

## New Cixiidae (Hemiptera, Auchenorrhyncha) from the Ryukyus, Japan

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**Abstract** One new genus, one new subgenus and four new species of the family Cixiidae are described from the Ryukyus, Japan: *Andixius nupta* gen. et sp. n., *Dystheatias mangroveicus* sp.n. – type species of *Dystheratus* subgen.n., *Neocarpia okinawana* sp.n., and *Kirbyana pacifica* sp.n. The distribution of 13 cixiid species known to the Ryukyus is reviewed.

### Introduction

The cixiid fauna of the Ryukyus has been poorly elucidated, because of insufficient studies on this group. Shonen MATSUMURA (1914) described *Betacixius kumejima* from Okinawa and recorded *Kirbyana pagana* MELICHAR, which is really an independent species described below. Representatives of the genera *Cixius s.lat.* and *Oliarus s.lat.* (i.e., those in the tribes Cixiini and Pentastirini, respectively) are little known from the Ryukyus. Currently, 10 cixiid species have been recorded from the Ryukyus (cf. VAN STALLE, 1991; HAYASHI, 2002). And very recently, EMELJANOV (2007) proposed to establish three genera in the *Oliarus* group of the Oriental Region, and transferred two Ryukyuan species to his genera; *O. ryukyucola* VAN STALLE and *O. okinawensis* VAN STALLE to the genera *Atretus* EMELJANOV and *Siniarus* EMELJANOV, respectively. In the present paper, we are going to describe one new genus, one new subgenus and four new species of Cixiidae from the Ryukyus, Japan.

The type specimens including all holotypes are deposited in the collection of Saitama University, Saitama, Japan, and some paratypes are in the collection of the Zoological Institute of Russian Academy of Sciences, St. Petersburg, Russia.

### Taxonomy

Tribe **Andini** EMELJANOV, 2002

*Andixius* gen.n.

[Type species: *Andixius nupta* sp.n.]

The new genus is closely related to the genus *Andes* STÅL, 1866, but the main diagnostic character of *Andes*, the trifid fork of veins RA, RP and M near basal cell, is absent.

Lateral carinae of metope (“frons”) and postclypeus foliate, confluent, directed forward; carinae of postclypeus a little lower than those of metope. Lower part of metope with convex disc separated from lateral carinae by furrows; its upper part deeply trough-like. Middle ocellus distant from postclypeus. Median carina of metope developed in lower part only. Small upper compartment of metope (acrometope) meeting the main part of metope (eumetope) at slightly obtuse angle. Transverse intermetopal carina weak



Figs. 1–7. New Ryukyuan Cixiidae, habitus. — 1, *Andixius nupta* gen. et sp. n., ♂ (body length, 5.9 mm); 2, 3, *Dystheatias (Dystheratus) mangroveicus* subgen. et sp. n. (2, ♂ 5.3 mm; 3, ♀ 6.0 mm); 4, 5, *Neocarpia okinawana* sp.n. (4, ♂ 4.3 mm; 5, ♀ 4.8 mm); 6, 7, *Kirbyana pacifica* sp.n. (6, ♂ 4.5 mm; 7, ♀ 4.9 mm).

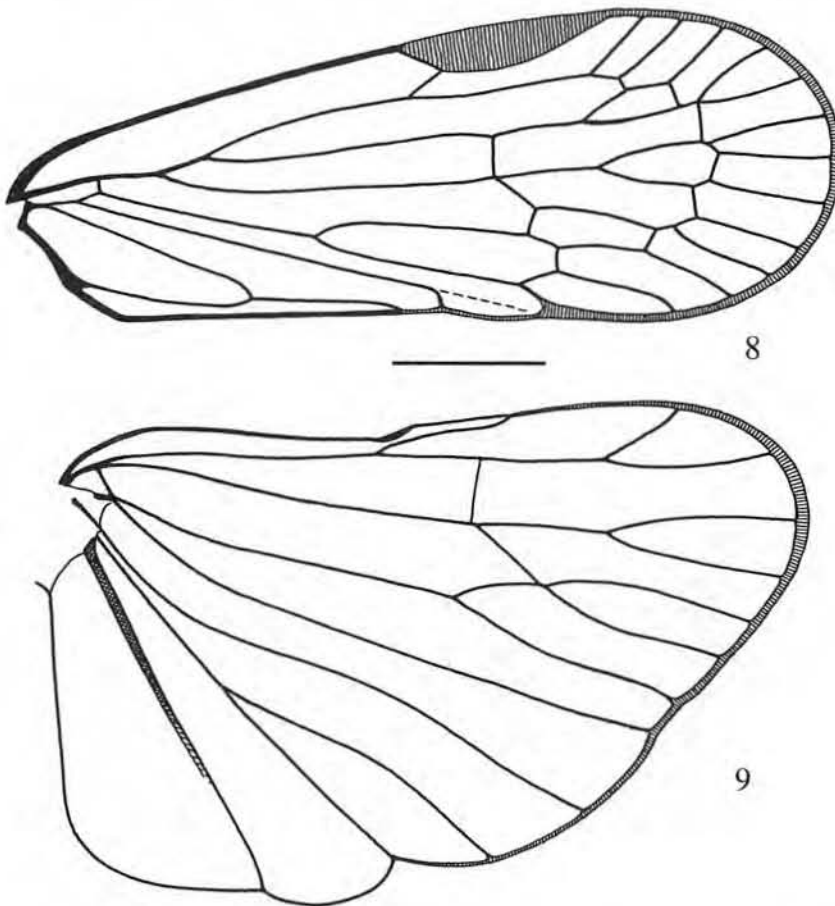
and low. Acrometope nearly square. Transverse carina between acrometope and coryphe ("vertex") as strong as conjunct lateral carinae. Coryphe trapezoid, widened caudad, concave, but not so deep as in *Andes*. Postclypeus with a well developed median carina. Anteclypeus compressed without lateral carinae. Rostrum long, extending considerably beyond hind coxae. Antennae medium-sized; 2nd article (pedicellum) rounded conical and isodiametric. Upper part of pronotum short, disc flat and small, with straight anteri-

