

A new species and a newly-recorded species in the genus *Goneokara* (Hemiptera: Fulgoromorpha: Derbidae) from China

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Abstract: A new species, *Goneokara albivena* **sp. nov.**, and a newly-recorded species, *Goneokara pullum*, are reported from China with descriptions and illustrations. The female terminalia of this genus are described and illustrated. A key to species in this genus is also provided.

Key words: Auchenorrhyncha; taxonomy; key

中国戈袖蜡蝉属一新种一新记录（半翅目：蜡蝉次目：袖蜡蝉科）

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摘要：记述采自中国的戈袖蜡蝉属 1 新种：白脉戈袖蜡蝉 *Goneokara albivena* **sp. nov.**，和 1 中国新记录种：普鲁戈袖蜡蝉 *Goneokara pullum*。记述了该属的雌性外生殖器。本文还提供了该属的种检索表。

关键词：头喙亚目；分类；检索表

Introduction

The planthopper genus *Goneokara* Muir belongs to the tribe Cenchreini (Derbidae: Derbinae) and can be easily distinguished by the following features: head with junction between vertex and frons obtusely angular in profile, not much produced forward, only slightly beyond anterior margin of eyes, subantennal process tiny; pronotum with lateral carinae and ventral lateral margins not foliately raised; tegmina with C1 long, ScP+RA separating from RP at or before basal quarter, MP₃₊₄ single, clavus closed; metatibiotarsal formula: 6-5-5 (Muir 1918; Fennah 1952).

This genus was originally established by Muir (1913) with the type species, *Goneokara pullum*, which was collected in Telok Ayer, Singapore. Thereafter, Yang & Wu (1994) described a species *G. improcerum* from Taiwan, China. So far, the genus *Goneokara* comprises two species, distributed in the Oriental Region (Metcalf 1945; Bourgoin 2024).

In this paper, a new species *Goneokara albivena* **sp. nov.**, and a newly-recorded species

Goneokara pullum are reported and illustrated from China. The female genitalia in this genus are described for the first time based on the two species mentioned. A key to species in this genus is provided.

Material and methods

External morphology was observed under a Leica MZ125 microscope. All measurements are given in millimeters (mm). Morphological interpretations and subsequent terminologies follow Bourgoin (1987) for male genitalia, Bourgoin (1993) for female genitalia and Bourgoin *et al.* (2015) for wing venation with MP interpretation following Emeljanov (1995) as proposed in Bourgoin *et al.* (2015).

The genital segments of the examined specimens were dissected and macerated in 10% NaOH solution at approximately 100°C for about 1–2 minutes, and subsequently transferred into glycerin. The specimens were photographed using a Leica M205A microscope with a Leica DFC camera. Images were produced using the software LAS (Leica Application Suite) V3.7. The holotype is deposited in the Entomological Museum of Northwest A&F University (NWAUFU), Yangling, China.

Taxonomy

Family Derbidae Spinola, 1839

Subfamily Derbinae Spinola, 1839

Tribe Cenchreini Muir, 1917

Genus *Goneokara* Muir, 1913

Type species: *Goneokara pullum* Muir, 1913.

Description. Head and thorax. Vertex quadrate, width of base longer than length in midline, with lateral marginal carinae robust and elevated, beset with sensory pits, disc depressed, without median carina, width across eyes narrower than pronotum; frons and vertex separated by distinct transverse carina, junction angular in lateral view; frons slightly narrowed in middle, widening at apex, with lateral marginal carinae elevated and separated throughout, beset with sensory pits. Postclypeus flattened and tricarinate, lateral carinae joining frontal ones. Eyes reniform, semicircularly emarginate in ventral margin. Ocelli present. Antennae much shorter than frons, with sensilla, pedicelli of male globular, a little longer than width, slightly enlarged toward apex, pedicelli of female smaller and not so globular; subantennal process small. Pronotum with lateral carinae and ventral margins not foliately raised, posterior margin broadly and angularly emarginate. Mesonotum large and tricarinate. Tegmina oblong, short and broad, about 2.5–3.5 times longer than widest part, anterior margin and posterior margin parallel for most of length, jugal margin not convex and apical margin round, with sensory pits along anterior margin and Pcu; basal cell sword-shaped with moderate length; ScP+RA separating from RP at basal quarter, C1 elongate; MP with four terminals, MP₃₊₄ and MP₂ single, MP₁ forked; CuA forked at distal side of ScP+RA and RP forking, with two branches not anastomosing; clavus closed; Pcu connected with A₁ at

about 0.85 times length of clavus; subapical lines present. Metatibiotarsal formulae: 6-5-5. Wings flabellate, slightly shorter and wider than tegmina, anterior margin concave at point of connection with ScP+RA, posterior margin relatively smooth, jugal margin wavy, ScP+RA connected to anterior margin slightly beyond middle of wings.

Male terminalia. Anal tube broad and short, subrectangular in dorsal view. Gonostylus long and rectangular, upcurved apically, with well-developed internal process. Phallic complex slender, with processes at apex.

Female terminalia. Of fulgoroid type. Anal tube of female shorter than male. Sternite VII with posterior margin strongly produced caudad medially. Gonapophysis VIII with anterior connective lamina triangular, with apical teeth; endogonocoxal process developed, about same size as anterior connective lamina; endogonocoxal lobe reduced; gonocoxa VIII short and semilunar. Gonapophysis IX triangular in dorsal view, relatively straight in basal two thirds and slightly inclined in apical third in lateral view. Gonospiculum bridge short. Gonoplares developed, divided right and left, each gonoplar divided into two lobes (Gp₁, Gp₂) again, Gp₁ (dorsal lobe) positioned horizontally and Gp₂ (lateral lobe) vertically, Gp₁ subtriangular, Gp₂ subrectangular with fine spines in apical margin.

Distribution. China (Fujian, Taiwan, Xizang); Singapore (Telok Ayer).

