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ON THE TAXONOMY OF SOME FULGOROIDEA (HEMIPTERA)

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ABSTRACT

Issidae: *Ardelia* Melichar, 1907 is placed in synonymy under *Vishnuloka* Distant, 1906 and *Vishnuloka cuneata* Distant, 1906 – under *Vishnuloka prominula* Distant, 1906; *Delia deserta* Melichar, 1906 is transferred to the genus *Vishnuloka*. Nogodinidae: *Narayana buruensis* Schmidt, 1926 is transferred to the genus *Scalabis* Stål, 1870, *Hysteropterum solidum* Melichar, 1911 – to the genus *Mangola* Melichar, 1906, and *Hysteropterum ecarinatum* Synave, 1956 – to the genus *Telmosias* Fennah, 1967; *Oryxana subrecta* Jacobi, 1941 and *Buehleria rabana* Lallemand et Synave, 1953 are placed in synonymy under *Oryxana suturalis* (Melichar, 1906). Acanaloniidae: *Amphiscepa subpellucida* Fowler, 1904 is transferred to the genus *Acanalonia* Spinola, 1839. Tropiduchidae: *Nacmusius* Jacobi, 1944 is placed in synonymy under *Cixiopsis* Matsumura, 1900; *Nacmusius chelydinus* Jacobi, 1944 is transferred to the genus *Cixiopsis*. A key to the species of the genus *Vishnuloka* is provided. Lectotypes are designated for *Amphiscepa subpellucida* Fowler, 1904, *Delia deserta* Melichar, 1906, *Issina suturalis* Melichar, 1906, *Narayana buruensis* Schmidt, 1926, *Oryxana subrecta* Jacobi, 1941, *Vishnuloka cuneata* Distant, 1906, and *V. prominula* Distant, 1906.

Key words: Acanaloniidae, Issidae, Nogodinidae, Tropiduchidae, new combinations, new synonyms, lectotype designation

К СИСТЕМАТИКЕ НЕКОТОРЫХ FULGOROIDEA (HEMIPTERA)

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РЕЗЮМЕ

Issidae: *Ardelia* Melichar, 1907 сведена в синонимы к *Vishnuloka* Distant, 1906, а *Vishnuloka cuneata* Distant, 1906 – к *Vishnuloka prominula* Distant, 1906; *Delia deserta* Melichar, 1906 перенесена в род *Vishnuloka*. Nogodinidae: *Narayana buruensis* Schmidt, 1926 перенесена в род *Scalabis* Stål, 1870, *Hysteropterum solidum* Melichar, 1911 – в род *Mangola* Melichar, 1906, а *Hysteropterum ecarinatum* Synave, 1956 – в род *Telmosias* Fennah, 1967; *Oryxana subrecta* Jacobi, 1941 и *Buehleria rabana* Lallemand et Synave, 1953 сведены в синонимы к *Oryxana suturalis* (Melichar, 1906). Acanaloniidae: *Amphiscepa subpellucida* Fowler, 1904 перенесена в род *Acanalonia* Spinola, 1839. Tropiduchidae: *Nacmusius* Jacobi, 1944 сведен в синонимы к *Cixiopsis* Matsumura, 1900; *Nacmusius chelydinus* Jacobi, 1944 перенесен в род *Cixiopsis*. Дана определительная таблица к видам рода *Vishnuloka*. Установлены лектотипы для *Amphiscepa subpellucida* Fowler, 1904, *Delia deserta* Melichar, 1906, *Issina suturalis* Melichar, 1906, *Narayana buruensis* Schmidt, 1926, *Oryxana subrecta* Jacobi, 1941, *Vishnuloka cuneata* Distant, 1906 и *V. prominula* Distant, 1906.

Ключевые слова: Acanaloniidae, Issidae, Nogodinidae, Tropiduchidae, новые комбинации, новые синонимы, установление лектотипов

INTRODUCTION

In the course of studying the material, including types of planthoppers of the families Acanaloniidae Amyot et Serville, 1843, Issidae Spinola, 1839, Nogodinidae Melichar, 1898, and Tropiduchidae Stål, 1866 from several European museums some new synonyms and new combinations were discovered and are here established.