or margin and deeply angulately incised posterior margin; lateral carinae of disc and postocular carinae forming a common arch encircling eyes from behind and below; upper postocular parts of carinae running close to hind margin of pronotum and almost parallel to it; surface of pronotum in front of postocular carinae almost vertical. Paranotal lobes of pronotum behind postocular carinae separated from upper part of pronotum by lateral carinae. Configuration and venation of fore wings as in *Andes*, except for absence of trifold branching of ScRA, RP and M; ScR (ScRA and RP) forming a short common stalk. A common stalk of ScR present also in some *Parandes* MUIR, 1925. Legs simple, as in *Andes*; fore coxae without angular apical lobe, present in *Parandes*.

In addition to the type species (*A. nupta* sp.n.), the new genus includes *Andixius venustus* (TSAUR et HSU, 1991), comb.n. (= *Brixia venusta*) from Taiwan (TSAUR *et al.*, 1991).

*Distribution.* Japan (Ryukyus) and Taiwan.

The tribe Andini is characterized by the following combination of characters: (1) Fore wings steeply tectiform, (2) trifold branching of ScR and M on fore wing (except *Andixius* gen.n. and some species of *Parandes*), (3) fore wings with convexity of



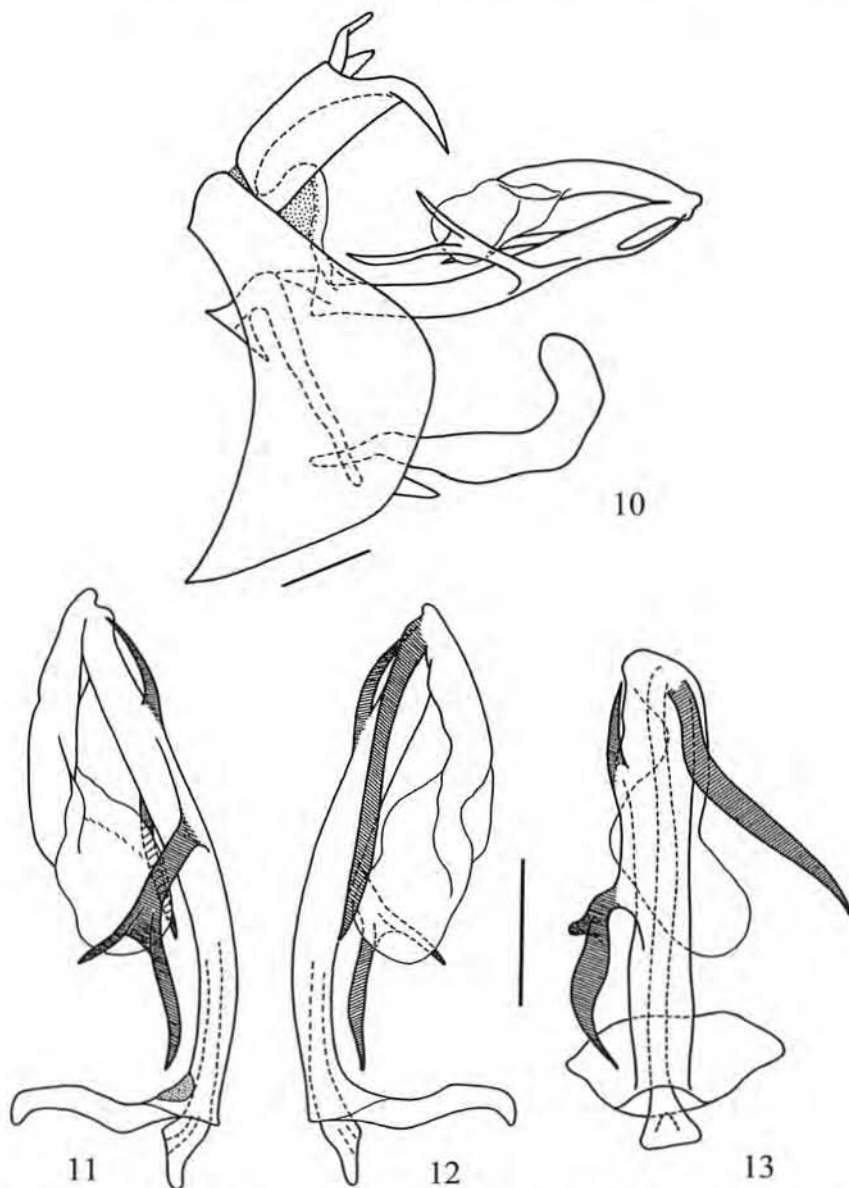
Figs. 8-9. *Andixius nupta* gen. et sp. n., wings. — 8, Fore wing; 9, hind wing. Scale, 1 mm.

membrane margin behind claval apex, (4) MP and CuA1 contacting in one point on the hind wing. The characters (3) and (4) are absent in the tribe Brixini, which includes the genus *Brixia* STÅL, 1856. In contrast of *Andes* and *Andixius* gen.n., *Brixia* has branching of the media on fore wings to be 2+3 not true 3+2.

*Andixius nupta* sp.n.