Key to species

1. Tegmen yellowish basally two thirds and brown in apical third, length about 3.3 times longer than widest part *G. albivena* **sp. nov.**
- . Tegmen generally dark brown to black, length about 2.6–2.7 times longer than widest part 2
2. Tegmen with MP₁₊₂ almost continuing to follow direction of MP stem *G. pullum*
- . Tegmen with MP₁₊₂ straightly turned anterad abruptly *G. improcerum*

1. *Goneokara pullum* Muir, 1913 (Figs 1–3, 7B, 7D, 8A), new record to China

Goneokara pullum Muir, 1913: 32.

Measurements. Body length: male ($n = 3$) (incl. tegmen): 5.8–6.0 mm (except tegmen: 3.2–3.3 mm), female ($n = 3$) (incl. tegmen): 6.3–6.4 mm (except tegmen: 3.7–3.8 mm); length of tegmen: male ($n = 3$): 4.8–4.9 mm, female ($n = 3$): 5.2–5.3 mm.

Coloration. Body generally dark brown. Vertex with lateral marginal carinae brown and sensory pits brownish, disc brown (Fig. 1A). Frons brown, with lateral marginal carinae brown and sensory pits brownish, in lateral view, genae brown, slightly darker in front of eyes (Figs 1B, 1C). Transverse carina between vertex and frons dark brown. Postclypeus brown, with three carinae dark brown. Rostrum brown to dark brown, with apex darker (Figs 1B, 1C). Eyes black; ocelli brown. Antennae brown. Pronotum dark brown, with median carina and lateral carinae yellow (Figs 1A–C). Mesonotum dark brown, with median carina and lateral carinae same color as mesonotum (Fig. 1A). Tegula brown. Ventral side of thorax brown (Fig. 1C). Tegmina generally dark brown, almost opaque, with a white stripe crossed with ScP+RA₁ at terminal, veins dark brown, with white spots at middle of subapical lines and apex of apical veins (Figs 1A, 1B, 1E). Wings pale, veins brown. Fore and middle legs brown to dark brown, hind legs yellowish brown. (Figs 1C, 1D). Abdomen dark brown, slightly tinged red on dorsum, tinged yellow on posterior margin of each sternite (Fig. 1C). Genital segments dark brown (Figs 1F, 1G).

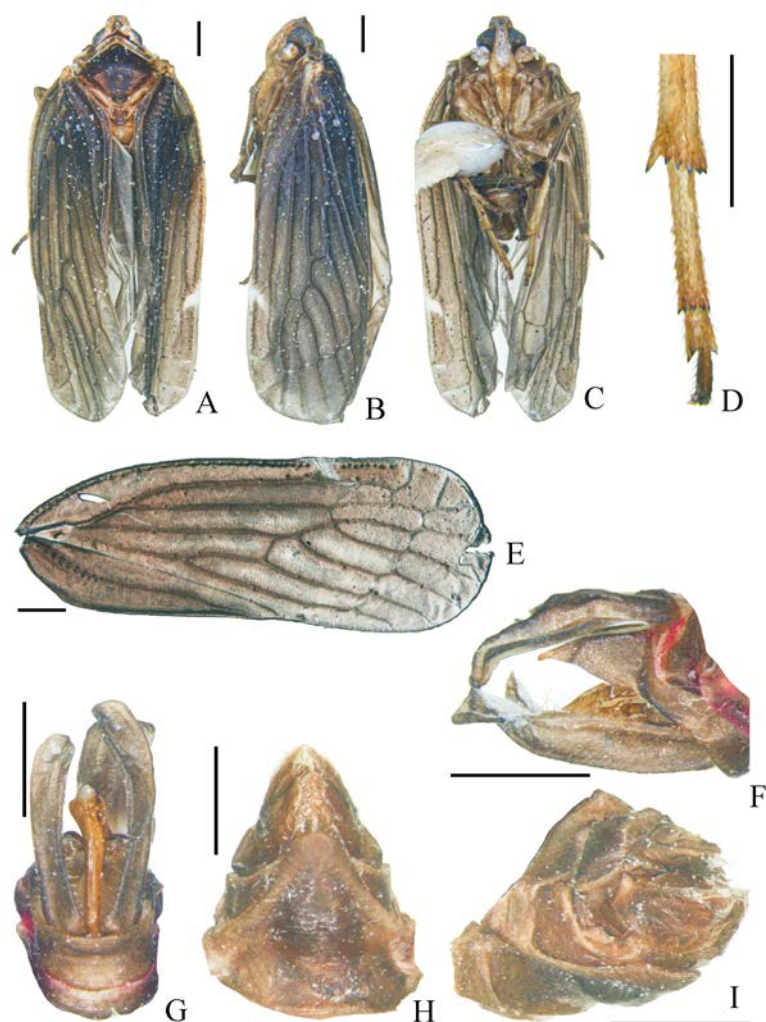


Figure 1. *Goneokara pullum* Muir, 1913, adult. A–G. Male; H–I. Female. A–C. Habitus, dorsal, lateral and ventral view; D. Metatibiotarsal formula; E. Tegmen; F, G. Male terminalia, lateral and ventral views; H, I. Female terminalia, ventral and laterocaudal views. Scale bars = 0.5 mm.

Structure. Head and thorax. Vertex short and trapezoidal, wide basally and narrow apically, somewhat beyond anterior margin of eyes, length of midline about half width of base, and equal to width of apex, anterior margin relatively straight, posterior margin concave angularly at middle; with lateral marginal carinae very robust and elevated, disc depressed triangularly (Fig. 1A). Frons narrow and subrectangular, narrowest at middle and expanded at both ends, lower margin slightly longer than upper margin, approximately 1.8 times longer in midline than width of widest part (Fig. 1C). Postclypeus narrow and triangular, slightly shorter than frons, elevated centrally and compressed laterally, longitudinally tricarinate, slightly concave near base of lateral margin (Figs 1B, 1C). Rostrum elongate, significantly

