

Classification of the Triozidae from Korea

(Homoptera: Psylloidea)

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韓國產 창나무이科 害虫의 分類

(同翅亞目 : 나무이上科)

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Abstract

This paper deals with the Triozidae of Korea. A total of 20 species belonging to 5 genera are recognized, among them 6 species are new to science as: *Bactericera* (S.) *distinctissima* n. sp., *B.* (S.) *miyatakei* n. sp., *B.* (S.) *yamagishii* n. sp., *Heterotrioza* (D.) *noknamui* n. sp., *Trioza breviata* n. sp., and *T. mayicola* n. sp., 4 species are newly recorded from Korea as: *Epitrioza yasumatsui* Miyatake, 1978, *Bactericera* (S.) *calcarata* (Schaefer, 1949), *B.* (S.) *striola* (Flor, 1861), and *Trioza abdominalis* Flor, 1861, and a new combination is made to: *Heterotrioza* (D.) *chilgia* (Park et Lee, 1980) n. comb. Keys are provided to the genera and species respectively. Some illustrations of head, forewing, male and female genitalic characters are given.

Introduction

The trioqid jumping plant-lice are an important component of the homopterans as well as psyllids feeding on plants, and some have been proven as vectors of several plant viral diseases while others cause severe damage directly or conspicuous gall or pseudo-gall formation to vegetables, ornamental shrubs and forest. But inspite of their economic importance, the Korean fauna of these pests is almost certainly one of the least known of any homopteran parts.

Indeed, only 10 species have been known correctly to occur in Korean Peninsula up to the pres-

ent, since Dr. C.H. Kim(1965, 1967), the first discoverer of the trioqid pests from this country, and several other entomologists as listed in references. Furthermore their taxonomy as well as zoogeographical distribution associated with host plants were more or less obscure previously.

It is our purpose here to construct the classification of exact identification and to provide the credible knowledge for the insect pest control. In this paper we intend to add 4 species of hitherto unrecorded from Korea and 6 species new to science. The keys separating genera and species respectively known to occur in Korea are given as we believe that these will be of the greatest use to students, so the keys have been made as clear

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cut and concise as possible.

We have made an attempt to arrange all the reported domestic localities of each species, together with new localities based on the material collected recently by us, but collecting data are omitted to save publication costs. The host plants which reported from Korea formerly and surveyed by us are included in case of available, some rectification are also made to the wrong records as these pests are usually stenophagous in their choice of food plant.

We believe there remain still several or more species not as yet represented from Korean distribution, thus in future it must be added as the studies will progress continuously.

Before going further, we here with express our cordial thanks to Prof. Dr. C.E. Lee and Prof. Dr. Y.E. Choi of Kyungpook Nat. University, and to Dr. Y. Miyatake of Osaka Museum of Natural History, Japan, for their kind guidance. Special thanks are due to Dr. K. Yamagishi of Entomological Laboratory, Kyushu University, Japan, and to Dr. P. Gilbert of Department of Entomology, British Museum (Natural History), Great Britain, for their kindness in various ways.

Systematics

Triozidae Low, 1879. 창나무이과

Key to genera of Korean Triozidae

1. Apex of forewing located above termination of vein M_{1+2} . Vein M shorter than two branches (M_{1+2} , M_{3+4}). Vein M_{1+2} subparallelled with M_{3+4} . Cell m2 and cul somewhat parallelogramy..... *Epitrioza*
- Apex of forewing located below termination of vein M_{1+2} , or rarely above termination. Vein M longer than two branches (M_{1+2} , M_{3+4}). Vein M_{1+2} more or less divergent with M_{3+4} . Cell m2 and cul somewhat subtriangular..... 2.
2. Genal cones clavate in dorsal view, slightly constricted at base. Forewing with distinct color pattern..... *Trichohermes*
- Genal cones not clavate in dorsal view, broadest at base. Forewing without color pattern, usually transparent..... 3.

3. Hind tibia with 3 saltatorial spines arranged 1 +2 at apex. Male proctiger with subtriangular ventral lobes produced caudad, as long as wide or broader. Paramere, slender in lateral view, tapered to apex..... *Bactericera*
Hind tibia with 3 or 4 saltatorial spines arranged 1+2 or 1+3 at apex. Male proctiger without subtriangular ventral lobes, but simple or roundly enlarged, as long as wide or longer. Pramere varied..... 4.
4. Hind tibia with 3 saltatorial spines arranged 1 +2 at apex..... *Heterotrioza*
Hind tibia with 4 saltatorial spines arranged 1 +3 at apex..... *Trioza*

Genus *Epitrioza* Kuwayama, 1910 진보리나

무이屬

Key to species of *Epitrioza*

1. Apex of forewing located nearly in the middle of terminations of vein Rs and M_{1+2} . Male paramere slender, with an acute apex curved anterad..... *E. mizuhonica*
- Apex of forewing located distinctly closer to termination of vein M_{1+2} . Male paramere somewhat stout, sinuate basally, with apex directed caudad..... *F. yasumatsui*

1. *Epitrioza mizuhonica* Kuwayama, 1910

진보리나무이

LOCALITY: published records-Unmoonsa Temple, Yongyeonsa Temple, Dongwhasa Temple; new records- Mt. Palgongsan, Mt. Yeongchuisan, Mt. Naejangsan, Is. Wando, Mt. Hanlasan, Seoguipo.
DISTRIBUTION: Korea, Japan.

HOST PLANT: *Elaeagnus crisper* var. *parvifolia*, *E. macrophylla*, *E. glabra*.

2. *Epitrioza yasumatsui* Miyatake, 1978

보리수나무이 (新稱)

LOCALITY: new records- Mt. Gyeryongsan, Mt. Gajisan, Mt. Weonhyosan, Is. Namhaedo, Mt. Mudeungsan, Mt. Hanlasan.

DISTRIBUTION: Korea (new record), Japan.

HOST PLANT: *Elaeagnus crisper* var. *typica*, *E. crisper* var. *parvifolia*.