(Figs. 1, 8-13)

Integuments white with delicate pinkish-brownish pattern. Face a little white-



Figs. 10-13. *Andixius nupta* gen. et sp. n. — 10, Genital block of male, left side; 11, aedeagus, left side; 12, ditto, right side; 13, ditto, ventral view. Scales, 0.3 mm.

powdered. Head with a spot on supraocular area near its margin and oblique stripe between supraocular and preocular areas dark. Pronotum almost white. Mesonotal scutum reddish brown, hind parts of carinae and apex of scutellum a little paler. Tegulae white. Fore wings generally white, with small black dots along both sides of veins, sometimes present in basal part only. Distal part of costal vein with 3 spaced black spots: in middle part of vein, near stigma, and between these two. Nodal veinlets *rm*, *mcu* and two *icu* and an irregular spot distad of these veinlets the fork of *M* adjoining last radial area dark brown. Corium with light brownish spots: one at wing base, one on clavus in front of claval fork, and one behind each costal black spot; from these spots, an oblique row of confluent spots running toward postclaval cell. Membrane with brownish confluent spots approximately near postnodal transverse veinlets. Margins of apical cells darkened, brownish. Legs pale; fore femora brownish.

Body length: ♂, 5.9–6.2 mm; ♀, 6.6–7.4 mm.

The male genitalia are similar to those of *A. venusta* (TSAUR et HSU), but the furcate process arises from middle part of the theca, the subapical recurrent process is longer, and the apical process is absent.

*Type series.* Holotype ♂, Mt. Yonaha-dake, Kunigami, Okinawa Is., Ryukyus, Japan, 15. V. 1993 (M. HAYASHI *et al.*).

Paratypes: [Amami-Oshima] 1 ♀, Kinsakubaru, Naze, 18. VII. 1993; 1 ♀, Higashinakama, Sumiyō, 19. V. 1993; 2 ♀, Ichi, Sumiyō, 20. V. 1993; 1 ♀, Shinmura, Sumiyō, 19. V. 1993 (light trap); 9 ♂, 7 ♀, Hatsuno, Setouchi, 20. V. 1993; 1 ♀, ca. 3 km SSE of Fukumoto, Yamato, 21. V. 1993 (M. HAYASHI); [Okinawa] 13 ♂, 24 ♀, same data as holotype.

*Distribution.* Japan: Ryukyus (Amami-Oshima, Okinawa).

#### Tribe Eucarpiini EMELJANOV, 2002

We largely owe the progress in the knowledge of the *Eucarpia* group (now the tribe Eucarpiini) to the valuable works by R. G. FENNAH (1950, 1956, 1967, 1970, 1978, 1980). In the latest paper (FENNAH, 1980), he revised the genera and gave their refined diagnoses, described new genera, and established new synonymies based partly on new criteria. Recently, one genus, *Neocarpia* was added by TSAUR and HSU (2003). In spite of being greatly developed by R.G. FENNAH, the generic classification of the tribe is still imperfect. Some structures depicted in his figures were not used for separation of the genera; for example, the frontal epiclypeal carina, which occurs in different genera but not in all their representatives. This carina is probably a derivative of the frons proper. It is present in the type species of the genus *Dystheatias* KIRKALDY but absent in many congeners, which may probably indicate heterogeneity of *Dystheatias*. Another interesting character present in some Eucarpiini is a secondary carina separating the epiclypeal lobes of the metope from the main part of the latter. A transverse metopal carina is present in *Kirbyana thyas* FENNAH, but absent in *K. pacifica* sp.n. described herein.

#### *Dystheatias* KIRKALDY, 1907

##### *Dystheratus* subgen.n.

[Type species *Dystheatias mangroveicus* sp.n.]

*Dystheatias mangroveicus* sp.n. has a unique combination of characters making it worth of a subgeneric rank: the sharp transverse carinae on bases of the epiclypeal lobes and a transverse epiclypeal carina. The presence of both epiclypeal and transverse metopal carinae is characteristic of this subgenus.

*Distribution:* Japan (Ryukyus).

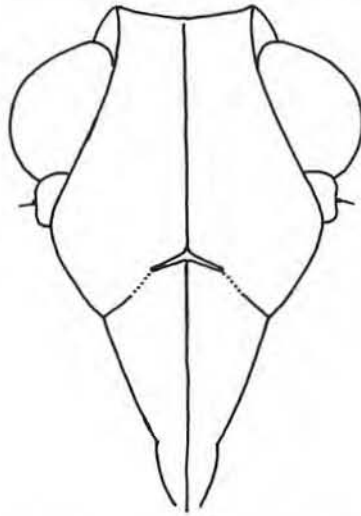
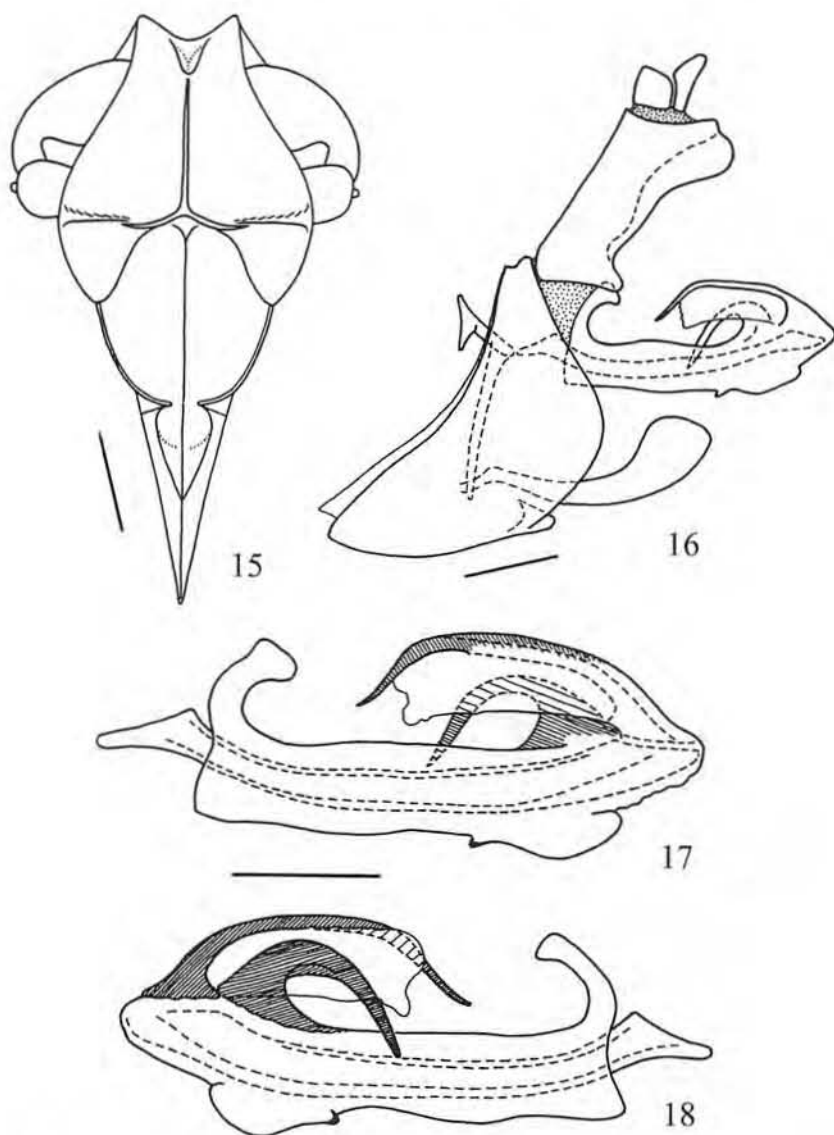