beyond coxae of hind legs, with apical segment cylindrical and not expanded (Fig. 1C). Pronotum narrow centrally, anterior margin convex roundly and posterior margin concave roundly, laterodorsal angles slightly convex roundly, ventral margin round and not foliately raised, slightly curved anterad, with median carina distinct, lateral carinae slightly raised (Figs 1A–C). Mesonotum large and diamond shaped, length in midline about equal to width of widest part, with thin median and two lateral carinae, disc raised apparently, posterior part slightly depressed (Fig. 1A). Tegmina slightly expanded distally, about 2.6 times longer than widest part, anterior margin and posterior margin relatively straight and parallel for most of length; ScP+RA forked at apical two fifths; ScP+RA₁ obliquely extended to anterior margin; RA₂ single and curved anterad; RP stem relatively straight, forked near apex; MP with four terminals, MP₃₊₄ single, MP₁₊₂ almost continuing to follow direction of MP stem, MP₁ forked near apex; first r-m adjoined to MP₁₊₂ forking; m-cu long; CuA forked at basal third, with two branches not anastomosing and almost parallel (Fig. 1E). Wings with MP unbranched, CuA three-branched (Fig. 7B). Metatibiotarsal formula: 6-5-5 (Fig. 1D).

Abdomen with dorsum longitudinally raised centrally.

Male terminalia. Anal tube broad and moderately long, in dorsal view, rectangular, slightly narrowed near base, anal stylus slightly beyond middle of anal tube, epiproct wide, paraproct round, anal apodeme thin (Figs 2A, 2C); in lateral view, not reaching apex of gonostylus, moderately narrow at base, broadest in middle, narrowest and curved ventrad at apex (Figs 1F, 2B). Pygofer moderately narrow in lateral view, widest at venter, anterior margin relatively straight, posterior margin slightly concave near venter, laterodorsal angles well developed, extremely protruding caudad and reaching level of epiproct (Figs 1F, 2B); in ventral view, venter rectangular, anterior margin roundly convex and posterior margin roundly concave, without medioventral process (Figs 1G, 2E). Gonostylus long and hirsutiusculus, in dorsal view, rectangular with a hooked process pointed cephalad on dorsal inside (Fig. 2A), in lateral view, anterior part narrow with basal angle acute, membranous in subapical part of dorsal margin, slightly upcurved and folded inward at apex (Figs 2B, 2D); internal process well-developed near middle, in dorsal view, triangular, narrow basally and wide apically, lateral margin roundly concave near apex, apical margin round (Fig. 2A), in lateral view, round at base with about 10 short spines on ventral side, dorsal basal angle conical and hirsutiusculus, distinctly notched near base of dorsal margin, with a small hook at middle and pointed cephalad, apical angle hooked and protruded ventrocaudad, ventral margin notched before apex (Figs 2B, 2D). Phallic complex slender, in dorsal view, periandrium clavate, slightly expanded at base and apex, apical margin round (Fig. 2F); in lateral view, periandrium arched ventrad (Figs 2G, 2H, 7D); with six processes directed dorsocephalad in lateral view at apex: two processes on left side, from base to apex, a relatively narrow and sheet-like process (P₁) with surface slightly rough, a small conical process (P₂) directed right and caudal direction in dorsal view; largest and sheet-like process (P₃) in median, in lateral view, more and less membranous, in dorsal view, broad at base, then relatively straight and directed cephalad, apical margin obliquely truncated; three processes on right side, from apex to base, an elongate and acicular process (P₄) gradually tapering distad, slightly curved cephalad in lateral view and directed left in dorsal view, a broader and nearly acicular process (P₅) slightly expanded centrally and directed dorsad, an elongate process (P₆) gradually

tapered distad and acute apically, curved left near base and curved right near apex; endosoma large and produced along P_3 (Figs 2F–H, 7D).

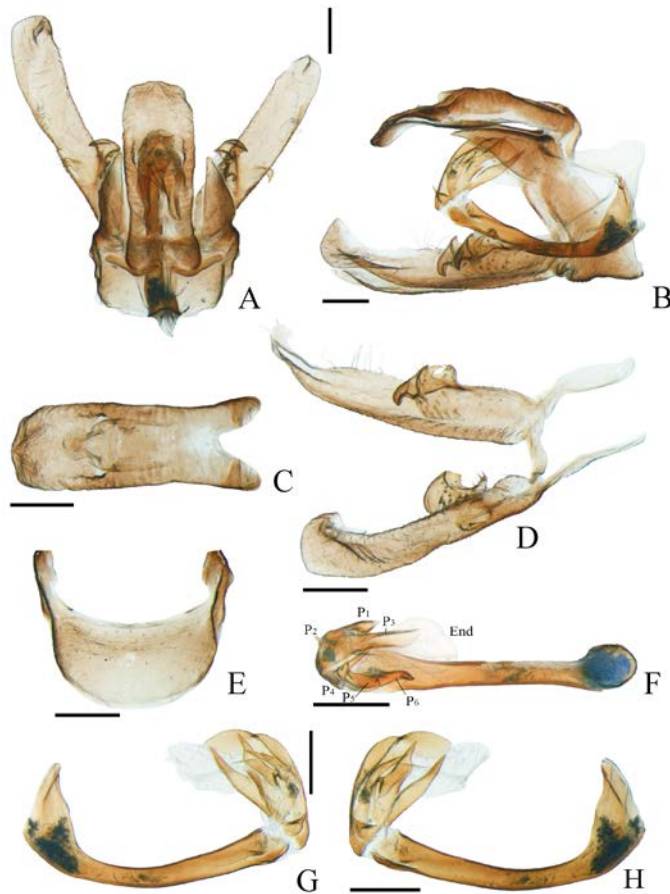


Figure 2. *Goneokara pullum* Muir, 1913, male adult. A, B. Male terminalia, dorsal and lateral views; C. Anal tube, dorsal view; D. Gonostyli, laterodorsal view; E. Pygofer, ventral view; F–H. Phallic complex, dorsal, left and right views. (P_{1-6} — process 1–process 6; End — endosoma). Scale bars = 0.2 mm.

