host plant, ecology, distribution, faunistics (Iran, Turkmenistan).
Nasocoris desertorum: Linnavuori (2004a): 12–13. Key, figures.

Distribution. Iran (Linnavuori 1999), Tadjikistan (Kiritshenko 1964, Kerzhner 1970), Turkmenistan (Kerzhner 1970, Kaplin 1993, Linnavuori 1999), Uzbekistan (Kerzhner 1970).

Host plant. *Ephedra strobilacea* (Central Asia, Turkmenistan) (Kerzhner 1970; Kaplin 1993 – larval development; Linnavuori 1999), *Ephedra* sp. (Turkestan) (Linnavuori 1968).

Bionomics. Kaplin (1993) gave the following account of the bionomics of *N. desertorum*: 'The Southern-Turanian plant bug *Nasocoris desertorum* develops on *Ephedra strobilacea* in three to four overlapping generations per year with winter embryonal diapause. Larvae and adults suck on young sprouts of *Ephedra*. Larvae of the first generation hatch in April / beginning of May, which relates to flowerage and beginning of fruitage of *E. strobilacea*, the last generation appears in August. Life-span of one generation lasts up to 40 days. Larvae of the last generation complete their development at the end of September / first half of October. Adults occur from the second decade of May to October. In the eastern Garagum desert, *N. desertorum* is a less abundant and sporadically found species. Its mean density only rarely exceeds 0.2 spec./model branch (0.6–0.7 thousands spec./ha).' Other authors reported adults in May (Kerzhner 1970, Linnavuori 1999), June (Kerzhner 1970, Linnavuori 1999), and July (Kiritshenko 1964, Kerzhner 1970).

Ecology. Sandy steppes of Central Asia (Kerzhner 1970, Kaplin 1993). In dry habitats (Linnavuori 1999).

Nasocoris ephedrae Reuter, 1902

Lectotype. female, Spain: 'Albarracin, Spain' (MZHF) (Kerzhner 1997).

Nasocoris ephedrae sp. nov.: Reuter (1902): 103. Description, differential diagnosis, host plant, faunistics (Spain).

Nasocoris ephedrae: Oshanin (1909): 856. Catalogue, distribution.
Nasocoris ephedrae: Oshanin (1912): 77. Catalogue, distribution.
Nasocoris ephedrae: Carvalho (1958): 78. Catalogue.
Nasocoris ephedrae: Lindberg (1939): 18–19. Key, figure, distribution.
Nasocoris ephedrae: Lindberg (1951): 26. List of types in Reuter's collection.
Nasocoris ephedrae: Stichel (1956): 209. Diagnosis, key, host plant, distribution.
Nasocoris ephedrae: Stichel (1958): 800. Distribution.
Nasocoris ephedrae: Linnavuori (1968): 201. Redescription, key, host plants, distribution (Morocco).
Nasocoris ephedrae: Wagner (1968): 299–301. Key, figures, distribution.
Nasocoris ephedrae: Wagner (1974): 402, 404–405. Redescription, key, figures, host plant, distribution.
Nasocoris ephedrae: Schuh (1995): 360. Catalogue.
Nasocoris ephedrae: Kerzhner (1997): 117. Lectotype designation and depository.
Nasocoris ephedrae: Ribes *et al.* (1997): 39. Bionomics, host plant, faunistics (Spain).
Nasocoris ephedrae: Ribes and Goula (1997): 17. Bionomics, host plant, faunistics (Spain).
Nasocoris ephedrae: Kerzhner and Josifov (1999): 375–376. Catalogue, type depository, distribution.

Distribution. Spain (Reuter 1902, Ribes *et al.* 1997, Ribes and Goula 1997), Morocco (Linnavuori 1968).

Host plants. *Ephedra cossonii* (Spain, Morocco) (Stichel 1956, Linnavuori 1968), *E. distachya* (Spain, larval feeding) (Ribes *et al.* 1997), *E. nebrodensis* (Spain, Morocco) (Reuter 1902, Stichel 1956, Linnavuori 1968, Ribes *et al.* 1997, Ribes and Goula 1997).

