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First Record of the Genus *Adolenda* Distant (Hemiptera: Fulgoroidea: Kinnaridae) from China, with Description of One New Species

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Ai-Ping Liang (2001) First record of the genus *Adolenda* Distant (Hemiptera: Fulgoroidea: Kinnaridae) from China, with description of one new species. *Zoological Studies* **40**(4): 365-370. *Adolenda fuscofasciata* sp. nov. (Hemiptera: Fulgoroidea: Kinnaridae) is described and illustrated from Yunnan and Guangxi, southwestern China. This represents the 1st record of the genus *Adolenda* Distant from China. Scanning electron micrographs of the antennal sensilla, rostral apex, and wax glands of the new species are provided. A key for separation of the species of *Adolenda* is included. http://www.sinica.edu.tw/zool/zoolstud/40.4/365.pdf

Key words: *Adolenda*, Kinnaridae, New species, Antennal sensilla, Wax glands.

The planthopper family Kinnaridae was established by Muir in 1925 and is one of the smallest of the 20 Fulgoroidea families currently recognized, including about 17 genera and over 80 described species (Metcalf 1945, Emeljanov 1984). The family is essentially distributed in the Oriental and Neotropical regions (mainly in the West Indies), with some species in the Nearctic Region (southwestern US) and south Palaearctic Region.

Members of the Kinnaridae can be recognized by the following combination of characters: head usually small, distinctly narrower than thorax; vertex small and narrow, about as long as wide, nearly trough-like and narrower anteriorly; frons longer than wide, broadest in the middle, lateral margins strongly carinate, without median carina; postclypeus tricarinate; ocelli usually 3; antennae small, with pedicel usually globose, rarely elongate; rostrum long, reaching between hind femur or apex of abdomen, apical segment long; pronotum very short, much wider than head, with hind margin widely emarginate; mesonotum wider than long, tricarinate; tegulae large; forewings usually elongate, nearly parallel sided; Sc and R usually forking near middle of wing; R and M with 2 or more branches, claval veins usually joining near apex, without granulation; legs slender, hind tibia without lateral spine, hind tarsomere II with apical spines; abdominal terga divided medially into 2 plates, female with 6th-8th abdominal tergites chevron shaped, bearing wax-secreting plates; male genitalia with genital plates usually large, aedeagus with apex membranous, connective forked apically; and female genitalia incomplete.

The Kinnaridae was separated by Muir (1925 1930) from the Cixiidae by reason of their different male genitalia and the presence in the female of wax-secreting plates on the 6th-8th abdominal tergites. The Kinnaridae is grouped with the Cixiidae, Delphacidae, Achilidae, Meenoplidae, Dictyopharidae, and Fulgoridae, which all have a row of spines on the hind tarsomere II in the adults. Within this family group, Kinnaridae and Meenoplidae are considered a sister group, based on the possible synapomorphy of the wax-secreting plates on 6th-8th abdominal tergites in adult females (Muir 1925 1930, Asche 1988, Emeljanov 1990, Bourgoin 1993). Externally the Kinnaridae can be distinguished from the Meenoplidae by the veins in the forewing clavus not being granulate. The monophyly of Kinnaridae is not conclusive. Bourgoin's (1993) cladistic analysis of the phylogenetic relationships among the genera of the Meenoplidae and Kinnaridae indicates that the Kinnaridae is paraphyletic relative to the Meenoplidae.

The biology of the Kinnaridae is little known. Most kinnarid species are associated with dicots in

the Asteridae and Dilleniidae (Fennah 1948). The remaining records are from ferns, gymnosperms in the Ephedraceae, and monocots in the Agavaceae. As adults, most kinnarid species have been reported on a single host plant genus (Wilson et al. 1999). Adults are generally collected from the upper portions of plants, but the adults of *Oeclidius* Van Duzee have also been found on the roots of their hosts (Fennah 1980). Nymphs are subterranean, feeding on roots (Fennah 1948 1980).