Female terminalia. Anal tube of female oval, shorter than in male, with long setae at apical margin, with small notches between bases of long setae (Figs 3A, 3B, 3E). Sternite VII very developed, with posterior margin strongly produced caudad medially in a triangular shape, apical margin round, lateral posterior margin slightly concave (Fig. 1H). Gonapophysis VIII sclerotized, anterior connective lamina triangular, disc slightly membranous, with a row of five small teeth in apical group, two large teeth with connective bases in outside group and another three small discontinuous teeth in inside group, anterior fibula sclerotized and slender, slightly curved; endogonocoxal process very developed and sword-like, narrowing distad, with base connected to anterior connective lamina; gonocoxa VIII wide and semilunar, anterior margin slightly convex near base and posterior margin moderately concave at middle;

endogonocoxal lobe reduced (Fig. 3C). Gonapophysis IX triangular in dorsal view, broad at base, posterior connective laminae constricted distad, fused at middle of basal third, roundly emarginate and membranous in middle of inner margin, bearing a number of chalazae or verrucae (Fig. 3D); in lateral view, posterior connective lamina long and narrow, slightly inclined ventrad near basal third and constricted apically, rounded conically protruded ventrad at base, with semicircular and membranous process near base, dorsal margin with two shallow emarginations in middle, posterior fibula sclerotized and slightly thick, about half of length of posterior connective lamina; gonospiculum bridge short (Fig. 3F). Gonoplac developed, in dorsal view, Gp_1 triangular, with disc and inside of basal part sclerotized, other parts membranous, Gp_2 strongly sclerotized and hirsutiusculus (Fig. 3G); in lateral view, Gp_2 rectangular and generally sclerotized, slightly constricted near base and expanded distad, dorsal margin, dorsal half of apical margin and ventral half of basal part membranous, dorsal basal angle distinctly protruded, dorsal apical angle subtriangularly sclerotized, apical margin with seven to nine long sclerotized spines (Figs 3H, 8A).

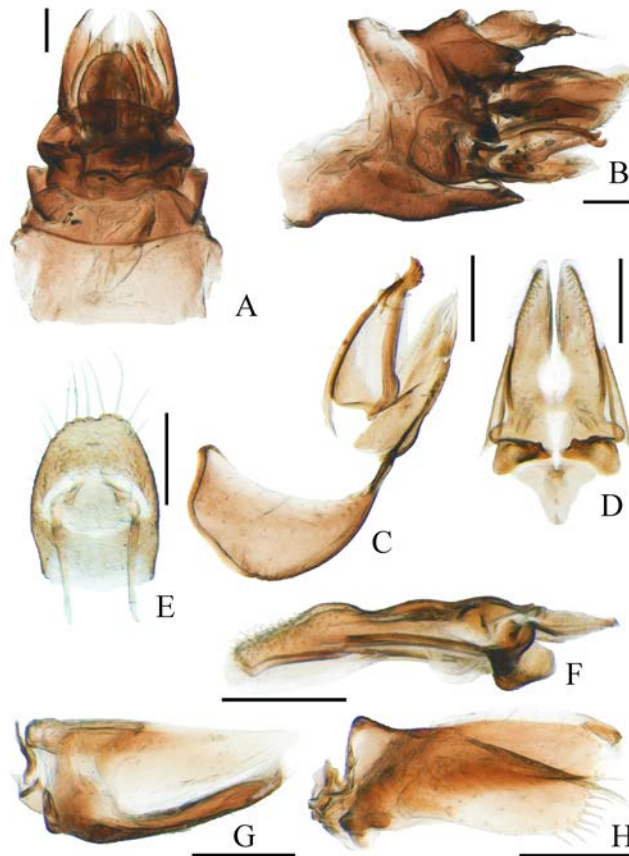


Figure 3. *Goneokara pullum* Muir, 1913, female adult. A, B. Female terminalia, dorsal and lateral views; C. Gonapophysis VIII and gonocoxa VIII, lateral view; D, F. Gonapophyses IX, dorsal and lateral views; E. Anal tube, dorsal view; G, H. Gonoplac, dorsal and lateral views. Scale bars = 0.2 mm.

Specimens examined. 3♂3♀ (2♂2♀ in CAU, 1♂1♀ in NWAUFU), **China**, Chayu, Xizang Autonomous Region, 1,590–2,100 m, 24–29-VI-1978, coll. Fasheng LI.

Remarks. These specimens were identified primarily based on the coloration and tegminal venation. The male and female genitalia are described for the first time here.

2. *Goneokara albivena* **sp. nov.** (Figs 4–6, 7A, 7C, 7E, 8B)

Measurements. Body length: male ($n = 1$) (incl. tegmen): 5.8 mm (except tegmen: 3.0 mm), female ($n = 1$) (incl. tegmen): 6.2 mm (except tegmen: 3.7 mm); length of tegmen: male ($n = 1$): 4.9 mm, female ($n = 1$): 5.4 mm.