Genus *Trichohermes* Kirkaldy, 1904 털나무이屬

3. ***Trichohermes grandis* Loginova, 1965** 털나무이
LOCALITY: published records-Mt. Sudosan, Kachang, Yongyeonsa Temple; new records-Mt. We-

onhyosan, Mt. Hanlasan, Jungmun.

DISTRIBUTION: Korea, Japan, China (Shansi), USSR (Maritime Territory).

HOST PLANT: *Rhamnus davurica*.

Genus *Bactericera* Puton, 1976 버드나무이屬

Present knowledge indicates all the known members in Korea belong to the subgenus *Smirnovia* Klimaszewski.

Keys to species of *Bactericera*

- 1. Forewing membrane with surface spinules present in all cells..... 2.
 - Forewing membrane with surface spinules absent..... 4.
 - 2. Mesonotum reddish to ocher brown, venter pale yellow to dirty yellow. Male proctiger with subtriangular lobes slightly bent upwards at distal portions in lateral view...*B. distinctissima* sp. nov.
 - Mesonotum and venter dark brown to black. Male proctiger with subtriangular lobes not bent.....3.
 - 3. Forewing with membrane yellowish. Male paramere in lateral view approximately parallel sided, with apex simply curved anteriorly.....*B. salicivora*
 - Forewing with membrane clear, colorless. Male paramere somewhat tapered distad, with tips recurved anteriorly..... *B. myohyangi*
 - 4. General coloration dark brown to black, with pink reddish markings on intersegments. Female genitalia longer than broad, subgenital plate with a long spine like process posteriorly...*B. calcarata*
 - General coloration light, with or without dark brown to black markings. Female genitalia shorter than broad, subgenital plate with somewhat dull apex5.
 - 5. Head and thorax dirty yellowish to orange, without any dark markings.....6.
 - Head and thorax with dark brown or black markings..... 7.
 - 6. Forewing broadest at middle...*B. miyatakei* sp. nov.
 - Forewing broadest at distal third...*B. koreana*
 - 7. Genal cones entirely dark brown to black*B. striola*
 - Genal cones milky white...*B. yamagishii* sp. nov.
4. *Bactericera* (*S.*) *distinctissima* sp. nov.

붉은버드나무이(新稱)

General coloration reddish to ocher brown with yellowish markings on venter. antennae dark brown to black, with 3 basal segments milky white to pale yellowish. Head dark brown to black. Vertex slightly longer than half as long as wide (ratio, 9 : 17), deeply incised anteriorly, a little bulging in front on eachside of median suture, with prominent discal impressions rather posteriorly, elevated at lateral ocelli. Genal cones somewhat stout, shorter than vertex (ratio, 7. 5 : 9). Forewings long, narrow basally, widest in apical third, with surface spinules in all cells, leaving broad spinule-free stripes along margins of veins. Fore and middle legs tinted dark brownish. Male genitalia as in figure. Proctiger with subtriangular lobes laterad, distal portion of lobes slightly bent upward in lateral view. Female genitalia as in figure, proctiger in lateral view over hanging subgenital plate.

Length of body: ♂ 2.16mm, ♀ 2.28mm; to tip of folded wings ♂ 3.15mm, ♀ 3.98mm.

TYPES EXAMINED: Holotype ♂, Hayang Eup, Gyeongbug Prov., Korea, 5, VII, 1980, coll. Y.J. Kwon; paratypes: 2♂♂, 4♀♀, same data as holotype; Daegu, Korea, 1♂, 11, W, 1979, coll. Y.J. Kwon.

HOST PLANT: *Salix* sp.

REMARKS: This species is very close to *Bactericera* (*S.*) *salicivora* (Reuter, 1876), but differs from the latter in having rather stout genal cones, and male proctiger with subtriangular lobes slightly bent upwards, and female proctiger overhanging subgenital plate.

5. *Bactericera* (*S.*) *salicivora* (Reuter, 1876)

버드나무이

LOCALITY: published records-Padong, Yongyeonsa Temple, Jungdae, Mt. Sansungsan.

DISTRIBUTION: Korea, Japan, Mongolia, USSR (European part, Sakhalin), Great Britain, Poland, Scandinavia.

HOST PLANT: *Salix babylonica*.

6. *Bactericera* (*S.*) *myohangi* (Klimaszewski, 1968) 묘향나무이(改稱)

LOCALITY: published records-Myohyang, Mt. Sudosan, Jungdae; new record-Mt. Juwangsan.

DISTRIBUTION: Korea, China(Shansi).

HOST PLANT: *Salix* sp.

7. *Bactericera* (*S.*) *calcarata* (Schaefer, 1949)

이른쭈나무이(新稱)

LOCALITY: new record-Mt. Palgongsan.

DISTRIBUTION: Korea(new record), USSR(Euro-dean part, Sakhalin), Switzerland.

HOST PLANT: *Artemisia* sp.

8. *Bactericera* (*S.*) *miyatakei* sp. nov.

꼬마버드나무이(新稱)

General coloration dirty yellowish to orange, abdomen yellowish green. Antennae with 3 basal segments pale, remainder dark brown to black. Vertex tinted with orange, slightly longer than half as long as wide(ratio, 7 : 13), incised anteriorly, with prominent discal impressions posteriorly on each side of median suture. Genal cones shorter than vertex(ratio, 5 : 7), divergent, short conical, inclined downwards. Forewings broadest at middle, membrane with surface spinules absent in all cells. Marginal spinules distributed typically, in cells m1, m2 and cul. Cell m1 slightly larger than that of cul.

Male genitalia as in figure. Proctiger with subtriangular lobes somewhat narrowed to apex. Parameres long, somewhat sickle shaped, with distal portion curved anteriorly. Female genitalia as in figure, proctiger in lateral view slightly overhanging subgenital plate, length of anus shorter than remainder of proctiger.

Length of body: ♂1.42mm, ♀1.54mm to tip of folded wings ♂2.47mm, ♀2.65mm.