The kinnarid fauna of China and adjacent areas is very poorly known. Only 1 Indian species, *Kinnara fumata* Melichar, was recorded from Hubei, China (Fennah 1956, Chou et al. 1985). Fennah (1978) described *Kinnara doto* Fennah from northern Vietnam. The only comprehensive treatment for Oriental Kinnaridae was that of Distant (1906 1916) dealing with the fauna of India, Sri Lanka, and Myanmar (Burma). Standard revisionary work on this group in this area is badly needed.

The genus *Adolenda* was described by Distant in 1911 for *A. typica* Distant from Simla in northern India. Distant (1916) redescribed and illustrated this genus and species. Dlabola (1957) described the 2nd species of the genus, *A. decolorata*, from Afghanistan. Both Distant (1911 1916) and Dlabola (1957) placed *Adolenda* in the Cixiidae. Emeljanov (1984) moved *Adolenda* from Cixiidae to Kinnaridae based on the wing venation and the presence of the wax gland plates on the 6th-8th abdominal tergites in female adults. He established the new tribe Adolendini for the genus and added a 3rd species, *A. ephedrina* Emeljanov, from Tajikistan to the genus. He also described the new subgenus *Adolina* to accommodate his new species.

While sorting and identifying Kinnaridae from material in the Insect Collections of the Institute of Zoology, Chinese Academy of Sciences, Beijing (IZCAS), I found a distinct new species of *Adolenda*. Specimens of this new species were collected from Yunnan and Guangxi, southwestern China. The new species represents the 1st record of *Adolenda* in China, and its discovery has broadened our knowledge of the morphology and biogeography of the genus.

In the present paper I describe the new species *Adolenda fuscofasciata* sp. nov. and present a key to the species of *Adolenda*. The ultrastructure of the antennal sensilla, rostral apex, and wax glands of *A. fuscofasciata* sp. nov. was examined with scanning electron microscopy, and scanning electron micrographs (Figs. 2-8) are provided to draw attention to further future study on these character systems, since they may be of phylogenetic significance.

MATERIALS AND METHODS

Specimens studied: All specimens studied in the course of this work are deposited at the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

Terminology: The terminology follows that of Kramer (1950).

SEM: For scanning electron microscopy (SEM), the head together with antennae or the abdomen of the adult female was removed from the body and transferred to 10% KOH for 5 min, cleaned with a fine brush, then washed in distilled water, mounted on aluminum stubs with double-sided sticky tape, air-dried at room temperature, and coated with gold-palladium using a sputter coater. Observations were made with a JEOL 5200LV and Zeiss DSM 950 scanning electron microscope, operated at accelerating voltages of 25 kV.

TAXONOMY

Genus *Adolenda* Distant, 1911

Adolenda Distant, 1911: 740. Type species: *Adolenda typica* Distant, 1911, by original designation.

Key to the species of *Adolenda*

1. Forewings with post-discal cell having 3 cross veins .... *A. ephedrina*
   Forewings with post-discal cell lacking cross veins 2
2. Forewings with costal areas having 6 narrow, oblique fuscous fasciae; mesonotum with nearly parallel lateral carinae .... *A. fuscofasciata* sp. nov.
   Forewings with costal areas lacking oblique fuscous fasciae; mesonotum with oblique lateral carinae 3
3. Hindwings with 2 apical cells, R branched apically .... *A. typica*
   Hindwings with 1 apical cell, R unbranched apically .... *A. decolorata*