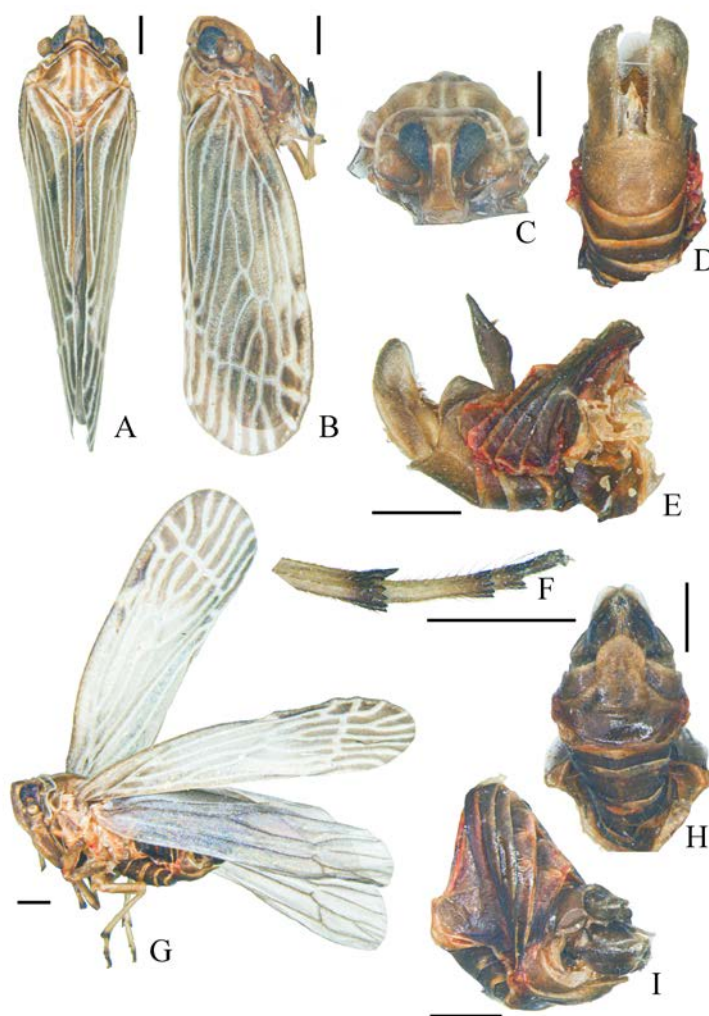
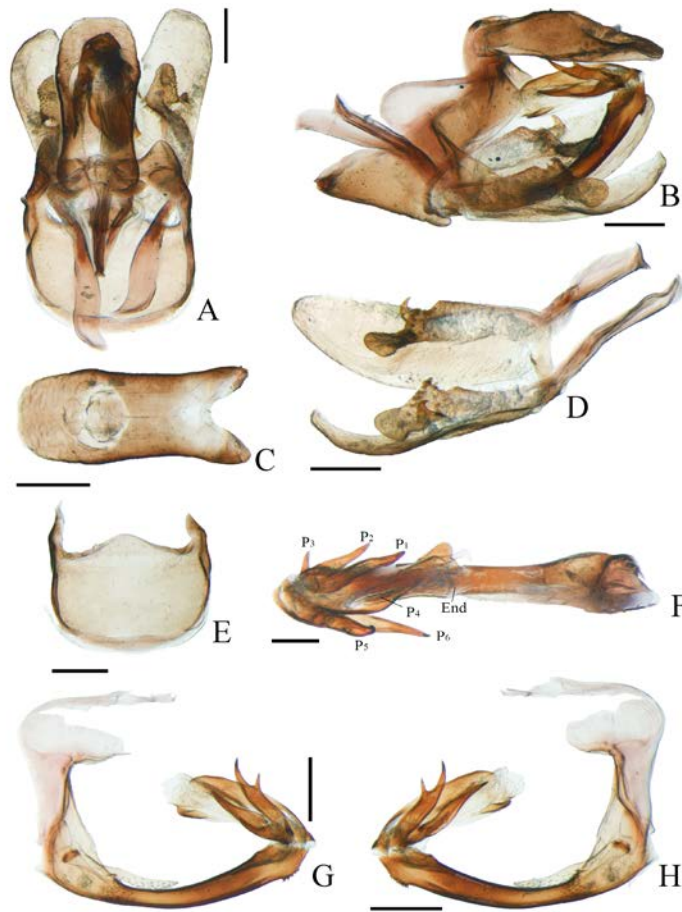


Figure 4. *Goneokara albivena* **sp. nov.**, adult. A–F. Male; G–I. Female. A–C. Habitus, dorsal, lateral and frontal views; D, E. Male terminalia, ventral and lateral views; F. Metatibiotarsal formula; G. Habitus, lateral view; H, I. Female terminalia, ventral and laterocaudal views. Scale bars = 0.5 mm.



Figures 5. *Goneokara albivena* **sp. nov.**, male adult. A, B. Male terminalia, dorsal and lateral views; C. Anal tube, dorsal view; D. Gonostyli, laterodorsal view; E. Pygofer, ventral view; F–H. Phallic complex, dorsal, left and right views. (P_{1–6} — process 1–process 6; End — endosoma). Scale bars = 0.2 mm.

Coloration. Body generally brownish. Vertex with lateral marginal carinae brown and sensory pits on inside yellowish, disc brown (Fig. 4A). Frons brownish, with lateral marginal carinae brown, in lateral view, genae brown, tinged light around eyes (Figs 4B, 4C). Transverse carina between vertex and frons white (Fig. 4C). Postclypeus brownish, slightly darker on lateral posterior part, with three carinae white. Rostrum brownish, with apex black (Fig. 4G). Eyes black; ocelli yellowish. Antennae brown basally and yellow apically. Pronotum brown, with median carina and lateral carinae yellowish, each lateral part with a yellowish stripe nearly parallel to posterior margin, margins yellowish (Figs 4A–C). Mesonotum brownish, with median carina and lateral carinae yellowish, each lateral carina with a yellowish line from middle to margin parallel to anterior margin (Fig. 4A). Pleuron with a red marking between coxae of fore and middle legs (Fig. 4G). Tegula brownish, darker

in anterior part (Fig. 4C). Tegmina yellowish in basal two thirds and brown in apical third, almost opaque, with a white stripe crossed with ScP+RA₁ at terminal, veins white (Figs 4B, 4G). Wings pale, veins brown. Legs yellowish to brownish yellow, tarsi and apices of tibiae dark brownish (Figs 4B, 4F, 4G). Abdomen dark brown, slightly tinged red on dorsum, tinged yellow on posterior margin of each sternite (Figs 4G, 4E, 4I). Genital segments dark brown (Figs 4D, 4E, 4H, 4I).

