

Nymphs of Delphacidae from Taiwan (I) (Homoptera: Fulgoroidea)

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Introduction

The knowledge of nymphs of Fulgoroidea is nearly an unexplored field. Vilbaste, 1968, "Preliminary key for the identification of the nymphs of North European Homoptera Cicadina, 1. Delphacidae" stimulated our interest in this field. We made the attempt to do some work in our country in next few years. In this first article, we deal with nine species.

Structural terminology used mostly follows that of Vilbaste, (1968) except some additional ones which will be defined and illustrated in Fig. 1. In making measurement are from slide mounted specimens.

Euidella albipennis (Matsumura, 1935)

Fig. 1.

Euidella albipennis Ishihara, 1949, Sci. Rep. Matsuyama Agric. Coll. 2:34.

Toyoides albipennis Matsumura, 1935, Ins. Matsum. 10:78.

General color green. Mesopleura each with a distinct rounded black marking, fore and mid-legs with apices of last tarsi black. Face, antennae, legs always somewhat grayish black.

Head between eyes nearly as wide at narrowest portion as long in middle line, moderately protruding beyond level of eyes, length of eye longer than length between level of eyes and lateral point of frons about 3 : 1, width of head including eyes wider than width of basal compartment at hind margin about 3.3 : 1, submedian carinae attaining hind margin of vertex submedially, basal compartment wider

at hind margin than greatest length about 2 : 1, hind margin curved upward laterally. Frons longer in middle line than widest portion about 2 : 1, lateral carinae nearly straight, with two median carinae, separated, parallel. Interfrons about as wide as laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lowest pit lies far away from frontoclypeal suture, distance about half as long as length of frons at apex, distance between dorsal level of lower pits and ventral level of median pits much shorter than former to frontoclypeal suture, about 1 : 3.5, lower of upper pits much higher than higher of median pits. Between eye and lateral carina with seven pits, lowest one lies at middle of eye. Frontoclypeal suture straight, clypeus longer in middle line than frons at apex about 1.7 : 1. Antennae short, basal segment distinctly longer than wide, shorter than second about 1 : 2.3. Rostrum moderately long, reaching beyond mid-trochanters, relative length of each segment about 1.1 : 1 : 1, third segment longer than wide about 2.5 : 1.

Pronotum each side with eight pits, two medial, six lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, relative distance between W_1 to W_2 and W_2 to W_3 about 1.4 : 1, anterior wing pad protruding to level of hind one, latter not reaching anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.3 : 1, spur about as long as first tarsal segment, with about 28 teeth.

Abdominal tergite V: bears 1 pit on each

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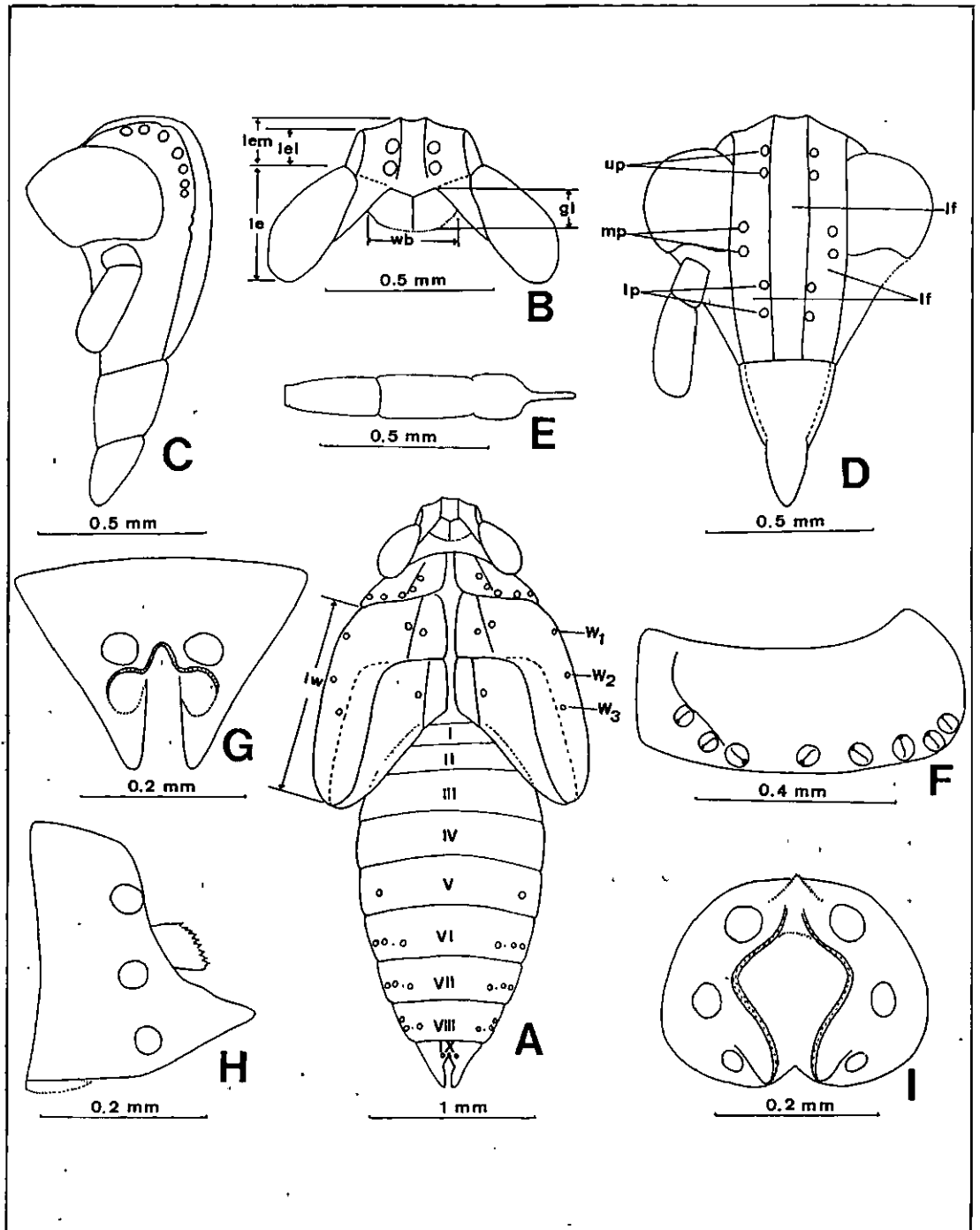


Fig. 1. *Euidella albipennis* (Matsumura) A, Fifth instar nymph, dorsal view: lw = length of anterior wing pad, W_1 , W_2 , W_3 = lateral sensory pits of anterior wing pad; B, Head, dorsal view: gl = greatest length of basal compartment, le = length of eye, lel = length between level of eyes and lateral point of frons, lem = length between level of eyes and mid-point of anterior margin, wb = width of basal compartment; C, Head, lateral view; D, Head, ventral view: lf = interfrons, lf = laterofrons, up = upper pits, mp = median pits, lp = lower pits (after vilbaste); E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge deeply incised medially, lateral lobes cylindrical, pits lies near base, in lateral view strongly produced near base, with anal comb moderately large, in caudal view with opening widest near middle.

Length of body: 3.40–3.50 mm.

Width of head including eyes: 0.80–0.90 mm.

Length of anterior wing pad: 1.20–1.23 mm.

Length of antenna: 0.40 mm.

Specimens examined: Fifth instar nymph: 7, Kuantzuling (關仔嶺), Tainan Hsien, 29-IV-1985, C. T. Yang.

Host plant: *Pennisetum alopecuroides* (L.) Spring.

Distribution: Taiwan.

In vilbaste's key, this species running to *Xanthodelphax* Wg. it differs from latter in having pits on tergite V. Special characters of this species are pronotum each side with eight pits, between eye and lateral carina with seven pits.

Sogata nigrifacies (Matsumura, 1935)

Comb. Nov.

Fig. 2.

Hosunka nigrifacies Ishihara, 1949, Sci. Rep. Matsuyama Agric. Coll. 2:40.