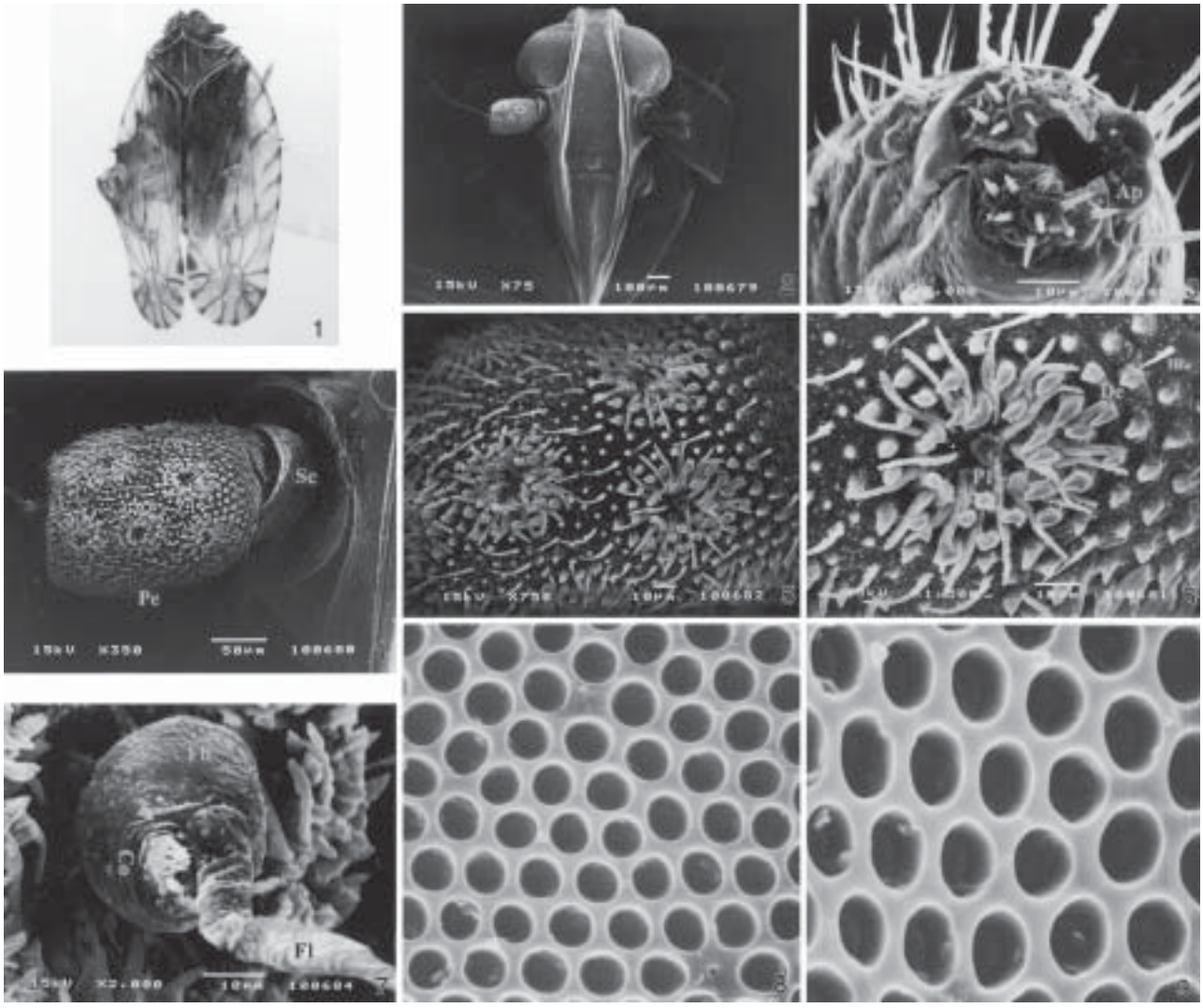
Adolenda fuscofasciata sp. nov.

(Figs. 1-21)

Description: Length (from apex of vertex to tip of forewings): ♂ 4.0-4.2 mm; ♀ 4.5-4.6 mm. General color ochraceous, marked with fuscous or brown; vertex (Figs. 1, 10) brown with anterior and lateral carinae ochraceous; lateral marginal areas of frons (Fig. 11), area surrounding ocellus on genae (Fig. 12) and apex of rostrum fuscous, lora (Fig. 12) sometimes fuscous; pronotum (Figs. 1, 10) with disc and anterior 1/2 of lateral ventrally curved area suffused with fuscous or brown; mesonotum (Fig. 1) brown with median and lateral carinae ochraceous; tegulae with anterior 1/2 fuscous brown; mesopleu-

