

**REVISION OF GREENIDEA AND RELATED GENERA
(HOMOPTERA, APHIDIDAE)**

by

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The present paper contains the results of studies on the tribe Greenideini of the subfamily Greenideinae Takahashi, 1931, a primitive group of Aphididae mainly restricted to East Asia. Material could be studied of twenty-seven species described by previous authors, while seven species had to be described as new. Some changes had to be effected in the systematic arrangement, so that at present six genera (old and new) are recognised in the group, together including five subgenera. In spite of repeated attempts not all the species so far described could be examined, accordingly in a final chapter notes are added on the species that were not available.

The project for carrying out research work on Aphididae could be realised through the kind help of Mr. D. Hille Ris Lambers at Bennekom, who not only selected a suitable subject for these studies (the genus *Greenidia* and its allies), but also placed the valuable material from his private collections at my disposal together with the literature of the group from his library, and, moreover, arranged for the loan of specimens from other institutions.

After having discussed at Bennekom the plans for the investigations, the work was carried out in the Rijksmuseum van Natuurlijke Historie at Leiden, whilst the results were supervised by Mr. Hille Ris Lambers during my repeated visits to Bennekom; I am greatly indebted to him for assiduous guidance and for hospitality received at his home.

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Material. Only material mounted in slides could be studied. This had been submitted to a clearing process before it was mounted, apparently frequently by heating in KOH. It is well known that this process bleaches the dark pigments in the integument. Consequently it is possible that several species are darker pigmented than they have been described here, or that those parts of such specimens which in fresh material differ much in degree of pigmentation from other parts of the body have been reduced to a similar, paler shade.

Measurements. These were made with an ocular micrometer as follows:

1. length of body: distance between the tangent of the most anterior part of the front to the apex of the cauda, including its median process if present.
2. length of hairs: the length of the part of the hair which emerges from the socket to the tip.
3. base of last antennal segment: the length from its sclerotic base up to the outer margin of the primary rhinarium.
4. length of the processus terminalis: the length of the part of the last antennal segment from the distal margin of the primary rhinarium to the apex of the segment.
5. basal diameter of IIIrd antennal segment: the smallest width of the segment near its basal articulation.
6. the length of the 2nd tarsal joint: the distance between its very base up to its apex excluding the claws.

Colour notes. The colour of living material is in general not referred to because in no case this could be studied.

Tribe GREENIDEINI

A. HISTORY.

Heer (1853) recorded *Aphis macrostyla* Heer from the Miocene of Radoboj (Yugoslavia). Mordvilko (1934) suspected this to be a species of the genus *Greenidea* Schout., but from the original description and the figure it is very difficult to decide to which genus it belongs, although it is beyond doubt that it is a species of this tribe. A number of different genera belonging here have been described. Takahashi (1931) created the subfamily Greenideinae for the then known genera *Greenidea* Schout., *Paratrichosiphum* Tak., *Greenideoida* van der Goot, *Eutrichosiphum* Essig et Kuwana, *Cervaphis* van der Goot, *Brasilaphis* Mordv., and *Anomalaphis* Baker, all of which Börner (1930) included in the tribe Thelaxini of his subfamily Thelaxinae. In 1931 Takahashi considered the first four genera

to form the tribe Greenideini. All the later workers have accepted Takahashi's view. In the present paper this tribe is used in the same sense as Takahashi did in 1931.

B. GENERAL BIOLOGY.

The species attack the under sides of leaves and young shoots of the following families of plants, Annonaceae, Anacardiaceae, Apocynaceae, Euphorbiaceae, Fagaceae, Guttiferae, Hamamelidaceae, Loranthaceae, Moraceae, Myrtaceae, etc. A considerable part of the species is restricted to *Quercus* and nearly related genera of the Fagaceae. Mordvilko (1934) has expressed his opinion that the group originated on Fagaceae and other more primitive host plants, and suggests that from there species have colonized more recent orders of plants. In the area of distribution of the tribe, the tropics and subtropics, aphids generally reproduce parthenogenetically and Greenideini on the whole follow this pattern. But of some species, near the northern boundary of their territory, it is known that sexuales are produced and therefore presumably oviparous reproduction occurs and it is possible, as also is suggested by the find of an oviparous female in Malaya, that the capacity for bisexual reproduction is not completely lost.

C. GEOGRAPHICAL DISTRIBUTION.

From paleontological data it is evident that at one time the tribe occurred in Europe, and Mordvilko (1929) even points to the possibility that species belonging here might still be found in Southern Europe. This, however, remains doubtful and at present the tribe would seem to be restricted to Eastern Asia. The western boundary seems to be in India, the northern boundary somewhere in Siberia (Chabarowsk), the eastern boundary in Japan, while in the south several species are known from Java. From Melanesia no species has been recorded. Mr. Hille Ris Lambers tells me that so far a special hunt for these species in Dutch New Guinea has given negative results. In view of this it is possible that Hardy's (1931) record of *Greenidea* from Australia on *Ficus* and *Quercus* refers to introduced species.

