

# THE PALAEARCTIC PLANTHOPPER GENUS *DICTYOPHARA* GERMAR, 1833 (HEMIPTERA: FULGOROIDEA: DICTYOPHARIDAE) IN CHINA

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**Abstract.**— The dictyopharids planthopper genus *Dictyophara* Germar, 1833 from China is revised and restricted in Palaearctic Region of northern China. Only four recognized *Dictyophara* species are: *D. europaea* (Linnaeus, 1767), *D. koreana* Matsumura, 1915, *D. nekkana* Matsumura, 1940 and *D. pannonica* (Germar, 1830), which the former two are recorded from China for the first time. One new generic and three new specific synonyms are recognized: *Dictyophara* Germar, 1833 = *Togaphora* Matsumura, 1940 **syn. nov.**; *D. koreana* Matsumura, 1915 = *Centomera manchurica* Kato, 1933 **syn. nov.** = *Togaphora hokuryonis* Matsumura, 1940 **syn. nov.**; *D. nekkana* Matsumura, 1940 = *Dictyophara kaszabi* Dlabola, 1967 **syn. nov.** Photographs of the adults of all known species are presented. Descriptions of the genus and its included species are provided together with structural illustrations of the male genitalia. A key and a distribution map to the four species of *Dictyophara* from China are provided.



**Key words.**— *Dictyophara*, revision, new synonymy, Dictyopharidae, Palaearctic Region, China.

## INTRODUCTION

The planthopper genus *Dictyophara* (a replacement name for *Fulgora* Latrielle, 1810, nec Linn., 1767) was established by Germar in 1833 for *Fulgora europaea* L. 1767 from Europe. Though being the type genus of the family Dictyopharidae, it has been a highly confused taxonomic taxon since it was erected. So many non-natural taxa were there in the genus that it has not been revised correctly and completely for one and three-quarter centuries.

Melichar (1912) in his dictyopharid monograph described 63 *Dictyophara* species are distributed in the Palaearctic region (15 species), the Indo-Australian region (18 species), the African region (13 species) and the American region (17 species), respectively. Metcalf's (1946) catalogue of world Dictyopharidae

recorded 77 species (subspecies) in above regions. However, Fennah (1944) pointed that *Dictyophara europaea* (L.) (the type species of *Dictyophara*) is not congeneric with any of the American Dictyopharini by comparing *D. europaea* with the dictyopharid species of the New World. Fennah (1944) also suggested that two genera *Dictyophara* Germar and *Nersia* Stål, 1862, which were retained by Melichar (1912) in the New World, are far from compact. They included several compact and natural groups which were separated as several new genera. Fennah (1956) proposed that no species in southern China fall into the restricted concept of *Dictyophara*.

Based on an examination of the historical type material, Fennah (1978) moved the below eight *Dictyophara* species: *D. percarinata* Kirby, 1891, *D. inscripta* Walker, 1851, *D. albivitta* Walker, 1851, *D. despecta* Walker, 1851, *D. leptorhina* Walker, 1851,

*D. sinica* Walker, 1851, *D. insculpta* Walker, 1858 and *D. walkeri* Atkinson, 1886, into the genus *Raivuna* Fennah, 1978. No *Dictyophara* species were listed in the dictyopharid fauna of Vietnam by Fennah in 1978.

Emeljanov (2004) proposed that as a natural taxon, the genus *Dictyophara* should be restricted in the Palaearctic Region, which most species are distributed in the southern part of its western half. Wide variability is notable in secondary characters, especially the length, thickness and general shape of the cephalic process. Meantime, the shape of the cephalic process is sometimes similar, due to convergence, in different genera, including not related ones.

Emeljanov (2004) subdivided the genus into five subgenera based on the length, thickness and general shape of the cephalic process. They are *Ancylocrius* Emeljanov, 2004, *Euthremma* Emeljanov, 2004, *Dictyophara* s. str. Germar, 1833, *Chanithus* Kolenati, 1857, and *Conopenchus* Emeljanov, 2004.

Thousands of dictyopharid specimens collected from China and adjacent regions in the Insect Collection at the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, and elsewhere, were examined by the authors. More than 550 specimens belonged to four *Dictyophara* species respectively, were entirely collected from northern China. Our studies support Emeljanov's view that the natural genus *Dictyophara* is restricted in the Palaearctic Region.

About 14 *Dictyophara* species have ever been reported from China, but most do not belong to *Dictyophara*, and should be moved into the genus *Raivuna* Fennah, 1978 or be synonymized (Song and Liang, in prep.). Only four *Dictyophara* species are recognized and restricted in the Palaearctic Region of northern China. They are: *D. europaea* (L., 1767), *D. koreana* Matsumura, 1915, *D. nekkana* Matsumura, 1940 and *D. pannonica* (Germar, 1830), which the former two are recorded from China for the first time. In addition, one new generic and three new specific synonymies were also discovered.

The purpose of the present paper is to revise the known species of *Dictyophara*; to redescribe the genus and its included species from China; to provide a key and a distribution map to the four species of *Dictyophara* from China; and to provide the dorsal habitus photographs of the adults, and the illustrations of the cephalic process, forewing, and male genitalia for the recognition and separation of the species in the genus.

## MATERIAL AND METHODS

The specimens studied in the course of this work are deposited in the following institutions whose

names are abbreviated in the text as follows: Laboratory of Systematic Entomology, Hokkaido University, Sapporo, Japan (HU); Zoological Museum, Institute of Zoology, Chinese Academy of Sciences, Beijing, P. R. China (IZCAS); Department of Biology Insect Collection, Nankai University, Tianjin, P. R. China (NU); Tianjin Museum of Natural History, Tianjin, P. R. China (TMNH).

Specimens used for dissection were cleared in 10% KOH at room temperature for ca. 12 hours, rinsed in distilled H<sub>2</sub>O, then transferred to glycerol for examination. Morphological characters were observed with a Zeiss (Stemi SV 11) optical stereomicroscope and were illustrated with the aid of a drawing tube attached to the microscope; measurements were made with the aid of an eyepiece micrometer. Descriptions were based on 10 specimens, where possible.

Information from each type was recorded exactly as given on labels, with (1), (2), (3), indicating the sequence of labels on the pin from top to bottom.

The following abbreviations are used in the text, BL: body length (from apex of cephalic process to tip of forewings); HL: head length (from apex of cephalic process to base of eyes); HW: head width (including eyes); FWL: forewing length.

The morphological terminology and measurements used in this study follow Liang and Jiang (2005) and Liang and Song (2006).

## TAXONOMY

### *Dictyophara* Germar, 1833

*Dictyophara* Germar, 1833: 175. Type species: *Fulgora europaea* L., 1767; by subsequent designation of Desmarest 1849: 2.

*Pseudophana* Burmester, 1835: 159. Type species: *Fulgora europaea* L., 1767; by subsequent designation of Westwood, 1840: 115. Synonymized by Desmarest 1849: 2.

*Chanithus* Kolenti, 1857: 427. Type species: *Flata pannonica* Germar, 1830; by original designation. Synonymized by Stål 1866: 151. [in part.]

*Togaphora* Matsumura, 1940: 18. Type species: *Togaphora hokuryonis* Matsumura, 1940; by original designation and monotypy, *syn. nov.*

**Diagnosis.** General color uniformly green, pale yellowish green or stramineous green; cephalic process distinctly elongate, somewhat upturned, its length, thickness and general shape highly variable (nearly cuneiform or cylindrical); vertex with median carina complete or only distinct between eyes; pronotum with median carina distinct, lateral discal carinae complete or only distinct in basal third to half; forewing with stigma obsolete; legs moderately elongate, fore femur not flattened and dilated, hind tibiae with 7 apical black-tipped spines; aedeagus symmetrical, with a pair of phallical processes anteroventrally directed, apically

acute; phallobase with four apical membranous lobes, ventral two lobes with numerous spines.