Bionomics. Adults were collected in June (Ribes *et al.* 1997), July (Ribes *et al.* 1997), August (Ribes *et al.* 1997; Ribes and Goula 1997), and October (Ribes and Goula 1997); the larvae were collected in early July (Ribes *et al.* 1997).

Nasocoris labanicus Linnavuori, 2004

Holotype. Male, Iran: 'Hormozgan: Labani, 10.–12.XII.2000' (RLRF).

Nasocoris labanicus sp. nov.: Linnavuori (2004a): 12–13. Description, key, figures, bionomics, ecology, faunistics (Iran).
Nasocoris labanicus: Linnavuori (2004b): 94. Bionomics, ecology, faunistics (Iran).

Distribution. Iran (Linnavuori 2004a, 2004b).

Host plant. Unknown.

Bionomics. Adults were collected at the end of February, March, beginning of April, and in the second week of December (Linnavuori 2004a, 2004b).

Ecology. Collected by light traps in gardens near sandy and gravelly steppes (Linnavuori 2004a, 2004b).

Nasocoris lautereri sp. nov.

(Figs. 1–4)

Holotype. Male, 'Greece: Attiki, Poros Isl., SW parts, pasture, macchia, *Pinus* wood undergrowth, 2–50 m a.s.l., 10.vi.1995, lgt. P. Lauterer' (MMBC).

Nasocoris lautereri sp. nov.: this paper. Description, differential diagnosis, figures, bionomics, host plant, ecology, faunistics (Croatia, Greece).

Distribution. Croatia, Greece (this paper).

Host plants. *Ephedra campylopoda* (Greece) and *E. distachya* (Croatia) (this paper).

Bionomics. Adults were collected in June and September (this paper).

Ecology. Coastal maquis, exposed slopes of coastal mountains (this paper).

Nasocoris platycranoides Montandon, 1890
(Fig. 8)

Syntypes. Algeria: 'Oran (L. Moisson)' (MGAB, MZHF, NHMW – see Kerzhner & Josifov (1999)). Kerzhner & Matocq (1994) listed also syntypes in collection of MNHN.
Nasocoris platycranoides sp. nov.: Montandon (1890): 179–180. Description, faunistics (Algeria).
Nasocoris platycranoides: Puton (1899): 71. Catalogue, distribution.
Nasocoris platycranoides: Reuter (1902): 103. Differential diagnosis, distribution.
Nasocoris platycranoides: Oshanin (1909): 855. Catalogue, distribution.
Nasocoris platycranoides: Oshanin (1912): 77. Catalogue, distribution.
Nasocoris platycranoides: Vidal (1937): 205. Faunistics (Morocco).
Nasocoris platycranoides: Lindberg (1939): 18–19. Key, figure, distribution.
Nasocoris platycranoides: Lindberg (1940): 46–47. Bionomics, host plant, ecology, faunistics (Morocco).
Nasocoris platycranoides: Lindberg (1951): 26. List of types in Reuter's collection.
Nasocoris platycranoides: Stichel (1956): 210 (partim). Diagnosis, key, distribution.
Nasocoris platycranoides: Carvalho (1958): 78. Catalogue.
Nasocoris platycranoides: Stichel (1958): 800 (partim). Distribution.
Nasocoris platycranoides: Wagner (1958): 76. Bionomics, faunistics (Morocco).
Nasocoris platycranoides: Sienkiewicz (1964): 22. Faunistics (Algeria).
Nasocoris platycranoides: Linnavuori (1968): 201, 203–204. Redescription, key, bionomics, host plant, faunistics (Morocco).
Nasocoris platycranoides: Wagner (1968): 299–301. Key, figures, distribution.
Nasocoris platycranoides: Wagner (1974): 402, 405. Redescription, key, host plant, distribution.
Nasocoris platycranoides: Ribes and Goula (1986): 277. Catalogue of Wagner's collection.
Nasocoris platycranoides: Kerzhner and Matocq (1994): 64. List of types.
Nasocoris platycranoides: Faraci and Rizzotti Vlach (1995): 25. List, distribution (Italy: Sardinia – error!).
Nasocoris platycranoides: Schuh (1995): 360. Catalogue.
Nasocoris platycranoides: Carapezza (1997): 109. Bionomics, host plant, distribution, faunistics (Tunisia).
Nasocoris platycranoides: Kerzhner and Josifov (1999): 376. Catalogue, type depository, distribution (Spain – marked as first record).