Unkana nigrifacies Matsumura, 1935, Ins Matsum., 9:134.

Unkanella nigrifacies Esaki et Ishihara, 1943, Cat. Araeopid. Imp. Jap. 21.

General color pale yellowish brown. Head whitish except antennae yellowish brown and base of frons black. Dorsal aspect of thorax and abdomen with wide median area whitish and lateral dark brown. Tergite IX with dorsal median portion black.

Head between eyes distinctly longer in middle line than wide at narrowest portion about 1.7 : 1, strongly protruding beyond level of eyes, anterior margin between submedian carinae convex, eyes nearly straight, length of

eye longer than length between level of eyes and lateral point of frons about 4.7 : 1, than mid-point of anterior margin about 2.3 : 1, width of head including eyes wider than width of basal compartment at hind margin about 3 : 1, submedian carinae attaining hind margin of vertex laterally, basal compartment at hind margin about as wide as greatest length, hind margin slightly curved downward. Frons longer in middle line than widest portion about 1.6 : 1, widest at level of middle of eyes, lateral carinae strongly convex at level of middle of eyes, with two median carinae, separated, nearly parallel below lower of upper pits, strongly narrowed at base. Interfrons narrower than laterofrons. Number and arrangement of pits typical, each side with three extra pits, lower pit lies near frontoclypeal suture, distance about a diameter of itself, distance between dorsal level of lower pits and ventral level of median pits shorter than former to frontoclypeal suture about 1 : 2, lower of upper pits high than higher of median pits. Between eye and lateral carina with four pits, lowest one lies below median point of eye. Frontoclypeal suture straight, clypeus in middle line longer than frons at apex about 1.5 : 1. Antennae short, first segment slightly shorter than wide, shorter than second about 1 : 2.7. Rostrum short, reaching to mesotrochanters, relative length of each segment about 1.2 : 1.2 : 1, third segment longer than wide about 2.2 : 1.

Pronotum each side with seven pits, two medial, five lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, distance between W_1 to W_2 longer than W_2 to W_3 about 1.9 : 1, anterior wing pad protruding not over hind one, latter reaching to anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.2 : 1, first tarsal segment very long, longer than two latter combined about 1.6 : 1, spur shorter than first tarsal segment, with about 16 teeth.

Abdominal tergite V: bears 1 pit on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge deeply incised medially, lateral lobes cylindrical, pits distinctly lies near

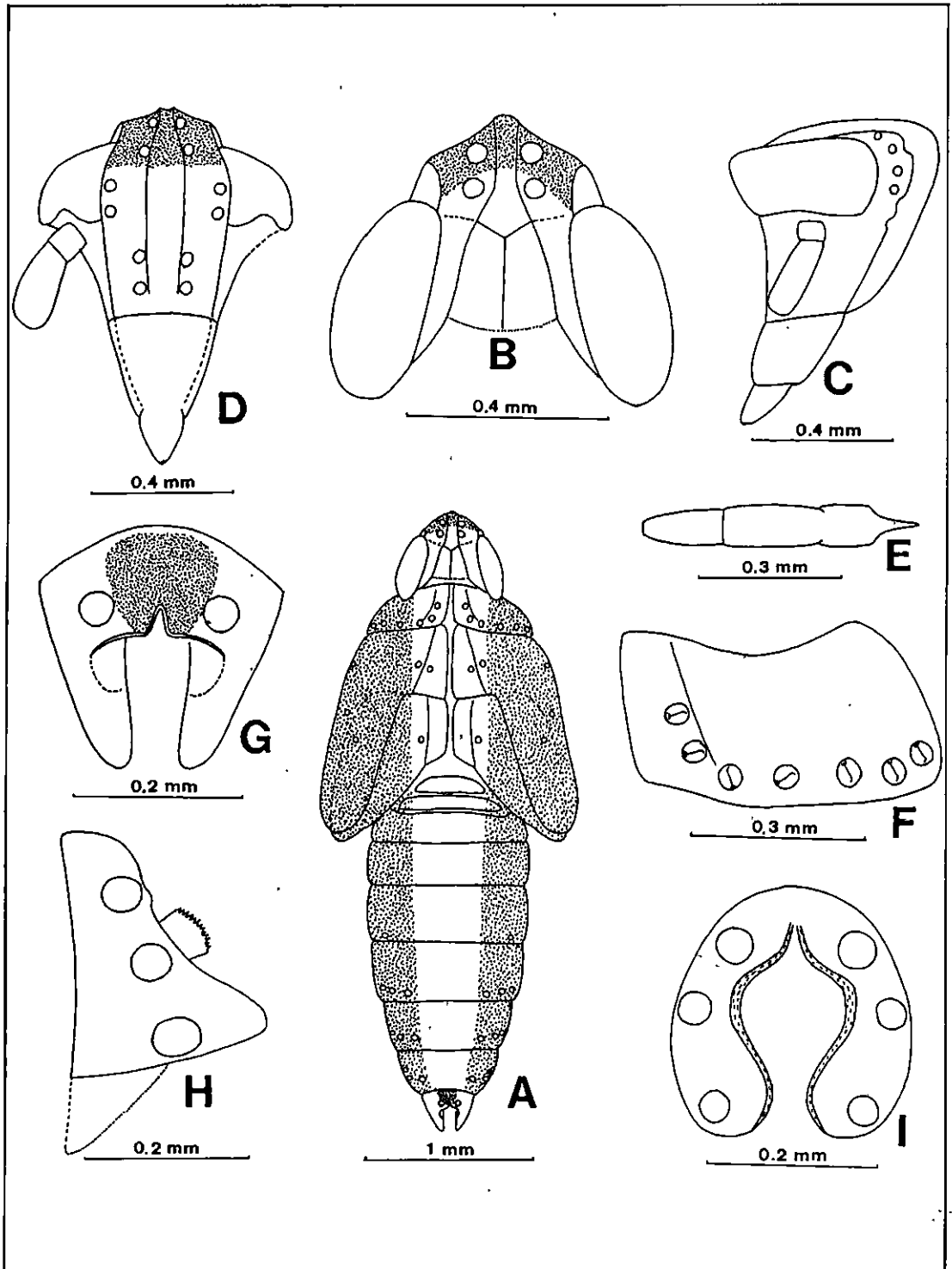


Fig. 2. *Sogata nigrifacies* (Matsumura) A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

base, in lateral view strongly produced medially, with dorsal margin narrow, anal comb normal, in caudal view with opening widest near middle.

Length of body: 3.56 mm.

Width of head including eyes: 0.63 mm.

Length of anterior wing pad: 1.10 mm.

Length of antenna: 0.26 mm.

Specimens examined: Fifth instar nymph: 2, Shitou (溪頭), Nantou Hsien, 9-XII-1984, C. T. Yang.

Host Plant: *Miscanthus floridulus* (Labill.) Warb.

Distribution: Taiwan.

In Vilbaste's key, this species running to *Megamelus* Fieber. Special characters are basal compartment at hind margin as wide as greatest length; two median carinae of frons strongly narrowed at base; first tarsal segment of hind leg very long; and eyes nearly straight.

Saccharosydne procerus (Matsumura, 1910)

Fig. 3.

Saccharosydne procerus Matsumura, 1917, Applied Ent. Form. ser., 382.

Oxycromus procerus Matsumura, 1910, Dainippon Gaichu Zensho, form ser., 120.

General color uniformly green or somewhat yellowish.