D. GENERAL MORPHOLOGY.

I. Head. In apterae always fused with pronotum, transverse, with the front convex to concave, often with four more or less joined elevations in the middle or with the middle part convex; frontal tubercles absent to small, diverging, always smooth. Antennae long, thin, usually of six segments, in the genus *Eutrichosiphum* Essig et Kuwana always of five segments, rarely with 5 or 6 segments within the same species (*Paratrichosiphum javanicum*

nov. spec.); secondary rhinaria in apterae absent (when rhinaria are present in an apterous morph, often traces of ocelli and abnormalities on the thorax are present, which show that they are alatiform intermediates); alatae with circular to transversely oval rhinaria on IIIrd antennal segment, rarely with some on IVth segment; these rhinaria without a hairy fringe. Primary rhinaria normal, with hairy fringe, that on the last segment often up to the processus terminalis with its accessory rhinaria placed basad. Processus terminalis usually longer than the basal portion of last segment, usually shorter than IIIrd antennal segment, especially in alatae; IVth, Vth, and the base of last segment more or less subequal in length; basal segments often somewhat spinulosely imbricated, flagellum usually imbricated with sometimes a considerable portion of IIIrd segment smooth. Antennal hairs usually very long and more or less like those on the dorsum of the body, but invariably with less unusual apices than in apterae and with slightly more abnormal apices than in alatae; direction and arrangement variable, so that antennae occur in which especially on the IIIrd segment a number of long hairs are directed inwards, while a number of short hairs are directed both outwards and inwards; in other taxa the antennal hairs are of more or less uniform lengths and point rather evenly in all directions. Eyes always multicorneal with a very large processus-like triommatidion. Ocelli normal. Rostrum rather long, retractile, usually of seemingly five segments because the last segment is subdivided into a hair-bearing 4th segment and a darkly pigmented hairless, much smaller 5th segment; this combination of segments 4 + 5 generally long, tapering and acute, more rarely (in *Greenideoida* van der Goot) rather short and bluntish, in which case usually no clear division into a 4th and 5th segment is present.

II. Thorax. In apterae usually the pro- and mesothorax only little wider than the head, but the metathorax and the abdominal segments rather suddenly much wider. Nota smooth to spinulose, sterna often locally spinulose. Thoracal hairs sometimes in alatae much longer than the abdominal hairs, and sometimes furcated where the abdominal hairs show normal apices. Middle, fore, and hind coxae in apterae always very near each other, in alatae the middle and hind coxae very much more apart than the fore coxae, trochanters separated; femora fairly normal, dorsally often with sinuated profile on apical half, with the hairs more or less like those on the abdominal dorsum, but ventrally on basal half with at least some hairs like those on the venter, dorsally at apex with two usually curved, rather short hairs with nearly always irregular apex; these two hairs always present in alatae, often also in apterae; cuticle usually with transverse imbrications on part of the surface and these imbrications sometimes spinulose; tibiae usually

rather straight, the hind tibiae sometimes slightly curved inwards, or sideways and outwards; frequently darker than the femora; hairs on the tibiae on their outer side often different and longer than those on their inner side, which are more often spiny; cuticle variable, so that all tibiae may be smooth with at most some little conspicuous imbrications near the apices, or all imbricated over their whole length so that they look transversely striate, or only the hind tibiae may show a number of curious transverse cuts, which are not comparable to normal imbrications and which occur especially on basal $\frac{1}{2}$ to $\frac{3}{4}$; hind tibiae with such cuts or scars always curved sideways; this structure is later referred to as the stridulatory apparatus; in alatae on distal $\frac{2}{3}$ to $\frac{1}{4}$ along the inner side of the tibiae a number of adpressed, large spinules is always present while also in other morphs normal spinules may be present near the apices of the tibiae; ventrally the tibiae bear 4 usually thick and stout spine-like hairs, which as a rule but not always are very different from other tibial hairs. Tarsi 2-segmented, the 1st segment nearly always with 7 hairs ventrally, of which 5 are placed along its distal margin, the middle one being about $\frac{1}{3}$ in length of the 4 lateral ones; basad of these 5 hairs 2 more long hairs are placed, except in *Greenideoida elongata* van der Goot, in which only the 5 marginal hairs are present. Empodial hairs are thread-like with slightly spatulate apices, similar to 1 or 2 dorso-apical hairs on the 2nd joint of tarsi. In oviparous females the hind tibiae are not different from those in the viviparous females. Wings usually normal, but sometimes the hind wings reduced in size and without obliques (*Greenideoida* van der Goot s.s.). Veins pale to black, not shadowed; pterostigma long, often extending rather far towards the tip of the fore wing; sector radii from almost straight to markedly curved; media once (*Greenideoida* van der Goot s.s.) or (usually) twice branched.