Distribution. Italy (Sicily) (Carapezza 1997, without an exact locality), Spain (Kerzhner and Josifov 1999, without an exact locality; confirmed in this paper), Algeria (Montandon 1890, Sienkiewicz 1964), Morocco (Vidal 1937, Lindberg 1940, Wagner 1958), Tunisia (Carapezza 1997). The records from Sardinia (Servadei 1952, 1967; Stichel 1956, 1958) refer to *N. psyche*. Wagner (1968) mentioned in the key its occurrence in Sardinia (not Sicily), but he mentioned it from Sicily (but not from Sardinia) in the discussion; thus Wagner's record from Sicily probably is a mistake.

Host plant. *Ephedra cossonii* (Morocco) (Lindberg 1940), *E. fragilis* (Morocco, Tunisia) (Carapezza 1997, this paper).

Bionomics. Adults were collected in April (Wagner 1958, this paper), May (Lindberg 1940, Linnavuori 1968, Carapezza 1997, this paper), June (Lindberg 1940, Linnavuori 1968, this paper), July (Carapezza 1997), October (this paper), and November (Lindberg 1940). Larvae of 5th instar were collected in May (this paper).

Ecology. Collected on the banks of the Reraïa river in the High Atlas Mts. (1250 m a.s.l.) in Morocco, together with *Hyoidea horvathi* (Lindberg 1940).

Nasocoris psyche Linnavuori, 1968

Holotype. Female, Italy, 'Sardinia, Platamona, 11. VII. 1949, Servadei' (RLRF).

Nasocoris platycranoides: Servadei (1952): 455. Bionomics, faunistics (Italy: Sardinia).
Nasocoris platycranoides: Stichel (1956): 210 (partim). Diagnosis, key, distribution.
Nasocoris platycranoides: Stichel (1958): 800 (partim). Distribution.
Nasocoris platycranoides: Servadei (1967): 48. Catalogue (Italy).

Nasocoris psyche sp. nov.: Linnavuori (1968): 201, 203. Description, key, bionomics, faunistics (Italy: Sardinia).
Nasocoris psyche: Servadei (1969): 418. List, distribution.
Nasocoris psyche: Wagner (1974): 402, 404. Redescription, key, figures, distribution (incorrectly as Sicily!).
Nasocoris psyche: Faraci and Rizzotti Vlach (1995): 25. List, distribution (Italy).
Nasocoris psyche: Schuh (1995): 360. Catalogue.
Nasocoris psyche: Kerzhner and Josifov (1999): 376. Catalogue, type depository, distribution.
Nasocoris psyche: Linnavuori (1999): 52–54, 58. Comparative notes, figures.

Distribution. Italy (Sardinia) (Servadei 1952, Linnavuori 1968).

Host plant. Unknown.

Bionomics. The holotype was collected in July (Servadei 1952, Linnavuori 1968).

Nasocoris serratus Linnavuori, 1984

Holotype. Male, 'Iraq: Al Muthanna, As Salman-Takhadid, 17–18.IV.1980, Linnavuori' (AMNH).

