Two New Genera of Tropidocephalini (Hemiptera: Fulgoroidea: Delphacidae) from Hainan Province, China

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TWO NEW GENERA OF TROPIDOCEPHALINI (HEMIPTERA: FULGOROIDEA: DELPHACIDAE) FROM HAINAN PROVINCE, CHINA

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ABSTRACT

Two new genera of Tropidocephalini (Hemiptera: Fulgoroidea: Delphacidae: Delphacinae) are described from Hainan Province, China. They are Yuanchia Chen and Tsai gen. nov. and Neocarinodelphax Chen and Tsai gen. nov. One new species, Yuanchia maculata Chen and Tsai sp. nov. (China: Hainan: Diaoluoshan) and 1 new combination, Neocarinodelphax hainanensis (Qin and Zhang 2005) comb. nov. (China: Hainan: Wuzhishan, Tongshi, Yancheng) (transferred from Carinodelphax Ding and Yang) are described or redescribed and illustrated.

Key Words: Hemiptera, Fulgoroidea, Delphacidae, Tropidocephalini, new genus, new species, new combination, bamboo pests, China

RESUMEN

Se describen dos géneros nuevos de Tropidocephalini (Hemiptera: Fulgoroidea: Delphacidae: Delphacinae) de la Provincia de Hainan de China. Estos son Yuanchia Chen y Tsai gen. nov. y Neocarinodelphax Chen y Tsai gen. nov. Se describen y se ilustran una nueva especie, Yuanchia maculata Chen y Tsai sp. nov. (China: Hainan: Diaoluoshan) y una nueva combinación, Neocarinodelphax hainanensis (Qin y Zhang 2005) comb. nov. (China: Hainan: Wuzhishan, Tongshi, Yancheng) (transferida de Carinodelphax Ding y Yang).

The delphacid tribe Tropidocephalini (Hemiptera: Fulgoroidea: Delphacidae: Delphacinae) was erected by Muir (1915) and it is the second largest tribe of Delphacinae. Tribal characters include forewings with R1 separated from Rs+M basally; hindwings with M stalked with Cu1 at basal half, anal areas with IA, IIA, and IIA, all reaching posterior margin; post-tibial spur large and thick, concave on inner surface, without teeth along the hind margin; spiral formula of hind leg 5-6-4; aedeagus often tightly connected with ventral portion of anal segment; complicated asymmetrical distortion in the basal part of the aedeagus with at least one elongated process arising from this part (Asche 1985; Chen 2003; Ding 2006).

Muir (1915) included 6 genera in the Tropidocephalini when he proposed it as a tribe of the Delphacinae, and he included species having a solid post-tibial spur but with a concave inner surface and no teeth along the edge. Asche (1985) increased the number to 21 genera. The tribe Tropidocephalini has now been expanded to include more than 31 genera. Most of species of the tribe feed on bamboo (Bambusoideae) or other grasses (Gramineae). They are mostly Oriental with 26 genera restricted to that region and another 2 shared with the Neotropical region. Two genera are restricted to the Neotropical, 2 to the Palaearctic and 1 to the Australian region. The widespread genus Tropidocephala Stål is distributed through the Palaearctic, Afrotropical, Oriental, Australian, and Pacific regions (Donaldson 1991; Chen & Li 2000b; Chen 2003; Ding 2006).

The fauna of Chinese tribe Tropidocephalini is very abundant and 10 new genera were erected in the last 3 decades, as follows: Bambusiphaga Huang and Ding (Huang et al. 1979), Specineruvres Kuoh and Ding (Kuoh et al. 1980), Paraneotopica Ding and Tian (Ding & Tian 1981), Neobelocera Ding and Yang (Ding et al. 1986), Arcifrons Ding and Yang (Ding et al. 1986), Malaxella Ding and Hu (Ding et al. 1986), Carinodelphax Ding and Yang (Ding & Yang 1987), Carinofrons Chen and Li (Chen & Li 2000b), Mirocauda Chen (Chen 2003) and Gufacies Ding (Ding 2006). A key to genera of the tribe Tropidocephalini from China was provided by Chen (2003), who described a new genus. Seventeen genera and 68 species, including 1 new genus, 7 new species, and a revised key were provided in a monograph on the Delphacidae of China (Ding 2006). Recently, the revision...
and description of new species of some genera in
the tribe Tropidocephalini were also reported
(Chen et al. 2006; Chen & Liang 2007; Chen et al.
2007a,b). Most species of Tropidocephalini from
China feed exclusively on Bambusoideae (Yang et
al. 1999; Chen 2003; Chen et al. 2007a,b; Ding
2006). To date, the Chinese tribe Tropidocephalini
has been increased to 18 genera, 3 subgenera and
82 species (Muir 1913, 1915; Fennah 1956; Huang
et al. 1979; Kuoh 1979, 1980, Kuoh et al. 1980;
Ding & Tian 1981; Ding 1982, 1987, 2006; Ding &
Hu 1982, 1991; Ding et al. 1986, 1999; Yang &
Yang 1986; Zhu 1988; Yang 1989, 1992; Qin &
Yuan 1998, 1999; Chen 1999, 2002, 2003; Chen &
Ding 2000; Chen & Li 2000a,b, 2002; Chen et al.
2000, 2006, 2007a,b; Qin & Zhang 2005; Chen &
Liang 2007).