III. Abdomen. Generally very much wider than the thorax, often almost circular in outline, to elongated oval, sometimes with maximum width rather near the siphunculi. Tergites 1 to 6 often fused, tergites 7 and 8 always mutually free. Marginal sclerites often free from the middle portion of the tergites but at least in apterae mutually fused and caudad also fused with the rest of the tergum. Ventrally sclerotisation extensive so that often a very large ventral plate is formed which is not connected with the marginal sclerites. Dorsal hairs from scarce to very numerous, in most species with curious apices; the latter may be very finely drawn out, acuminate, more or less deeply bifid (sometimes to almost $\frac{1}{2}$ their length), serrate or branched; in the latter case several acute spines arise at various levels from the distal portion of the hair; hairs of various lengths may be present in

the same specimen, in which case the longest hairs correspond to hairs already present from the 1st instar, while shorter secondary hairs usually are restricted to the anterior part of the abdomen; hairs on strong sockets, but not on tubercles, sometimes placed on slightly differently pigmented round discs; 6th abdominal tergite often with one long median hair usually besides other hairs, 7th tergite with often only two long hairs, 8th tergite only with two long hairs which are always or nearly always thinner than most other hairs and which have finely drawn out apices. Dorsal cuticle smooth, faintly wrinkled or more or less densely spinulose over almost its entire surface; frequently very few spinules present more or less laterally on the anterior tergites and laterally also more caudad; ventrally spinules almost always present on the anterior sternites and laterally on sternites more caudad, but in some groups ventrally a great number of spinules or nodules present, in which case a median area may remain almost or completely smooth. Siphunculi often more or less distinctly articulated with the body in alatae, so that they do not easily break near their bases, but in apterae at base fused with the tergites, usually placed conspicuously far caudad and seemingly on the 6th tergite, rather short ($\frac{1}{5}$ length of the body) to exceedingly long (1.01 times as long as body), in alatae always very much longer than in the corresponding apterous morphs, rather densely covered with hairs similar to those on the abdominal dorsum, but usually mostly with acute apices also when the dorsal hairs of the body have irregular apices; shape variable, from thickly sickle-shaped to almost cylindrical, usually with the inner side very much more curved than the outer side, especially in apterae, or at least with the apical portion curved outwards, several times as thick as the middle of the tibiae, as a rule darker pigmented than any other part of the body, rarely pale like the body, in alatae always dark to black; structure of the cuticle variable; invariably transverse rows of spinules present near the apex and from there often occurring more dispersally to very near the base of the siphunculi, but always nearly or completely absent on parts which are transversely reticulated; such reticulations may be entirely absent, present on a very small area near the base of the siphunculi (in which case the siphunculi usually break in mounting not at but near the base) or over the entire length excepting the spinulose tips; more rarely siphunculi somewhat imbricated from the base up to their spinulose tips; alatae always with the siphunculi almost completely reticulated if the corresponding apterae have reticulation even at only the bases of the siphunculi, or like the apterae with no reticulation at all. Cauda from broadly semioval to more or less semicircular or obtusely conical, frequently with a more or less distinct short cylindrical

to conical processus at its apex, with 4 to 16 normal hairs, of which none is placed on the stylus-like processus, not differently pigmented from the preceding tergites. Subanal plate more or less shaped like the cauda, with normal hairs, and with below the anus a few rows of reticulations, in oviparae with more hairs than in viviparae, like the cauda with rows of spinules. Rudimentary gonapophyses in viviparous females 3 in number, but in oviparae the middle one is cleft so that 4 are present of which the middle pair is considerably larger than the lateral ones. Male genitalia rather unusual in shape (vide fig. 2d, p. 48), those in oviparae also unusual (vide fig. 3d, p. 62). Subgenital plate with a limited number of hairs but in oviparae exceedingly hairy.

E. TAXONOMY OF GENERA AND SUBGENERA.

KEY TO GENERA AND SUBGENERA.

- 1 (16) Siphunculi in larvae and apterae without reticulation on upper and under sides, not even at their bases, very rarely in apterae with a few interconnected striae only on the under side near base. Cauda never with a median process or stylus.
- 2 (10) Rostrum with the last segment long and acute, distinctly subdivided into two parts (fig. 2a, p. 48). Fore wings in alatae with the media twice furcated.
- 3 (13) Antennae of six segments, in some specimens on one or very rarely on both sides of five segments.
- 4 (7) Hind tibiae in alatae and apterae curved transversely on basal $1/2$ to $2/3$ (fig. 4a,b, p. 89), with a number of transverse cuts (stridulatory apparatus), the other tibiae smooth *Metatrichosiphon* nov. gen. s. l.
- 5 (6) Radial sector almost straight (fig. 4c, p. 89). Antennal hairs very numerous, pointing in all directions and all of about the same length (fig. 4d, p. 89)
Neotrichosiphon nov. subgen., typus subgeneris
Trichosiphum tenuicorpus Okajima.
- 6 (5) Radial sector curved (fig. 2c, p. 48). Antennal hairs mainly directed inwards, and those directed outwards much shorter than those directed inwards (fig. 1a, p. 12) *Metatrichosiphon* s.s., typus generis
Trichosiphum nigrofasciatum Maki.
- 7 (4) Hind tibiae in alatae and apterae straight or curved inwards, like the other tibiae either smooth or imbricated (fig. 1b, p. 12).
- 8 (9) Dorsum not spinulose. Siphuncular hairs all long and with acute apices
Paratrichosiphum Tak., typus generis
Paratrichosiphum tattakanum (Tak.).
- 9 (8) Dorsum at least in apterae spinulose. Siphunculi with long and short hairs intermingled, with acute, acuminate or bluntish apices (fig. 3b, p. 62).
Holotrichosiphon nov. gen., typus generis
Holotrichosiphon heterotrichus nov. spec.
- 10 (2) Rostrum with the last segment rather short and blunt and not distinctly subdivided (fig. 3a, p. 62). *Greenideoida* van der Goot s. l.
- 11 (12) Alatae with media in the fore wings twice branched and hind wings with two obliques *Neogreenideoida* nov. subgen., typus subgeneris
Neogreenideoida philippensis nov. spec.