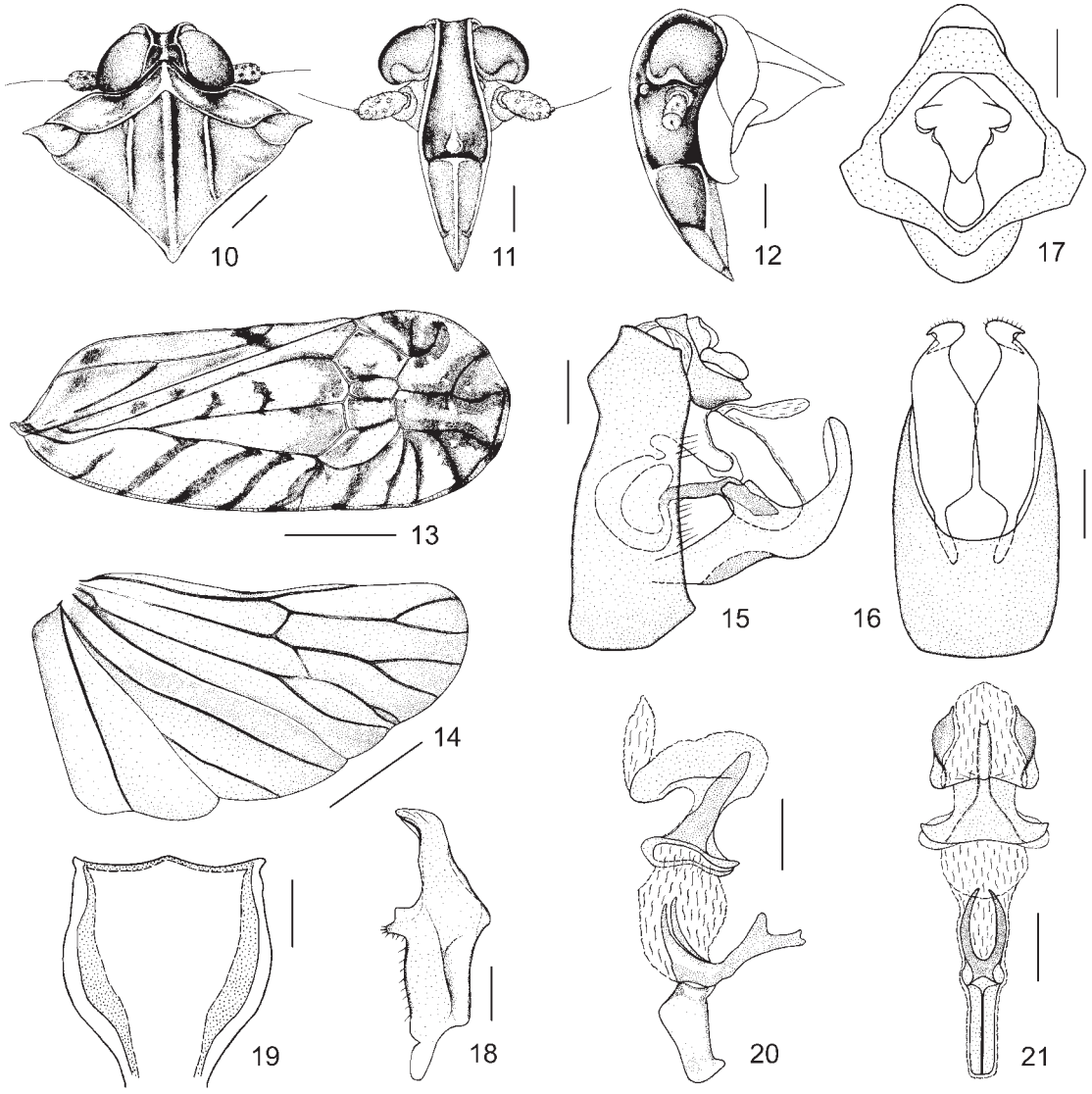
rae and mesosterna fuscous; legs with femora sometimes pale fuscous, spine pectens on hind tibia and tarsus brown, tips of apical spines on hind tibia and tarsus black; forewings (Figs. 1, 13) subhyaline, costal areas with about 6 narrow, slender, oblique fuscous fasciae, apical cells and areas surrounding veins fuscous brown; hindwings (Fig. 14) pale fuliginous, veins brown. Abdomen brown, pygofer ventrally and genital styles ochraceous.