In this paper 2 new genera, Yuanchia gen.
nov. and Neocarinodelphax gen. nov., 1 new spe-
cies, Yuanchia maculata sp. nov., and 1 new com-
bination, Neocarinodelphax hainanensis (Qin and
Zhang, 2005) comb. nov. (transferred from Car-
inodelphax Ding and Yang) from the Hainan
Province, China, are described or redescribed and
illustrated.

**MATERIALS AND METHODS**

Morphological terminology used in this work
follows that of Yang & Yang (1986). The genital
segments of the examined specimens were macer-
ated in 10% KOH and drawn from preparations in
glycerin jelly with aid of a light microscope. Illus-
trations of the specimens were made with a Leica
MZ 12.5 stereomicroscope. Spinal formula means
the numbers of apical spines of the hind tibiae
and 1st and 2nd hind tarsomeres. The type speci-
mens and examined specimens are deposited in the
Insect Collection at the Institute of Entomol-
ogy, Guizhou University, Guiyang, Guizhou Pro-
vince, China (IEGU).

**DESCRIPTION TAXONOMY**

**Yuanchia** Chen and Tsai gen. nov. (Figs. 1-11, 21-25)

Type species. Yuanchia maculata Chen and
Tsai sp. nov., here designated.

**Diagnosis.** In profile, dorsum, including vertex,
pro- and mesonotum and posterior margin of
forewings, in almost the same plane (Fig. 21). Ver-
tex nearly trapeziform, lateral carinae distinctly
keeled and slightly converging distad (Figs. 1, 22).
Y-carina with stalk absent (present in Fig. 1). Head
truncate in lateral view, frons at right angle to
the longitudinal axis of body (Figs. 21, 23). Frons
rectangular, narrower at base, lateral mar-
gins parallel from middle to apex, lateral carinae
keeled, median carina forked at extreme base
(Figs. 2, 24). Antennae cylindrical, exceeding level
of frontoclypeal suture (Figs. 2, 24). Forewing
broadening apically, rounded at apex (Figs. 3, 21).
Anal segment of male with ventral margin sad-
dle-backed, overlaying base of phallobase and
aedeagus (Figs. 8, 9). Pygofer with opening longer
than broad (Fig. 6). Genital styles slender, diver-
ging distad (Figs. 6, 10, 11).

**Description.** Head including eyes narrower
than pronotum, vertex trapeziform, with margins
well defined. Vertex at base wider than long in
middle line, distinctly narrower at apex than at
base; submedian carinae originating from near
apical 1/4 of lateral carinae, uniting at anterior
margin of vertex; lateral carinae distinctly keeled
and slightly converging distad (Figs. 1, 22); Y-car-
ina with stalk absent. Head truncate in lateral
view, frons at right angle to longitudinal axes of
body (Figs. 21, 23). Frons rectangular, narrower at
base, lateral margins parallel from middle to
 apex, lateral carinae keeled, median carina
forked at extreme base (Figs. 2, 24), about 3 times
longer in middle line than widest part, widest
above level of ocelli to apex. Clypeus at base as
wide as frons at apex, tricarinate (Figs. 2, 24), in
profile with post-clypeus strongly curving caudal
(Fig. 23); rostrum almost reaching hind trochant-
ers. Antennae exceeding level of frontoclypeal
suture, cylindrical, basal segment slightly widen-
ing distad, about 1.5 times as long as wide, second
segment about 2 times as long as first (Figs. 2,
24). Pronotum as long as vertex medially, poste-
rior margin concave medially, lateral carinae in-
curved, reaching to hind margin. Mesonotum
about 1.5 times as long as vertex and pronotum
together in middle line, median carina discontin-
uous medially (Figs. 1, 22). Forewings broadening
apically, rounded at apex, row of cross veins lo-
cated in apical half of wing (Figs. 3, 21). Spinal
formula of hind leg 5-6-4, post-tibial spur with
apical tooth (Fig. 25).