Fig. 14. *Dystheatias beecheyi* KIRKALDY, face (modified after FENNAH, 1950).

***Dystheatias (Dystheratus) mangroveicus* sp.n.**  
(Figs. 2-3, 15-20)

Configuration of head similar to that of the type species of the genus, *D. beecheyi* KIRKALDY. Coryphe trapezoid, its fore margin irregularly convex, hind margin concave, surface excavated. Face concave with lateral margins of metope and postclypeus slightly raised. Metope in front view with lateral margins concave from coryphe almost to level of antennae, at level of antennae slightly produced laterad. Median carina strong, but terminating a little before margin of coryphe; clypeal end of this carina reaching thick transverse marginal carina of metope enclosed between its epiclypeal lobes. Epiclypeal lobes, in contrast to typical *Dystheatias*, separated from main part of metope by a pair of secondary transverse carinae, median ends of which lie above transverse epiclypeal carina of metope. Epiclypeal lobes along transverse carinae distinctly inclined inward, sidewise of convex postclypeus. Postclypeus nearly pyriform, with convex disc separated from lateral subfoliate parts by furrows, median carina strong. Lateral carinae of anteclypeus running toward the middle of median carina but not reaching. Lateral ocelli large. Eyes in lateral view oblong-ovoid, below with incision opposite to antennae. Antennae of moderate size; antennal foramen of head capsule large, with raised lower border. Because of inclination of epiclypeal lobes of metope, genae much broader than lorae. Margin of metope almost arcuately continued into loral suture. Disc of pronotum as broad as coryphe; lateral discal carinae slightly not reaching hind margin of pronotum and angularly connecting with postocular carinae, encircling eyes from behind and below. Lateral carinae of mesonotum a little divergent backward; anterior third of mesonotum shallowly concave, posterior two thirds weakly convex. Hind tibia with 5 apical spines, 1st and 2nd articles of fore tarsi each with 7 spines without subapical setae. Venation of fore wing typical of the tribe Eucarpiini.

General color brown to dark brown. Coryphe irregularly brown. Metope dark brown with light speckles; median carina and carinae near postclypeus light. Postclypeus entirely dark brown in males, and reddish brown with lateral part dark brown in females; sides of median carina with indistinct light dots bordered with dark ringlets. Pronotum and mesonotum dark brown with slightly paler carinae. Fore wings brown



Figs. 15–18. *Dystheatis mangroveicus* sp.n. — 15, Head, face; 16, genital block of male, left side; 17, aedeagus, left side; 18, ditto, right side. Scales, 0.3 mm (15–16) and 0.2 mm (17–18).

and semitransparent; membrane a little darker; veins dark brown with darker granules; veins on corium and clavus also with light and dark alternating short sections: transverse veinlets of nodal row with diffuse dark spots, on membrane, apices of all veins with dark triangular spots. Underside of body and legs brown to dark brown; margins of abdominal terga light; female subgenital sternum light.

Body length: ♂, 5.0–5.6 mm; ♀, 5.9–6.5 mm.

*Male genitalia.* Pygofer lacking characteristic features, with lateral lobes rounded, ventrocaudal process small, angularly rounded. Styli with apical dilations rounded-

triangular, gently curved dorsocaudad. Anal tube nearly twice as long as broad, truncate at apex, with rounded angles; lower surface moderately concave horizontally and longitudinally, with a pair of small rounded lobes subapically. Aedeagus moderately long, with recurrent distal article reaching mid-length of theca; apex of theca with dorsally arcuate process at right side. Distal article membranous, with sclerotized medial stripe prolonged terminally into acuminate process turned ventrad. Lower wall of theca with low longitudinal crest undulate in lateral view and middle.