MATERIAL AND METHODS

The terminology of head follows Emeljanov (1995), hypocostal plate – Emeljanov (1971), and female genitalia – Bourgoïn (1993). Dry and pinned specimens were examined using the light microscope. The material examined is deposited in the museums listed below.

Photographs of *Vishnuloka prominula* Distant and *Mangola solida* (Melichar) were made using Leica MZ8 with JVC video camera KY F70B. Images are produced using the software Synoptics Automontage and Adobe Photoshop.

Institutional abbreviations:

SNSD – Staatliche Naturhistorische Sammlungen Dresden, Museum für Tierkunde, Germany.

MIZ – Museum and Institute of Zoology of the Polish Academy of Sciences, Warsaw, Poland.

MMBC – Moravian Museum, Brno, Czech Republic.

NMW – Naturhistorisches museum Wien, Austria.

MNB – Museum für Naturkunde, Berlin, Germany (formerly Zoologisches Museum, Humboldt Universität).

MNHN – Muséum National d' Histoire Naturelle, Paris, France.

BMNH – The Natural History Museum, London, United Kingdom.

IRSNB – Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

NHMB – Naturhistorisches Museum, Basel, Switzerland.

TAXONOMY

Family Acanaloniidae Amyot et Serville, 1843

Genus *Acanalonia* Spinola, 1839

Type species: *Acanalonia servillei* Spinola, 1839.

Acanalonia subpellucida (Fowler, 1904) comb. nov.

Amphiscepa subpellucida Fowler, 1904: 119, tab. 12, figs 9, 9a.

Type material examined. Female (lectotype here designated) – GUATEMALA, City, Champion (BMNH).

Supplementary description. Coryphe very narrow. Fore wings with hypocostal plate. Hind tibiae without lateral spines.

Note. To stabilize the nomenclature in the group (ICZN 1999: Art. 74) the lectotype is here designated for the specimen listed above which corresponds to the original description and belongs to the syntype serie (Fowler 1904).

The species is transferred to the genus *Acanalonia* according to wide metope and narrow coryphe and the shape and venation of fore wings. The ovipositor with large nearly triangular gonoplacs bearing marginal teeth is of characteristic acanaloniid type as described by Gnezdilov (2012).

Family Issidae Spinola, 1839

Tribe Issini Spinola, 1839

Genus *Vishnuloka* Distant, 1906

Vishnuloka Distant, 1906: 345;

Delia Melichar, 1906: 265 (Type species: *Delia deserta* Melichar, 1906), homonymy;

Ardeia Melichar, 1907: 324, nom. nov. pro *Delia* Melichar, 1906, nec *Delia* Robineau-Desvoidy, 1830, **syn. nov.**

Type species: *Vishnuloka prominula* Distant, 1906.

Vishnuloka prominula Distant, 1906

(Fig. 1A–C)

Vishnuloka prominula Distant, 1906: 345

Vishnuloka cuneata Distant, 1906: 346, **syn. nov.**

Type material examined. Female (lectotype of *Vishnuloka prominula*, here designated) – INDIA, Mungphu (BMNH). Female (lectotype of *Vishnuloka cuneata*, here designated) – MYANMAR, Tenass Vall, Myitta, Doherty (BMNH).

Supplementary description. Coryphe transverse, with anterior margin weakly marked (Fig. 1B). Metope with no intermediate carinae, protruding like a cone in its upper part (Fig. 1C). Fore wings narrowing apically; radius, median, and cubitus anterior bifurcate (R 2 M 2 CuA 2); median bifurcates