**Description.** General color green, pale yellowish green or stramineous green (probably green in life; dead dried specimens are sometimes yellowish), carinae on cephalic process, frons, pronotum and mesonotum, lateral carinae on pronotum and an oblique longitudinal fascia on propleurae, dark green; cephalic process specked with blackish at extreme apex; rostrum with extreme apex blackish; hind femora with 3 fuscous specks at extreme apex.

Head (Figs 2–12, 20–22, 31–33, 42–44) produced into a cephalic process, which its length, thickness and general shape highly variable (nearly cuneiform or cylindrical). Vertex (Figs 2–10, 20, 31, 42) with median carina complete or only conspicuous between eyes. Frons (Figs 12, 22, 33, 44) with lateral carinae reaching to clypeal suture, with distinct median carina.

Pronotum (Figs 2–10, 20, 31, 42) distinctly shorter than mesonotum medially, narrow anteriorly, broad posteriorly; disc broad with anterior margin centrally slightly arched, posterior margin angularly widely concave; with median carina distinct, lateral discal carinae complete or only distinct in basal third to half; lateral depressions between median and lateral carinae large; lower lateral carinae between eyes and tegulae complete in lateral aspect (Figs 11, 21, 32, 43). Mesonotum (Figs 2–10, 20, 31, 42) tricarinate on disc, with median carina conspicuous, not reaching to apex, lateral carinae straight, nearly parallel or somewhat curving anteriorly towards median carina. Forewing (Figs 2–9, 13, 23, 34, 45) with Sc+R, M, and Cu1 branched apically, respectively; generally numerous netted veins on apical area, apical margin with about 16–22 cells; stigma obsolete. Legs moderately elongate, fore femur not flattened and dilated, hind tibiae with 5–6 lateral and 7 apical black-tipped spines; hind tarsomeres I and II with about 14–20 black-tipped apical spines, respectively.

Male genitalia: pygofer in lateral view very narrow, ventrally distinctly broader than dorsally, anterior margin broadly and bluntly protruded anteriorly near base, posterior margin somewhat sinuate in lateral view (Figs 15, 26, 37, 47). Anal tube relatively short and broad in dorsal view (Figs 16, 27, 38, 48); anal style slender, with extreme apex extended beyond posterior margin of anal tube in dorsoposterior view (Figs 16, 27, 38, 48). Parameres symmetrical, with numerous spiniform setae on inner surfaces in basal half in ventral aspect (Figs 14, 25, 36, 46); base narrow, expanded towards apex, broadest subapically in lateral view (Figs 15, 26, 37, 47), apex bluntly rounded, upper margin with an dorsally directed, black-tipped process at apex, outer upper edge with a ventrally directed, hook-like process near middle. Aedeagus (Figs 17–19, 28–30, 39–41, 49–51) symmetrical, with a pair of phallical

processes protruded dorsolaterally, apically sclerotized and acute; phallobase with four apical membranous lobes: dorsal two lobes smaller and shorter, without spines; ventral two lobes larger and longer, covered with numerous spines.

**Remarks.** The genus is highly variable in secondary characters, especially the length, thickness and general shape of the cephalic process. Externally, it is often similar to *Raivuna* Fennah, 1978 (actually, most *Raivuna* species were moved from *Dictyophara*), but can be distinguished from the latter by the general color which is almost uniformly green, pale yellowish green or stramineous green (vertex, frons, genae, pronotum or mesonotum generally with vivid orange red markings or stripes in *Raivuna* species); the stigma obsolete; aedeagus with pair of phallical processes (without phallical processes in *Raivuna* species).

Some of *Dictyophara* s. str. species are externally similar to those of *Tenguna* Matsumura, 1910, but can be separated from the latter by the vertex with lateral margins strongly carinate, apically subacuminate and obtuse (vertex with lateral margins slightly sinuate in front of eyes and then gradually narrowing to arrowhead at apex in the *Tenguna* species); the hind tibiae with 7 apical black-tipped spines (8 in the latter); the aedeagal structure, especially the ventral lobes on the phallobase with numerous elongate spines.

Matsumura (1940) described the new genus *Togaphora* for a single species, *T. hokuryonis* Matsumura, 1940 from Hokuryo, Hoten, Manchouchuo (today Beiling, Shenyang, Liaoning Province) in north-eastern China. Since then, neither the genus nor the species was mentioned in the literature, except in Metcalf's (1946) catalogue of the world Dictyopharidae and in Liang and Suwa's (1998) paper dealing with the historical types of the Fulgoroidea species described by Matsumura. Our study shows that *Togaphora hokuryonis* Matsumura, 1940 is conspecific with *D. koreana* Matsumura, 1915 (see "Remarks" below under *D. koreana*) and *Togaphora* Matsumura, 1940 is then a new junior synonym of *Dictyophara*.

**Distribution.** Palaearctic Region.

### Key to the Species of Genus *Dictyophara* Germar from China

1. Cephalic process nearly cuneiform, relatively short, shorter than pronotum and mesonotum combined . . . . . **2**
- . Cephalic process cylindrical, long, nearly as long as or longer than pronotum and mesonotum combined . . . . . **3**
2. Cephalic process relatively elongate; vertex narrow, with ratio of length to width between eyes about 3.3:1 . . . . . *D. europaea* (Linnaeus)

- Cephalic process relatively short; vertex broad, with ratio of length to width between eyes about 2.3:1 ..... *D. koreana* Matsumura
- 3. Cephalic process relatively robust, 1.1 times as long as pronotum and mesonotum combined ..... *D. nekkana* Matsumura
- Cephalic process very robust, 2.3 times as long as pronotum and mesonotum combined ..... *D. pannonica* (Germar)

***Dictyophara europaea*** (Linnaeus, 1767)  
(Figs 2–3, 10–19)

*Fulgora europaea* L., 1767: 704.

*Flata europaea* (L.): Germar 1818: 190.

*Dictyophara europaea* (L.): Germar 1833: 175.

*Pseudophana europaea* (L.): Burmeister 1835: 160.

*Dictyophara* [sic] *italica* Kirschbaum, 1868: 15. Synonymized by Fieber 1872: 29.

**Description.** ♂, BL: 10.0–11.9 mm, HL: 2.1–2.3 mm, HW: 1.3–1.5 mm, FWL: 7.2–8.8 mm; ♀, BL: 12.1–13.0

mm, HL: 2.5–2.6 mm, HW: 1.6–1.7 mm, FWL: 8.9–9.5 mm.

Cephalic process (Figs 2, 3, 10–12) distinctly upturned, nearly cuneiform, relatively short, slightly shorter than pronotum and mesonotum combined (about 0.9:1). Vertex (Fig. 2, 3, 10) relatively narrow, with ratio of length to width between eyes about 3.3:1; lateral margins strongly carinate, sub-parallel at base, converging anteriorly to subacuminate; median longitudinal carina distinct and complete, lateral oblique depressions distinct. Frons (Fig. 12) with lateral carinae approaching frontoclypeal suture, with ratio of length to width 2.7:1. Pronotum (Figs 2, 3, 10) with median carina distinct, lateral discal carinae only conspicuous in basal 1/2 to 2/3. Forewing as in figure 13. Hind tibia with 5–7 lateral black-tipped spines, spinal formula 7-(18-20)-(17-19).