Nasocoris serratus sp. nov.: Linnavuori (1984): 41. Description, figures, bionomics, host plant, ecology, faunistics (Iraq).
Nasocoris serratus: Linnavuori (1993): 255. Bionomics, host plant, ecology, distribution, faunistics (Iraq).
Nasocoris serratus: Schuh (1995): 360. Catalogue.
Nasocoris serratus: Kerzhner and Josifov (1999): 376. Catalogue, type depository, distribution (Israel, marked as a new record).
Nasocoris serratus: Linnavuori (1999): 55–57. Redescription, key, figures, bionomics, host plant, ecology, faunistics (Iran, Iraq).

Distribution. Iran (Linnavuori 1999), Iraq (Linnavuori 1984, 1993, 1999), Israel (Kerzhner and Josifov 1999, no exact locality given).

Host plants. *Ephedra alata* (no country) (Linnavuori 1999), *Ephedra foliata* (Iraq) (Linnavuori 1984, 1993).

Bionomics. The adults were collected in April (Linnavuori 1984, 1993) and May (Linnavuori 1999).

Ecology. Collected on *Ephedra foliata* in a small gravelly wadi (Linnavuori 1984, 1993). According to Linnavuori (1999), this species inhabits steppe and hilly habitats.

Nasocoris tesquorum Kerzhner, 1970
(Fig. 9)

Holotype. Male, Kazakhstan: 'Taldy-Kurganskaya obl., Topolevka, 40 km vost. Sarkanda, Dzhungarskiy Alatau, 7 VII 1957 (Kerzhner)' (ZMAS).

Nasocoris argyrotrichus: Reuter (1879): 206 (partim, specimen from Sarepta – see Kerzhner 1970). Description, distribution.
Nasocoris argyrotrichus: Reuter (1884): 318–319 (partim, specimen from Sarepta). Redescription, distribution.
Nasocoris argyrotrichus: Reuter (1887): 33 (partim, specimen from environs of Astrakhan). Faunistics (Russia).
Nasocoris argyrotrichus: Oshanin (1909): 77 (partim, specimens from Astrakhan). Catalogue, distribution.
Nasocoris argyrotrichus: Kiritshenko (1951): 127, 188, 219 (except of figures – see Kerzhner 1970: 642). Key, distribution.
Nasocoris argyrotrichus: Putshkov (1960): 368. Faunistics (Ukraine).
Nasocoris argyrotrichus: Putshkov (1961): 90. Bionomics, host plant, ecology, distribution, faunistics (Ukraine).
Nasocoris argyrotrichus: Kerzhner (1964): 747, 749. Key, figures.
Nasocoris tesquorum sp. nov.: Kerzhner (1970): 640–642. Description, taxonomy, key, figure, bionomics, host plant, ecology, faunistics (Kazakhstan: Asian part; Mongolia; Russia: South European Territory, Tuva; Ukraine).
Nasocoris tesquorum: Kerzhner (1973): 85. Faunistics (Russia: Tuva).
Nasocoris tesquorum: Schuh (1995): 360. Catalogue.
Nasocoris tesquorum: Vinokurov and Kanyukova (1995): 79, 115. Key.
Nasocoris tesquorum: Putshkov and Putshkov (1996): 44. Catalogue, distribution (Ukraine).

Nasocoris tesquorum: Kerzhner *et al.* (1997): 135. List of types.
Nasocoris tesquorum: Kerzhner and Josifov (1999): 376. Catalogue, type depository, distribution.
Nasocoris tesquorum: Linnavuori (1999): 52–55, 57–58. Redescription, key, figures, bionomics, host plant, faunistics (Kazakhstan).

Distribution. Russia (Southern European Territory – Reuter 1879, Kerzhner 1970; Eastern Siberia: Tuva Republic – Kerzhner 1970, 1973), Ukraine (Putshkov 1961, Kerzhner 1970, Putshkov and Putshkov 1996), Kazakhstan (Asian part – Kerzhner 1970, Linnavuori 1999), Mongolia (Kerzhner 1970), Tadjikistan (Kerzhner and Josifov 1999, no published record known to us), Turkmenistan (Kerzhner and Josifov 1999, no published record known to us), Uzbekistan (Kerzhner and Josifov 1999, no published record known to us).