TYPES EXAMINED: Holotype ♂, Mt. Daedunsan, Jeonnam Prov., Korea, 29, Ⅳ, 1980, coll. Y.J. Kwon; paratypes: 2♂♂, 3♀♀, same data as holotype.

HOST PLANT: *Salix* sp.

REMARKS: This new species differs from *Bactericera* (*S.*) *crithmi* Löw, 1880, by the shape of male genitalia, especially in having parameres which are more broad and roundly curved cephalad.

9. *Bactericera* (*S.*) *koreana* (Klimaszewski, 1968) 고려나무이(改稱)

LOCALITY: published records-Myohyang, Geb. Onpho bei Chongjin, Jungdae.

DISTRIBUTION: Korea.

HOST PLANT: Unknown.

10. *Bactericera* (*S.*) *striola* (Flor, 1861)

유럽버드나무이(新稱)

LOCALITY: new records-Mt. Obongsan, Mt. Gajisan, Mt. Mayisan, Is. Yokjido.

DISTRIBUTION: Korea(new record), Japan, Mongolia, USSR, Europe.

HOST PLANT: *Salix koriyanagi*, *Salix* sp.

11. *Bactericera* (*S.*) *yamagishii* sp. nov.

산버드나무이(新稱)

General coloration orange yellowish to ochre brown, with dark brown markings. Eyes dark brown. Antennae with 3 basal segments pale, remainder dark brown to black. Vertex with dark brown to black markings on disc, distinctly longer than half as wide(ratio, 9 : 15), incised anteriorly, with prominent discal impressions on each side of median suture, somewhat elevated at lateral ocelli. Genal cones milky white, shorter than vertex(ratio, 6.5 : 9), divergent apically. Forewings long, narrow basally, widest in apical third, membrane with surface spinules absent in all cells. Marginal spinules distributed typically in cells m1, m2, and cul. Male genitalia as in figure. Proctiger with narrow subtriangular lobes on distal half of ventral margin, furnished with long macrosetae on distal portion of the lobes. Parameres long, rather straight in lateral view, with apices pointed.

Proximal segment of aedeagus with enlarged apical portion. Female genitalia as in figure. Proctiger slightly sinuate next to apex in lateral view, length of anus shorter than remainder of proctiger.

Length of body: ♂1.79mm, ♀1.91mm; to tip of folded wings ♂3.27mm, ♀3.52mm.

TYPES EXAMINED: Holotype ♂, Mt. Gajisan, Gyeongnam Prov., Korea, 10, Ⅴ, 1981, coll. Y. J. Kwon; paratypes: 3♀♀, same data as holotype.

HOST PLANT: *Salix* sp.

REMARKS: This new species resembles *Bactericera* (*S.*) *myohyangi* (Klimaszewski, 1968) in male genitalic characters, but distinctly differs from it by the absence of surface spinules on membrane of forewing in all cells, and by the shape of male paramere which is not recurved at apex.

Genus *Heterotrioza* Dobreanu et Manolache, 1962 명아주나무이屬

Key to species of *Heterotrioza*

1. Head and thorax in male dark brown, abdomen yellowish green, female usually yellowish green. Male aedeagus with a pair of subapical processes, bent downwards on dorsal side of apex.....
..... *H. (s. str.) obliqua*
 - General coloring yellowish orange to yellowish brown, with or without dark markings. Male aedeagus without subapical process on dorsal side(subgenus *Dyspersa* Klimaszewski).....2.
 2. Forewing with vein Rs exceeding the termination of vein M_{3+4} . Big species longer than 3mm in total length.....*H. (D.) ukogi*
 - Forewing with vein Rs shorter than the termination of vein M_{3+4} . Small species less than 3 mm in total length3.
 3. Genal cones distinctly exceeding half of median length of vertex. Living on *Pueraria* sp.
.....*H. (D.) chilgi*
 - Genal cones nearly half as long as vertex. Living on *Cinnamomum* sp.....
..... *H. (D.) noknamui* sp. nov.
- 12. *Heterotrioza (s. str.) obliqua* (Thomson, 1877)** 명아주나무이(新稱)

LOCALITY: published records- Phyöngyang, Phyöngyang: Moranbong; new records- Hayang Eup, Daegu, Samnam Myeon, Is. Yokjido, Is. Hongdo.
DISTRIBUTION: Korea, USSR, Europe.
HOST PLANT: *Chenopodium* spp., *Atriplex* spp.

13. *Heterotrioza (D.) ukogi* (Shinji, 1940)
오갈피나무이

LOCALITY: published record-Mt. Jiri.
DISTRIBUTION: Korea, Japan.
HOST: *Acanthopanax chiisanensis*.

14. *Heterotrioza (D.) chilgia* (Park et Lee, 1980) comb. nov. 칩나무이

LOCALITY: published records-Hwangak Mt., Yongyeon Temple, Tongdo Temple, Mt. Jiri; new records- Mt. Palgongsan, Mt. Jirisan, Mt. Mudungsan, Mt. Hanlasan, Seoguipo, Jungmun, Is. Hongdo, Is. Heuksando.
DISTRIBUTION: Korea.
HOST PLANT: *Pueraria lobata*.

The above species was originally recorded by

Dr. C.H. Kim(1965, 1967) from Mt. Jirisan under the name of *Trioza camphorae* (nec Sasaki, 1905) with descriptions of observation on the larval and adult biology in detail. Therefore, previously known records of *Trioza camphorae* Sasaki (= *Heterotrioza (D.) camphorae* (Sasaki) comb. nov.), which is still undiscovered indeed but its host-*Cinnamomum camphora*-is distributed in Is. Jejudo (=Is. Quelpart), from Korea (Ko, 1969; Kor. Soc. Pl. Prot., 1972) must be referred to the above species.

15. *Heterotrioza (D.) noknamui* sp. nov. 제주 녹나무이(新稱)

General coloration dirty yellowish to orange, with dark brown longitudinal narrow markings on each side of dorsum behind eyes.