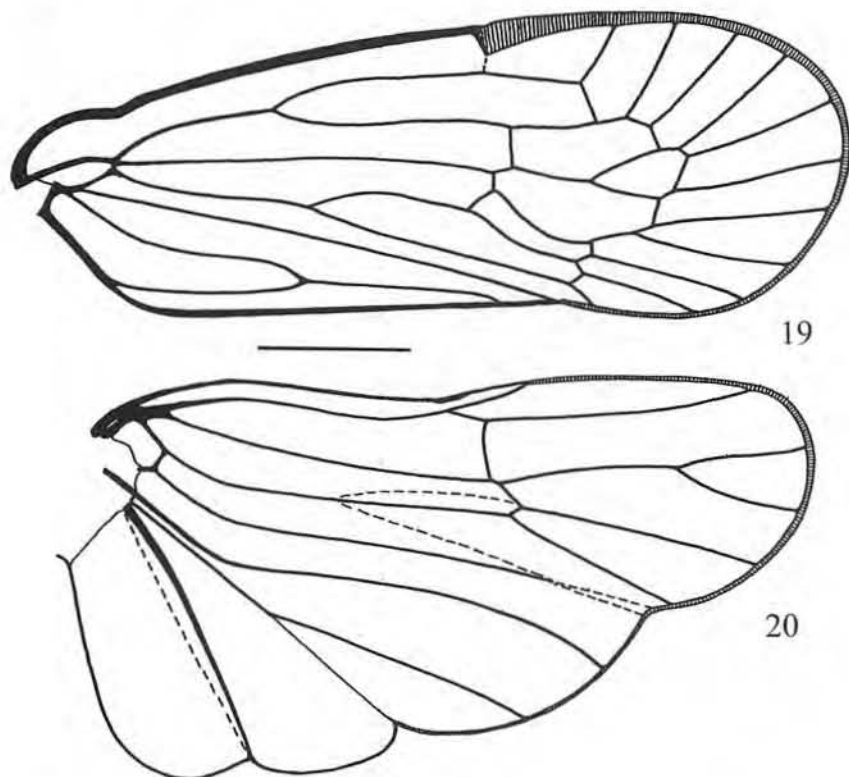
Judging from the drawings by FENNAH (1950, 1970), the new species is related to *D. beecheyi* KIRKALDY (Fig. 14) and *D. vitiensis* KIRKALDY (both described from Fiji) and also the species from Rennel Island in the presence of the transverse epiclypeal carina of metope and configuration of the face. The new species differs from them in the presence of carinae separating the epiclypeal lobes from the main part of the metope.

*Type series.* Holotype ♂, Hoshidate, Iriomote Is., Ryukyus, Japan, 6. VII. 1993 (M. HAYASHI).

Paratypes: 1♂, same locality, 13. V. 1993; 3♀, 1. IV. 1992; 3♂, 2♀, 22. VI. 1992; 3♂, 1♀, 10. IX. 2003 (M. HAYASHI); 1♀, 6. VI. 2000 (M. KINJO); 1♂, Funaura, Iriomote Is., 6. VI. 2000 (M. KINJO).

*Distribution.* Japan: Ryukyus (Iriomote).

*Biological notes.* This new cixiid species inhabits mangrove forests on Iriomote Is. of the Yaeyama group, dependent upon *Bruguiera gymnorrhiza* (L.) and *Rhizophora mucronata* LAM. of Rhizophoraceae.

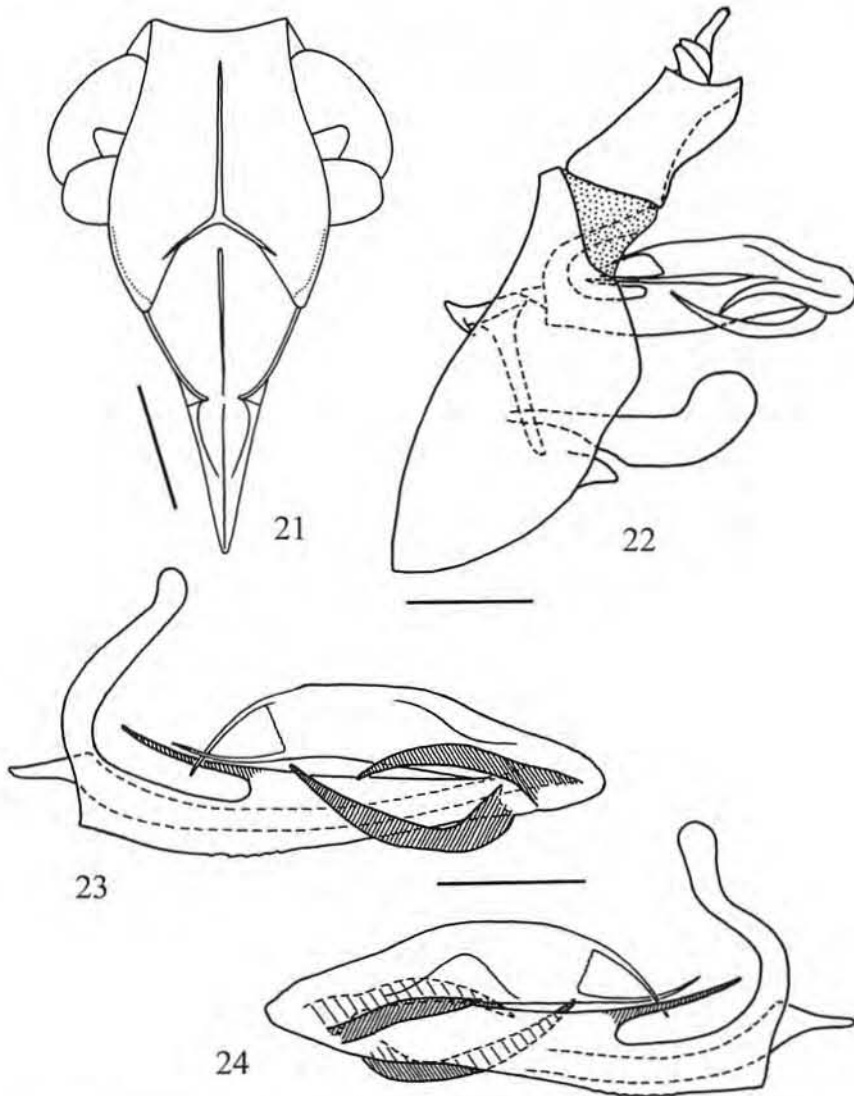


Figs. 19–20. *Dystheatis mangroveicus* sp.n., wings. — 19, Fore wing; 20, hind wing. Scale, 1 mm.