Head between eyes distinctly longer in middle line than wide at narrowest portion about 2.2 : 1, strongly protruding beyond level of eyes, anterior margin between submedian carinae convex, eyes lies obliquely, length of eye longer than length between level of eye and lateral point of frons about 2.9 : 1, than mid-point of anterior margin about 1.7 : 1, width of head including eyes wider than width of basal compartment at hind margin about 2 : 1, submedian carinae attaining hind margin of vertex laterally, basal compartment wider at hind margin than greatest length about 1.2 : 1, hind margin slightly curved downward, indistinct. Frons longer in middle line than wide about 2.5 : 1, lateral carinae nearly parallel, with two median carinae, separated, parallel. Interfrons narrower than laterfrons. Lower

pits normal, median and upper pits single, each side with three extra pits dorsally, lowest pit lies far away from frontoclypeal suture, distance about 0.6 times as long as width of frons at apex. Between eye and lateral carina with four pits, lowest one lies about level of anterior margin of eye, other three about same level before eye. Frontoclypeal suture arched, clypeus in middle line longer than frons at apex about 1.6 : 1. Antennae short, basal segment slightly shorter than wide, shorter than second segment about 1 : 2.4. Rostrum short, not reaching to mid-trochanters, relative length of each segment about 1.2 : 1.6 : 1, third segment slightly longer than wide about 1.2 : 1.

Pronotum each side with seven pits, two medial, five lateral, lateral carinae attaining hind margin. Number and arrangement of pits on meso-, metathorax and wing pads typical, distance between W_1 to W_2 longer than W_2 to W_3 about 2.5 : 1, anterior wing pads protruding over hind one, latter reaching to middle of tergite IV. Spinal formula of hind leg 7-8-4, metatibia longer than three tarsi combined about 1.1 : 1. Spur about half as long as first tarsal segment, with 13-15 teeth.

Abdominal tergite V: bears 2 pits on each side; VI-VII: 1+2 respectively; VIII: 1+1; IX: 2 dorsal, 1 ventral. Ninth abdominal segment in dorsal aspect with anal ridge shallowly incised medially, lateral lobes cylindrical, pits lies near base, in lateral view strongly produced more upper, with anal comb relatively small, in caudal view with opening widest dorsally.

Length of body: 3.40-3.73 mm.

Width of head including eyes: 0.53-0.56 mm.

Length of anterior wing pad: 1.40-1.53 mm.

Length of antenna: 0.26-0.30 mm.

Specimens examined: Fifth instar nymph: 3, Puli (埔里), Nantou Hsien, 11-III-1985, R. H. Wu.

Host plant: *Zizania latifolia* Turcz.

Distribution: Taiwan, Mainland China, Japan, Korea.

In Vilbaste's key, this species running to

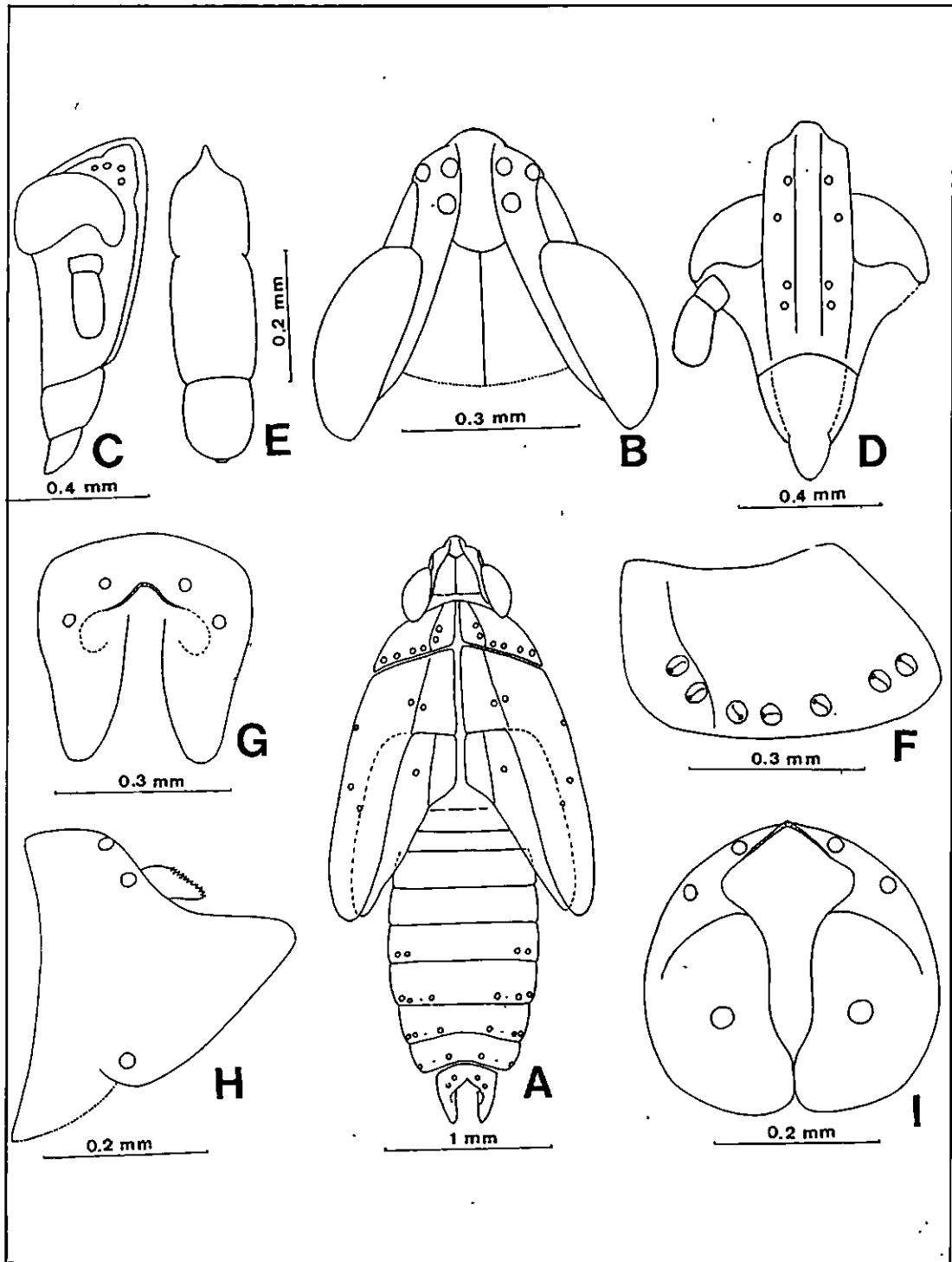


Fig. 3. *Saccharosydne procerus* Matsumura A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

Unkanodes Fennah, differs from latter in having body color uniformly green or somewhat yellowish. This species with special characters are frons with median and upper pits single, rostrum with third segment short, lateral carinae of pronotum attaining hind margin, spinal formula of hind leg 7-8-4, abdominal tergite VIII bears 1+1 on each side, IX: 2 dorsal, 1 ventral.

***Eoerysa flavocapitata* Muir, 1913**

Fig. 4.

Eoerysa flavocapitata Muir, 1913, Proc. Hawaiian Ent. Soc. 2(5):249.

General color orange yellow with most lower portion of frons, legs and last two abdominal segment black except metatibiae light.

Body depressed. Head between eyes wider at narrowest portion than long in middle line, strongly protruding beyond level of eyes, anterior margin semicircular, length of eye longer than length between level of eyes and mid-point of frons about 1.8 : 1, width of head including eyes wider than basal compartment at hind margin about 1.6 : 1, submedian carinae attaining lateral margin apically, basal compartment wider at hind margin than greatest length about 2 : 1, hind margin straight. Eyes nearly straight, each side of frons with three pits dorsally. Between eye and lateral carina with two pits above anterior margin of eye. Frons wider at widest portion than long in middle line about 1.3 : 1, lateral carinae strongly convex above level of eyes, without median carina, with three pairs pits below dorsal level of eyes, four pairs near base. Frontoclypeal suture strongly arched upward medially, clypeus in middle line longer than frons at apex about 1.2 : 1. Antennae short, basal segment wider than long, shorter than second segment about 1 : 5. Rostrum very short and stout, not reaching beyond mid-trochanters, relative length of each segment about 1 : 1.2 : 1, third segment longer than wide about 1.6 : 1.