Vertex distinctly longer than half as long as wide (ratio, 7.2 : 10), incised anteriorly, with prominent discal impressions posteriorly on each side of median suture. Antennae pale yellowish, with basal two segments somewhat tinted dark brown, apical two segments dark brown. Genal cones short, nearly half as long as vertex(ratio, 7.2 : 3.6), distal half somewhat paler.

Forewings long, broadest distal third, membrane with surface spinules absent in all cells. Marginal spinules distributed typically.

Vein Rs very short, usually not exceeding the termination of vein Cula. Cell cul slightly larger than that of m2. Male genitalia as in figure. Proctiger somewhat stout and longer than paramere. Parameres broad, apices obliquely truncate, with tips directed anteriorly in lateral view, basal third of posterior margin broadly produced caudad.

Length of body: ♂ 1.28mm, ♀ 1.52mm; to tip of folded wings ♂ 2.28mm, ♀ 2.61mm.

TYPES EXAMINED: Holotype ♂, Jungmun, Jejudo Prov., Korea, 23, VII, 1981. coll. Y.J. Kwon, on *Cinnamomum camphora*; paratypes: 12 ♂♂, 17 ♀♀, same data as holotype.

HOST PLANT: *Cinnamomum camphora*.

REMARKS: This new species differs well from *Heterotrioza (D.) camphorae* (Sasaki, 1905) comb. nov., by the forewing venation and the chaacristic shape of the male genitalia.

Genus *Trioza* Forster, 1848 창나무이屬

Key to species of *Trioza*

1. Body dirty yellow to orange, or yellowish brown, without black markings on head and venter. Usually smaller species not exceeding 3mm in total length.....2.
- Body with prominent dark brown to black markings, or generally coloring dark brown to blackish. Bigger speceeding 3mm in total length...3.
2. Forewing with cell cu1 two times as large as cell m2. Living on *Celtis sinensis* var. *japonica* *T. brevifrons*
- Forewing with cell cul nearly as large as cell m2. Living on *Chrysanthemum* spp..... *T. abdominalis*
3. Genal cones very, reduced and attached to antero-ventral sides of antennal sockets. Antennal sockets very large, bulging near anterior margin of vertex *T. breviata* sp. nov.
- Genal cones more or less conical, usually well developed. Antennal sockets smaller than genal cones4.
4. Vertex and dorsum with long hairs sparsely scattered. Genal cons black, nearly as long as vertex *T. nigra*
- Vertex and dorsum with few very short hairs. Genal cones light, nearly half as long as vertex *T. mayicola* sp. nov.

16. *Trioza brevifrons* Kuwayama, 1910 뽕죽평나무이(新稱)

LOCALITY: published record-Mt. Sudosan.

DISTRIBUTION: Korea, Japan, Taiwan.

HOST PLANT: *Celtis sinensis* var. *japonica*.

The present species was firstly reported from Korean Peninsula by Dr. Y. Miyatake (1971) as unnamed one-*Trioza* sp., and later he identified it to the senior author when the latter intended to make the catalogue (in his personal communication).

17. *Trioza abdominalis* Flor, 1861 갈고리나무이(新稱)

LOCALITY: new records-Mt. Deogyusan, Mt. Jirisan, Mt. Hanlasen.

DISTRIBUTION: Korea (new record), Mongolia, USSR(N.W. European part), Europe.

HOST PLANT: *Chysanthemum* sp.

The Korean population seems belonging to *T.*

abdominalis orientalis Kimaszewski, 1966, of which the type-locality is Mongolia where the subspecies population is widespread and very numerous.

18. *Trioza breviata* sp. nov. 민뽕나무이(新稱)

General coloration dirty yellow, with dark brown markings on head, dorsum, and abdomen. Vertex dark brown, with posterior half much darker, nearly half as long as wide (ratio, 8.5 : 17), broadly depressed medially, prominently elevated at lateral ocelli. Eyes reddish brown, median ocellus prominent, yellowish orange, 0.11mm indiameter. Antennal sockets very large, much bigger than genal cones. Genal cones very small, reduced and attached to antero-ventral sides of antennal sockets, divergent. Pronotum dirty yellow, slightly narrower than head including eyes. Mesonotum polished dark brown. Female genitalia dark brown, with middle portion light brown, long, evenly tapered to apex, proctiger slightly larger than subgenital plate, length of anus distinctly shorter than remainder of proctiger.

Length of body: ♀2.29 mm; wings missing.

TYPE EXAMINED: Holotype♀, Mt. Jirisan, Gyeongnam Prov., Korea. 9, VI, 1980, coll. Y.J. Kwon.

HOST PLANT: Unknown.

REMARKS: Although this new species resembles the elements of the genus *Bactericera* s. str., for instance, *B.(B.) ferrisi* Puton, 1876, in having very small genal cones which are reduced and attached to large antennal sockets, but it is distinctly separated from them by the presence of 4 saltatorial spines of hind tibia arranged 1 +3 at apex.

19. *Trioza nigra* Kuwayama, 1910 째죽나무이

LOCALITY: published records-Mt. Sudosan, Unmoonsa Temple, Kachang, Yongyeonsa Temple, Urock, Mt. Sansungsan, Songrimsa Temple; new records-Mt. Weonhyosan, Mt. Sinbulsan, Mt. Yeongchuisan, Mt. Gajisan, Mt. Palgongsan, Mt. Gyeryongsan. Mt Whangaksan, Nt. Jirisan, Mt. Mudeungsan, Mt. Hanlasan, Is. Hongdo.

DISTRIBUTION: Korea, Japan.

HOST: *Styrax japonica*, *S. obassia*, *Symplocos coreana*.