**Male Genitalia.** Pygofer with opening longer
than broad (Fig. 6), in profile much shorter dor-
sally than ventrally (Fig. 5). Two sides of dia-
aphragm separated from each other (Fig. 7). Ade-
eagus slender, tubular, phallobasal process arising
basally (Fig. 8). Genital styles slender, diverging
distad (Figs. 6, 10). Anal segment of male short
and ring-like, lateroapical angles separated, each
moderately produced ventrad in a rounded lobe
(Figs. 4, 8), ventral portion saddle-backed, over-
laying base of phallobase and aedeagus (Figs. 4, 8,
9). Anal style long (Figs. 8, 9).

**Host Plant.** Unknown.

**Distribution.** Oriental (Indo-Malayan) Region
(southern China).

**Etymology.** The name is derived from translit-
eration of the Chinese “yuan-chi” meaning the
rounded apex of forewings, a feature seldom seen
in Tropidocephalini. This genus is feminine in
gender.

**Remarks.** The features of the post-tibial spur
and of the male genitalia place this genus in the
Tropidocephalini. It is closely related to the genus *Arcofacies* Muir in the shape of vertex and frons, but differs in: vertex with length in middle line shorter than width of base about 0.79:1.00 (about 0.53-0.59:1.00 in the latter); frons longer in middle line than widest part about 3.25:1.00 (about 1.75-2.17:1.00 in the latter); frons with median carina forked at extreme base (not forked in the latter); dorsum of body without median longitudinal stripe from apex of vertex to end of scutellum (in the latter, dorsum of body with a narrow stripe along median longitudinal carina of vertex, pro- and mesonotum, which are often white, bordered with brown or fuscous stripe); forewings rounded at apex (acuate at apex in the latter). This new genus is also related to *Carinofrons* Chen and Li, but differs in: vertex distinctly narrower at apex than at base, submedian carinae originating from lateral carinae subapically, uniting at anterior margin of vertex (in the latter, vertex at apex as wide as at base, submedian carinae originating from lateral carinae medially, not uniting at apex.

Figs. 1-11. *Yuanchia maculata* Chen and Tsai *sp. nov*. 1. Head and thorax, dorsal view; 2. Frons and clypeus; 3. Forewing; 4. Anal segment and anal style, dorsal view; 5. Male genitalia, lateral view; 6. Male genitalia, posterior view; 7. Pygofer, posterior view; 8. Anal style, anal segment, connective and genital style, lateral view; 9. Anal style, anal segment and aedeagus, posterior and ventral view; 10. Genital styles, posterior view; 11. Left genital style, lateral view. Scale bars = 0.5 mm (Figs. 1-2); 1 mm (Fig. 3); 0.2 mm (Figs. 4-11).
Yuanchia maculata Chen and Tsai *sp. nov.* (Figs. 1-11, 21-25)

**Description.** Body length (from apex of vertex to tip of forewing): male 3.50 mm, female 4.05 mm; forewing length: male 2.90 mm, female 3.45 mm.

General color pale yellowish brown (Figs. 21-25). Vertex with median carina and adjacent lateral areas pale yellowish white (Fig. 22). Frons brown with several pale yellowish spots (Fig. 22), lateral carinae brown, median carina pale yellowish brown; apex fuscous. Clypeus yellowish brown, brown at base. Genae fuscous, lateral margins and 3 spots near lateral carinae of frons pale yellowish white (Fig. 24), area above ocelli, between eyes and lateral carinae of frons with 3 brown spots (Fig. 23). Eyes fuscous infused with red, ocelli red. Antennae with segment I brown; II with proximal portions and apex brown (Fig. 24). Pro- and mesonotum with outer areas of lateral carinae, brown, areas between lateral carinae yellowish, median carina yellowish white, lateral margin of scutellum and margin of the forewing.

**Diagnosis.** Dorsum of body in profile not in the same plane, posterior margin of forewings distinctly keeled (Fig. 26). Vertex trapeziform with a well defined margin, lateral carinae strongly keeled, Y-carina with stalk weak (Figs. 12, 27). Frons in profile at an acute angle to longitudinal axes of body (Figs. 26, 28), subrectangular, widest at apex, lateral carinae distinctly keeled, median carina simple (Figs. 13, 29). Antennae cylindrical, extending to the level of frontoclypeal suture (Figs. 13, 29). Forewings with acute apical angle, outer margin approximately straight, oblique, posterior margin sinuate, with irregular markings at apical half (Figs. 14, 26). Pygofer of male with inner side of each lateral margin having a stout process (Figs. 16, 17).