Male genitalia: anal tube (Figs 15, 16) relatively broad and large, lateral margin somewhat diverging towards apex in dorsal view (Fig. 16), ratio of length to width at apex about 1.3:1. Aedeagus (Figs 17–19) with phallical processes very short, only apical portion

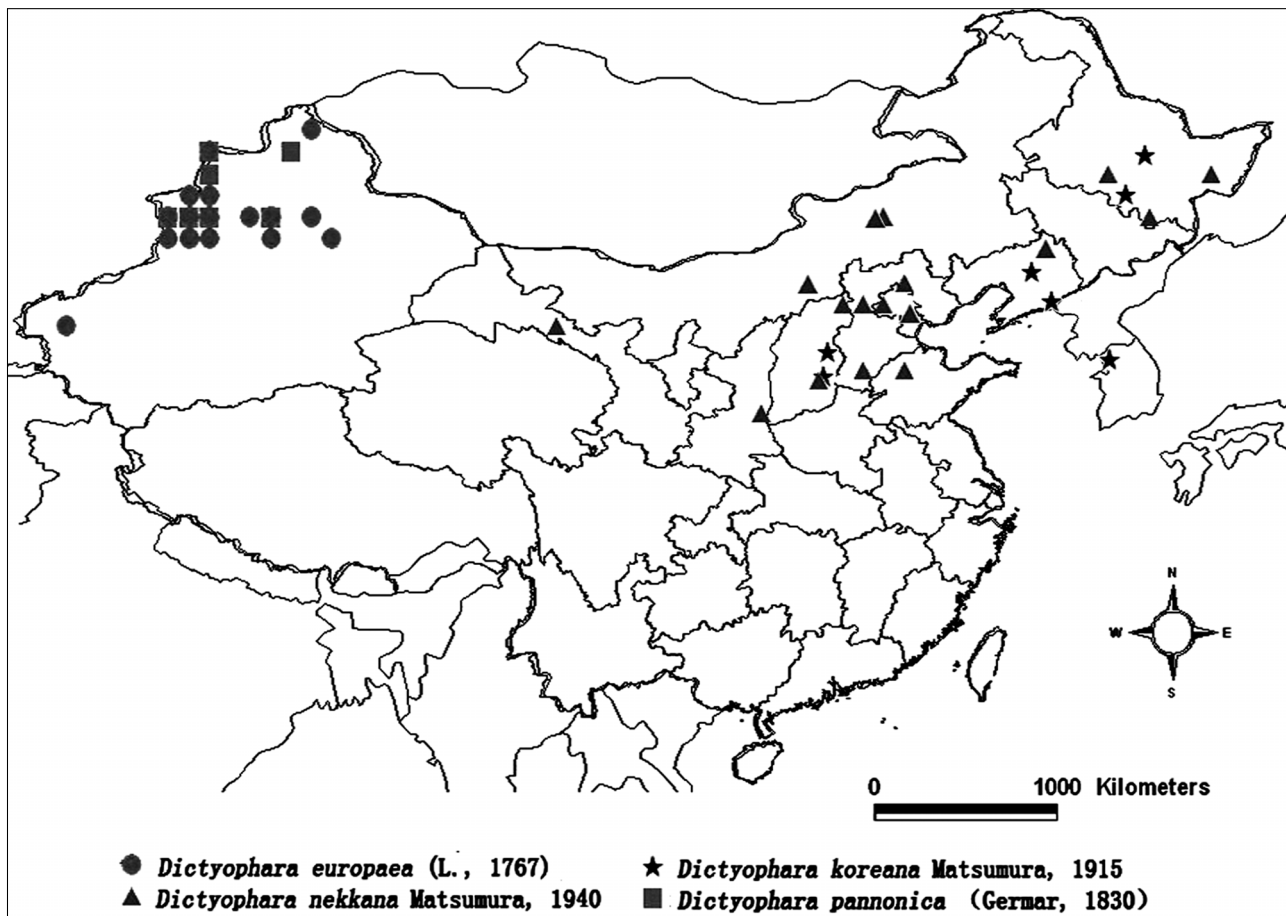
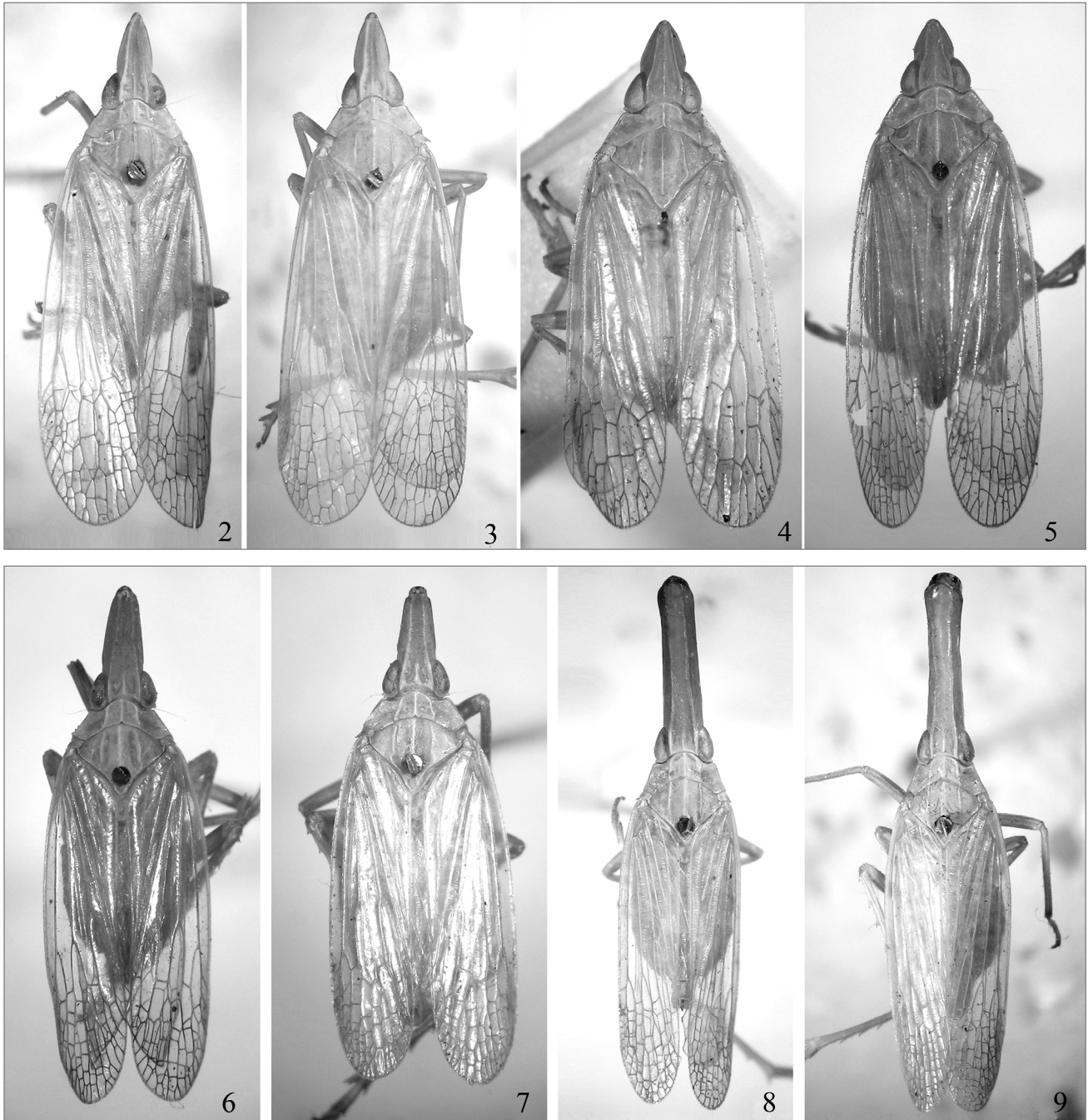


Figure 1. Geographic distribution of *Dictyophara* species from China.

protruded dorsolaterally; ventral two lobes of phallobase with about 16–18 long spines on upper dorsolateral area, and about 6–8 short spines lower ventrolateral area.