- 12 (11) Alatae with media in the fore wings once furcated and hind wings without obliques *Greenideoida* van der Goot s.s., typus generis
Greenideoida elongata van der Goot.
- 13 (3) Antennae always five-segmented. Dorsum in apterae with or without spinules (see also *Paratrichosiphum javanicum* nov. spec.)
Eutrichosiphum Essig et Kuwana s.l., typus generis
Trichosiphum pasaniae Okajima.
- 14 (15) Hind tibiae smooth or very faintly imbricated like all other tibiae.
Eutrichosiphum Essig et Kuwana s.s.
- 15 (14) Hind tibiae on one side seemingly imbricated (stridulatory apparatus?), the other tibiae, with the exception of rarely a few striae on the middle tibiae, quite smooth *Ditrichosiphon* nov. subgen., typus subgeneris
Eutrichosiphum elongatum Tak.
- 16 (1) Siphunculi in apterae at least reticulated only at the base (fig. 2b, p. 48).
Greenidea Schout. s.l.
- 17 (18) Hind tibiae in apterae and alatae on their faintly curved inner side with hardly developed stridulatory ridges which in profile look like very short perpendicular spinules, in dorsal view like transverse striae which at their ends are faintly curved towards the base of the tibiae (fig. 3c, p. 62). Antennal hairs on both sides of IIIrd antennal segment long, fine and wavy and of about the same lengths. Siphunculi in apterae reticulated with a strongly transverse network over nearly the entire length. Dorsal hairs all with very fine acute apices
Paragreenidea nov. subgen., typus subgeneris
Greenidea viticola Tak.
- 18 (17) Hind tibiae straight, smooth or normally imbricated like all other tibiae, these imbrications in profile look like a fine saw with the teeth strongly directed apicad. Antennal hairs on the inner side of segment III much more numerous, longer and thicker than those on the outer side, all stiff. Siphunculi reticulated either only near base or over nearly their entire lengths. Dorsal hairs in apterae at least partly with subdivided apices, in alatae acute.
- 19 (20) Siphunculi in apterae reticulated only at the very base.
Trichosiphum Perg., typus subgeneris
Trichosiphum anonae Perg.
- 20 (19) Siphunculi in apterae reticulated over entire length
Greenidea Schout. s.s., typus subgeneris
Siphonophora artocarp Westw.

Genus **Eutrichosiphum** Essig et Kuwana, 1918

A. HISTORY.

The genus was erected by Essig & Kuwana (1918) for *Trichosiphum pasaniae* Okajima. They distinguished it from related genera by the species having five-segmented antennae. The genus was accepted by all the later authors. Takahashi (1931) gave a more specific diagnosis. He reserves the genus for species having a cauda without a stylus-like process. He also mentions as characters that the siphunculi are shorter than the body, and that no transverse striae or sensoria are present on the hind tibiae of the viviparous females. In the present paper *Eutrichosiphum* is understood in the same way as Takahashi (1931) did, but with the additional characters that the last rostral segment is long and acute and distinctly subdivided

while the media in the fore wings of alatae is twice branched, and in the apterae the siphunculi show no trace of reticulation. *Eutrichosiphum elongatum* Takahashi (1940) differs from other species of this genus by having a stridulatory apparatus on the hind tibiae, though it agrees in having five-segmented antennae and also in the distribution of its antennal hairs. Accordingly a new subgenus, *Ditrichosiphon* nov. subgen., is erected for *Eutrichosiphum elongatum* Tak.

B. SYNONYMY.

The synonymy of *Eutrichosiphum* Essig et Kuwana s.s. is as follows.

1908. Okajima, G., Bull. Coll. Agric., Tokyo Imp. Univ., vol. 8, pt. 1, p. 23, *Trichosiphum* Perg. partim.
1918. Maki, M., Formosan Agric. Rev (in Japanese), no. 138, p. 344, *Trichosiphum* Perg. partim.
1918. Essig, O. E., and Kuwana, S. I., Proc. Calif. Acad. Sci., 4th ser., vol. 8, no. 3, p. 97, *Eutrichosiphum*, typus generis *Trichosiphum pasaniae* Okajima.