Pronotum without lateral carinae, each side with seven pits, first median one move far away from second. Number and arrangement of pits on meso-, metathorax and wing pads typical,

relative distance between W_1 to W_2 and W_2 to W_3 about 1.3 : 1, anterior wing pad protruding not over hind one, latter beyond anterior margin of tergite IV. Spinal formula of hind leg 5-8-4, metatibia shorter than three tarsi combined, spur shorter than first tarsal segment, with 13-16 teeth.

Abdominal tergite IV: bears 1 pit on each side; V: 2; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge deeply incised medially, lateral lobes not cylindrical, pits lies near apex, in lateral view with posterior margin strongly emarginate in middle, anal comb normal, in caudal view with anal ridge very broad, opening widest near middle.

Length of body: 3.06 mm.

Width of head including eyes: 0.70 mm.

Length of anterior wing pad: 1.06 mm.

Length of antenna: 0.20 mm.

Specimens examined: Fifth instar nymph: 2, Kuantzuling (關仔嶺), Tainan Hsien, 29-IV-1985, C. T. Yang.

Host plant: *Saccharum officinarum* L.

Distribution: Taiwan, Mainland China, Malaya.

In Vilbaste's key, this species running to *Eurya* Fieber, this species is a very peculiar one, broad frons, frons without median carina, pro-, meso- and metathorax without lateral carinae, pronotum with first pit move far away, vertex with submedian carinae attaining lateral margin apically, between eye and lateral carina with two pits, differs from most other nymphs of this family.

***Chloriona tateyamana* Matsumura, 1935**

Fig. 5.

Chloriona tateyamana Matsumura, 1935, Ins Matsum. 9:138.

General color green or somewhat yellowish.

Head between eyes nearly as wide at narrowest portion as long in middle line, moderately protruding beyond level of eyes, length of eye longer than length between level of eyes and

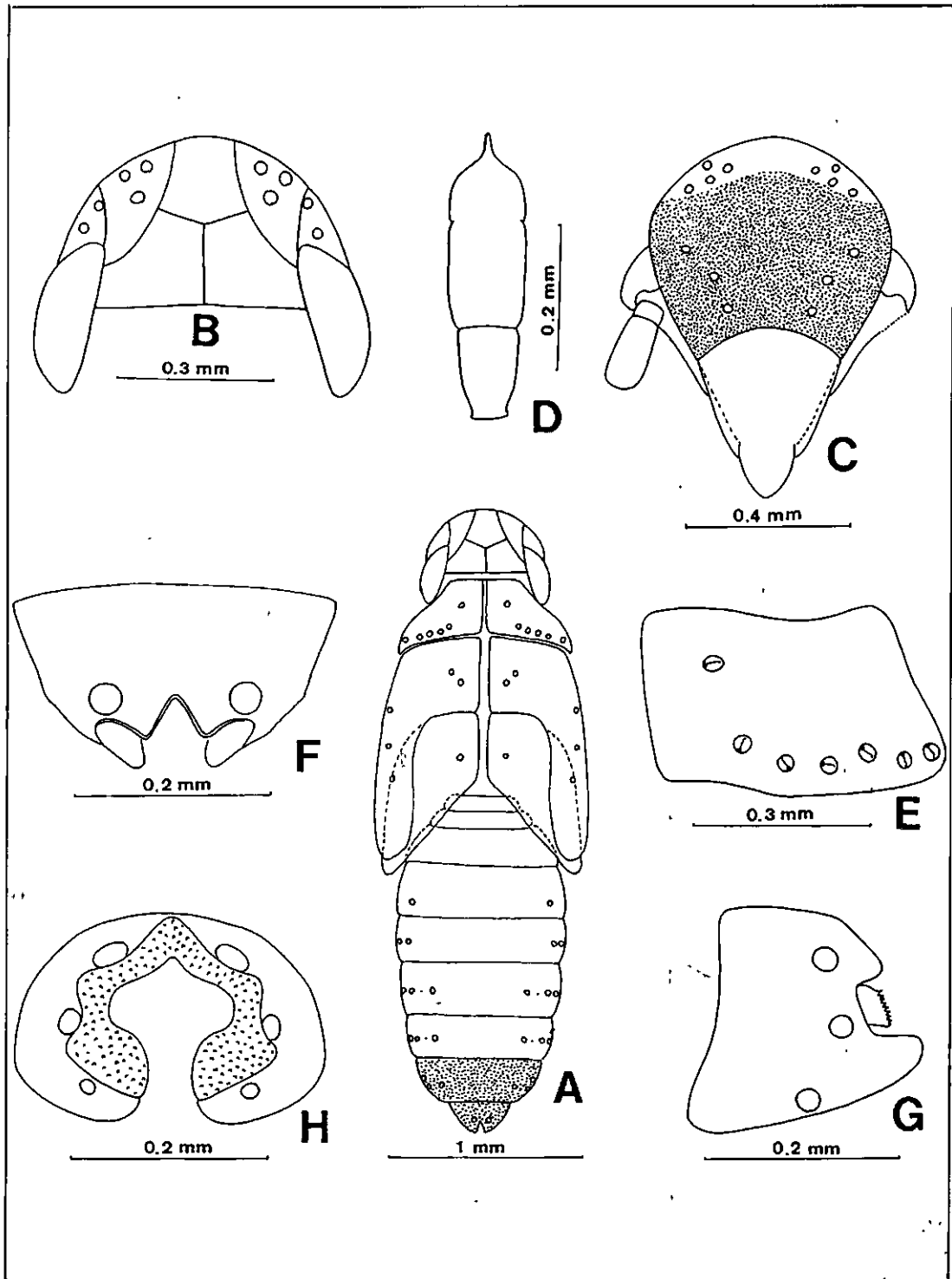


Fig. 4. *Eoerysa flavocapitata* Muir A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, ventral view; D, Rostrum, ventral view; E, Pronotum, flat surface; F, Ninth abdominal segment, dorsal view; G, Ninth abdominal segment, lateral view; H, Ninth abdominal segment, caudal view.