20. *Trioza mayicola* sp. nov. 마이산나무이(新稱)

General coloration dirty yellowish orange, with

prominent dark brown markings on vertex, dorsum and adomen. Eyes dark brown. Antennae pale yellowish brown, with two apical segments and distal half of VII-segment dark brown. Vertex distinctly longer than half as long as wide(ratio, 10.5 : 16.1), deeply incised anteriorly on median suture, with prominent pit-like discal impressions on each side locating next to middle. Genal cones short, almost half as long as vertex (ratio, 5.3 : 10.5). distal half somewhat paler, slightly divergent apically. Forewings long, narrow basally, widest in middle, with acute, membrane with surface spinules only on basal cells(pb and cu2). Vein Rs very long, reaching beyond branching of vein M, wavy and bisinuate. Vein M nearly two times as long as vein Cu1. Cell cu1 slightly larger than m2. Female proctiger dark brown, with dorsum sinuated next to anus and somewhat to apex in lateral view.

Length of body: ♀2.09 mm; to tip of folded wings ♀3.47mm.

TYPE EXAMINED: Holotype ♀, Mt. Mayisan, Jeonbug Prov., Korea, 11, V, 1980, coll. Y.J. Kwon.
HOST PLANT: Unknown.

REMARKS: The present species apparently differs from *Trioza nigra* Kuwayama, by the coloration of body, genal cones which are almost half as long as vertex, and by the characteristic surface spinules on forewings.

摘 要

우리나라産 창나루이科 害虫은 지금까지 10種만이 정확히 分布하고 있는 것으로 알려져있을 뿐이다. 著者들은 本 調査를 통해 새로이 6新種 및 4未記錄種을 發見하였으므로 이에 記載報告코자 하며, 따라서 우리나라産은 모두 20種이 된다. 또한 과거의 잘못 사용되어 오던 學名을 정리하였으며 각 屬 및 種의 검색표를 작성하였고 그 國內産地 및 分布, 寄主植物을 정리하였다.

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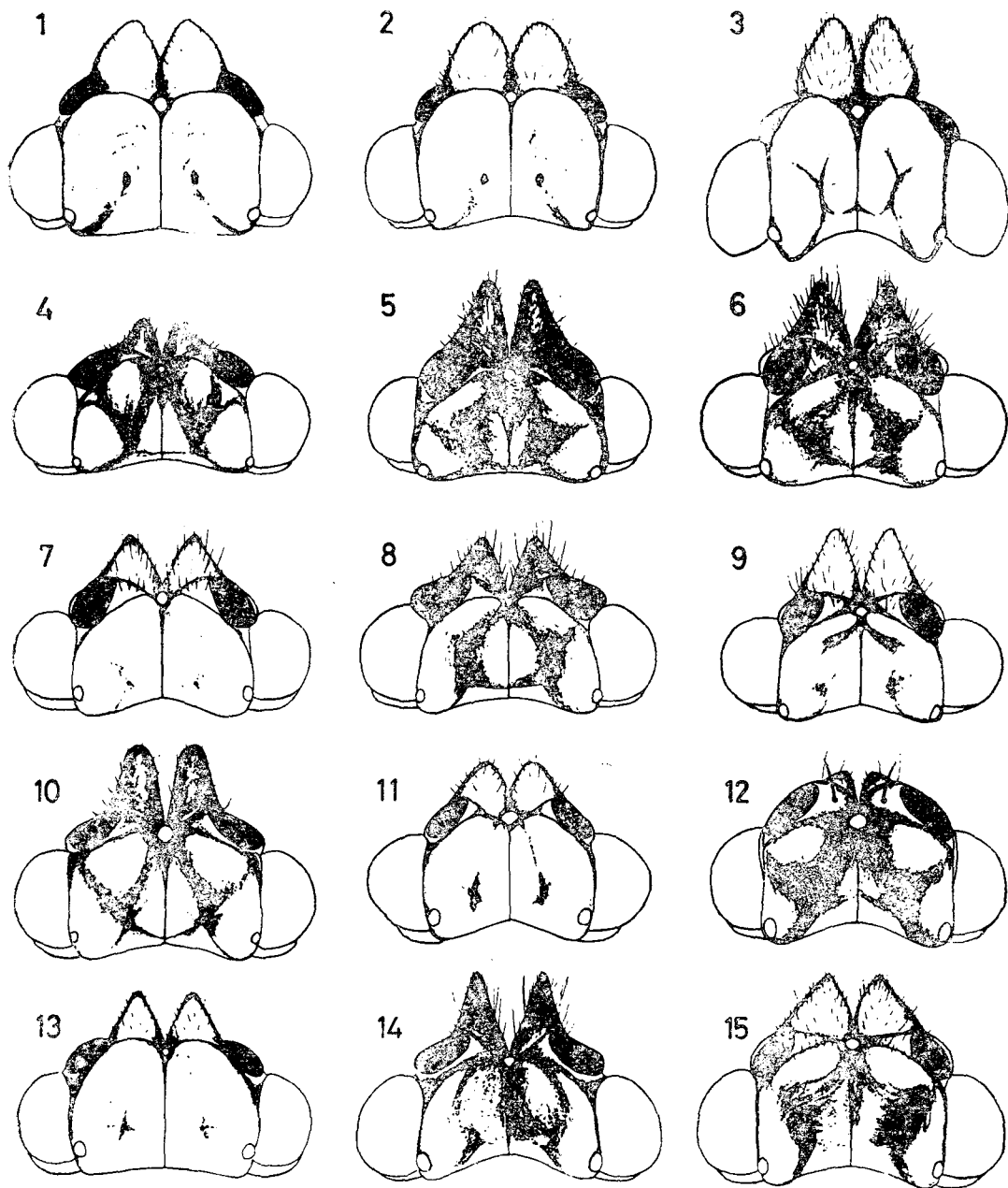


PLATE 1. Head structure of triozids.