*Neocarpia* TSAUR et HSU, 2003*Neocarpia okinawana* sp.n.  
(Figs. 4–5, 21–24)

Coryphe transverse, about twice as broad as long; lateral margins very weakly divergent posteriad; median longitudinal carina obsolete, lateral carinae prominent. Metope comparatively elongate, moderately dilated downward; margins between eyes a little concave, lower margin obtusely angulated, concave; median carina abrupt above near margin of metope, reaching below the well-developed subclypeal carina.



Figs. 21–24. *Neocarpia okinawana* sp.n. — 21, Head, face; 22, genital block of male, left side; 23, aedeagus, left side; 24, ditto, right side. Scales, 0.3 mm (21–22) and 0.2 mm (23–24).

General color brown with castaneous tint. Coryphe, pro- and mesonotal discs yellowish to whitish. Face castaneous-brown; upper part of metope paler than lower; median and subclypeal carinae light; sides of metope opposite to eyes with light speckle; apices of epiclypeal lobes light (as a speckle). Upper part of median carina of postclypeus lightened; lateral carinae of postclypeus and anteclypeus partly lightened. Lateral parts of pronotum, mesonotum and underside of body brown. Fore wings brown and semitransparent, with dark brown dots at bases of chaetae. Pterostigma light; margin of membrane light, with dark brown speckles at ends of longitudinal veins. Oblique diffuse dark band running from end of costal margin to hind margin of membrane, distally of claval end. Underside of body and legs brown, in places light brown.

Body length: ♂, 4.0–4.5 mm; ♀, 4.4–5.2 mm.

*Male genitalia.* Pygofer with very short dorsal wall and rounded posterolateral margins; medioventral process cuneiform. Anal tube relatively small; lateral margins of its basal part slightly concave; distal part a little convex; hind margin rounded. Ventral wall of anal tube convex in basal part and concave in distal part. Styli with terminal part elongate and rectangularly declined upward and with ventral prominence on middle part of stem. Phallosome bearing peculiar arched suspensorium; upper margin directed caudad, as in *N. maai* TSAUR et HSU. Phallosome with two apical processes on the left and one on the right, bent pincers-like. Distal article of penis furnished with long and thin distal projections.

This species is related to the type species *N. maai* TSAUR et HSU described from Taiwan, but may be distinguished by the dorsal thecal process recurrent and subparallel to the theca and by the left two curved and cheliform processes on the theca.

*Type series.* Holotype ♂, Mt. Yonaha-dake, Kunigami, Okinawa Is., Ryukyus, Japan, 17. VI. 1994 (M. HAYASHI *et al.*). Paratypes: [Okinawa] 1 ♀, same data as holotype; 1 ♂, 2 ♀, same data except 12. IX. 2005; 1 ♀, Hedo, Kunigami, 12. IX. 2005; 4 ♀, Mt. Nishime-dake, Kunigami, 11. IX. 2005 (light trap); 2 ♂, 1 ♀, same data except 12. IX. 2005; 24 ♂, 23 ♀, Mt. Terukubi-yama, Kunigami, 5. V. 1991; 2 ♂ 1 ♀, Okuma, Kunigami, 11. IX. 2005; 1 ♂, upper part of Hiji River, Kunigami, 12. IX. 2005 (light trap); 1 ♂, Tancha, Onna, 14. IX. 2005 (M. HAYASHI *et al.*).

*Distribution.* Japan: Ryukyus (Okinawa).