**Material examined.** N.W. CHINA, Sinkiang: 5♂♂, Tacheng, 26.vi.1955, 21.vii.1955 (S.J. Ma, K.L. Xia, Y.L. Chen); 4♂♂, 5♀♀, Tacheng, 470 m,

8, 9, 11.ix.1960 (S.Y. Wang); 3♂♂, 3♀♀, Aletai, 31.vii.1955 (S.J. Ma, K.L. Xia, Y.L. Chen); 1♂, Aletai, 4.ix.1956 (W.Y. Yang); 5♂♂, 2♀♀, Mt. Tianshan, 21, 25, 28.viii.1957 (C.P. Hong, G. Wang); 1♂, 1♀, Teke-siya, Mayuan, 4.vii.1957 (G. Wang); 2♂♂, Gongliu, eastern suburbs, 680–760 m, 20.viii.1957 (G. Wang); 2♂♂, 1♀, Tulufan, 30.vi.1958, no collector;



Figures 2–9. Dorsal habitus of *Dictyophara* species. (2) *D. europaea* (L.), male; (3) same, female; (4) *D. koreana* Matsumura, male; (5) same, female; (6) *D. nekkana* Matsumura, male; (7) same, female; (8) *D. pannonica* (Germar), male; 9. same, female.

1 ♀, Tulufan, 20–140 m, 25.vi.1958 (C.Q. Li); 55 ♂♂, 73 ♀♀, Shihezi, 590 m, 21–26.viii.1959 (S.Y. Wang, C.Q. Li, Y.R. Zhang, A.F. Tian); 3 ♂♂, 4 ♀♀, Nileke, 850–1250 m, 25,26.viii.1957 (G. Wang); 2 ♂♂, 4 ♀♀, Zhaosu, 1200 m, 11.viii.1957 (G. Wang); 11 ♂♂, 20 ♀♀, Changji, 680 m, 21.viii.1959 (S.Y. Wang, A.F. Tian); 2 ♂♂, 1 ♀, Wusu, 420–460 m, 2.viii.1957 (C.P. Hong); 1 ♂, 4 ♀♀, Keshi, 720 m, 21, 22.viii.1957 (G. Wang); 2 ♂♂, 1 ♀, Manasi, 345 m, 3.viii.1957, (C.P. Hong, G. Wang); 3 ♂♂, 6 ♀♀, Manasi, 580 m, 28.viii.1959 (C.Q. Li, A.F. Tian); 1 ♀, Manasi, Shihezi, 28.vii.1957 (C.P. Hong); 2 ♂♂, Jinghe, 2.ix.1957 (C.P. Hong); 3 ♀♀, Jinghe, 25.vii.1955 (S.J. Ma, K.L. Xia, Y.L. Chen); 2 ♀♀, Manasi, Shihezi, 17.vii.1957 (Z.B. Lu); 7 ♂♂, 8 ♀♀, Wulumuqi, 980 m, 1–5.ix.1959 (S.Y. Wang, C.Q. Li, A.F. Tian); 2 ♂♂, 8 ♀♀, Wulumuqi, 980 m, 23, 26.viii.1959, 2, 5, 8.ix.1959 (A.F. Tian); 1 ♀, Tuokesi, 1160 m, 6.viii.1957 (C.P. Hong); 1 ♀, Wukagou, 14.viii.1956 (W.Y. Yang); 1 ♀, Bole, 2.ix.1955 (S.J. Ma, K.L. Xia, Y.L. Chen); 2 ♂♂, Bole, Wugu, 480 m, 2.viii.1957 (G. Wang); 7 ♂♂, 4 ♀♀, Suiding, 390–650 m, 31.viii.1957 (C.P. Hong, G. Wang); 7 ♂♂, 6 ♀♀, Yining valley, 540–630 m, 4, 5.viii.1957 (C.P. Hong, G. Wang); 15 ♂♂, 20 ♀♀, Xinyuan, 850–1200 m, 23.viii.1957 (W.Y. Yang, C.P. Hong, G. Wang); 1 ♀, Shawan, Ningjiahe, 2320 m, 18.vii.1957 (G. Wang); 1 ♀, Shawan, Lama temple, 1636 m, 2.viii.1957 (G. Wang); 1 ♀, Miqian, 720 m, 3.viii.1959 (S.Y. Wang); 2 ♀♀, Emin, Qianjin, 520 m, 29.vii.1967 (Y.L. Chen); 1 ♀, Fuhai, 460 m, 17.vii.1969 (Y.L. Chen); 2 ♀♀, Sinkiang, no date and collector; 4 ♂♂, Kuitun, 31.vii.1975, 02, 03.viii, no collector (NU); 2 ♂♂, Beitun, 24.viii.1975, no collector (NU).

**Distribution.** N.W. China (Sinkiang) (new record), Albania, Austria, Belgium, Bulgaria, Denmark, Germany, Greece, Hungary, Italy, Kazakhstan, Kirgizstan, Moldova, Poland, Portugal, Romania, S. Russia, Sardinia, Sicily, Sweden, Switzerland, Turkey, Ukraine, East Palaearctic, N. Africa, Near East.

**Remarks.** The species is similar to *D. koreana* Matsumura, but can be distinguished from the latter by the vertex relatively elongate with ratio of length to width between eyes about 3.3:1 (about 2.3:1 in *D. koreana*).

This species widely distributes in Palaearctic Region of Europe, North Africa and West Asia. Its discovery in Sinkiang represents the first record from China.

### *Dictyophara koreana* Matsumura, 1915

(Figs 4–5, 20–30)

*Dictyophara* [sic] *koreana* Matsumura, 1915: 176.

*Centromeria manchurica* Kato, 1932: 227, Pl. VIII, Figs 3–5, syn. nov.

*Togaphora hokuryonis* Matsumura, 1940:19, syn. nov.

**Description.** ♂, BL: 9.9–10.8 mm, HL: 1.8 mm, HW: 1.5 mm, FWL: 7.2–8.2 mm; ♀, BL: 11.2–11.4 mm, HL: 1.7–1.8 mm, HW: 1.6 mm, FWL: 8.2–8.8 mm.

Cephalic process (Figs 4, 5, 20–22) somewhat upturned, nearly cuneiform, much shorter than pronotum and mesonotum combined (about 0.8:1). Vertex (Figs 4, 5, 20) relatively broad, with ratio of length to width between eyes about 2.3:1; lateral margins strongly carinate, sub-parallel at base, converging anteriorly to subacuminate; median longitudinal carina distinct and complete, lateral oblique depressions distinct. Frons (Fig. 22) with lateral carinae approaching frontoclypeal suture, with ratio of length to width 2.5:1. Pronotum (Figs 4, 5, 20) with median carina distinct, lateral discal carinae only conspicuous in basal 1/3 to half. Forewing and hindwing as in figures 23 and 24. Hind tibia with 5–6 lateral black-tipped spines, spinal formula 7-(16-18)-(14-16).

Male genitalia: anal tube (Figs 26, 27) relatively broad and large, lateral margin somewhat diverging towards apex in dorsal view (Fig. 27), ratio of length to width at apex about 1.4:1. Aedeagus (Figs 28–29) with phallical processes very short, only apical portion protruded dorsolaterally; ventral two lobes of phallobase with about 10–14 long spines on upper dorsolateral area, and about 6–8 short spines lower ventrolateral area.