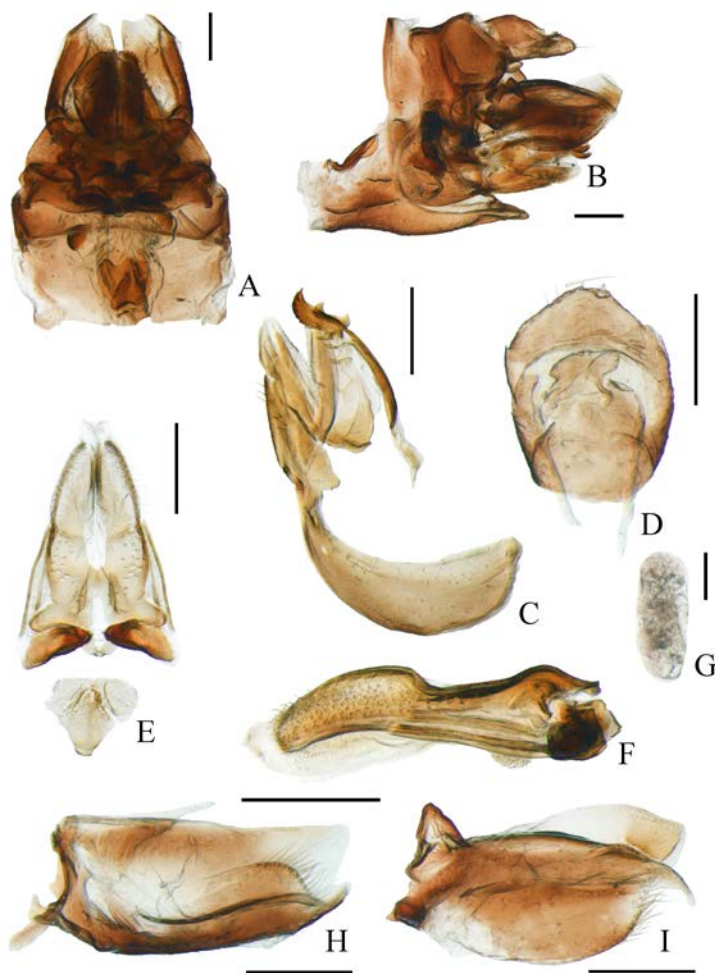


Figure 6. *Goneokara albivena* **sp. nov.**, female adult. A, B. Female terminalia, dorsal and lateral views; C. Gonapophysis VIII and gonocoxa VIII, lateral view; D. Anal tube, dorsal view; E, F. Gonapophyses IX, dorsal and lateral views; G. Immature egg; H, I. Gonoplac, dorsal and lateral views. Scale bars = 0.2 mm.

Structure. Head and thorax. Vertex short and trapezoidal, wide basally and narrow apically, somewhat beyond anterior margin of eyes, length of midline slightly shorter than width of base, and about twice longer than width of apex, anterior margin straight, posterior

margin roundly concave at middle; with lateral marginal carinae robust and elevated, disc depressed triangularly (Fig. 4A). Frons narrow and subrectangular, narrowest at middle and expanded at both ends, lower margin slightly longer than upper margin, approximately 1.8 times longer in midline than width of widest part (Fig. 4C). Postclypeus narrow and triangular, shorter than frons, elevated centrally and compressed laterally, longitudinally tricarinate. Rostrum elongate, beyond coxae of hind legs, with apical segment cylindrical and not expanded (Fig. 4G). Pronotum narrow centrally, anterior margin roundly convex and posterior margin concave roundly, laterodorsal angles slightly convex roundly, ventral margin round and not foliately raised, slightly curved anterad, with median carina distinct, lateral carinae slightly raised (Figs 4A–C). Mesonotum large and diamond, length in midline about equal to width of widest part, with thin median and two lateral carinae, disc raised slightly, posterior part slightly depressed (Fig. 4A). Tegmina oblong, about 3.3 times longer than widest part, anterior margin and posterior margin relatively straight and parallel for most of length; ScP+RA forked at apical two fifths; ScP+RA₁ obliquely extended to anterior margin; RA₂ single and curved anterad; RP stem relatively straight, forked near apex; MP with four terminals, MP₃₊₄ single, MP₁₊₂ almost continued to follow direction of MP stem, MP₁ forked near apex; first r-m far before MP₁₊₂ forking level; m-cu extremely short, sometimes causing MP and CuA₁ to form an intersection; CuA forked at basal third, with two branches not anastomosing, CuA₁ convex anterad at point of connection with m-cu (Figs 4G, 7A). Wings with MP two-branched, CuA three-branched (Fig. 7C). Metatibiotarsal formula: 6-5-5 (Fig. 4F).

Abdomen with dorsum longitudinally raised centrally (Figs 4E, 4I).

Male terminalia. Anal tube broad and short, in dorsal view, rectangular, slightly expanded near apex, apical margin almost flat and not protruding, anal stylus beyond middle of anal tube, epiproct wide, paraproct oval, anal apodeme thin (Figs 5A, 5C); in lateral view, almost reaching apex of gonostylus, moderately narrow at base, broadest in middle, narrowest and not inclined at apex (Figs 4E, 5B). Pygofer moderately narrow in lateral view, widest at venter, anterior margin relatively straight, posterior margin roundly concave near venter, laterodorsal angles slightly protruded roundly (Fig. 5B); in ventral view, venter rectangular, anterior margin roundly convex, posterior margin with arched medioventral process (Figs 4D, 5E). Gonostylus long and hirsutiusculus, in dorsal view, rectangular with a hooked process pointed cephalad on dorsal inside (Fig. 5A), in lateral view, anterior part narrow with basal angle acute, broad in most part, constricted to roundly angular and upcurved at apex (Figs 5B, 5D); internal process well-developed near middle, in dorsal view, triangular, wide basally and narrow apically, external margin notched at base, with a number of small verrucae in apical two thirds, apical margin round (Fig. 5A), in lateral view, hirsutiusculus, broad at base with about 10 short spines on ventral side, dorsal margin with a small notch at base and a large notch near apex, forming a conical process at middle, ventral margin wide and shallowly concave, apex slightly expanded to capitate. (Figs 5B, 5D). Phallic complex slender, in dorsal view, perianthium clavate, slightly expanded at base and apex, apical margin round (Fig. 5F); in lateral view, perianthium arched ventrad, with several small spines in basal part of dorsal margin and subapical part of ventral margin, and a large membranous process growing from base (Figs 5G, 5H, 7E); with six processes about directed dorsocephalad in lateral view at apex: three processes on left side, from base to apex, an elongate process (P₁) gradually

tapered distad and slightly curved centrally, a moderate long process (P_2) gradually tapered distad with dorsal margin concave, a short spinous process (P_3) directed right in dorsal view; a largest and sheet-like process (P_4) in median, in lateral view, more and less membranous, ventral part near apex obviously membranous, apical angle elliptically sclerotized, in dorsal view, relatively broad basally and narrow apically, apical margin round, curved near base to directed right and cephalic direction; two processes on right side, from apex to base, an elongate process (P_5) bifurcated apically, cephalic branch larger than caudal one, both directed dorsad, an elongate process (P_6) gradually tapered distad; endosoma large and produced along P_4 (Figs 5F–H, 7E).