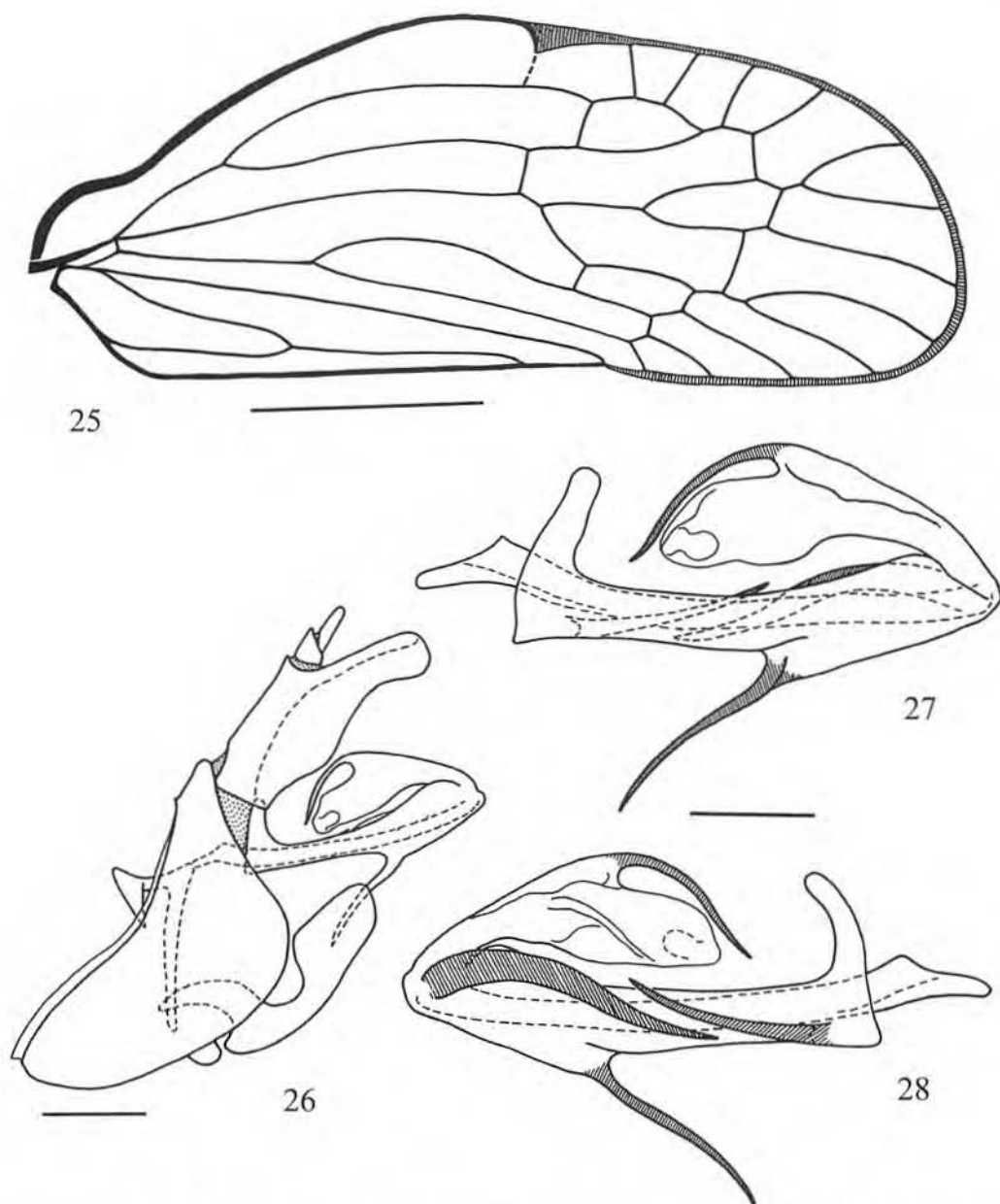
### *Kirbyana* DISTANT, 1906

#### *Kirbyana pacifica* sp.n.

(Figs. 6–7, 25–28)

The species from Taiwan and the Ryukyus, previously identified as *K. pagana* MELICHAR, 1903, is identical with *K. pacifica* sp.n. described here. *Kirbyana pagana*, type species of the genus, described from Ceylon (= Sri Lanka), clearly differs from *K. pacifica* sp.n. in the pronouncedly oblique terminal margin of the fore wing as shown in the figure by MELICHAR (1903). Specimens from Taiwan identified as *K. pagana* by TSAUR and HSU (2003) have some differences from *K. pacifica* sp.n. in the length and curvature of the thecal processes.

Body slender, with relatively narrow fore wings. Fore margin of coryphe feebly and obtusely angulated, concave, its middle part in front view slightly angulately protruding upward. Coryphe nearly square, feebly concave; median carina not reaching hind margin of coryphe. Metope also feebly concave, widest a little beneath antennal level; median carina not developed in upper third; subclypeal carina as high as median



Figs. 25–28. *Kirbyana pacifica* sp.n. — 25, Right fore wing; 26, genital block of male, left side; 27, aedeagus, left side; 28, ditto, right side. Scales, 1mm (25), 0.3 mm (26) and 0.2 mm (27–28).

one; subclypeal lobes of metope a little higher than subclypeal carina, with distinct keel-shaped bend. Fore wings with costal and sutural margins parallel or slightly convergent in distal part after concavity of costal margin near base. Terminal margin of membrane tapering toward costal margin, thus the wing apex lying at top of vein  $MP_1$ . Hind tibiae with 6 spines, lateral spine of the row large, other spines shorter and subequal. Apical margins of 1st and 2nd metatarsal articles with combined row of simple denticles

(spines), two on each side, and platellae (thick stout setae) without prominent socle in middle part, totally 11/9.

General color light brown, with brown infusion and dark brown spots. Coryphea yellowish white; discs of pro- and mesonotum and anal fields of fore wings combined, bearing a dorsal longitudinal light band. Metope brownish, with whitish median carina, bordered laterally in lower part with brown stripes. Preocular area with 3 dark brown spots occupying the whole width of area; these spots visible through lateral parts of metope; lower spot lying in front of ocellus; ocellus red. Lower and upper sulci of lorae usually darkened. Eyes darkened; dark lateral stripes from eyes, running on sides of pro- and mesonotum and continuing to wings; lower edge of each stripe diffuse, but upper edge contiguous with dorsal light band distinct in anterior part and becoming indistinct at apex of clavus. Bases of fore coxae and mesepisternum with dark spot. Fore wings almost entirely light brown, with whitened veins and row of black points on each side of veins lateral to bases of setae. A series of 5–7 dark brown spots on border between light and dark stripes, on veins  $A_1$  and its prolongation  $Pcu+A_1$ ; the middle spot largest, lying behind fork of  $Pcu+A_1$ ; another relatively large spot situated between veins  $CuA_1$  and  $CuA_2$  close to apex of clavus. Oblique diffuse dark band running from subbasal convexity of costal margin to hind margin of membrane behind cubital spot; two brownish spots equidistant from band situated in front of it in costal and 2nd radial field. Margin of membrane whitish, except ends of veins marked with dark speckles; cells of membrane usually brown. In strongly pigmented individuals, darkening more intense, but color pattern quite same; membrane entirely dark brown, except veins; pterostigma remains light. Underside of body and legs light and brownish; tibiae with dark stripes between light longitudinal carinae; abdomen sometimes with dark spots. Ovipositor always darkened.

Body length: ♂, 4.3–5.0 mm; ♀, 4.6–5.4 mm.

*Male genitalia.* Pygofer with short dorsal wall and arched posterolateral margins. Anal tube ovoid, without projections. Styli L-shaped, with dilated and rounded tops, with subbasal projection from below. Theca simple, with subbasal projection on left side directed caudad; middle part of underside with long teeth; apex of left side with recurrent teeth. Distal article of penis with subapical teeth.