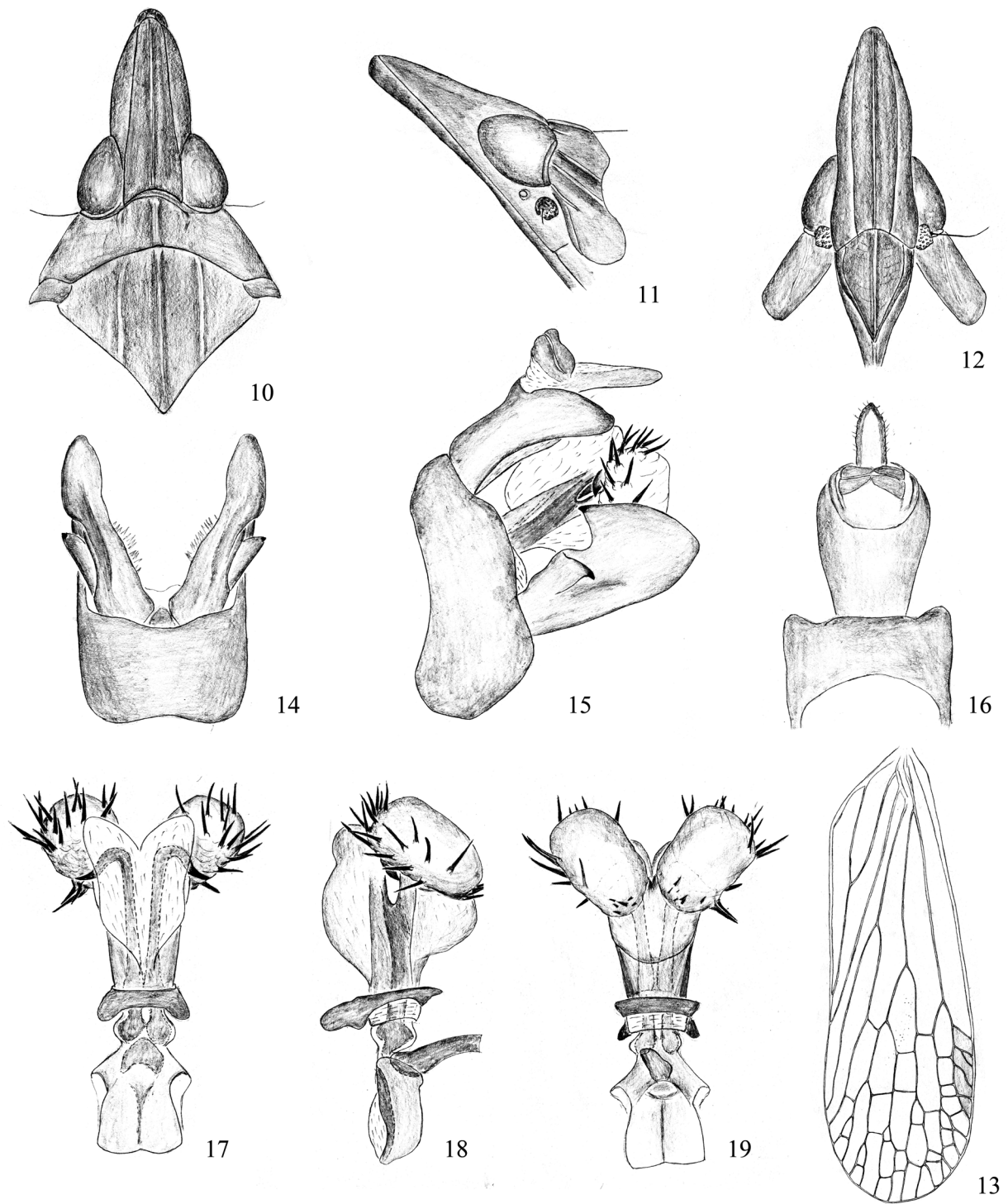
**Type material examined.** Holotype, 1 ♀, (1) Korea, Seoul Ikuma [all in Chinese], [underside] 1914 (20); (2) [Matsumura's handwriting] *Dictyophora* [sic] *koreana* n. sp. det. Matsumura (HU).

**Other material examined.** CHINA: [Liaoning]: 1 ♂, [Ho-]kuryo, Hoten, Manchouchuo, 16.viii.1940, S. Matsumura. **Shanxi:** 4 ♂♂, 2 ♀♀, Shanxi, viii.1950 (Y.B. Zhao); 1 ♂, 1 ♀, Taigu, 7.vii.1953; 3 ♂♂, Taiyuan, 23–26.viii.1974, no collector. **Heilongjiang:** 1 ♀, Pingtingshan, Manchouchuo, 18.viii.1940, S. Matsumura; 2 ♀♀, Mt. Maoer, 4.ix.1973, no collector.

**Distribution.** China (Shanxi, Liaoning, Heilongjiang) (new record), Korea.

**Remarks.** The species was described by Matsumura in 1915 from Seoul, Korea. We examined its type specimen housed in the Hokkaido University, Sapporo, Japan. It is recorded from China for the first time in this paper.

Kato (1932) described *Centromeria manchurica* Kato, 1932 from Antoken, South Manchuria (today Dandong, Liaoning, near Korea) in northeastern China. Matsumura (1940) has ever suspected *C. manchurica* is actually conspecific with *Togaphora hokuryonis* Matsumura, 1940, but he still erected the latter as a new species in his paper. Based on careful examination of the descriptions and illustrations, and the geographic distribution of *C. manchurica* (Kato, 1932; 1933), we propose that *C. manchurica* Kato, 1932 is a junior synonym of *D. koreana* Matsumura, 1915.



Figures 10–19. *Dictyophara europaea* (L., 1767). (10) Head, pronotum and mesonotum, dorsal view; (11) head and pronotum, lateral view; (12) head, ventral view; (13) forewing; (14) pygofer and parameres of male, ventral view; (15) genitalia of male, lateral view; (16) pygofer and anal tube of male, dorsal view; (17) aedeagus, dorsal view; (18) aedeagus, lateral view; (19) aedeagus, ventral view.



Eight dictyopharid species were described by Matsumura in 1940 from northeastern and southeastern China and Colombo, Sri Lanka. It is a pity that any of the original specimens studied in Matsumura's study failed to be found in the Hokkaido University, Sapporo, Japan, which conserved most of the type specimens of the Fulgoroidea species described by Matsumura (Liang and Suwa 1998). Liang and Suwa (1998) guessed that the type series of Matsumura's dictyopharid species at that time were missing.

Fortunately, partial original specimens of dictyopharid species studied by Matsumura in 1940 were successively found in the Insect Collection of the IZCAS, Beijing, China (Liang and Jiang 2005; Liang and Song, 2006; Song and Liang, in prep.). In these original specimens, some specimens are attached to Matsumura's handwritten determination and type labels, which undoubtedly belong to type material, but others only possess Matsumura's collecting label. By comparing the label data (e.g., collecting time (16–28 Aug. 1940), collector (S. Matsumura) and locality (Manchoukuo)) on the specimens with the original descriptions (Matsumura, 1940), we believe these specimens should be the studied material which were used in Matsumura's study in 1940.

In his study, Matsumura (1940) described *T. hokuryonis* from Hokuryo, Hoten, Manchoukuo in northeastern China. In the IZCAS, we found a male specimen bearing a label written "KURYO-HOTEN, Manchoukuo, 16-8-1940, S. Matsumura". Based on carefully checking the original descriptions of Matsumura (1940), we believe that this specimen is one of the original specimens of *T. hokuryonis* which Matsumura have studied in 1940, though it doesn't possess the Matsumura's handwritten determination or type label, and its collecting locality appears to differ from the original one. It is very possible that Matsumura omitted the two letters "HO" before "KURYO-HOTEN" on the label. Meantime, our careful examination of *T. hokuryonis* shows that it is a junior synonym of *D. koreana* Matsumura, 1915.

In addition, another female specimen bearing a label written "Pingtingshan, Manchoukuo, 18-8-1940, S. Matsumura" is obviously fallen into the Matsumura's material, but it was not mentioned by Matsumura in his study in 1940.

***Dictyophara nekkana* Matsumura, 1940**  
(Figs 6–7, 31–41)

*Dictyophara* [sic] *nekkana* Matsumura, 1940: 17 [not "16" as stated by Metcalf (1946)].

*Dictyophara nekkana* Matsumura: Metcalf 1946: 171; Liang and Suwa 1998: 135; Liang and Jiang 2005: 119, Figs 1–14.

*Dictyophara kaszabi* Dlabola, 1967: 137, **syn. nov.**

**Description.** ♂, BL: 9.9–10.9 mm, HL: 2.5–2.7 mm, HW: 1.3–1.5 mm, FWL: 6.7–7.2 mm; ♀, BL: 10.8–11.7 mm, HL: 2.9–3.2 mm, HW: 1.4–1.5 mm, FWL: 6.9–7.5 mm.