**Description.** Dorsum of body in profile not in the same plane, posterior margin of forewings distinctly keeled (Fig. 26). Head including eyes narrower than pronotum. Vertex trapeziform, at base wider than long medially (about 1.6:1.0), lateral carinae strongly keeled, diverging caudad, Y-carina with stalk weak, submedian carinae originating from lateral margin subapically, uniting at anterior margin of vertex (Figs. 12, 27). Frons in profile at an acute angle to longitudinal axes of body (Figs. 26, 28), subrectangular, widest at apex, lateral carinae strongly keeled, median carina simple (Figs. 13, 29), longer in middle line than widest about 2.69:1.00. Clypeus at base slightly wider than frons at apex, tricarinate, in profile with post-clypeus in same plane as frons, ante-clypeus curving ventrad, apex abruptly bent to left and forming a scoop, tapering apically, orifice dorsally near apex (Figs. 8, 9). Phallobasal process slender, subequal length of aedeagus, arising from base of aedeagus dorsally, directed ventrocaudad and curving to right distad (Figs. 8, 9). Genital styles slender, diverging distad, broader at base, tapering apically, apical half sinuate, apex rounded (Figs. 10, 11). Anal segment of male with lateroapical angles slightly produced ventrocaudad in nipple-like process, separated from each other (Figs. 4, 6).

**Host plant.** Unknown.

**Distribution.** South China (Hainan Province).

**Specimens Examined.** Holotype male, CHINA: Hainan, Diaoluoshan (18°42'N, 109°52'E), 16-VII-2007, Q.-Z. Song; paratype 1 male, same data as holotype; 1 female, Hainan, Jianfengling (18°42'N, 108°47'E), 12-VII-2007, Q.-Z. Song (IEGU).

**Etymology.** The name is derived from the Latin word “macula” (marking) referring to the spots on the scutellum and margin of the forewing.

**Type species.** Neocarinodelphax hainanensis Qin and Zhang, 2005 (here designated).

**Diagnosis.** Dorsum of body in profile not in the same plane, posterior margin of forewings distinctly keeled (Fig. 26). Vertex trapeziform with a well defined margin, lateral carinae strongly keeled, Y-carina with stalk weak (Figs. 12, 27). Frons in profile at an acute angle to longitudinal axes of body (Figs. 26, 28), subrectangular, widest at apex, lateral carinae distinctly keeled, median carina simple (Figs. 13, 29). Antennae cylindrical, extending to the level of frontoclypeal suture (Figs. 13, 29). Forewings with acute apical angle, outer margin approximately straight, oblique, posterior margin sinuate, with irregular markings at apical half (Figs. 14, 26). Pygofer of male with inner side of each lateral margin having a stout process (Figs. 16, 17).

**Description.** Dorsum of body in profile not in the same plane, posterior margin of forewings distinctly keeled (Fig. 26). Head including eyes narrower than pronotum. Vertex trapeziform, at base wider than long medially (about 1.6:1.0), lateral carinae strongly keeled, diverging caudad, Y-carina with stalk weak, submedian carinae originating from lateral margin subapically, uniting at anterior margin of vertex (Figs. 12, 27). Frons in profile at an acute angle to longitudinal axes of body (Figs. 26, 28), subrectangular, widest at apex, lateral carinae strongly keeled, median carina simple (Figs. 13, 29), longer in middle line than widest about 2.69:1.00. Clypeus at base slightly wider than frons at apex, tricarinate, in profile with post-clypeus in same plane as frons, ante-clypeus curving caudad (Fig. 28); rostrum nearly reaching posterior trochanters. Antennae cylindrical, extending to frontoclypeal suture, basal segment slightly widening distad, about 1.8 times as long as wide, second segment about 1.5 times as long as first. Pronotum as long as vertex.
medially, posterior margin concave medially, tricarinate, developed, lateral carinae recurved, reaching to hind margin. Mesonotum tricarinate, but not distinctly keeled, about 1.8 times as long as vertex and pronotum together in middle line (Figs. 12, 27). Forewings broadening apically, cross veins located in apical half, with apical angles acute, outer margin approximately straight, oblique, posterior margin sinuate, with irregular markings at apical half (Figs. 14, 26). Hindwing subtriangle, M+Cu,a and Cu,b with a short common stalk, vein A with 3 branches (Fig. 15). Spinal formula of hind leg 5-6-4, post-tibial spur with apical tooth.