The synonymy of the subgenus *Ditrichosiphon* nov. subgen. is as follows.

1940. Takahashi, R., Philipp. Jour. Sci., vol. 72, no. 4, p. 386, *Eutrichosiphum* Essig et Kuwana partim.

C. GENERAL BIOLOGY.

The recorded species are known to live on the young shoots and under sides of leaves of trees. Parthenogenetic reproduction seems to be the rule but in some species oviparous females are also known to occur. The host plants belong mostly to the Fagaceae, but one species lives on Apocynaceae.

D. GEOGRAPHICAL DISTRIBUTION.

The species of this genus are recorded from South India, Malaya, Java, Formosa, Japan and China. So the distribution can be said to be restricted to South-East Asia. No species has yet been recorded from any other part of the world.

E. GENERAL MORPHOLOGY.

I. Head. Antennae of five segments, in alatae sometimes with rhinaria on segment IV; antennal hairs partly long and partly short, with the longer hairs mostly directed inwards, especially on segment III, and the shorter ones mostly directed outwards. Rostrum distinctly of five segments.

II. Thorax. Generally spinulose on dorsum but sometimes smooth, ventrally it may show small groups of spinules. Wings normal with the media in the fore wings twice furcated, sector radii more or less curved, hind wings with two obliques; extension of pterostigma rather variable. Tibiae always with 4 distinct apical spines which are usually quite distinct

from normal hairs; hind tibiae with or without stridulatory apparatus. 1st tarsal joints with 7 hairs.

III. Abdomen. Tergum in apterae sclerotic, pale to blackish brown, usually spinulose but sometimes smooth. Dorsal hairs of various types, long and short; the longer ones may have furcated or acute apices but the shorter ones usually have acute apices. Ventrally the abdomen has spinules on the anterior sternites, laterally also on sternites more caudad. Siphunculi variable in shape and length, in apterae always more or less curved outwards, narrowing to the base and more so gradually to the apex, so that the largest width is basad of the middle, in alatae more cylindrical on basal half, not curved as in apterae; in apterae usually covered with long hairs and sometimes also with some short hairs near their very bases, in alatae, however, the hairs are more or less uniform; the long hairs in both apterae and alatae always with acute apices. In apterae siphunculi without a trace of reticulation even at their very bases, but in alatae reticulation present over the entire length of the siphunculi. In apterae and larvae spinules in great numbers present on the whole length of the siphunculi, though denser and more distinctly in transverse rows towards the apex; in alatae spinulosity much reduced, except at the apex of the siphunculi. Cauda with rounded apex, much wider than long.

F. TAXONOMY OF THE SUBGENERA AND SPECIES.

I. KEY TO THE SUBGENERA.

- 1 (2) Hind tibiae smooth or very faintly imbricated like all other tibiae.
Eutrichosiphum Essig et Kuwana s.s.
 2 (1) Hind tibiae on one side seemingly imbricated (stridulatory apparatus?), the other tibiae, with the exception of (rarely) a few striae on the middle tibiae, quite smooth
Ditrichosiphon nov. subgen.

II. KEY TO THE SPECIES OF *Eutrichosiphum* ESSIG ET KUWANA S.S.

(a) Apterous viviparous females.

- 1 (2) Dorsum also in larvae extremely densely covered with spinules which are several times as long as their basal width
davidi nov. spec.
 2 (1) Dorsum often spinulose, but then the spinules are less than twice as long as their basal width.
 3 (4) Dorsal hairs extremely long, 5 to 7 times as long as basal diameter of IIIrd antennal segment
minutum Tak.
 4 (3) Dorsal hairs shorter, at most 4 times as long as basal diameter of IIIrd antennal segment.
 5 (6) Body rather pale. Siphunculi about $\frac{2}{5}$ of length of body, about twice as long as IIIrd antennal segment.
sinense nov. spec.
 6 (5) Body dark brown. Siphunculi normally less than $\frac{3}{8}$ of length of body, hardly more than $1\frac{1}{2}$ times as long as IIIrd antennal segment.

- 7 (8) Femora not with spinulose transverse striae on ventral side. Segment 4 of rostrum nearly 5 to $5\frac{1}{2}$ (4.9 to 5.3) times as long as segment 5.
vandergooti nov. spec.
- 8 (7) Femora with spinulose striae on the ventral side. Segment 4 of rostrum nearly 4 to not even $4\frac{1}{2}$ (3.8 to 4.2) times as long as segment 5.
pasaniae (Okajima).
- (b) Alate viviparous females.
- 1 (2) Femora without spinulose transverse striae on the ventral side. Ant. segment IV never with rhinaria; ant. segment III with 20 to 25 strongly transversely oval rhinaria in one row over its entire length.
vandergooti nov. spec.
- 2 (1) Femora with spinulose transverse striae on the ventral side. Ant. segment IV sometimes with one circular rhinarium.
- 3 (4) Longest hair on the dorsum of the thorax about $5\frac{1}{2}$ to 6 times as long as basal diameter of IIIrd antennal segment. Hind tibiae about $1\frac{1}{2}$ times as long as the siphunculi. Siphunculi about 9 times as long as their maximum width
dauidi nov. spec.
- 4 (3) Longest hair on the dorsum of the thorax at most up to $4\frac{1}{2}$ times as long as basal diameter of IIIrd antennal segment. Hind tibiae shorter than the siphunculi. Siphunculi about 11.6 times as long as their maximum width.
pasaniae (Okajima).