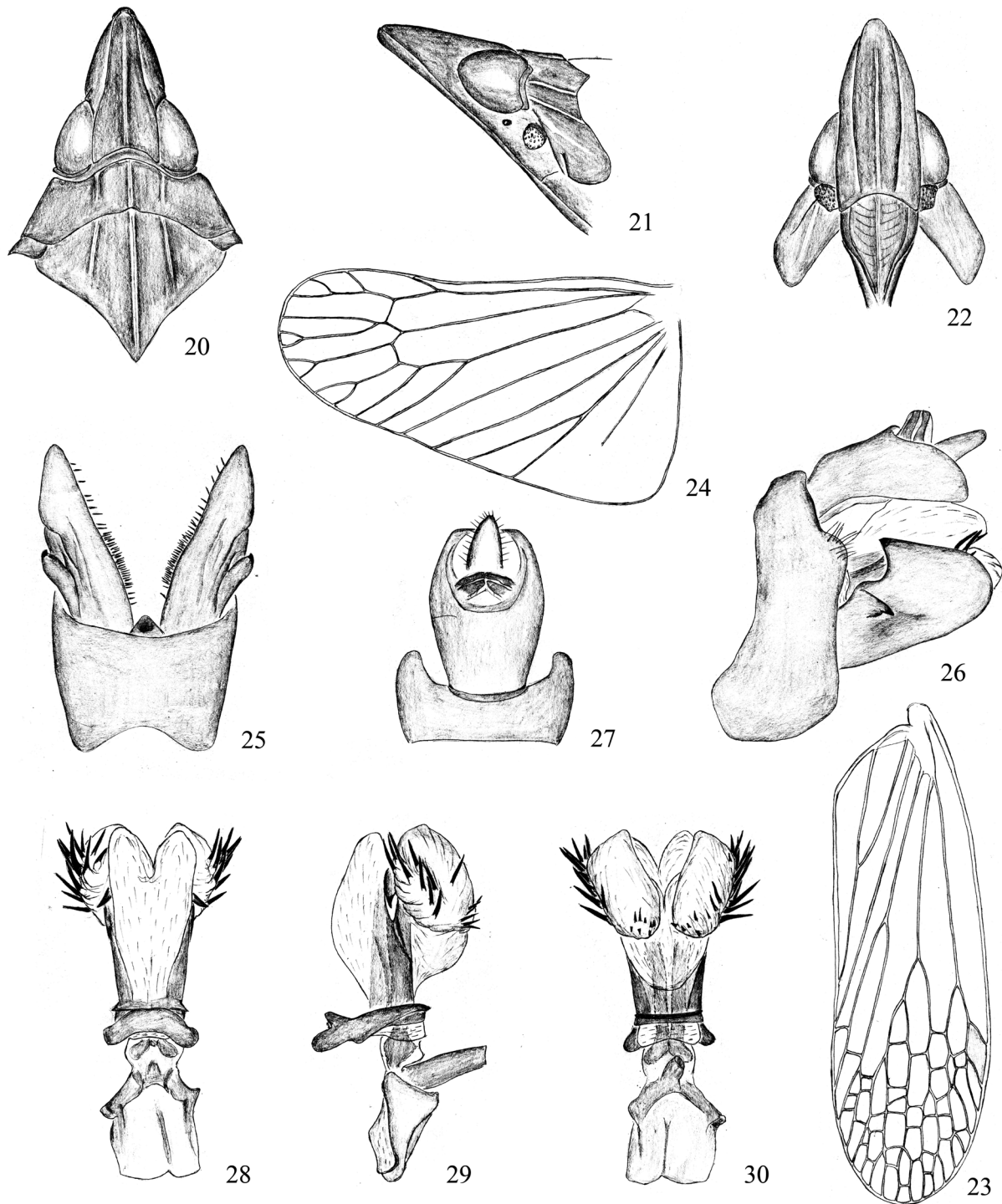
Cephalic process (Figs 6, 7, 31–33) relatively robust, distinctly upturned, nearly cylindrical, slightly longer than pronotum and mesonotum combined (about 1.1:1). Vertex (Figs 6, 7, 31) with lateral margins carinate, converging towards apex; median longitudinal carina only conspicuous between eyes, lateral oblique depressions distinct. Frons (Fig. 33) with lateral carinae approaching frontoclypeal suture. Pronotum (Figs 6, 7, 31) with median carina distinct, lateral discal carinae almost complete, approaching posterior margin. Forewing and hindwing as in figures 34 and 35. Hind tibia with 5–6 lateral black-tipped spines, spinal formula 7-(15-17)-(16-18).

Male genitalia: anal tube (Figs 37, 38) distinctly broad and large, lateral margin diverging towards apex in dorsal view (Fig. 38), ratio of length to width at apex about 1.1:1. Aedeagus (Figs 39–41) with phallical processes elongate, apical 2/5 protruded dorsolaterally; ventral two lobes of phallobase with about 14–16 long spines on upper dorsolateral area, and about 5–10 short spines lower ventrolateral area.

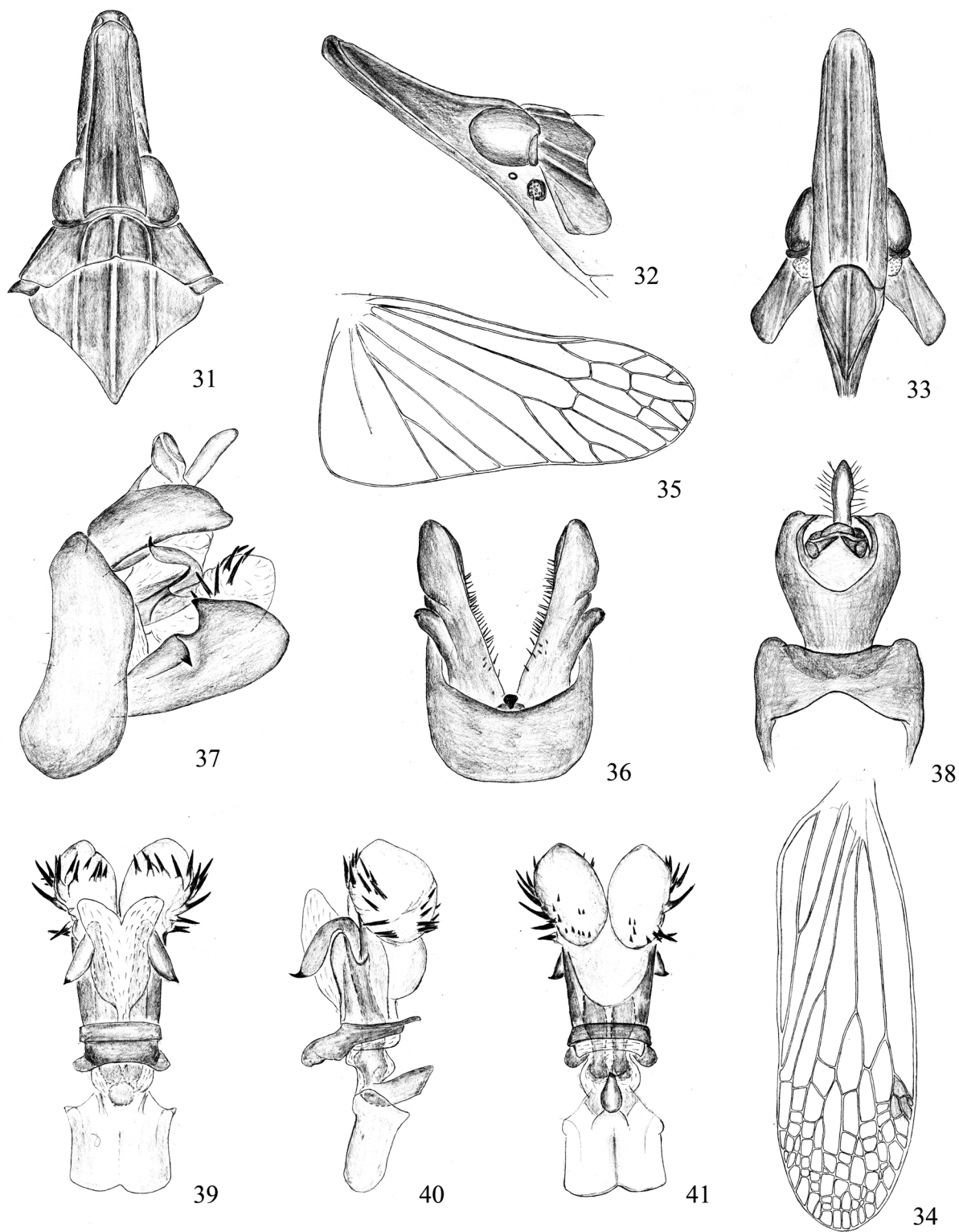
**Type material examined.** Lectotype, 1 ♀, (1) Shotoku, Manchoukuo, 28-8-1940, S. Matsumura; (2) [Matsumura's handwriting] *Dictyophora* [sic] *nekkana* Mats., det. Matsumura; (3) [pink label] Paratype, Matsumura (IZCAS). Paralectotypes: 1 ♀, (1) Shotoku, Manchoukuo, 28-8-1940, S. Matsumura; (2) [Matsumura's handwriting] *Dictyophora* [sic] *aminea* M. (IZCAS).