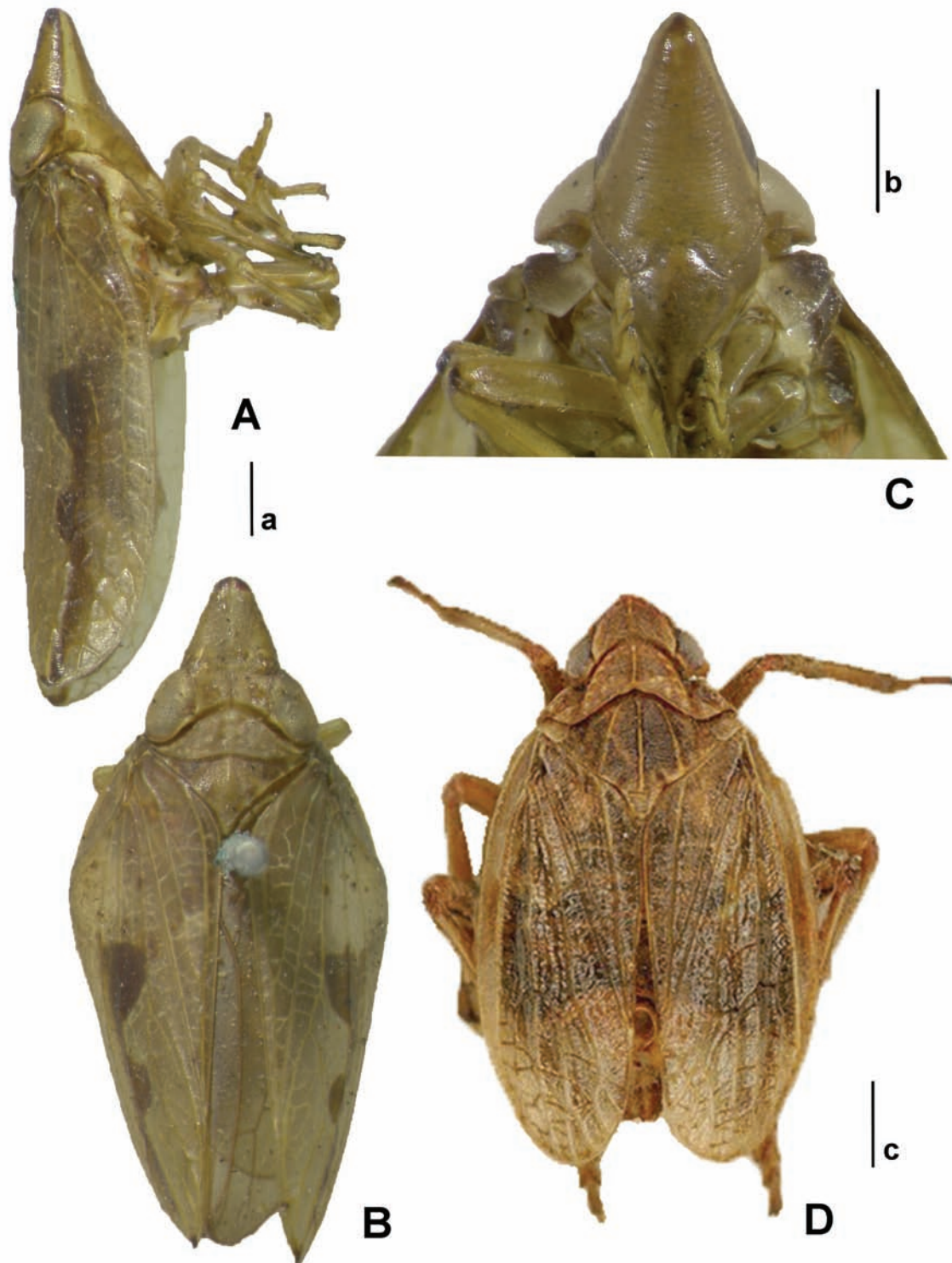


Fig. 1. Issidae and Tropiduchidae, external view: A, *Vishnuloka prominula* Distant (lectotype of *Vishnuloka cuneata*), lateral view; B, same, dorsal view; C, same (lectotype of *Vishnuloka prominula*), frontal view; D, *Cixiopsis chelydinus* (Jacobi), dorsal view. Scale bar (1 mm): a = A, B; b = C; c = D.

distally. Hind wings well developed, 3-lobed. Hind tibia with 2 lateral spines. First metatarsomere with 2 latero-apical and 2 intermediate spines.

Distribution. Northeastern India (Sikkim) and Myanmar (Distant 1906).

Note. The lectotypes are here designated for the specimens listed above which correspond to the original descriptions and belong to the syntype series (Distant 1906).