***Eutrichosiphum dauidi* nov. spec.**

(text-fig. 1a, p. 12)

Apterous viviparous female.

Morphological characters. Body elongated, with the width evenly increasing from head to abdomen, about 1.72 mm long, with as maximum width 0.82 to 0.86 mm. Tergum sclerotised, pale brown to blackish brown, strongly spinulose excepting the head; on the pronotum spinules present only on the posterior and lateral margins; dorsal spinules several times as long as their basal widths. Large dorsal hairs thick and stiff with normal acute apices; on the dorsum of the abdomen up to the 6th tergite small and thinner, thorny hairs between the larger hairs; longest hair on the anterior tergites of abdomen with acute apex about 2.3 to 2.4 times as long as basal diameter of IIIrd antennal segment, the short thorny hairs up to about 0.67 to 0.87 times as long as the mentioned diameter; 7th abdominal tergite with 6 or more hairs of which 2 are much longer than the others, about 3.8 to 4.2 times as long as basal diameter of IIIrd antennal segment; 8th tergite with only two hairs up to about 4.2 to 4.7 times as long as the mentioned diameter. Front convex. Antennae coloured like the head, with segment III pale, about 0.35 to 0.36 times as long as body; segment III faintly imbricated on distal $\frac{2}{3}$ part, the rest of the flagellum more distinctly imbricated; processus terminalis about 1.9 times as long as base of Vth segment, about 0.70 to 0.75 times as long as segment III; large hairs with more or less acute apices; longest hair on segment III about

2.1 to 2.2 times as long as basal diameter of the segment. Apex of rostrum reaching far beyond the middle of the body; segments 4 + 5 slender and acute, about 2.9 to 3.1 times as long as 2nd joint of hind tarsi; segment 4 about 6.5 times as long as segment 5, with about 12 to 14 fine and long hairs. Siphunculi pigmented like the posterior margin of the body, with slightly darker apex, about 0.18 to 0.19 times as long as body, curved outwards, about 4.2 to 4.4 times as long as their maximum width, at base about 1.6 to 1.7 times as thick as the middle of the hind tibiae, at the middle

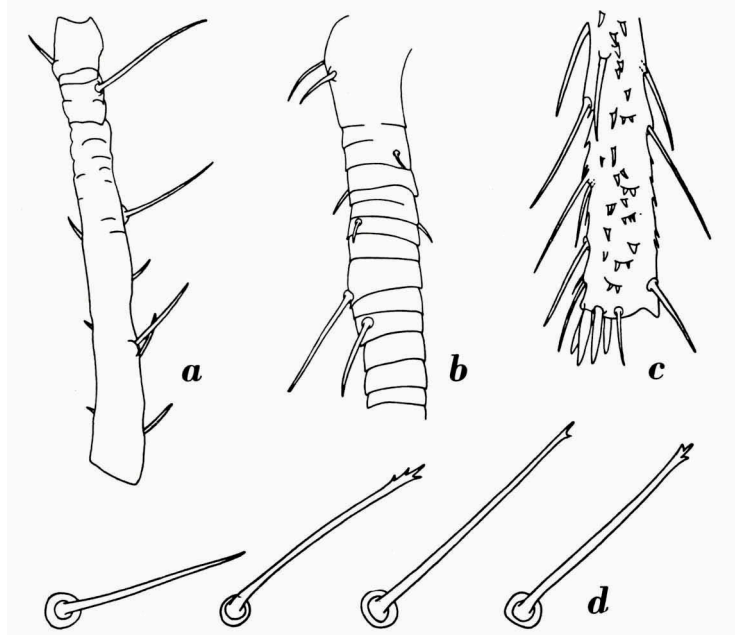


Fig. 1. *a*, *Eutrichosiphum davidi* nov. spec., ant. segment III, showing distribution of antennal hairs; *b*, *Greenidea decaspermi* Tak., basal portion of hind tibia, showing normal imbrications; *c*, *Greenidea artocarpi* (Westw.), alate, apical portion of hind tibia, showing arrangement of spinules; *d*, *Greenidea ficicola* Tak., aptera, four dorsal hairs from the anterior abdominal tergites. $\times 26$.

about 2.6 to 2.7 times as thick as the middle of the hind tibiae, and at apex about 1.1 to 1.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous and of two types, long ones with finely drawn out apices and short thorny ones, the shorter ones on about basal $\frac{1}{7}$ part; longest hair about 2.8 to 2.9 times as long as basal diameter of the siphunculi. Cauda with about 8 to 10 very long and fine hairs. Legs pale; femora with spinulose transverse striae ventrally; tibiae almost smooth.