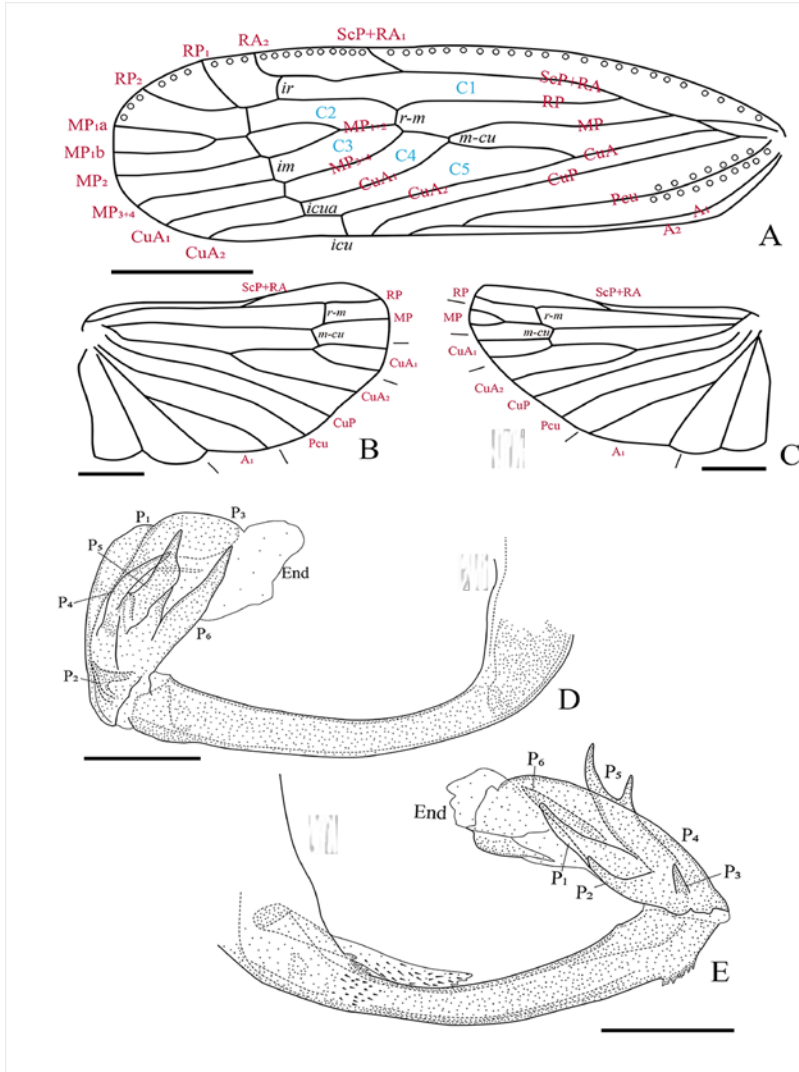


Figure 7. A. Tegminal venation (*G. albivena*); B. Right wing (*G. pullum*); C. Left wing (*G. albivena*); D. Phallic complex, right view (*G. pullum*); E. Phallic complex, left view (*G. albivena*). Scale bars = 1.0 mm (A–C); 0.2 mm (D, E).

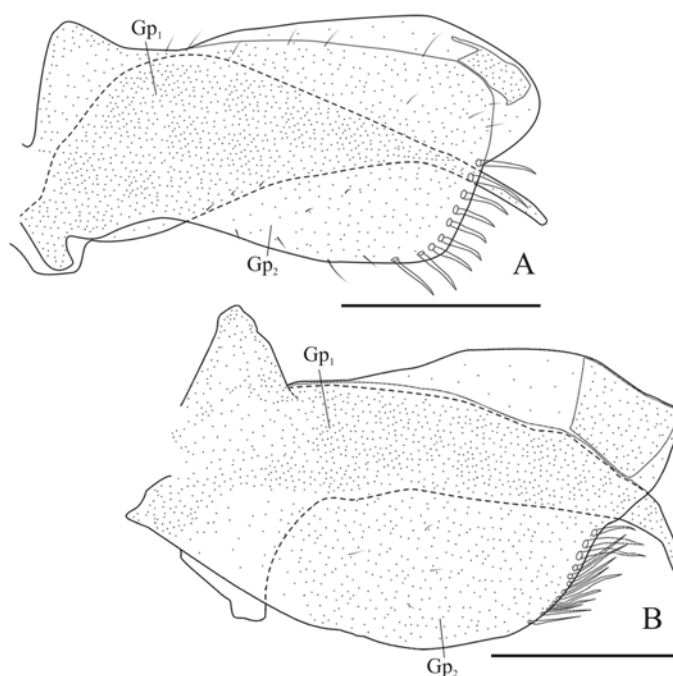


Figure 8. A. Gonoplac, lateral view (*G. pullum*); B. Gonoplac, lateral view (*G. albivena*) (Gp_1 , Gp_2 — lobes of the gonoplac). Scale bars = 0.2 mm.