***Vishnuloka deserta* (Melichar, 1906) comb. nov.**

Delia deserta Melichar, 1906: 265;

Ardelia deserta: Melichar, 1907: 324.

Type material examined. Female (lectotype, here designated) – INDONESIA, Sumatra, Deli, ex. coll. Fruhstorfer, “deserta det. Melichar” (handwritten), “*Delia deserta* [?] n sp” (handwritten) (NMW); 1 male (paralectotype) – INDONESIA, Sumatra, Soekaranda, Dr. H. Dohrn S., “Co=Typus.” (printed), “*Ar. deserta* det. Melichar” (handwritten), “*Ardelia dbel.*” (handwritten) (SNSD).

Distribution. Sumatra (Melichar 1906).

Note. The species was described after 3 specimens (Melichar 1906). The lectotype is here designated for the female specimen mentioned above which corresponds to the original description, even Melichar did not give the sex of the specimens described, but gave the length for the male only, he mentioned that one specimen from Deli is deposited in Wien (Melichar 1906). Subsequently other specimen which corresponds to the original description as well and apparently belongs to the syntype serie, originally labeled as the cotype, became the paralectotype. Very probably Melichar put the label “*Ar. deserta* det. Melichar” under the specimen after he replaced the name *Delia* by *Ardelia* (Melichar, 1907). Apparently “Java: Soekaranda” (Melichar 1906) in the original description is *lapsus calami*. As stated above Soekaranda is located in Sumatra. Tonkin (Northern Vietnam) mentioned by Lallemand (1942) seems to be a dubious record for the species. In Vietnam a closely related yet undescribed genus and species was discovered (Gnezdilov, unpublished).

Key to species of the genus *Vishnuloka*

1(2). Each fore wing light yellowish brown, with wide longitudinal dark brown stripe (Fig. 1A–B) *V. prominula* Distant

2(1). Fore wings brown, without stripe *V. deserta* (Melichar)

Family Nogodinidae Melichar, 1898

Tribe Tongini Fennah, 1954

Genus *Scalabis* Stål, 1870

Type species: *Tylana philippina* Stål, 1870.

***Scalabis buruensis* (Schmidt, 1926) comb. nov.**

Narayana buruensis Schmidt, 1926: 244.

Type material examined. Male (lectotype, here designated) – INDONESIA, Buru 1921, Station 9, 21 June, L.J. Toxopeus (MIZ); 1 female (paralectotype) – INDONESIA, same place, 23 June, L.J. Toxopeus (MIZ); 1 female (paralectotype) – INDONESIA, Buru 1921, Station 13, L.J. Toxopeus (SNSD).

Note. The lectotype is here designated for the specimen listed above which corresponds to the original description and belongs to the syntype serie (Schmidt 1926). Subsequently, other specimens which belong to the syntype serie as well became paralectotypes.

The species is placed in the nogodinid genus *Scalabis* according to carination of the metope and venation of the fore wings as described by Fennah (1954). The ovipositor with narrow and long gonoplags and anterior connective laminae of gonapophyses VIII is of characteristic nogodinid type as described by Gnezdilov (2003) for the tribe Tongini. Thus the issid genus *Narayana* Distant, 1906 is limited in its distribution to Sri Lanka and Southern India.

Genus *Oryxana* Distant, 1910

Type species: *Flata subacuta* Walker, 1870.

***Oryxana suturalis* (Melichar, 1906)**

Issina suturalis Melichar, 1906: 210;

Issella suturalis: Metcalf, 1952: 227;

Oryxana suturalis: Gnezdilov, 2009: 86;

Oryxana subrecta Jacobi, 1941: 292, **syn. nov.**;

Buehleria rabana Lallemand et Synave, 1953: 249, **syn. nov.**;

Oryxana rabana: Gnezdilov, 2009: 86.