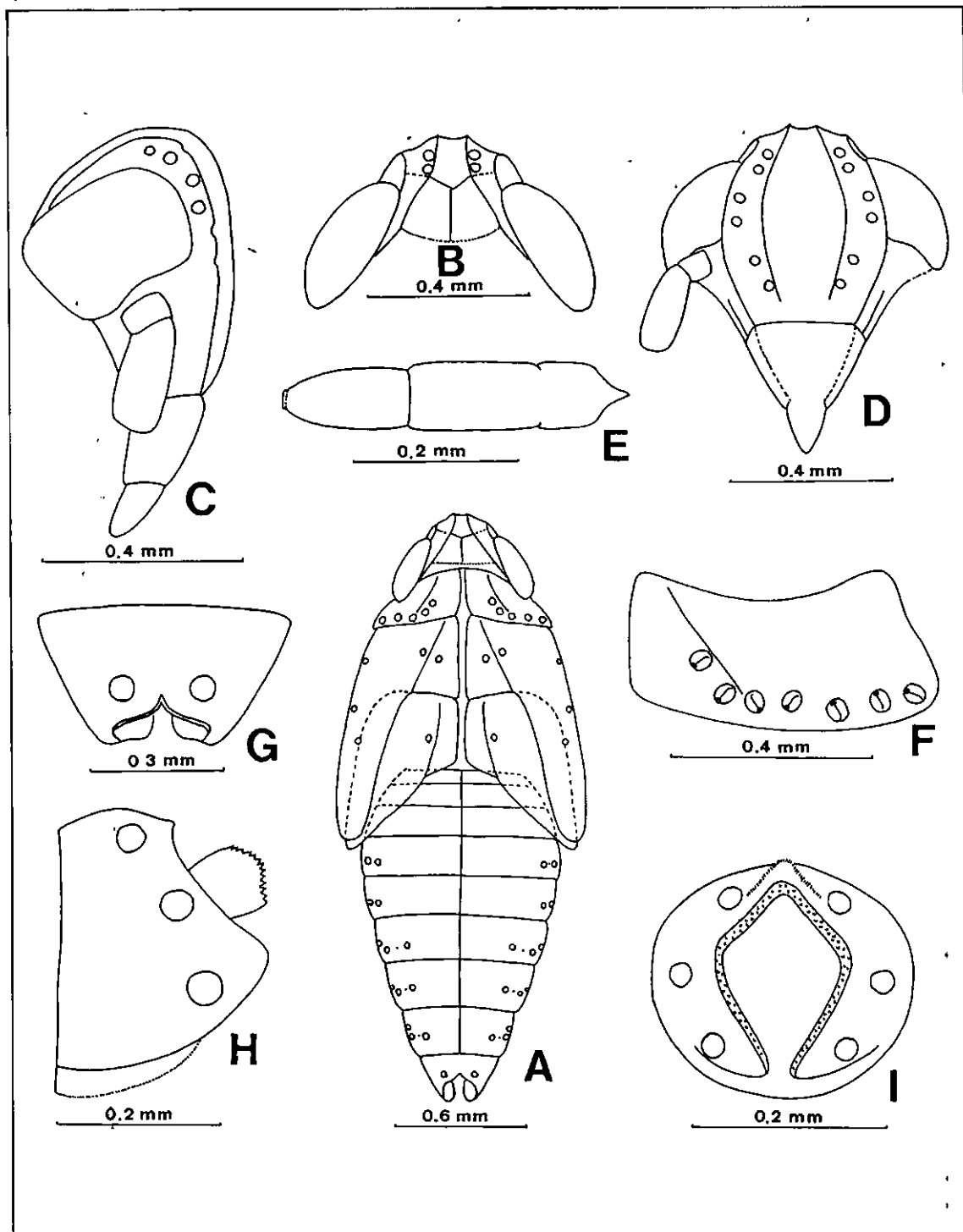


Fig. 5. *Chloriona tateyamana* Matsumura A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

lateral point of frons about 4.1 : 1, than mid-point about 2.7 : 1, width of head including eyes wider than width of basal compartment at hind margin about 2.9 : 1, submedian carinae attaining hind margin of vertex laterally, basal compartment wider at hind margin than greatest length about 1.6 : 1, hind margin curved upward laterally. Frons longer in middle line than widest portion about 1.1 : 1, widest just below level of eyes, lateral carinae strongly curved laterad, with two median carinae, separated, strongly curved medially. Interfrons distinctly wider than laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lowest pit lies far away from frontoclypeal suture, distance shorter than length of frons at apex about 1 : 3.2, distance between dorsal level of lower pits and ventral level of median pits much shorter than former to frontoclypeal suture about 1 : 2.4, lower of upper pits much high than higher of median pits. Frontoclypeal suture straight, clypeus in middle line longer than frons at apex about 1.3 : 1. Between eye and lateral carina with four pits, lowest one lies about middle of eye. Antennae short, basal segment about as wide as long, shorter than second about 1 : 3.5. Rostrum short, not reaching to mid-trochanters, relative length of each segment about 0.7 : 1 : 1, third segment longer than wide about 2 : 1.

Pronotum each side with seven pits, two medial, five lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, relative distance between W_1 to W_2 and W_2 to W_3 about 1.5 : 1, anterior wing pad protruding not over hind one, latter protruding over anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.1 : 1, spur shorter than first tarsal segment, with about 20 teeth.

Abdominal tergite IV-V: bear 2 pits on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge shallowly incised medially, lateral lobes not cylindrical, pits lies near apex, in lateral view strongly produced medially, with anal comb moderately large, in caudal view with opening widest near middle.

Length of body: 2.66–3.40 mm.

Width of head including eyes: 0.73–0.83 mm.

Length of anterior wing pad: 0.93–1.10 mm.

Length of antenna: 0.26 mm.

Specimens examined: Fifth instar nymph: 7, Shalu (沙鹿), Taichung Hsien, 13-V-1985, R. H. Wu.

Host plant: *Phragmites communis* Trinius.

Distribution: Taiwan (new record), Mainland China, Japan.

Sogatella longifurcifera (Esaki et Ishihara, 1947)

Fig. 6.

Sogatella longifurcifera Fennah, 1963, Bull. Ent. Res. 54:53.

Delphacodes longifurcifera Eskai et Ishihara, 1947, Mushi 17:41.

General color uniformly pale yellowish brown.

Head between eyes longer in middle line than width at narrowest portion, moderately protruding beyond level of eyes, length of eye longer than length between level of eyes and lateral point of frons about 4 : 1, width of head including eyes wider than width of basal compartment at hind margin about 3.3 : 1, submedian carinae attaining hind margin of vertex submedially, basal compartment wider at hind margin than greatest length about 1.2 : 1, hind margin nearly straight. Frons longer in middle line than widest portion about 1.4 : 1, lateral carinae strongly curved between eyes, with two median carinae, separated, parallel. Interfrons narrower than laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lowest pit lies away from frontoclypeal suture, distance about 0.4 times as long as width of frons at apex, distance between dorsal level of lower pits and ventral level of median pits much shorter than former to frontoclypeal suture about 1 : 2.2, lower of upper pits high than higher of median pits. Between eye and lateral carina with four pits,

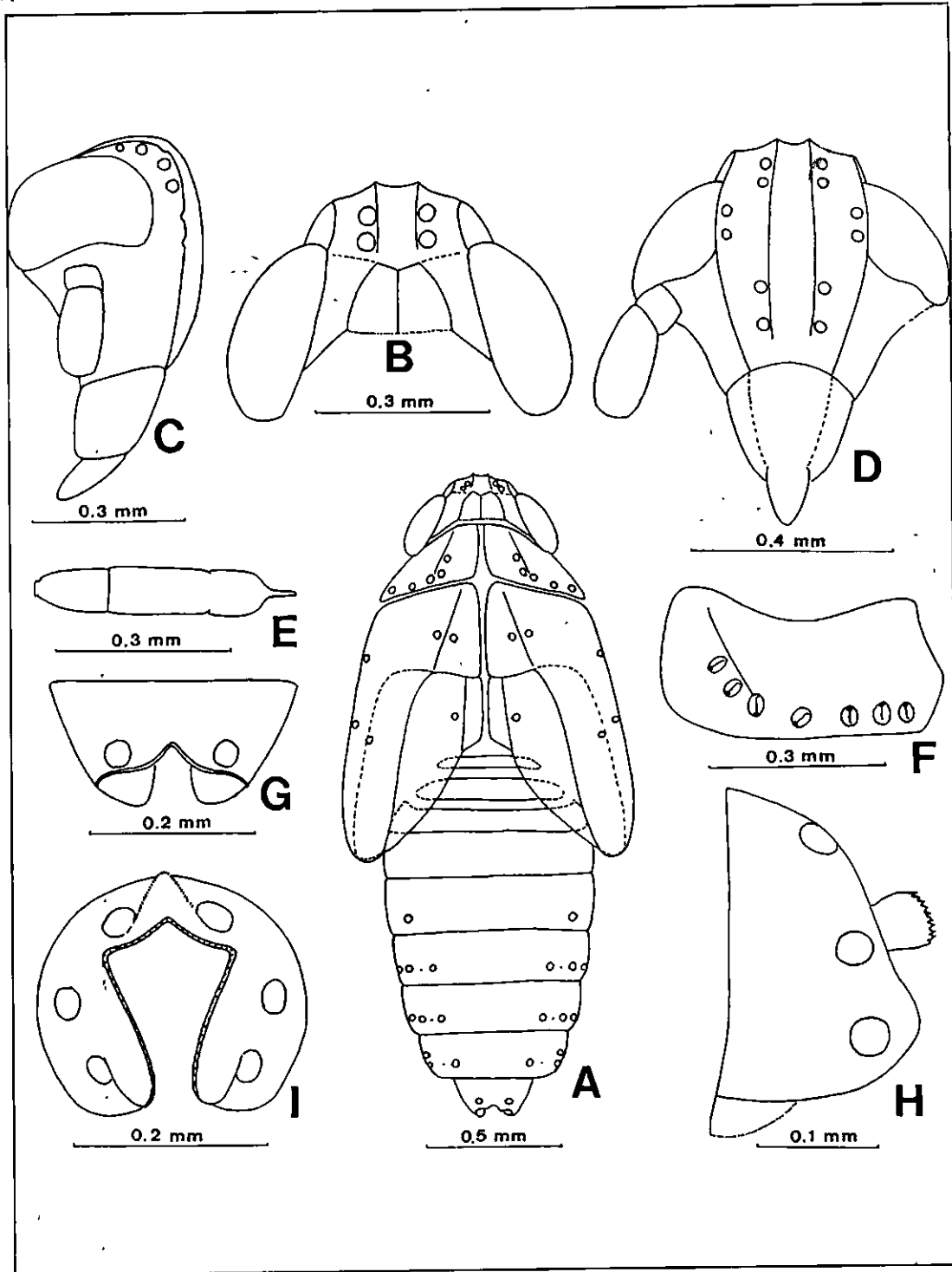


Fig. 6. *Sogatella longifurcifera* (Esaki et Ishihara) A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