1. *Epitrioza mizuhonica*, 2. *E. yasumatsui*, 3. *Trichohermes grandis*, 4. *Bactericera distinctissima* sp. nov., 5. *B. myohyangi*, 6. *B. calcarata*, 7. *B. miyatakei* sp. nov. 8. *B. striola*, 9. *B. yamagishii* sp. nov., 10. *Heterotrioza obliqua*, 11. *H. noknamui* sp. nov., 12. *Trioza breviata* sp. nov., 13. *T. abdominalis*, 14. *T. nigra*, 15. *T. mayicola* sp. nov.,

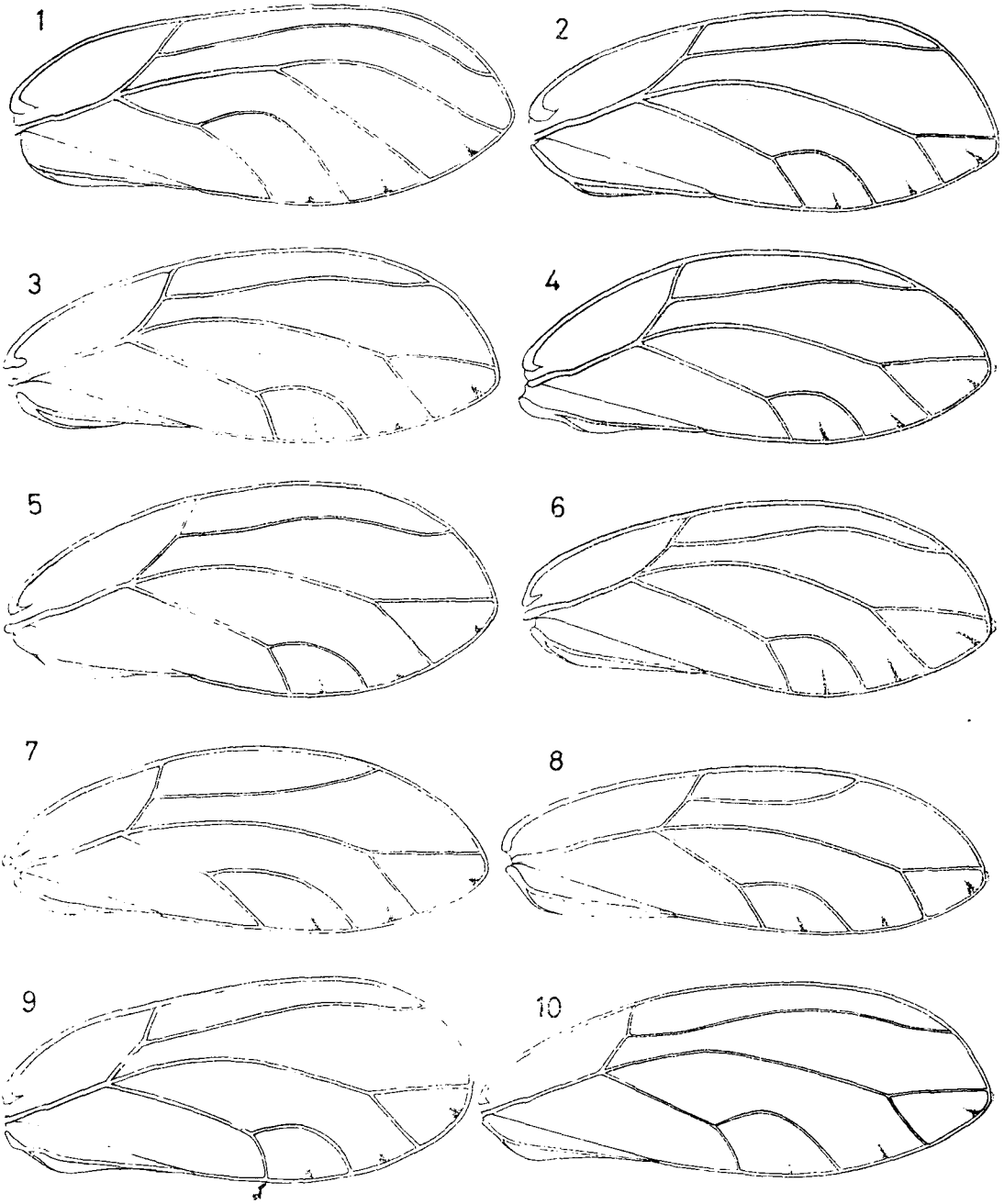


PLATE 2. Forewings of trioziids.

1. *Epitrioza yasumatsui*, 2. *Bactericera distinctissima* sp. nov., 3. *B. calcarata*, 4. *B. miyatakei* sp. nov., 5. *B. striola*, 6. *B. yamagishii* sp. nov., 7. *Heterotrioza obliqua*, 8. *H. noknamui* sp. nov., 9. *Trioza abdominalis*, 10. *T. nigra*.