Host plants. *Ephedra distachya* (Kazakhstan, European Russia; Ukraine – reported larval feeding) (Putshkov 1961, Kerzhner 1970), *E. monosperma* (Mongolia, Tuva) (Kerzhner 1970), *E. strobilacea* (Kazakhstan) (Linnavuori 1999).

Bionomics. Putshkov (1961) reported the finding of numerous fourth and fifth instars and young adults on July 9, and females with developed eggs on July 27 in Crimea (southern Ukraine). Adults were collected also in June (Kerzhner 1970, Linnavuori 1999), July (Kerzhner 1970, Linnavuori 1999), and August (Kerzhner 1970).

Ecology. It lives in steppes (Kerzhner 1970). Putshkov (1961) characterized its habitat as sea coastal sands in the Odessa region, and ridges of lower mountains around the Karadag biological station in Crimea (Ukraine).

Nasocoris tuberculicollis Linnavuori, 1999

Holotype. Male, 'Iraq: Dhi Gar, Abu Ghar, 16.IV.1980, Linnavuori' (RLRF).

Nasocoris albipennis: Linnavuori (1993): 255. Host plant, bionomics, ecology, distribution, faunistics (Iraq).
Nasocoris tuberculicollis sp. nov.: Linnavuori (1999): 52–55, 60–62. Description, key, figures, bionomics, host plant, ecology, faunistics (Iraq).
Nasocoris tuberculicollis: Linnavuori (2004a): 12–13. Key, figures.

Distribution. Iraq (Linnavuori 1993, 1999).

Host plant. *Ephedra alata* (Iraq) (Linnavuori 1993, 1999).

Bionomics. Adults were collected in April (Linnavuori 1993, 1999), May and August (Linnavuori 1993).

Ecology. In semi-deserts (Linnavuori 1993); in desert habitats (Linnavuori 1999).

Discussion

The bionomics and the ecology of the genus *Nasocoris* are only poorly known. According to all reliable records, *Nasocoris* species seem to be trophically confined to *Ephedra* spp. The records of *Nasocoris albipennis* on *Haloxylon schweinfurthi* (Chenopodiaceae) from the Sinai Peninsula (Lindberg 1939, Priesner and Alfieri 1953, Stichel 1956) seem to be merely sitting records.

The genus *Ephedra* Linnaeus, 1753 (Ephedraceae), is one of three distinct lineages (together with *Gnetum* (Gnetaceae) and *Welwitschia* (Welwitschiaceae)) which are survivors from an ancient and historically more diverse group of plants, most often classified as the order Gnetales. The phylogenetic position of this enigmatic group has often been the subject of phylogenetic studies which examine the possibility that Gnetales are the sister group of the seed plants (Price 1996). However, the most recent molecular systematic studies have suggested that Gnetales are the sister group of Pinaceae within a paraphyletic conifer group (Burleigh and Matthews 2004, Huang *et al.* 2005). *Ephedra*, known already from the Early Cretaceous of Portugal (Rydin *et al.* 2004), includes ca 50–65 described recent species (e.g., Price 1996, Huang *et al.* 2005) which are distributed in arid and semiarid regions of Asia, Europe, northern and northeastern Africa (southwards to Ethiopia, Somalia, and Sudan), western North America and South America, and grow from the sea level up to as much as 5000 m a.s.l. in the Himalayan and Andean mountain ranges (Pearson 1929, Price 1996, Freitag and Maier-Stolte 2003).