Male Genitalia. Pygofer in profile much shorter dorsally than ventrally, laterodorsal angles obtusely rounded, not produced caudad, lateral margins excavate at middle, each very strongly produced dorsad with medial pillar-like projection (Fig. 16); posterior opening longer than broad, medioventral process absent, ventral margin concave (Fig. 17). Aedeagus slender, tubular; phal-
lobasal process arising basally (Fig. 19). Genital styles long (Fig. 17). Anal segment of male short and ring-like, lateroapical angles not produced (Figs. 16, 17). Anal style moderately long (Figs. 16, 19).

**Host Plant.** Unknown.

**Distribution.** Oriental Region (southern China).

**Etymology.** The genus name, which is masculine, is a combination of “neo” (new) and “carino-
"delphax" (name of the related genus), in recognition of its similarity to the genus *Carinodelphax* Ding and Yang.

**Remarks.** This genus is related to *Carinodelphax* Ding and Yang, but differs in having frons widest at apex (widest at level of ocelli in the latter); antennae relatively long, reaching the level of the frongtocypleal suture (in the latter, antennae rather short, not reaching frontocypleal suture); pro- and mesonotum with 3 carinae normal (in the latter; 3 carinae of pro- and mesonotum, especially median carina of scutellum strongly keeled); the color pattern of forewings is also different. This genus resembles *Acrofacies* Muir in color pattern of dorsum and of frons, but differs in having the frons longer in middle line than widest part about 2.69-1.00, widest at apex (in the latter, frons longer in middle line than widest part about 1.75-2.17:1.00, widest at a level of ocelli). In profile, frons at an acute angle to longitudinal axes of body, post-clypeus in the same plane as frons (in the latter, frons at right angle to longitudinal axes of body, post-clypeus strongly curving caudad); forewings relatively long and narrow, longer than broad about 2.69-1.00, costal margin relatively straight (in the latter, forewings relatively short and broad, longer than broad about 2.20-2.26:1.00, costal margin curved); pygofer with an elongated projection at inner side of lateral margin (absent in the latter); aedeagus with long spinose phallobasal process (phallobasal absent or degenerative in the latter).

*Neocarinodelphax hainanensis* (Qin and Zhang) comb. nov. (Figs. 12-20, 26-29)

**Carinodelphax hainanensis** Qin and Zhang, 2005: 390.

**Description.** Body length (from apex of vertex to the tip of forewing): male 3.25 mm, female 3.80-3.85 mm; forewing length: male 2.75 mm, female 3.30 mm.

General color brown to fuscous (Figs. 26-29). Median carina of frons and clypeus, lateral margins of genae, pale yellowish white; antennae yellowish brown, middle and apex of basal segment, base of second segment, with blackish bands, apex of second segment brown (Fig. 29). A narrow stripe from apex of vertex to the end of scutellum, a narrow stripe along lateral carinae of pronotum, pale yellowish white, narrowly edged fuscous (Fig. 27); posterior half of lateral areas of pronotum, and propleura, basal half of humeral plate, pale yellowish white (Figs. 12, 26-28). Forewings with irregular hyaline markings (Figs. 14, 26). Abdomen with dorsal and ventral surface, genital segment, yellowish brown to brown; anal segment yellowish brown.

Structural features as in generic descriptions. Vertex wider at than long submedially (1.60: 1.00). Frons longer in middle line than wide at widest part (2.69: 1.00). Antennae with first segment 1.82 times as long as wide, second segment 1.5 times as long as first. Mesonotum 1.86 times as long as vertex and pronotum together in middle line. Forewing longer in middle line than wide at widest part (2.69:1.00).

**Male Genitalia.** Anal segment of male with lateral apical angles not produced, conjoined basally to the base of aedeagus (Fig. 19). Pygofer in posterior view with opening longer than wide, ventral margin concave broadly, medioventral process absent; inner side of lateral margin with a very long projection dorsally, apex rounded and with many minute teeth (Figs. 16-18); pygofer with posterior margin mediadly concave in lateral view (Fig. 16). Aedeagus tubular, slender, sinuate, thick at base, narrowing apically, apex flattened, ventral side of apical half concave, apex margin rounded, orifice dorsally near apex (Fig. 19); phallobasal process long, spinose, tapering distad, arising from base of aedeagus dorsally, slightly decurved, longer than half of aedeagus (Fig. 19). Genital styles thick and long, reaching to ventral margin of anal segment, in posterior view nearly parallel (Fig. 17), in profile broader at base, narrower at apex, apical margin truncate, inner aspect with a hook-like process, inner basal part and apex with minute teeth (Fig. 20).

**Host plant.** Unknown.

**Distribution.** South China (Hainan Province).


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