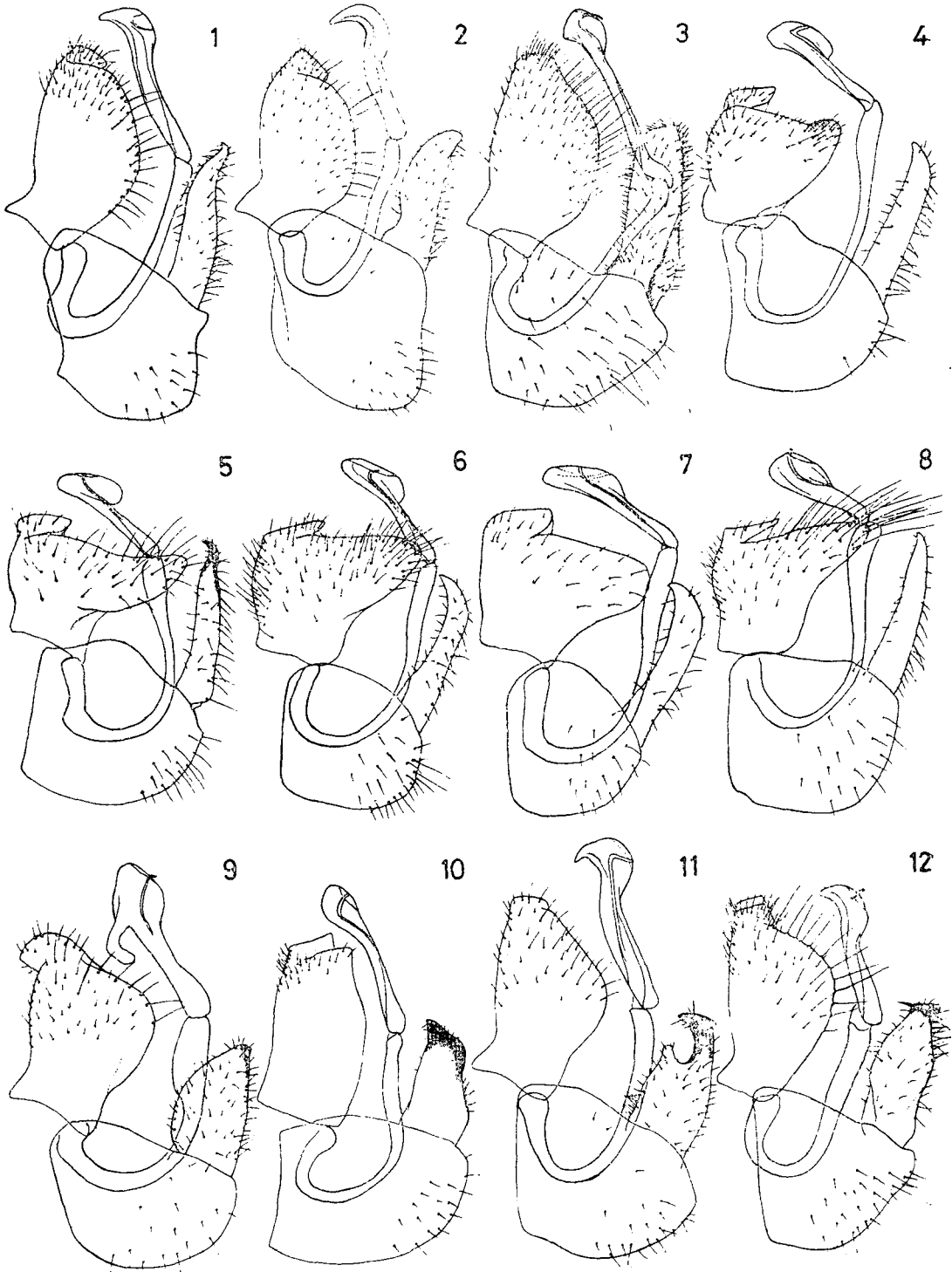
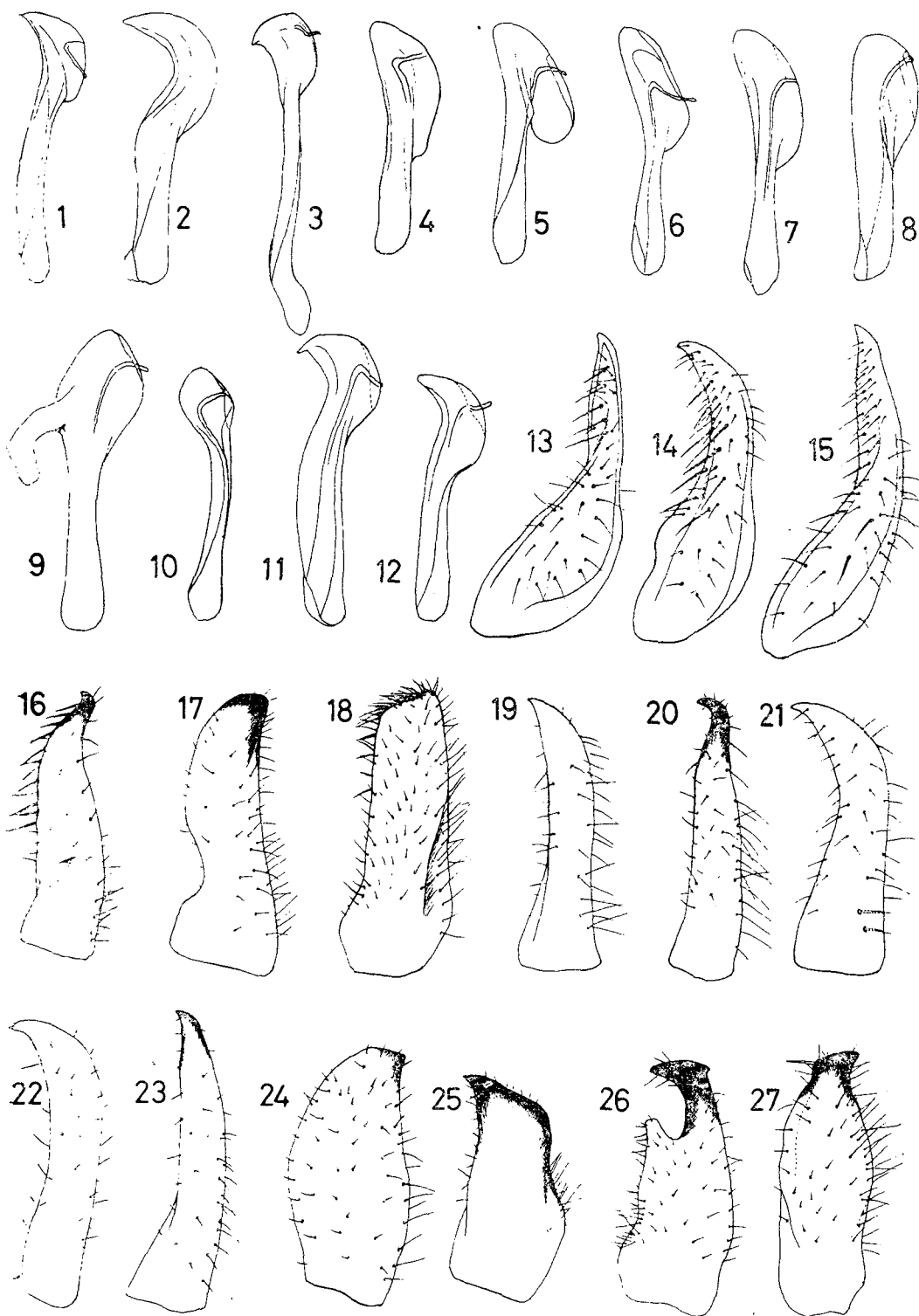


PLATE 3. Male genitalia of triozids in lateral view.