Type material examined. Female (lectotype of *Issina suturalis*, here designated) – INDONESIA,

Sumbawa, "Wien / Dr. Melichar", "*suturalis* det. Melichar", "Invent. č 3778 / Ent. Mor. Museum, Brno" (MMBC); 1 female (paralectotype of *Issina suturalis*) – INDONESIA, "Java / Coll. Signoret", "*suturalis* det. Melichar", "Issina" (NMW); 1 male (lectotype of *Oryxana subrecta*, here designated) – INDONESIA, W. Soembawa, Soembawa Besar, 24 April – 2 May 1927, Sunda-Exp. Rensch (SNSD); 1 male (paralectotype of *Oryxana subrecta*) – INDONESIA, W. Soembawa, Soembawa Besar, 24 April – 2 May 1927, Sunda-Exp. Rensch (MNB); 1 male and 1 female (holotype and paratype of *Buehleria rabana*) – INDONESIA, Sumbawa, Raba, 20 May 1949, Dr. Bühler & Dr. Sutter (NHMB).

Note. The lectotypes are here designated for the specimens listed above which correspond to the original descriptions and belong to the syntype series (Melichar 1906; Jacobi 1941). Subsequently, other specimens which belong to the syntype series as well became the paralectotypes.

Tribe Epacriini Fennah, 1978

Genus *Mangola* Melichar, 1906

Type species: *Mangola reticulata* Melichar, 1906.

Mangola solida (Melichar, 1911) comb. nov.

(Fig. 2A–D)

Hysteropterum solidum Melichar, 1911: 115.

Type material examined. Female (holotype) – KENYA, Afrique Orient. Angl., Mont Nyro, Maurice de Rothschild 1905, "*Hysteropt. solidum* n. sp." (handwritten) (MNHN).

Other material examined. 3 males, 3 females, KENYA, Kenya Marsabit N.P., Forêt Lac Paradis, 1400 m, 11–12 December 1972, M. Boulard leg. (MNHN).

Note. Melichar (1911) noted that only one specimen was available to him and this is here recognised as the holotype.

The species is transferred to the genus *Mangola* according to the characteristic robust shape of the body including fore wings, the transverse short coryphe, and the flat metope with a distinct median carina. The ovipositor is of characteristic nogodinid type as described by Gnezdilov (2003).

Tribe Mithymnini Fennah, 1967

Genus *Telmosias* Fennah, 1967

Type species: *Telmosias crito* Fennah, 1967.

Telmosias ecarinatus (Synave, 1956) comb. nov.

Hysteropterum ecarinatum Synave, 1956: 16, figs 14, 30, 31.

Type material examined. 1 male, 2 females (paratypes) – REPUBLIC OF SOUTH AFRICA, Lammerskraal, Prince Albert Distr., C. P. (IRSNB).

Note. The species is transferred to the genus *Telmosias* according to the carination of metope, the shape and venation of the fore wings, and the structure of male genitalia as described by Fennah (1967).

Family Tropiduchidae Stål, 1866

Tribe Cixiopsini Fennah, 1982

Fennah (1982) erected the tribe Cixiopsiini for the genera *Cixiopsis* Matsumura, 1900, *Zema* Fennah, 1956, *Duriopsis* Melichar, 1902, *Padanda* Distant, 1906, and *Olontheus* Jacobi, 1944. Subsequently the genus *Caffrommatissus* Fennah, 1967 was added to the tribe (Huang and Bourgoïn 1993). Matsumura (1914) placed *Padanda* Distant, 1906 in synonymy under *Cixiopsis* Matsumura, 1900 and *Padanda atkinsoni* Distant, 1906 – in synonymy under *Cixiopsis punctatus* Matsumura, 1900. He treated *P. atkinsoni* as brachypterous form of *C. punctatus*. Finally Anufriev and Emeljanov (1988) have regarded *Olontheus obscurus* Jacobi, 1944 as a junior synonym of *C. punctatus*. As *O. obscurus* is the type species of the genus *Olontheus* Jacobi, 1944 it means the synonymization of the genera *Cixiopsis* and *Olontheus* as well. Our study of the type specimen of *Nacmusius chelydinus* Jacobi, 1944, which was treated as belonging to the family Issidae (Jacobi 1944; Metcalf 1958), shows that this species belongs to the genus *Cixiopsis* and accordingly *Nacmusius* Jacobi, 1944 is a junior synonym of *Cixiopsis* Matsumura, 1900.