Head (Fig. 10) short, much narrower than pronotum, frons with anterior margins slightly projecting beyond eyes in males; vertex with anterior, lateral and hind margins carinate leaving disc depressed, anterior carinate margin very slightly curved posteriad medially, lateral carinate margins slightly converging anteriorly, hind carinate margin roundedly in males and angularly in females produced anteriorly; frons and postclypeus (Figs. 2, 11) with lateral margins strongly carinate and slightly expanded laterad near fronto-clypeal suture, frons flat on disc, postclypeus convex medially, with median carina; anteclypeus very narrow and convex; rostrum long, reaching between hind femur, basal segment slightly longer than apical segment, rostral



Figs. 1-9. *Adolenda fuscofasciata* sp. nov. 1, male holotype (China: Yunnan, IZCAS, dorsal view); 2, head (ventral view); 3, rostral apex, showing basiconic sensilla with elevated sockets; 4, antenna; 5, antennal pedicel surface, showing sensory plaque organs, tooth-shaped cuticular denticles and microtrichia; 6, a sensory plaque organ on antennal pedicel surface; 7, swollen flagellar base, showing tuft of hairs surrounding apical opening of coeloconic sensillum; 8, wax pores on 6th-8th abdominal tergites of female adult (5000x); 9, same (8774x). Abbreviations: (Ap) apical plate, (Co) coeloconic sensillum, (De) cuticular denticles, (Fb) expanded flagellar base, (Fl) flagellum, (M) microtrichia, (Pe) pedicel, (Pl) plaque organs, and (Sc) scape.

apex tripartite consisting of 2 lateral lobes separated by the dorsal stylet groove, and an apical plate, each lateral lobe possessing a terminal field of about 10 basiconic sensilla (Fig. 3); antennae (Figs. 2, 4) with very small and short scape, pedicel subglobose and moderately long, with about 16 sensory plaque organs distributed over the entire surface, each plaque having about 21 concentric, digitate processes separated by about 45-55 relatively large, smooth, tooth-shaped cuticular denticles (Figs. 4-6), pedicel surface covered with relatively small tooth-shaped cuticular denticles and hair-like microtrichia (Figs. 4-6), flagellum with swollen amphora-like base having 1 coeloconic sensillum apically with apical opening of coeloconic sensillum surrounded by dorsally and inwardly directed tuft of hairs (Fig. 7); pronotum (Figs. 1, 10, 12) short and broad, strongly sloping laterad and then curved down, with median carina elevated; mesonotum (Figs. 1, 10) broad, distinctly tricarinate on disc; hind tibia with 8 apical spines (5 outside, 3 inside), without lateral spurs, metatarsomeres I and II with 7 and 6 apical spines, respectively; forewings (Figs. 1, 13) relatively shorter in males and more slender in females, apical 1/3 be-



Figs. 10-21. *Adolenda fuscofasciata* sp. nov. 10, head, pronotum and mesonotum (dorsal view); 11, head (ventral view); 12, head, pronotum and mesonotum (lateral view); 13, forewing; 14, hindwing; 15, pygofer (lateral view); 16, pygofer and genital styles (ventral view); 17, anal segment (caudal view); 18, left genital style (ventral view); 19, apex of aedeagus (caudal view); 20-21, aedeagus and connective (20, lateral view; 21, ventral view). Scale bars: Figs. 10-12, 15, 16, 18, 20, 21 = 0.2 mm; Figs. 13, 14 = 1 mm; Figs. 17, 19 = 0.1 mm.

yond nodal line narrowing, apical margin rounded, costa not dilated and not finely cross-veined, costal area broad, without stigma, Sc and R on long stalk, M contiguous with Sc + R at base, with 9 apical cells and 4 anteapical cells, PCu and A_1 branched very basally; hindwing venation as in figure 14.