1. *Epitrioza mizuhonica*, 2. *E. yasumatsui*, 3. *Trichoermes grandis*, 4. *Bactericera distinctissima* sp. nov., 5. *B. myohyangi*, 6. *B. miyatakei* sp. nov., 7. *B. striola*, 8. *B. yamagishii* sp. nov., 9. *Heterotrioza obliqua*, 10. *H. nokamui* sp. nov., 11. *Trioza abdominalis* 12. *T. nigra*.



PLAT 4. Some male genitalic characters of triozids.

Fig. 1-12 : aedeagi, fig. 13-15 : caudal view of parameres, fig. 16-27 : outer lateral view of parameres. 1, 16 : *Epitrioza mizuhonica*; 2, 17 : *E. yasumatsui*; 3, 18 : *Trichohermes grandis*; 4, 13, 19 : *Bactericera distinctissima* sp. nov.; 5, 20 : *B. myohyangi*; 6, 14, 21 : *B. miyatakei* sp. nov.; 7, 22 : *B. striola*; 8, 15, 23 : *B. yamagishii* sp. nov.; 9, 24 : *Heterotrioza obliqua*; 10, 25 : *H. noknamui* sp. nov.; 11, 26 : *Trioza abdominalis*; 12, 27 : *T. nigra*.

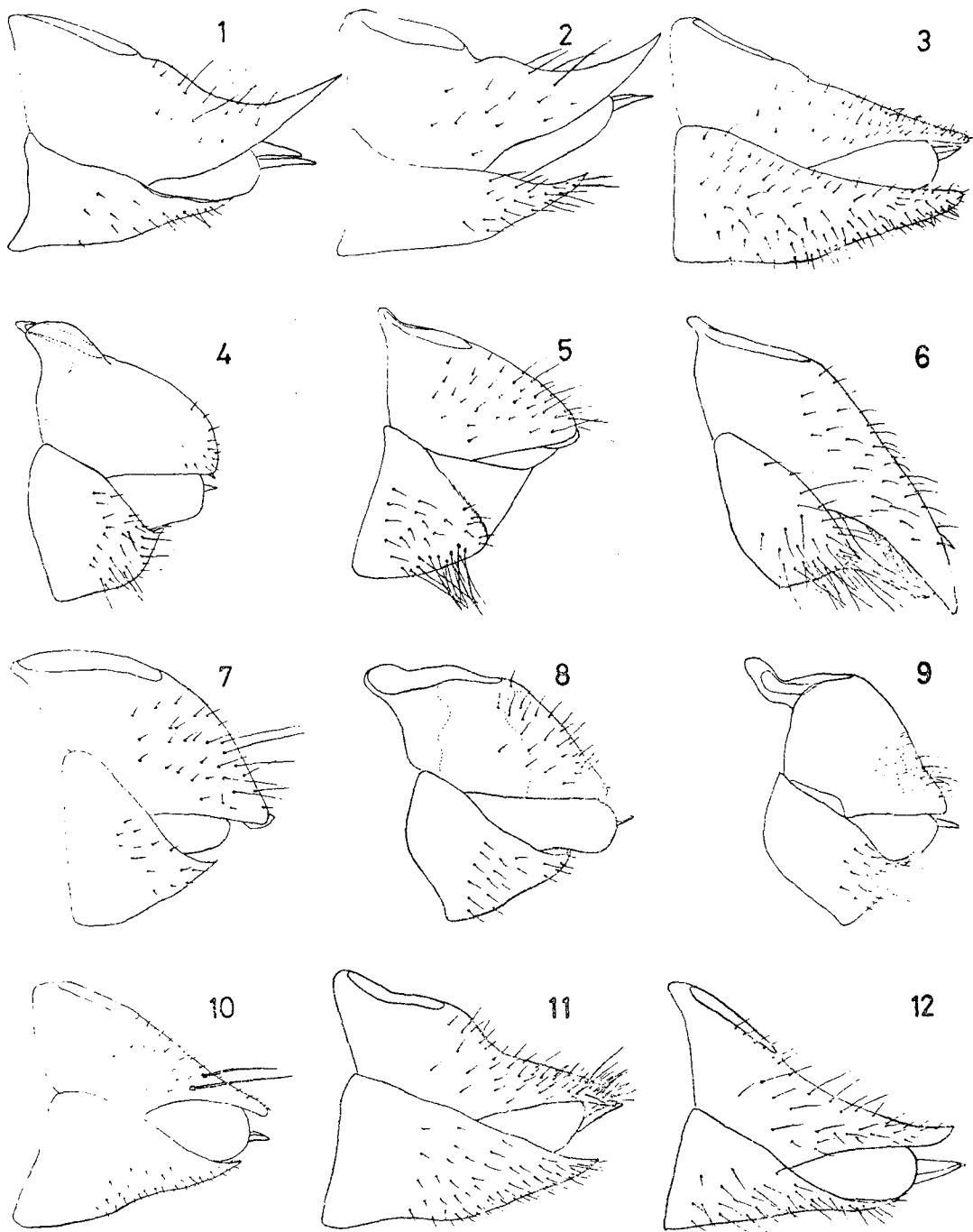


PLATE 5. Female genitalia of triozids in lateral view.

1. *Epitrioza mizuhonica*, 2. *E. yasumatsui*, 3. *Trichoermes grandis*, 4. *Bactericera distinctissima* sp. nov. 5. *B. myohyangi*, 6. *B. calcarata* 7. *B. miyatakei* sp. nov. 8. *B. striola*, 9. *B. yamagishii* sp. nov., 10. *Heterotrioza obliqua*, 11. *Trioza abdominalis*, 12. *T. nigra*.