Taking into consideration the synonymies mentioned above the tribe Cixiopsini consist of four genera: *Cixiopsis* Matsumura, 1900, *Duriopsis* Melichar, 1902, *Zema* Fennah, 1956, and *Caffrommatissus* Fennah, 1967 (Fennah 1982; Huang and Bourgoïn 1993). The first three genera are known from Asia (Matsumura 1900, 1914; Melichar 1902; Fennah

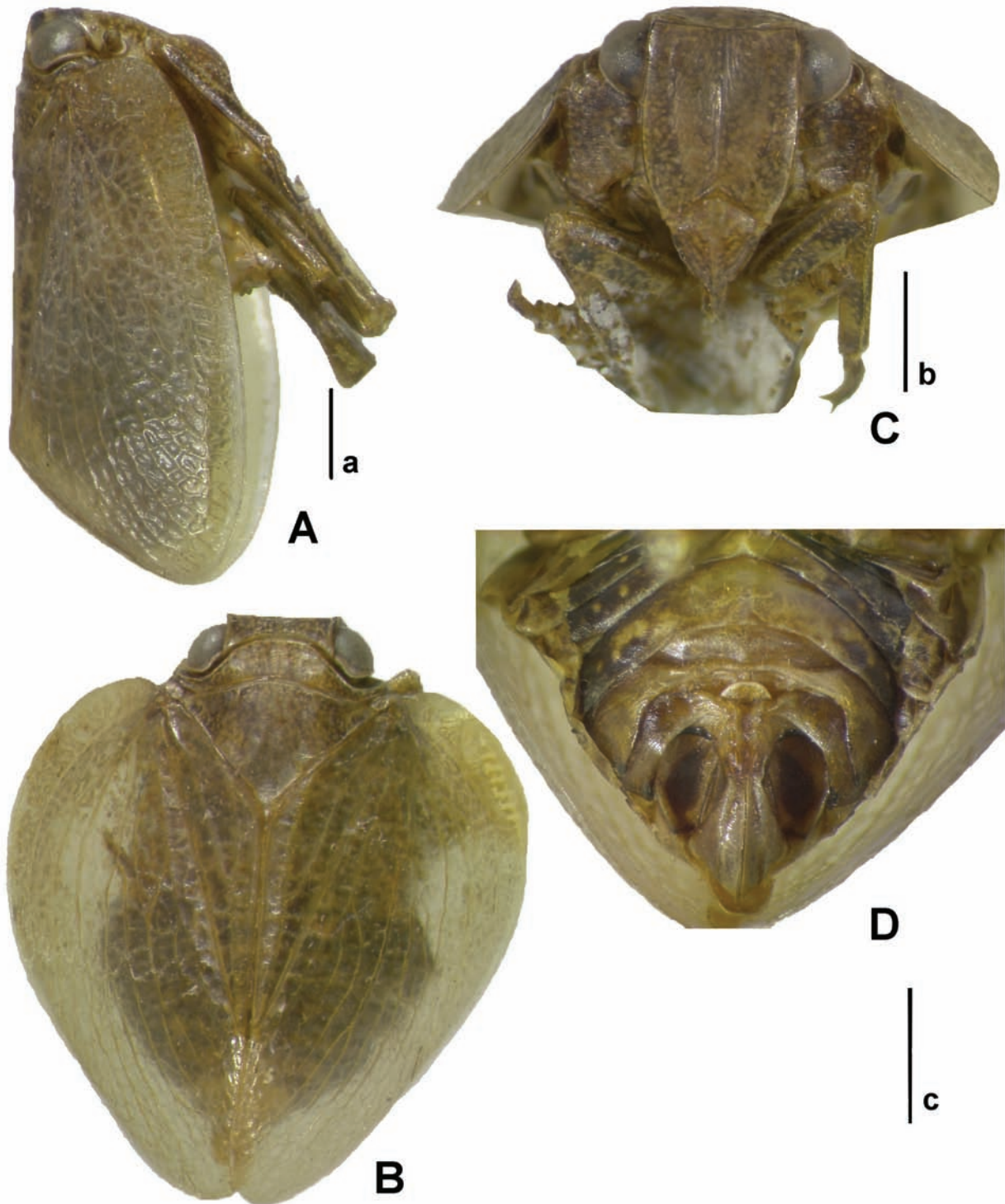


Fig. 2. Nogodinidae, *Mangola solida* (Melichar), holotype: A, lateral view; B, dorsal view; C, frontal view; D, ovipositor. Scale bar (1 mm): a = A, B; b = C; c = D.