TABLE 2. Summary of the host plant records for individual *Nasocoris* Reuter, 1879 species, compared with various opinions about the grouping of host *Ephedra* Linnaeus, 1753 species.
*) – sometimes classified as subspecies of *E. fragilis* Desf.; **) – often synonymized with *E. major* Host. Sections of *Ephedra* according to Stapf (1889) & Mussayev (1978): A – *Alatae*, E – *Ephedra*, M – *Monospermae*, S – *Scandentes*; species-groups (and subgroups) according to Freitag and Maier-Stolte (1994): A – *Alatae*, D(D) – *Distachyae* s. str., D(L) – *Distachyae* (subgroup *Leptocladae*), F – *Fragilis*; species-groups according to Huang *et al.* (2005): EM – Europe-Mediterranean, EWA – East-West Asia; Ickert-Bond and Wojciechowski (2004) and Rydin *et al.* (2004) did not give names for their groups, the same number means the species of one monophylum of presented cladogram; – species not included in the study.

	Ephedra sp.	*Ephedra alata C. A. Meyer*	*Ephedra campylopoda C. A. Meyer *)*	*Ephedra cossonii Stapf *)*	*Ephedra distachya Linnaeus*	*Ephedra fedtschenkoae Paulsen*	*Ephedra foliata Boiss & Kotschy*	*Ephedra fragilis Desf.*	*Ephedra monosperma Gmelin ex C.A. Meyer*	*Ephedra nebrodensis Tineo ex Guss.**)*	*Ephedra procera Fisch. & C. A. Meyer*	*Ephedra przewalskii Stapf*	*Ephedra sinica Stapf*	*Ephedra strobilacea Bunge*
Nasocoris albipennis Lindberg, 1939	x	x												
Nasocoris arabicus Linnavuori, 1999	x													
Nasocoris argyrotrichus Reuter, 1879	x				x	x					x	x	x	
Nasocoris artemis Linnavuori, 1968	x													
Nasocoris breviceps Wagner, 1968		x												
Nasocoris convexicollis Linnavuori, 1999	x													
Nasocoris desertorum Kerzhner, 1970	x													x
Nasocoris ephedrae Reuter, 1902				x	x					x				
Nasocoris lautereri sp. nov.			x		x									
Nasocoris platycranoides Montandon, 1890				x				x						
Nasocoris serratus Linnavuori, 1984		x					x							
Nasocoris tesquorum Kerzhner, 1970					x				x					x
Nasocoris tuberculicollis Linnavuori, 1999		x												
Stapf (1889)		**A**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**A**	**E**	**A**
Mussayev (1978)		**A**	**S**	**S**	**E**	**M**	**S**	**S**	**M**	**M**	**M**	**A**	**E**	**A**
Freitag and Maier-Stolte (1994)		**A**	**–**	**–**	**D(D)**	**D(D)**	**F**	**F**	**D(L)**	**D(L)**	**D(L)**	**A**	**–**	**A**
Ickert-Bond and Wojciechowski (2004)		**–**	**–**	**–**	**2**	**2**	**–**	**1**	**3**	**–**	**–**	**–**	**2**	**2**
Rydin et al. (2004)		**4**	**–**	**–**	**2**	**–**	**3**	**4**	**2**	**4**	**1**	**–**	**2**	**–**
Huang et al. (2005)		**–**	**–**	**–**	**EM**	**–**	**–**	**EM**	**–**	**–**	**–**	**–**	**EWA**	**–**

The great majority of *Ephedra* species are erect or sprawling shrubs, but some high mountain species grow as prostrate shrubs, and a few species form vinelike climbing shrubs or can reach the size of small trees. The genus is characterized by scale- or needle-like leaves, which are either decussate or in whorls of three and fused at the base to form a nodal sheath (Pearson 1929, Price 1996). *Ephedra* is also very distinct for its secondary product chemistry, notably for the accumulation of ephedrine and related alkaloid amines in many species (missing in several American ones) (see reviews by Hegnauer (1962, 1968) and Caveney *et al.* (2001)). The most recent revision of the entire genus is by Stapf (1889), who established three sections based on the nature of the bracts in the ovulate cones – *Alatae*, *Asarca*, and *Ephedra* (originally named *Pseudobaccatae*). This subdivison was later slightly modified by Mussayev (1978) and Freitag and Maier-Stolte (1994). However, recent molecular studies (Price 1996, Ickert-Bond and Wojciechowski 2004, Rydin *et al.* 2004, Huang *et*