lowest one lies about middle of eye. Frontoclypeal suture arched, clypeus in middle line longer than frons at apex about 2 : 1. Antennae short, basal segment distinctly wider than long, shorter than second about 1 : 3.5. Rostrum short, reaching to hind margin of mid-trochanters, relative length of each segment about 1.1 : 1.3 : 1, third segment longer than wide about 1.7 : 1.

Pronotum each side with seven pits, two medial, five lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, relative length of distance between W_1 to W_2 and W_2 to W_3 about 3 : 1, anterior wing pad protruding to level of hind one, reaching to median level of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.1 : 1, spur shorter than first tarsal segment, with 13-17 teeth.

Abdominal tergite V: bears 1 pit on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge shallowly incised medially, lateral lobes not cylindrical, pits lies near apex, in lateral view moderately produced below middle, anal comb normal, in caudal view with opening widest dorsally.

Length of body: 2.36-2.53 mm.

Width of head including eyes: 0.60-0.63 mm.

Length of anterior wing pad: 0.93-0.96 mm.

Length of antenna: 0.26 mm.

Specimens examined: Fifth instar nymph: 5, rearing by C. C. Chen, Taichung District Agriculture Improvement Station, 8-III-1985.

Host plant: *Oryza sativa* L.

Distribution: Taiwan, Japan, Mainland China.

In Vilbaste's key, this species running to *Megamelus* Fieber, no detail information of *Megamelus* to compare with. It differs from *Tarophagus proserpina* in having short rostrum; from *soqata nigrifacies* in having vertex with basal compartment distinctly wider at hind margin than greatest length, frons with two

median carinae parallel.

Nilaparvata lugens (Stål, 1854)

Fig. 7.

Nilaparvata lugens Giffard, 1924, Haw. Sugar Pl. Ass. Bull. 15:16.

Delphax lugens Stal, 1854, Oefv. Sv. Vet. Ak. Forh. 11:246.

General color pale brown except apices of legs black and ventral aspect of abdomen yellowish.

Head between eyes wider at narrowest portion than long in middle line, slightly protruding beyond level of eyes, length of eye longer than length between level of eyes and lateral point of frons about 6 : 1, width of head including eyes wider than width of basal compartment at hind margin about 3.4 : 1, submedian carinae attaining hind margin of vertex submedially, basal compartment wider at hind margin than greatest length about 1.9 : 1, hind margin straight. Frons longer in middle line than widest portion about 1.5 : 1, lateral carinae moderately convex near middle, with two median carinae, separated, parallel, only slightly convergent apically. Interfrons narrower than laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lowest pit lies near frontoclypeal suture, distance between dorsal level of lower pits and ventral level of median pits nearly as long as former to frontoclypeal suture, lower of upper pits in most specimens high than higher of median pits, some near same level. Between eye and lateral carina with four pits, lowest one lies at middle of eye. Frontoclypeal suture straight, clypeus longer in middle line than frons at apex about 1.4 : 1. Antennae short, basal segment as wide as long, shorter than second about 1 : 2.5. Rostrum moderately long, reaching beyond mid-trochanters, relative length of each segment about 1.1 : 1, third segment longer than wide about 2.4 : 1.

Pronotum each side with seven pits, two medial, five lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, relative distance between W_1 to W_2 and W_2 to W_3 about 2.8 : 1, anterior wing pads

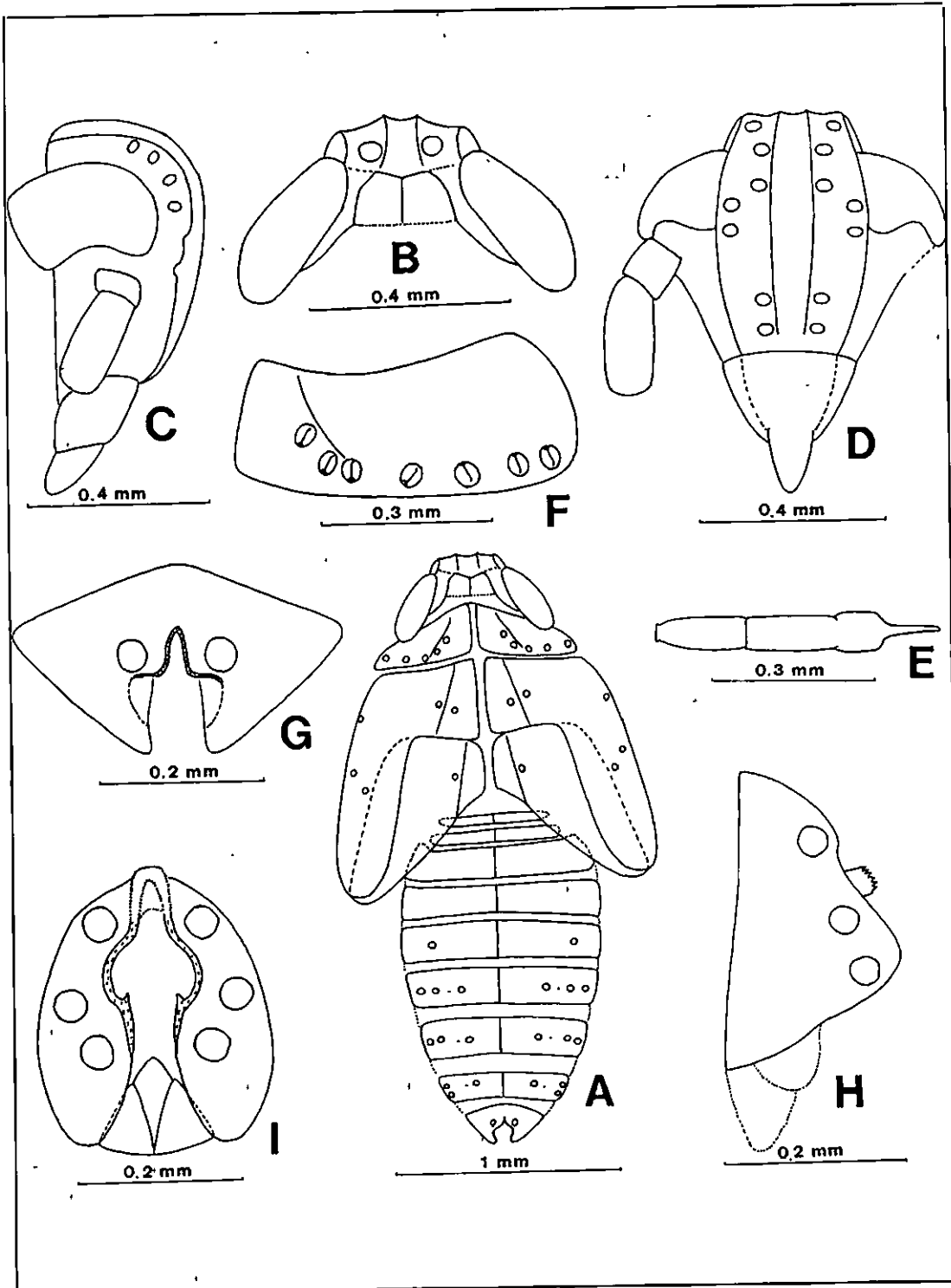


Fig. 7. *Nilaparvata lugens* (Stål) A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rosturm, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

protruding not over hind one, latter slightly beyond anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.2 : 1, spur as long as first tarsal segment, with 20-22 teeth.