*Type series.* Holotype ♂, Ôkuni For. Rd., Kunigami, Okinawa Is., Ryukyus, Japan, 6. IX. 1985 (M. HAYASHI). Paratypes: [Amami-Oshima] 1♀, Kominato, Naze, 19. V. 1993; 1♂, 1♀, ca. 3 km E of Arangachi, Uken, 21. V. 1993; 1♀, ca. 3 km SSE of Fukumoto, Yamato, 21. V. 1993; 1♂, Hatsuno, Setouchi, 20. V. 1993; 1♀, Kuji, Setouchi, 20. V. 1993; 1♂, Mt. Yuwan-dake, Uken, 20. V. 1993 (M. HAYASHI *et al.*); [Yoron] 1♀, Ôganeku, Yoron, 11. VII. 1993 (M. HAYASHI); [Okinawa] 5♂, 8♀, same data as holotype; 1♀, same data except 13. IX. 1985; 1♂, 5♀, Mt. Nishime-dake, Kunigami, 8. IX. 1985; 1♂, same data except 12. IX. 2005; 1♀, Mt. Terukubi-yama, Kunigami, 6. IV. 1991; 1♀, Mt. Yonaha-dake, Kunigami, 17. VI. 1994; 1♀, Mt. Oppadake, Nakijin, 23. X. 1990; 1♀, Ôura, Nago, 19. X. 1990; 2♀, Afuso, Onna, 12. IX. 1985 (M. HAYASHI *et al.*); [Miyako] 3♀, Kawamitsu, Shimoji, 2. IV. 1991; 1♂, Cape Nishi-hennazaki, Hirara, 22. XI. 1992 (M. HAYASHI); [Ishigaki] 1♂, 7♀, Takeda For. Rd., 27. VI. 2000; 1♀, Omoto/Takeda, 30. VI. 2003 (light trap); 1♀, Shiramizu, 24. VI. 2004; 1♀, same locality, 21. II. 2006 (M. HAYASHI *et al.*); 1♀, Ishigaki Is., 12. X. 1999 (S. BELOKOBYLSKI; Coll. Zool. Inst., Russian Acad. Sci.); [Iriomote] 1♀, Ubundoru, Ôtomi, 18. VI. 2004; 1♀, Shirahama, 29. VIII. 1985; 1♀, Funaura, 27. VIII. 1985; 2♂, 1♀, same locality, 22–23. XI. 2006 (light trap) (M. HAYASHI *et al.*); [Yonaguni] 2♀, Kubura-higashi, 25. IX. 1995 (M. HAYASHI *et al.*).

*Distribution.* Japan (Ryukyus northward to Amami-Oshima), Taiwan.

**Distributional Notes on Ryukyuan Cixiidae**

The present publication adds three species, and consequently, 13 species in total are known from the Ryukyus: Cixiini – *Cixius okinawanus* MATSUMURA, *Macrocixius giganteus* MATSUMURA; Semonini – *Betacixius brunneus* MATSUMURA, *B. kumejimae* MATSUMURA; Andini – *Andes harimaensis* (MATSUMURA), *Andixius nupta* gen. et sp. n.; Eucarpiini – *Kirbyana pacifica* sp.n., *Neocarpia okinawana* sp.n., *Dystheatias mangroveicus* sp.n.; Pentastirini – *Pentastiridius pachycephs* (MATSUMURA), *Siniarius okinawensis* (VAN STALLE), *Atretus ryukyucola* (VAN STALLE); Borystheninae – *Borysthenes maculatus* (MATSUMURA) (Table 1). The cixiid fauna comprises five species belonging to the genera distributed both to the north and to the south of the Ryukyus, seven endemic species allied to those known only from the regions south of the Ryukyus, and three species with wide distribution not occurring north of the Ryukyus. Southern

Table 1. Distribution of Cixiidae in the Ryukyus and adjacent regions.

	<i>Cixius okinawanus</i>	<i>Macrocixius giganteus</i>	<i>Betacixius brunneus</i>	<i>Betacixius kamejimae</i>	<i>Andes harimaensis</i>	<i>Andixius nupta</i> sp. n.	<i>Kirbyana pacifica</i> sp. n.	<i>Neocarpia okinawana</i> sp. n.	<i>Dystheatias mangroveicus</i> sp. n.	<i>Pentastiridius pachycephs</i>	<i>Siniarius okinawensis</i>	<i>Atretus ryukyucola</i>	<i>Borysthenes maculatus</i>
Kyushu etc.	▨▨▨▨▨	■		▨▨▨▨▨	■					■			
Ōsumi					●								
Tokara		●											
Amami			●		●	■	●						●
Okinawa	■		●	■	●	■	●	■		●	■		●
Sakishima							●		■	●		■	
Taiwan etc.	▨▨▨▨▨	■		▨▨▨▨▨	■	▨▨▨▨▨	■	▨▨▨▨▨	▨▨▨▨▨	■	▨▨▨▨▨	▨▨▨▨▨	■

- species with wider distribution
- species endemic to the Ryukyus
- ▨ distribution of the species from the Ryukyus north or south of the Ryukyus
- ▨▨▨▨▨ presence of allied congeners north or south of the Ryukyus

elements of the fauna belong to the Indo-Malayan (Oriental) derivatives. Little faunistic data on the Cixiidae are available from the region north of the Amami Islands (Tokara and Ōsumi groups). For the tribe Eucarpiini (Cixiinae) and the monotypical subfamily Borystheninae, the Amami group is the northern limit of the distribution. Two species of *Oliarus s.lat.* from the Ryukyus also belong to small genera *Siniarus* (*S. okinawensis*) and *Atretus* (*A. ryukyucola*) which also occur in Taiwan and other Oriental territories (EMELJANOV, 2007). The *Oliarus* species from Japan have not been revised at the current taxonomic level. The tribe Eucarpiini, newly recognized from the Ryukyus, is typical for neighboring Micronesia. Other common cixiid group of the Pacific Islands is *Myndus s.lat.* (tribe Oecleini), known from Mariana and Caroline, but not from the Ryukyus and the Ogasawara (Bonin) and Volcano groups. Discovery of some *Myndus* species from the Ryukyus is very presumable.

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