al. 2005) have shown that Stapf's (1889) original sections are artificial; fleshy bracts are ancestral, and shifts to dry, winged bracts have occurred several times. These studies agree that *Ephedra* is a monophyletic taxon, consisting of a basal paraphyletic grade of the Old World lineages, within which a highly supported New World clade is nested (Ickert-Bond and Wojciechowski 2004, Rydin *et al.* 2004, Huang *et al.* 2005). The examined Old World taxa form 3–6 monophyletic groups, but the placement of particular species differs among the studies (see Table 2), and additional evidence would be needed to obtain more consistent results (Ickert-Bond and Wojciechowski 2004, Rydin *et al.* 2004, Huang *et al.* 2005).

The host plant association with *Ephedra* is not common among the plant bugs (Miridae); however, it is not unique. Schuh (1995) summarized host plant records from *Ephedra* spp. In the Nearctic region (all of them from the southwestern USA and the adjacent area of Mexico) and listed five species from the large genus *Phytocoris* Fallén, 1814 (Mirinae) (see also Stonedahl 1988); one species (*Lopidea scutata* Knight, 1962, not strictly confined to *Ephedra*), of ca. 88 species of *Lopidea* Uhler, 1872 (Orthotylinae); a single species (*Ephedrodoma multilineata* Polhemus and Polhemus, 1984) from the monotypic genus *Ephedrodoma* Polhemus and Polhemus, 1984 (Orthotylinae) which seems to be specialized on *Ephedra* (Polhemus & Polhemus 1984) and four of the 27 known species of *Megalopsallus* Knight, 1927 (Phylinae), which also seem to be specialized on *Ephedra* spp. (see Schuh 1986, 2000). In the Palaearctic region, two species (of 29) of the genus *Camptotylidea* Wagner, 1957 occur exclusively on *Ephedra* spp. – *C. candida* (Linnavuori, 1984) from Iraq and *C. ephedrae* Konstantinov, 1999 from Kazakhstan and Turkmenistan (Konstantinov 1999). Two other Palaearctic genera are known to occur exclusively on *Ephedra* spp. – *Nasocoris* (Phylinae) with 15 species, and *Hyoidea* Reuter, 1876 (Orthotylinae), with nine described species known from Morocco, Algeria, Tunisia, Spain, Israel, Turkey, and the steppe zone of Eurasia from Slovakia, Hungary, and the Caucasus through Ukraine, southern Russia and Central Asia to Mongolia and northern China (Schuh 1995, Kerzhner and Josifov 1999, Ribes and Ribes 2000, Baena and Günther 2001). No species of the family Miridae has been reported to feed on *Ephedra* outside the Holarctic region, or on the remaining genera of Gnetales – *Gnetum* and *Welwitschia* (see Schuh 1995).

Of the 15 known *Nasocoris* species, only two (*N. labanicus* and *N. psyche*) have never been reported in association with any plant species. Three additional species (*N. arabicus*, *N. artemis*, *N. convexicollis*) have been reported only from unidentified *Ephedra* species. Four *Nasocoris* were found on a single *Ephedra* species – *N. albipennis*, *N. breviceps*, and *N. tuberculicollis* were found only on *Ephedra alata*, and *N. desertorum* only on *E. strobilacea*. Three species were found on two different *Ephedra* species, two *Nasocoris* were collected on three species of *Ephedra*, and *N. argyrotrichus* was reported to live on five different *Ephedra* species (see Table 2). A comparison of the host plants of those *Nasocoris* feeding on more than one *Ephedra* species with the available hypotheses of the *Ephedra* phylogeny does not show a restriction of some *Nasocoris* to a particular clade of *Ephedra* (see Table 2). However, the feeding records of *Nasocoris* as well as the phylogenetic evidence for *Ephedra* is so far too limited for any serious conclusions. In a lack of a strict monophagous specialization on one host *Ephedra* species, the natural conditions and geographical limits may be much more important factors limiting the distribution of particular species. Although only two species (*N. argyrotrichus* and *N. tesquorum*) live in the wide steppe and semi-desert zone from Ukraine through Central Asia to Mongolia, and one additional species (*N. desertorum*) is distributed in the deserts of Central Asia, the Mediterranean area, the Near and the Middle East host 12 species, usually with more restricted areas of distribution (e.g., *N. psyche* endemic to Sardinia). The more diverse natural conditions, geographical relief, and possibilities of allopatric speciation in different refugia during the alternating glacial and interglacial[1)] periods should be hypothesized as possible explanations of these distributional patterns. However, as *N. lautereri* **sp. nov.** from the Balkan peninsula shows, the number of described *Nasocoris* species is hardly final. There are still large areas (e.g., northeastern Africa, Turkey, Afghanistan, western China, and Tibet), where so far no *Nasocoris* species has been recorded.