Measurements of one specimen in mm (collected in South India, on

22.I.1955, from *Quercus serrata*): length of body: 1.72; width: 0.82; ant.: 0.59; siph.: 0.30; ant. segments: III; IV; V = 0.20; 0.08; (0.08 + 0.15).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 1.76 mm long, with as maximum width 0.72 mm. Abdominal tergum mostly sclerotised, brown, with a faint pattern of wavy coalescing striae. Dorsal hairs on the thorax very long, with acute apices, those on the abdomen mostly very short; longest hair on the mesothorax about 5.5 to 6 times as long as basal diameter of IIIrd antennal segment, longest hair on the anterior tergites of the abdomen about 0.8 times as long as the mentioned diameter; 7th abdominal tergite with two very long hairs up to about 3.4 times as long as basal diameter of IIIrd antennal segment and with some shorter hairs. Front with very small frontal tubercles. IIIrd antennal segment (partly broken) with 15 strongly transversely oval rhinaria; longest hair on segment III about 4 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum about 2.6 times as long as 2nd joint of hind tarsi. Siphunculi black, about 0.36 times as long as body, indistinctly reticulated-imbricated, very faintly curved outwards, about 9 times as long as their maximum width, near base about 2.9 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices; longest hair about 3.3 times as long as diameter of the siphunculi near their base; spinules present in distinct transverse rows on about distal $\frac{1}{4}$ part, a few more scattered ones basad of that area. Femora as dark as head, with basal $\frac{1}{2}$ of fore femora slightly paler, with spinulose transverse striae on ventral side; tibiae paler than femora, with the very bases and apices as dark as or darker than the apices of the femora, almost smooth. Pterostigma long, pigmented like the femora, and extending up to $\frac{1}{2}$ the radial sector.

Measurements of one specimen in mm (collected in South India, on 22.I.1955, from *Quercus serrata*): length of body: 1.56; width: 0.72; ant.: ?; siph.: 0.56; ant. segments: III; IV; V = ?; ?; (?).

Host plant. *Quercus serrata*.

Distribution. South India.

Biology. Not known.

Available material. 2 apterae and 1 alate; from the collections of Mr. D. Hille Ris Lambers, identified by him as *Eutrichosiphum lithocarpi* (Maki).

Note. This species differs by having many more spinules dorsally in

apterae than other species. Besides the spinules are very conspicuous by their length.

Type. In the collections of Mr. D. Hille Ris Lambers.

Eutrichosiphum minutum Takahashi, 1923

1923. Takahashi, R., Aph. of Formosa, pt. 2, p. 45, *Eutrichosiphum minutum*.

1931. —, Aph. of Formosa, pt. 6, p. 34, *Eutrichosiphum minutum*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.24 to 1.48 mm long, with as maximum width about 0.64 to 0.82 mm. Tergum sclerotised, brown, quite smooth. Two types of dorsal hairs present, exceedingly long ones and rather short ones; the long dorsal hairs on the anterior abdominal tergites mostly with furcated apices, up to about 5.8 to 6.7 times as long as basal diameter of IIIrd antennal segment; the rather short ones with acute apices, about 1.3 to 1.5 times as long as the mentioned diameter; 7th and 8th abdominal tergites both with two long hairs with acute apices, about 5.6 and 2.3 to 2.7 times as long as basal diameter of IIIrd antennal segment, respectively. Antennae pale, with basal segments as dark as head, about 0.50 to 0.60 times as long as body; flagellum almost smooth, with few imbrications from the middle of segment III towards the apex; processus terminalis about 1.7 to 2.2 times as long as base of Vth segment, about 1 to 1.1 times as long as segment III; nearly all large hairs bluntish; longest hair on segment III about 3.9 to 4.7 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 very slender and acute, about 1.8 to 2.1 times as long as 2nd joint of hind tarsi; segment 4 about 4 to 5.7 times as long as segment 5, with about 8 to 10 fine and rather short hairs. Siphunculi blackish brown, curved outwards, about 0.27 times as long as body, about 4 to 4.5 times as long as their maximum width, at base about 2 to 2.3 times as thick as the middle of the hind tibiae, at the middle about 2.9 to 3.2 times as thick as the middle of the hind tibiae, and at apex about 1.2 to 1.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi of two types, numerous, with acute apices; longest hair about 2.5 to 3.1 times as long as basal diameter of the siphunculi; short hairs near the base about as long as the mentioned diameter. Cauda with about 6 to 8 long and fine hairs. Legs pale like the head with basal $\frac{1}{4}$ of the tibiae slightly darker; femora smooth; tibiae smooth, near the apices with a few imbrications.

Measurements of one specimen in mm (collected in Foochow, China, date?, from an unknown host): length of body: 1.24; width: 0.64; ant.:

0.66; siph.: 0.34; ant. segments: III; IV; V = 0.22; 0.12; (0.11 + 0.22).

Host plant. *Trachelospermum jasminoides*.

Distribution. Formosa, East China.

Biology. Not known.