1956; Vilbaste 1968; Anufriev and Emeljanov 1988; Wang and Liang 2007; Rahman et al. 2011) and *Caf-frommatissus* – from southern Africa (Fennah 1967). However the genus *Cixiopsis* is very peculiar within all of the mentioned genera (except the genus *Duriopsis* for which the structure of the male genitalia is not described), in the structure of penis with the character of a large laterally flattened phallobase totally covering the aedeagus. The tribe is in need of revision.

Genus *Cixiopsis* Matsumura, 1900

Cixiopsis Matsumura, 1900: 207;

Padanda Distant, 1906: 331 (Type species: *Padanda atkinsoni* Distant, 1906), syn. fide Matsumura, 1914: 268;

Olontheus Jacobi, 1944: 17 (Type species: *Olontheus obscurus* Jacobi, 1944), syn. fide Anufriev and Emeljanov, 1988: 488;

Nacmusius Jacobi, 1944: 19 (Type species: *Nacmusius chelydinus* Jacobi, 1944), **syn. nov.**

Type species: *Cixiopsis punctatus* Matsumura, 1900.

Note. We have studied the material on the genus *Cixiopsis* from Nepal (Gnezdilov, unpublished) and found it significantly different in the structure of penis from *Cixiopsis punctatus*. Thus despite the synonymy proposed by Matsumura (1914) and supported by Anufriev and Emeljanov (1988) for the species, we suggest treating all type species mentioned above as distinct species of the genus *Cixiopsis* until the males of the species from type localities are examined.

Cixiopsis punctatus Matsumura, 1900

Cixiopsis punctatus Matsumura, 1900: 208.

Distribution. Japan (Hokkaido, Honshu, Kiushu) (Matsumura 1900, 1914), Southern Korea (Rahman et al. 2011), Russian Far East (Vilbaste 1968; Anufriev and Emeljanov 1988).

Cixiopsis atkinsoni (Distant, 1906)

Padanda atkinsoni Distant, 1906: 332, fig. 166.

Distribution. Northeastern India (Sikkim).

Cixiopsis chelydinus (Jacobi, 1944) **comb. nov.** (Fig. 1D)

Nacmusius chelydinus Jacobi, 1944: 19, fig. 6.

Material examined. 1 female – CHINA, Fukien, Shaowu (500 m), 7 August 1937, J. Klapperich leg. (SNSD).

Distribution. Southeastern China.

Note. The species was described after 3 males from Kwangtseh in China collected by J. Klapperich (Jacobi 1944). According to the list of types deposited in the Zoologisches Forschungsmuseum Alexander König in Bonn (Lampe et al. 2006) there is one specimen deposited there (incorrectly named as the holotype) with the labels corresponding to the original description and this may be designated later after examination as the lectotype; we have examined the photo of this specimen (Fig. 1D). Another specimen mentioned in the same list (as the paratype) does not completely correspond to Jacobi's label data (1944) as it was collected in October, but according to the abbreviation given by Jacobi all 3 syntypes were collected during July–September.

Cixiopsis obscurus (Jacobi, 1944)

Olontheus obscurus Jacobi, 1944: 17, fig. 5.

Type material examined. 1 specimen with abdomen missing (holotype) – VIETNAM, Tonkin, Chapa, 28 June 1917, Jeanvoine (SNSD).

Distribution. Northern Vietnam.

Note. The species was described after a single male (Jacobi 1944). The specimen listed above corresponds to the original description and this is recognised here as the holotype. Lampe et al. (2006) listed the holotype of the species as deposited in Bonn, however, the labels mentioned in the list is not corresponding to the original description.

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