All *Nasocoris* species are inhabitants of various arid and semi-arid areas of the Western and Central Palaearctic region, where the host *Ephedra* plants grow. They are known from hill sides at sea coast, maquis,

steppes, sandy and stony semi-deserts, and deserts. Bionomics of all species is only poorly known; only the life cycle of *N. desertorum* has been studied in detail by Kaplin (1993). According to him, *N. desertorum* is a polyvoltine species with three to four overlapping generations per year and overwinters in the egg stage. Also, Kerzhner (1970) characterized another Central Asian species, *N. argyrotrichus*, as probably bivoltine, overwintering in the egg stage. However, the life cycle (and especially the number of generations) differs substantially depending on the natural conditions. Specimens of *N. tesquorum*, which lives in steppes from Ukraine through southern Russia and Kazakhstan to Mongolia, were collected only from June to August (Kerzhner 1970, Table 3), whereas *N. desertorum* from deserts of Central Asia (Kaplin 1993, Table 3) occurred from April to October, and the West-Mediterranean species *N. platycranoides* was collected from April even to November (Table 3). The most peculiar bionomical data were obtained for *N. labanicus* from Hormozgan, the southernmost province of Iran, which was collected in light traps from February 23 to April 2 and at December 10–12 (Linnavuori 2004a, 2004b). In this case the winter egg diapause must be extremely short; or even a continual life cycle cannot be excluded.

[1)] For example *Ephedra distachya* L. was one of the permanent components of the periglacial formations distributed on the territory of Ukrainian planes during the Late Glacial. During Holocene its area of distribution was reduced and fragmented by the spreading of forest and forest-steppe formations (see Bezus'ko 1999).

TABLE 3. Summarized occurrence of larvae (L) and adults (A) of *Nasocoris* Reuter, 1879 species in the different months of a year. (For source data see the material examined and references with the key word 'bionomics' listed in the review of species).

Species / Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Nasocoris albipennis Lindberg, 1939					A	A			A			
Nasocoris arabicus Linnavuori, 1999											A	
Nasocoris argyrotrichus Reuter, 1879					A	A	A	A	A			
Nasocoris artemis Linnavuori, 1968					A	A	A			A		
Nasocoris breviceps Wagner, 1968				A								
Nasocoris convexicollis Linnavuori, 1999							A	A				
Nasocoris desertorum Kerzhner, 1970				L	L,A	L,A	L,A	L,A	L,A	L,A		
Nasocoris ephedrae Reuter, 1902						A	L,A	A		A		
Nasocoris labanicus Linnavuori, 2004		A	A	A								A
Nasocoris lautereri sp. nov.						A			A			
Nasocoris platycranoides Montandon, 1890				A	L,A	A	A			A	A	
Nasocoris psyche Linnavuori, 1968							A					
Nasocoris serratus Linnavuori, 1984				A	A							
Nasocoris tesquorum Kerzhner, 1970						A	L,A	A				
Nasocoris tuberculicollis Linnavuori, 1999				A	A			A				

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