Abdominal tergite V: bears 1 pit on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge deeply incised medially, lateral lobes somewhat cylindrical, pits lies near base, in lateral view strongly produced medially, with anal comb relatively small, in caudal view with opening widest above middle.

Length of body: 2.53-2.73 mm.

Width of head including eyes: 0.73 mm.

Length of anterior wing pad: 1.03 mm.

Length of antenna: 0.23-0.27 mm.

Specimens examined: Fifth instar nymph: 5, rearing by C. C. Chen, Taichung District Agriculture Improvement Station, 8-III-1985.

Host plant: *Oryza sativa* L.

Distribution: Taiwan, Mainland China, Japan, Korea, Malaya, India, Sri Lanka, Java, Philippines, Guam, New Guinea, Fiji, Australia.

In Vilbaste's key, this species running to *Laodelphax* Fennah, it differs from latter in having spur with 20-22 teeth (10-11 in *Laodelphax striatella*); spur as long as first tarsal segment (distinctly shorter in *striatella*); distance between dorsal level of lower pits and ventral level of median pits nearly as long as former to frontoclypeal suture (distinctly short in *striatella*).

Tarophagus proserpina (Kirkaldy, 1907)

Fig. 8.

Tarophagus proserpina Zimmerman, 1948, Insects of Hawaii 4:245.

Megamelus proserpina Kirkaldy, 1907, Haw. Sugar Pl. Ass. Bull. 3:147.

General color dark brown with apex of vertex, ventral side of abdomen, pronotum except median line, wing pads yellowish. Legs yellowish brown except median portion of

tibiae and tarsi of fore and mid-legs, spur, basal half of first tarsal segment and last one black.

Head between eyes longer in middle line than wide at narrowest portion, strongly protruding beyond level of eyes, length of eye longer than length between level of eyes and lateral point of frons about 3.7 : 1, than midpoint of anterior margin about 2.9 : 1, width of head including eyes wider than width of basal compartment at hind margin about 3.2 : 1, submedian carinae attaining hind margin of vertex laterally, basal compartment wider at hind margin than greatest length about 1.8 : 1, hind margin moderately curved downward. Frons longer in middle line than widest portion about 1.5 : 1, widest at lower level of eyes, lateral carinae slightly curved, with two median carinae, separated, nearly parallel. Interfrons narrower than laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lower pit lies near frontoclypeal suture, distance about 0.2 times as long as width of frons at apex (about the diameter of itself), distance between dorsal level of lower pits and ventral level of median pits much shorter than former to frontoclypeal suture about 1 : 4, lower of upper pits high than higher of median pits. Between eye and lateral carina with four pits, lowest one lies about middle of eye. Frontoclypeal suture slightly arched, clypeus in middle line longer than frons at apex about 1.7 : 1. Antennae moderately long, basal segment longer than wide, shorter than second about 1 : 2.3. Rostrum long, reaching to metatrochanters, relative length of each segment about 1 : 1.1 : 1, third segment longer than wide about 2.6 : 1.

Pronotum each side with seven pits, two medial, five lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, distance between W_1 to W_2 longer than W_2 to W_3 about 1.1 : 1, anterior wing pad protruding not over hind one, latter reaching to anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.2 : 1, spur shorter than first tarsal segment, with 15-19 teeth.

Abdominal tergite V: bears 1 pit on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal,

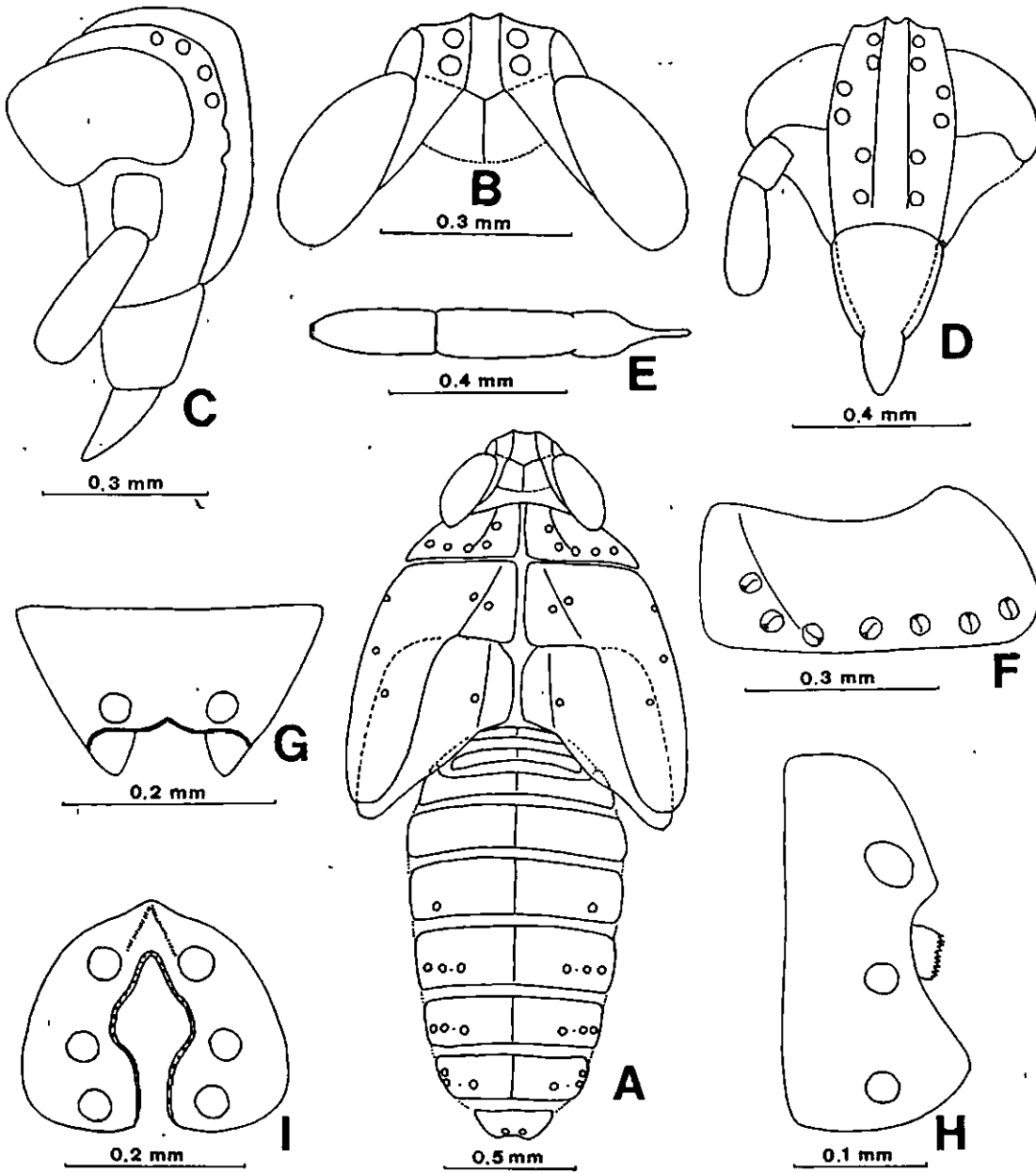


Fig. 8. *Tarophagus proserpina* (Kirkaldy) A, Fifth instar nymph, dorsal view; B, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge shallowly incised medially, lateral lobes not cylindrical, pits lies near apex, in lateral view with posterior margin evenly emarginate, anal comb normal, in caudal view with opening widest near middle.

Length of body: 2.66 mm.
Width of head including eyes: 0.60 mm.
Length of anterior wing pad: 0.93 mm.
Length of antenna: 0.33 mm.