**Other material examined.** CHINA, Beijing: 1 ♂, Beijing, Hopei, 21.vii.1937, T. P. Chang (Fan. Inst. Biol. Peiping); 8; [Matsumura's handwriting] *Dictyophora* [sic] *nekkana* M., det. Matsumura; [pink label] Paratype Matsumura [Note: This specimen, bearing Matsumura's type label and identification label, can not be regarded as a syntype since Matsumura (1940) in his original description never mentioned 'Beiping (Beijing)' as the type locality (Liang and Jiang, 2005)]; 34 ♂♂, 42 ♀♀, Beijing, Hopei, 13, 16, 19, 21, 23, 27, 31.vii.1937, 5, 28.viii.1937, 8, 11.ix.1937 (T. P. Chang) (Fan. Inst. Biol. Peiping); 1 ♀, Beijing, viii.1950 (Y.B. Zhao); 1 ♂, 1 ♀, Badaling, 700 m, 6.ix.1961 (X.Z. Zhang); 1 ♀, Badaling, sweeping from grass, 12.vii.1972, no collector; 5 ♂♂, 13 ♀♀, Sanbao, 17, 18, 19, 22, 24.viii.1964 (S.B. Liao); 1 ♂, 1 ♀, same locality, but 18.viii.1964 (T.S. Li); 3 ♂♂, 5 ♀♀, 1 ex. (abdomen missing), same locality, but 21,22.viii.1964 (Q. Zhou); 1 ♂, same locality, but 23.vii.1975 (Y.S. Shi); 2 ♀♀, same locality, but 11,19.viii.1972, no collector (all in IZCAS). Tianjin: 2 ♂♂, Wuqing County, sweeping, 6.vii.1976, no collector. Hebei: 1 ♀, Chahar, Yamhkiaping, 30.viii.1937, no collector; 2 ♀♀, Mt. Xiaowutai,

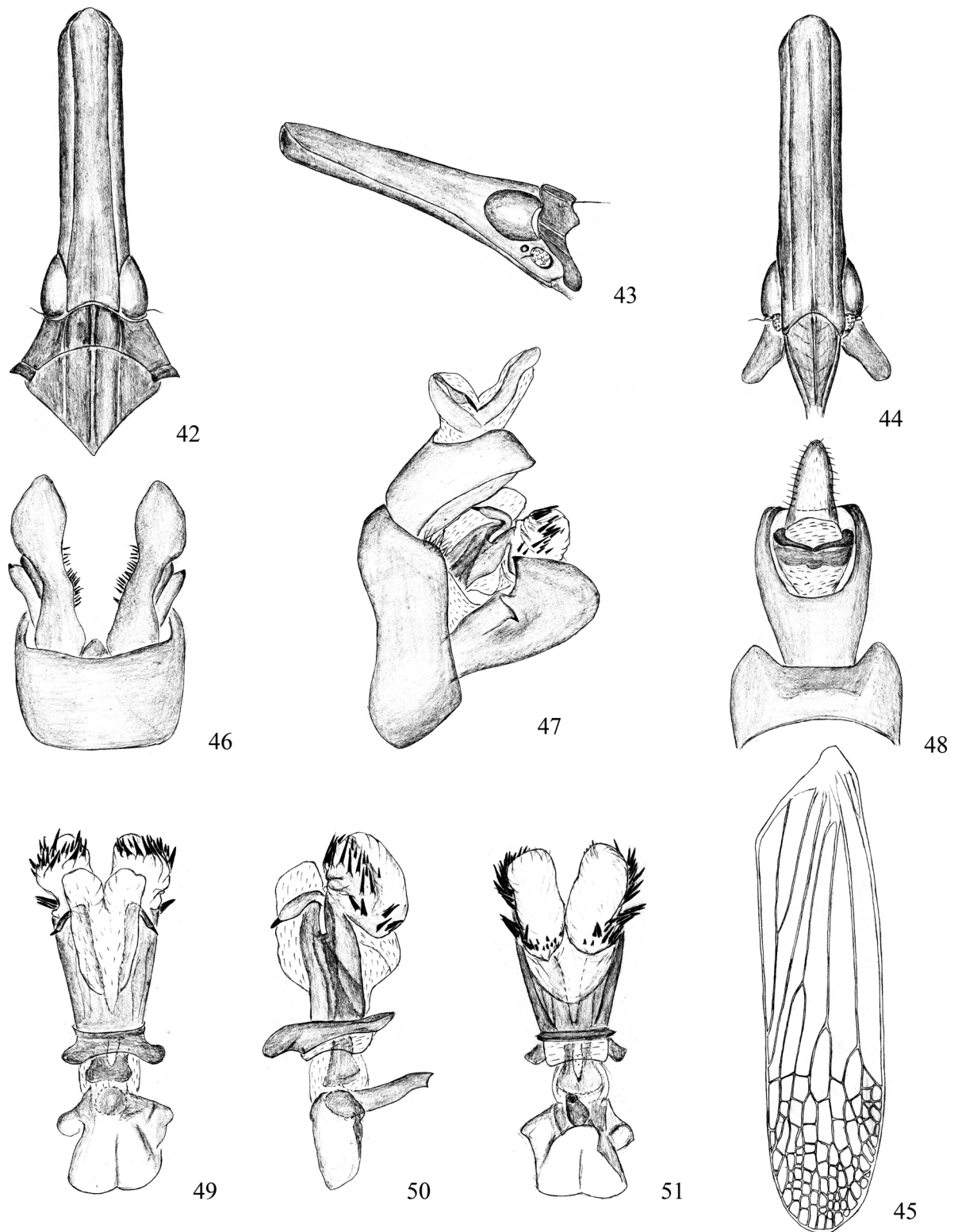




Figures 20–30. *Dictyophara koreana* Matsumura, 1915. (20) Head, pronotum and mesonotum, dorsal view; (21) head and pronotum, lateral view; (22) head, ventral view; (23) forewing; (24) hind wing; (25) pygofer and parameres of male, ventral view; (26) genitalia of male, lateral view; (27) pygofer and anal tube of male, dorsal view; (28) aedeagus, dorsal view; (29) aedeagus, lateral view; (30) aedeagus, ventral view.



Figures 31–41. *Dictyophara nekkana* Matsumura, 1940. (31) Head, pronotum and mesonotum, dorsal view; (32) head and pronotum, lateral view; (33) head, ventral view; (34) forewing; (35) hind wing; (36) pygofer and parameres of male, ventral view; (37) genitalia of male, lateral view; (38) pygofer and anal tube of male, dorsal view; (39) aedeagus, dorsal view; (40) aedeagus, lateral view; (41) aedeagus, ventral view.