Female terminalia. Anal tube of female oval, shorter than male, with long setae at apical margin (Fig. 6D). Sternite VII very developed, with posterior margin strongly produced caudad medially in a tongue shape, apical margin round, subapical part constricted, lateral posterior margin slightly concave (Fig. 4H). Gonapophysis VIII sclerotized, anterior connective lamina triangular, disc slightly membranous, with seven small continuous teeth in apical group, two large teeth with connective bases in outside group and three discontinuous teeth in inside group, anterior fibula strongly sclerotized and slender, slightly curved; endogonocoxal process very developed and sword-like, constricted distad, with base connected to anterior connective lamina; gonocoxa VIII wide and semilunar, anterior margin slightly convex near base and posterior margin moderately concave at middle; endogonocoxal lobe reduced (Fig. 6C). Gonapophysis IX triangular in dorsal view, broad at base, posterior connective laminae constricted distad, fused at middle of basal third, shallowly emarginate and membranous in middle of inner margin, bearing a number of chalazae or verrucae (Fig. 6E); in lateral view, posterior connective lamina long and narrow, slightly inclined ventrad and slightly constricted apically, rounded conical at base not so protruded, with semicircular and membranous process near base, dorsal margin with an oblique emargination in middle, posterior fibula sclerotized and slightly thick, about half of length of posterior connective lamina (Fig. 6F); gonospiculum bridge short (Fig. 6E). Gonoplac developed, in dorsal view, Gp_1 triangular, with disc sclerotized, margins membranous, Gp_2 strongly sclerotized and hirsutiusculus (Fig. 6H); in lateral view, Gp_2 fusiform and generally sclerotized, slightly

constricted near base and apex, expanded centrally, dorsal margin and ventral half of basal part membranous, dorsal basal angle acutely protruded, dorsal apical angle trapezoidally sclerotized, apical margin with 13–16 long sclerotized spines (Figs 6I, 8B).

Immature egg gray and oblong, length about 0.56 mm, approximately 2.8 times longer than widest part (Fig. 6G).

Holotype. ♂ (NWAFU), **China**, Fujian, Taoyuanyu, Wuyi Mountain, 600 m, 18-VIII-2008, coll. Lei ZHANG. **Paratype.** 1♀ (NWAFU), **China**, Fujian, Huanggangshan, Wuyi Mountain, 900 m, 14-VIII-2008, coll. Lei ZHANG.

Etymology. The specific epithet refers to the white veins of tegmina.

Remarks. This species is distinctly different from the two known species of the genus *Goneokara* in the following features: the ratio of the length to the widest part of the tegmen is 3.3, compared to 2.6 in the other two species; the coloration of tegmen is yellowish in basal two-thirds and brown in apical third, while for the other two species it is uniformly dark brown. Moreover, when at rest, the placement of the tegmina is closer to vertical compared to *G. pullum*, which are more like lying flat.

Discussion

The results of this study show that the female terminalia of the genus *Goneokara* belong to the “Fulgoroid type” (Bourgoin 1993). Although the female of *G. improcerum* is unknown, based on the two species (*G. pullum* and *G. albivena* **sp. nov.**) described in this paper, the female genitalia in this genus are very similar to those of the genus *Neomegatropis*, which also belongs to the subfamily Derbinae (Chen *et al.* 2024). This similarity is particularly evident in the third valvula, which is divided into two lobes (Gp₁ and Gp₂).

Additionally, there are distinct differences in the female genitalia characteristics among species within *Goneokara*. Firstly, the number of apical teeth of anterior connective lamina of gonapophysis VIII differs: *G. pullum* has five (Fig. 3C), while *G. albivena* **sp. nov.** has seven (Fig. 6C). Secondly, in dorsal view, the shape of the membranous emargination at the caudad side of the inner margin where the posterior connective laminae of gonapophyses IX are fused is round in *G. pullum* but shallow in *G. albivena* **sp. nov.** (Figs 3D, 6E). Thirdly, in lateral view, the shape of the emargination in the dorsal margin of the posterior connective lamina of gonapophysis IX is characterized by two shallow emarginations in *G. pullum*, whereas *G. albivena* **sp. nov.** has an oblique emargination (Figs 3F, 6F).

These characteristics suggest that the female terminalia can serve not only as a basis for species identification but also provide more comprehensive morphological data for phylogenetic research, thus highlighting the importance of further related research.

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References

- Bourgoin T. 1987. A new interpretation of the homologies of the Hemiptera male genitalia, illustrated by the Tettigometridae (Hemiptera, Fulgoromorpha). *Proceedings of the 6th Auchenorrhyncha Meeting, Turin, Italy* (7–11 September): 113–120.
- Bourgoin T. 1993. Female genitalia in Hemiptera Fulgoromorpha, morphological and phylogenetic data. *Annales de la Société Entomologique de France*, 29(3): 225–244.
- Bourgoin T. 2024. FLOW (Fulgoromorpha Lists on The Web): a world knowledge base dedicated to Fulgoromorpha. Version 8 (updated 4 Jan. 2024) (accessed 16 December 2024)
- Bourgoin T, Wang RR, Asche M, Hoch H, Soulier-Perkins A, Stroiński A, Yap S & Szewdo J. 2015. From micropterism to hyperpterism: recognition strategy and standardized homology-driven terminology of the fore wing venation patterns in planthoppers (Hemiptera: Fulgoromorpha). *Zoomorphology*, 134(1): 63–77.
- Chen WQ, Wang YL & Zhang YL. 2024. A new genus from southern China in the tribe Nicertini and discussion of distinguishing tribes of Derbinae (Hemiptera: Fulgoromorpha: Derbidae). *Zootaxa*, 5512(1): 103–112.
- Emeljanov AF. 1995. On the system and phylogeny of the family Derbidae (Homoptera, Cicadina). *Entomological Review*, 73: 783–811.
- Fennah RG. 1952. On the generic classification of Derbidae (Fulgoroidea) with descriptions of new neotropical species. *Transactions of the Royal Entomological Society of London*, 103(4): 109–170.
- Metcalf ZP. 1945. *General Catalogue of the Hemiptera. Fascicle IV, Fulgoroidea. Part 4. Derbidae*. Smith College, Northampton, Massachusetts, 212 pp.
- Muir F. 1913. On some new species of leafhoppers. Part II. Derbidae. *Bulletin of the Hawaiian Sugar Planters Association Division of Entomology*, 12: 28–92.
- Muir F. 1918. Notes on the Derbidae in the British Museum collection. II. Derbinae. *Entomologists Monthly Magazine*, 54: 228–243.
- Yang CT & Wu RH. 1994. *Derbidae of Taiwan (Homoptera: Fulgoroidea)*. Zhengchung Press, Taiwan, 230 pp.