Male genitalia: Pygofer (Fig. 15) narrow and high, slightly broadened ventrally, anterior and posterior margins nearly parallel sided in lateral view, anterior margin slightly incised subapically; anal tube (Figs. 15, 17) short and small, with apical part expanded laterad, directed posteroventrally and forked in caudal view; anal style (Figs. 15, 17) very small and short, constricted mesially, apex somewhat rounded; genital styles (Figs. 15, 16, 18) elongate and relatively broad, tapering to apex over distal 2/5, outer margin slightly angularly expanded laterally near mid length, inner margin with a distinct process curved dorsally near mid length, basal inner marginal area depressed with a short longitudinal carina on inner side in ventral aspect, distal 2/5 of style slender and upturned, somewhat sinuate with apex pointing outward in ventral view; aedeagus (Figs. 19-21) with apex consisting of 2 lateral sclerotized lamellae and a dorsal transverse sclerotized rod jointly enclosing a chamber with membranous tissues, nearly cup-like in caudal view (Fig. 19), dorsal transverse sclerotized rod with 1 central, slender, membranous process directed posteriorly in lateral view; connective (Figs. 20, 21) slender, strongly forked apically, extreme base excavated in lateral view.

Wax glands in adult females: Adult females with the 6th-8th abdominal tergites chevron-shaped, bearing a large amount of white filamentous wax threads. The cuticular surface of the wax-secreting plates is porous (Figs. 8, 9). The pores are similar to those found in species of Meenoplidae (Bourgoin 1997) but differ from those seen in species of Lophopidae (Liang 1997 2000).

Etymology: This new species is named for its fuscous fasciae on the costal areas of the forewings.

Distribution: Southwestern China (Yunnan, Guangxi).

Materials examined: Holotype: ♂, China, Yunnan: Simao (22°7'N, 100°9'E), 1300 m, 12 Apr. 1955 (V Popov) (IZCAS). Paratypes: China, Yunnan: 1♀, near Simao (22°7'N, 100°9'E), 26 Mar. 1957 (Mokievsky); 1♀, Xiaguan (25°5'N, 100°2'E), 18 Apr. 1957 (Mokievsky); 2♂♂, same locality, but 2050 m, 3 May 1955 (Bushike and Y Zhao) (all in IZCAS). China, Guangxi: 1♀, Napo (23°4'N, 105°8'E), Defu, 1440 m, 4 Apr. 1998 (F-S Huang) (IZCAS).

Remarks: This new species can be easily distinguished from all other known species of *Adolenda* by its forewings with costal areas having about 6 narrow, oblique fuscous fasciae (Figs. 1, 13) and the shape of the male genitalia (Figs. 15-21). It can be separated from the species of *Kinnara* Distant by the narrow forewings, costal and inner margins not being expanded, the lack of indentation on the costal margin beyond the middle, the lack of costal stigma, narrow frons with lateral carinae not expanded laterally, and the pronotum being distinctly tricarinate.

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窄額閽蠟蟬屬 *Adolenda* Distant (半翅目：蠟蟬總科：閽蠟蟬科) 在中國的首次記錄，附一新種記述

梁愛萍

本研究記述窄額閽蠟蟬屬 *Adolenda* Distant (半翅目：蠟蟬總科：閽蠟蟬科)一新種：褐帶窄額閽蠟蟬 *A. fuscofasciata* sp. nov.，新種模式標本採自中國雲南及廣西，這是窄額閽蠟蟬屬 *Adolenda* Distant 在中國的首次記錄，該屬先前記錄於印度北部、阿富汗及塔吉克斯坦。文章描述了新種的外部形態及雄性生殖器結構，且標示出新種與窄額閽蠟蟬屬 *Adolenda* 其他已知種類及閽蠟蟬屬 *Kinnara* Distant 種類的區別特徵，並提供了新種觸角感器、喙端部感器及雌性成蟲 6 − 8 腹節背板蠟腺超微形態的掃瞄式電子顯微鏡照片。新種的模式標本保存在北京中國科學院動物研究所。文章還提供了窄額閽蠟蟬屬 *Adolenda* 種的檢索表。

關鍵詞：窄額閽蠟蟬屬，閽蠟蟬科，新種，觸角感器，蠟腺。

中國科學院動物研究所昆蟲系