Specimen examined: Fifth instar nymph: 1, Chiasien (甲仙), Kaohsiung Hsien, 23-X-1981, C. T. Yang.

Host plant: *Colocasia esculenta* Schott.

Distribution: Taiwan, Micronesia, Philippines, Amboina, Java, Fiji, Samoa, Australia, Hawaii.

In Vilbaste's key, this species running to *Megamelus* Fieber, differs from *Tarophagus proserpina* in basal compartment wider than greatest length; two median carinae of frons nearly parallel; shape of ninth abdominal segment at lateral view. Special character of this species is long rostrum which reaching to metatrochanters.

Laodelphax striatella (Fällen, 1826)

Fig. 9.

Laodelphax striatella Fennah, 1963, R. Ent. Soc. Lond., (B) 32:15.

Delphacodes striatella Esaki et Ishihara, 1943, Cat. Araeopid. Imp. Jap. 31.

General color pale dark brown to brown. Ventral aspect of abdomen and legs yellowish except apices of legs black.

Head between eyes wider at narrowest portion than long in middle line, slightly protruding beyond level of eyes, length of eye longer than length between anterior level of eyes and lateral point of frons about 5.4 : 1, width of head including eyes wider than width of basal compartment at hind margin about 2.9 : 1, submedian carinae attaining hind margin of vertex submedially, basal compartment wider at hind margin than greatest length about 1.9 : 1. Frons longer in middle line than

widest portion about 1.5 : 1, lateral carinae moderately convex near middle, with two median carinae, separated, parallel. Interfrons narrower than laterofrons. Number and arrangement of sensory pits typical, each side with three extra pits, lowest pit lies very near frontoclypeal suture, distance between dorsal level of lower pits and ventral level of median pits shorter than former to frontoclypeal suture, lower of upper pits lies distinctly high than higher median pits. Between eye and lateral carina with four pits, lowest one lies at middle of eye. Frontoclypeal suture straight, clypeus in middle line longer than frons at apex about 1.3 : 1. Antennae short, basal segment wider than long, shorter than second about 1 : 3. Rostrum moderately long, reaching beyond mid-trochanters, relative length of each segment about 1.4 : 1 : 1, third segment longer than wide about 2.2 : 1.

Pronotum each side with seven pits, three medial, four lateral. Number and arrangement of pits on meso-, metathorax and wing pads typical, relative distance between W_1 to W_2 and W_2 to W_3 about 3.8 : 1, anterior wing pad protruding not over hind one, latter beyond anterior margin of tergite IV. Spinal formula of hind leg 5-7-4, metatibia longer than three tarsi combined about 1.2 : 1, spur distinctly shorter than first tarsal segment, with 10-11 teeth.

Abdominal tergite V: bears 1 pit on each side; VI-VIII: 1+2 respectively; IX: 1 dorsal, 2 ventral. Ninth abdominal segment in dorsal aspect with anal ridge deeply incised medially, lateral lobes not cylindrical, pits lies slightly near base, in lateral view with posterior margin obliquely straight, slightly produced ventrally, anal comb normal, in caudal view opening widest above.

Length do body: 2.30-2.43 mm.
Width of head including eyes: 0.63 mm.
Length of anterior wing pad: 0.93 mm.
Length of antenna: 0.23 mm.

Specimens examined: Fifth instar nymph: 5; rearing by C. C. Chen, Taichung District Agriculture Improvement Station, 8-III-1985.

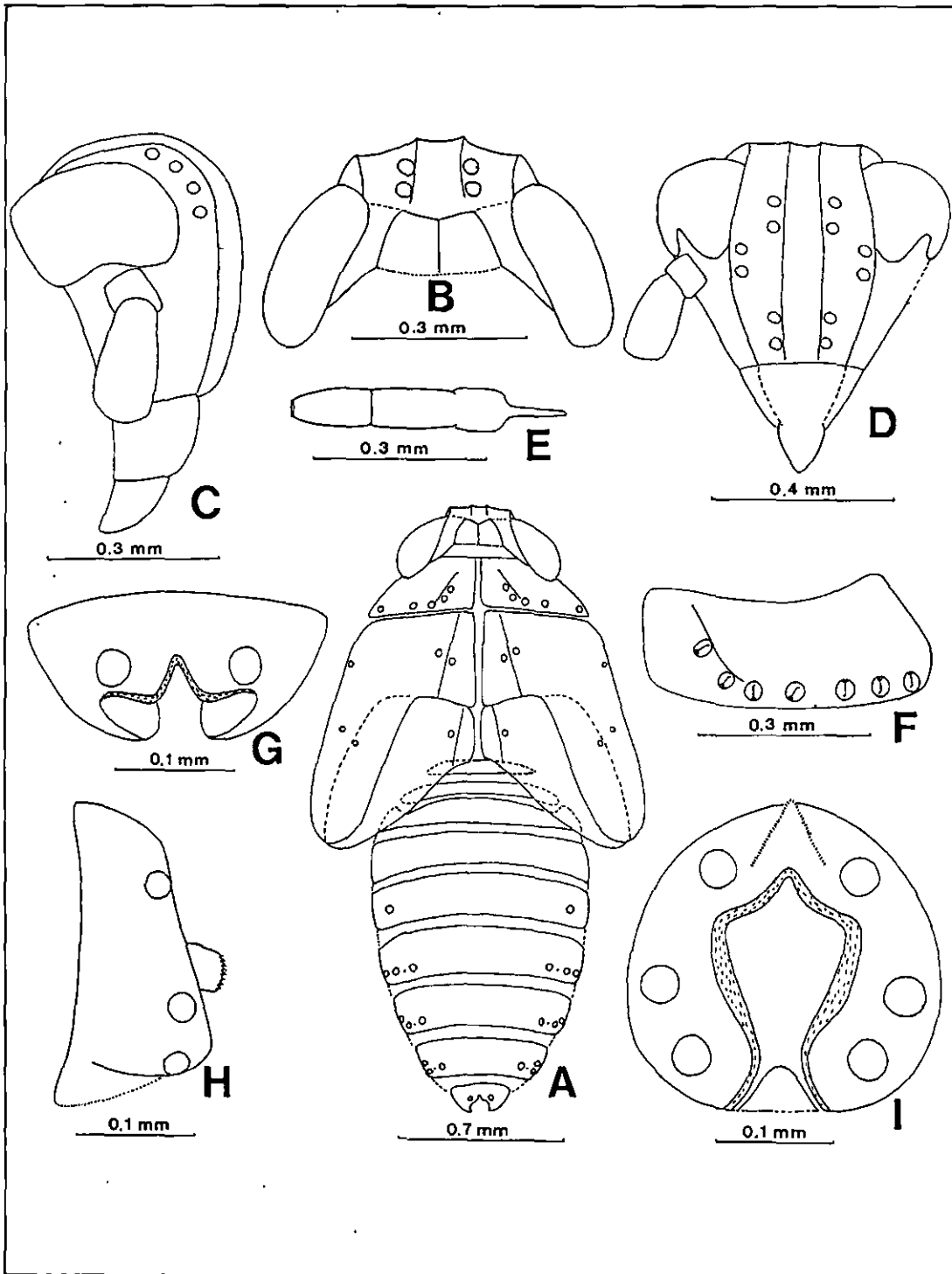


Fig. 9. *Laodelphax striatella* Esaki et Ishihara A, Fifth instar nymph, dorsal view; B, Head, dorsal view; C, Head, lateral view; D, Head, ventral view; E, Rostrum, ventral view; F, Pronotum, flat surface; G, Ninth abdominal segment, dorsal view; H, Ninth abdominal segment, lateral view; I, Ninth abdominal segment, caudal view.

Host plant: *Oryza sativa* L.

Distribution: Taiwan, Ryukyu, Korea, Siberia, Europe, Philippines.

Vilbaste, J. 1968, Preliminary key for the identification of the nymphs of North European Homoptera Cicadina. I. Delphacidae. Ann. Ent. Fenn., 34:2, pp. 65-74.

Reference