Figures 42–51. *Dictyophara pannonica* (Germar, 1830). (42) Head, pronotum and mesonotum, dorsal view; (43) head and pronotum, lateral view; (44) head, ventral view; (45) forewing; (46) pygofer and parameres of male, ventral view; (47) genitalia of male, lateral view; (48) pygofer and anal tube of male, dorsal view; (49) aedeagus, dorsal view; (50) aedeagus, lateral view; (51) aedeagus, ventral view.

1200 m, 25.viii.1964 (Y.H. Han); 1 ♀, same locality and altitude, but 2.ix.1964 (C.G. Wang); 1 ♀, Yu County (not "Wei" County as stated by Liang & Jiang, 2005), 960 m, 13.ix.1964 (C.G. Wang); 4 ♂♂, 5 ♀♀, Yu County, Baile, 920 m, 2, 3.viii.1964 (Y.H. Han); 1 ♂, 3 ♀♀, same locality and altitude, but 2,4.viii.1964 (B.Q. Li); 3 ♂♂, 2 ♀♀, same locality and altitude, but 3.viii.1964 (C.G. Wang); 1 ♂, 3 ♀♀, Yu County, Xiheyang, 860 m, 23, 28, 29.vii.1964 (Y.H. Han); 5 ♂♂, 1 ♀, same locality and altitude, but 23, 29.vii.1964 (B.Q. Li); 3 ♂♂, 1 ♀, same locality and altitude, but 28, 29.vii.1964 (C.G. Wang); 1 ♂, 1 ♀, Mt. Xiaowutai, Jinhekou, 20.viii.2005 (Z.Z. Yang, Z. S. Zhang) (all in IZCAS); 1 ♂, Mt. Wulingshan, 29.viii.1985, no collector (TMNH). **Liaoning:** 1 ♂ (Plesiotype, Liang & Jiang, 2005), Kaigen, Manchoukuo, no date (I. Okada) (IZCAS). **Shanxi:** 2 ♂♂, 3 ♀♀, Taigu, 3, 15.vii.1953, no collector; 1 ♂, Hunyuan, Mt. Hengshan, Liyu, 1020–1250 m, 26.viii.1962 (Y.L. Chen, Q.C. Long) (IZCAS). **Inner Mongolia:** 2 ♂♂, Helin, 1.viii.1972, no collector (NU); 5 ♀♀, Ximeng, Xilinhot, 22.vii.1972, no collector; 4 ♀♀, Ximeng, Dongwu, 23.vii.1972, no collector; 3 ♂♂, eastern Inner Mongolia, Wuqi, 16, 17.viii.1971, no collector; 4 ♀♀, same locality, sweeping from vegetable garden, 15.viii.1971, no collector (all in IZCAS); 3 ♂♂, 2 ♀♀, Hailaer, 25.vii.1981, 2, 9.viii.1981, no collector (NU); 1 ♂, same locality, 4.viii.1981 (S.L. Liu) (TMNH). **Heilongjiang:** 1 ♂, Ning'an, Jingbo lake, 2.ix.1970, no collector; 1 ♂, Mishan, Xingkai, 23.viii.1970, no collector; 2 ♂♂, 4 ♀♀, Harbin, no date, (V. J. Tolmachov) (Muse'e Heude) (IZCAS). **[Shandong]:** 1 ♂, 3 ♀♀, Tsinanfou [Jinan], Long-tong, 500–700 m, no date and collector (Muse'e Heude) (IZCAS). **Shaanxi:** 2 ♀♀, Huayin, 450 m, 9.viii.1972 (S.Y. Wang) (IZCAS). **Gansu:** 1 ♀, Sunan, 2500 m, 22.viii.1957 (Y.R. Zhang) (IZCAS).

**Distribution.** China (Beijing, Tianjin, Hebei, Liaoning, Shanxi, Inner Mongolia, Heilongjiang, Shandong, Shaanxi, Gansu), Russia (Far Eastern Region), Mongolia, Korea.

**Remarks.** *Dictyophara kaszabi* was described by Dlabola in 1967 from Mongolia. Good descriptions and illustrations of the species of Anufriev and Emeljanov (1988: 493, Figs 378(1), 380(4–6), 381(5–8)) show that it is conspecific with *Dictyophara nekkana* Matsumura, 1940. We herein propose that *D. kaszabi* is a junior synonym of *D. nekkana* Matsumura, 1940.

*Dictyophara pannonica* (Germar, 1830)  
(Figs 8–9, 42–51)

*Flata pannonica* Germar, 1830: 47.

*Pseudophana pannonica* (Germar): Burmeister 1835: 160.

*Dictyophora* [sic] *pannonica* (Germar): Herrich-Schäffer 1835: 64; Spinola 1839: 297; Melichar 1912: 118.

*Chanithus pannonicus* (Germar): Kolenti 1857: 427; Metcalf 1946: 99.

*Dictyophara pannonica* (Germar): Fieber 1872: 4; Nast 1972: 87.

**Description.** ♂, BL: 12.2–12.8 mm, HL: 4.6–4.7 mm, HW: 1.3–1.4 mm, FWL: 6.8–7.1 mm; ♀, BL: 12.8–14.3 mm, HL: 4.5–5.5 mm, HW: 1.5–1.6 mm, FWL: 7.3–7.9 mm.

Cephalic process (Figs 8, 9, 42–44) very robust and cylindrical, more or less upturned, much longer than pronotum and mesonotum combined (about 2.3:1). Vertex (Figs 8, 9, 42) with lateral margins slightly carinate and sub-parallel; median longitudinal carina only conspicuous between eyes, lateral oblique depressions distinct. Frons (Fig. 44) with lateral carinae approaching frontoclypeal suture. Pronotum (Figs 8, 9, 42) with median carina distinct, lateral discal carinae almost complete, approaching posterior margin. Forewing as in figure 45. Hind tibia with 5–6 lateral black-tipped spines, spinal formula 7-(16-17)-(16-17).

Male genitalia: anal tube (Figs 47, 48) broad and large, lateral margin diverging towards apex in dorsal view (Fig. 48), ratio of length to width at apex about 1.4:1. Aedeagus (Figs 49–51) with phallical processes elongate, apical 2/5 protruded dorsolaterally; ventral two lobes of phallobase with about 16–18 long spines on upper dorsolateral area, and about 4–7 short spines lower ventrolateral area.

**Material examined.** N.W. CHINA, Sinkiang: 4 ♂♂, 1 ♀, Tacheng, 20, 24.vii.1955 (S.J. Ma, K.L. Xia, Y.L. Chen); 2 ♂♂, 3 ♀♀, Yumin, 23.vii.1955, same collector; 3 ♂♂, 4 ♀♀, Buerjin, 27.vii.1955, same collector; 2 ♂♂, 2 ♀♀, Chabuchaer, 1955.viii.28, same collector; 2 ♀♀, Yili, 30.viii.1955, same collector; 2 ♂♂, 3 ♀♀, Shihezi, 590 m, 25, 26.viii.1959 (S.Y. Wang, C.Q. Li); 1 ♀, Yining valley, 540–680 m, 4.viii.1953 (G. Wang); 1 ♀, Nileke, 850–1750 m, 26.viii.1957, same collector; 1 ♂, Xianghe, 2.viii.1956 (W.Y. Yang); 1 ♀, Changji, 680 m, 21.viii.1959, same collector; 3 ♀♀, Aletai, Kelaketai, 650 m, 16.viii.1960, same collector; 2 ♀♀, Tacheng, 470 m, 11.ix.1960, same collector; 1 ♂, Zhaosu, Wukuerqi, 1120 m, no date (C.P. Hong). HUNGARY: 1 ♂, Budapest, 08-09 (Matsumura).

**Distribution.** N.W. China (Sinkiang), Bulgaria, Bulgaria, Germany, Hungary, Italy, Kazakhstan, Kirgizstan, Romania, S. Russia, Turkey, E. Europe, S. Europe, C. Asia.

**Remarks.** This species can be distinguished from other Chinese species in *Dictyophara* by its distinctly elongate and robust cephalic process.

The species widely distributes in Palaearctic Region of Europe and central Asia. Nast (1972) listed it in Sinkiang, China.

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