Available material. 8 apterous females; from the collections of Mr. D. Hille Ris Lambers, and the British Museum (Nat. Hist.) London, identified by R. Takahashi.

Note. This species differs from all others by its extremely long dorsal hairs on the abdomen.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Eutrichosiphum pasaniae* (Okajima, 1908)**

1908. Okajima, G., Bull. Coll. Agric. Tokyo Imp. Univ., vol. 8, pt. 1, p. 23, *Trichosiphum pasaniae*.
1918. Essig, O. E., and Kuwana, S. I., Proc. Calif. Acad. Sci., 4th ser., vol. 8, no. 3, p. 97, *Eutrichosiphum pasaniae*.
- ? 1918. Maki, M., Formosan Agric. Rev. (in Japanese), no. 138, p. 344, *Trichosiphum lithocarphae*.
- ? 1919. —, Ent. Mag. Kyoto, pt. 4, p. 21, *Eutrichosiphum lithocarpi*.
- ? 1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 68, *Eutrichosiphum lithocarphae*.
- ? 1923. —, Aph. of Formosa, pt. 2, p. 118, *Eutrichosiphum lithocarpi*.
- ? 1923. —, Aph. of Formosa, pt. 2, p. 67, *Eutrichosiphum pasaniae*.
- ? 1930. —, Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 322, *Eutrichosiphum lithocarpi*.
- ? 1931. —, Aph. of Formosa, pt. 6, p. 34, *Eutrichosiphum lithocarpi*.
1950. —, Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 589, *Eutrichosiphum lithocarpi* subspec. *malayense*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.50 to 1.75 mm long, with as maximum width 0.93 to 1.04 mm. Tergum sclerotised, brownish to blackish brown, on the thoracal segments and on the abdomen with short, conical spinules, but the spinules on an area of the abdominal dorsum often very indistinct and not longer than thick. Hairs on the dorsum of various types, long and short; the long hairs on the abdomen mostly with furcated or branched apices, but a few hairs longer than all the others, with normal and fine apices; longest hair on the anterior tergites of abdomen about 2.8 to 2.9 times as long as basal diameter of IIIrd antennal segment; the shortest hair with acute apex about 0.83 times to as long as the mentioned diameter; 7th and 8th abdominal tergites each with two long hairs with acute apices, up to about 2.7 times as long as basal diameter of IIIrd antennal segment. Front somewhat convex, without marked frontal tubercles. Antennae about 0.41 to 0.53 times as long as body; flagellum

pale brown, darker towards apex, gradually more distinctly imbricated from base towards apex; processus terminalis about 1.3 to 1.5 times as long as base of Vth segment, about 0.5 to 0.6 times as long as segment III; large hairs with acute apices; longest hair on segment III about 3.1 to 3.8 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 slender and acute, about 1.9 to 2.1 times as long as 2nd joint of hind tarsi; segment 4 about 3.8 to 4.2 times as long as segment 5, with about 10 long and fine hairs. Siphunculi blackish to black, at base more fuscous, curved outwards, about 0.25 to 0.31 times as long as body, about 5.3 to 6.1 times as long as their maximum width, at base about 1.7 to 1.9 times as thick as the middle of the hind tibiae, at the middle about 2.7 to 2.9 times as thick as the middle of the hind tibiae, and at apex about 1.4 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices, with on the basal portion a few very much shorter, thorny hairs; longest hair about 2.3 to 2.4 times as long as basal diameter of the siphunculi. Cauda with about 6 to 10 long hairs. Legs pigmented like the head; femora with a number of spinulose striae ventrally, especially the hind ones ventrally with some imbrications; tibiae almost smooth with some imbrications at the very apices.

Measurements of one specimen in mm (collected in Tokyo, Japan, on 12.3.1909, from *Pasania* spec.): length of body: 1.70; width: 0.93; ant.: 0.74; siph.: 0.42; ant. segments: III; IV; V = 0.29; 0.11; (0.11 + 0.15).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated. Longest hair on the anterior tergites of abdomen about 1.7 to 2 times as long as basal diameter of IIIrd antennal segment, the shortest hair about 0.65 to 0.85 times as long as the mentioned diameter; 7th abdominal tergite with two very long hairs with acute apices, and some shorter hairs; 8th with only two long hairs, about 3.3 times as long as basal diameter of IIIrd antennal segment. Antennae about 0.75 times as long as body, dark, almost smooth; processus terminalis about 0.35 to 0.40 times as long as segment III; segment III with about 17 to 22 large transversely oval rhinaria placed in a row, along its entire length; segment IV with 0 to 1 circular rhinarium on its basal $\frac{1}{3}$ part; large hairs longer and finer; longest hair on segment III about 4.2 times as long as basal diameter of IIIrd antennal segment. Apex of rostrum hardly reaching the hind coxae. Siphunculi dark brown, almost cylindrical, slightly curved outwards near the apex, about 0.52 times as long as body, very faintly striate on basal

half, about 11.6 times as long as their maximum width, near base about 2.3 times as thick as the middle of the hind tibiae; all hairs on the siphunculi long, with acute apices, up to about 2.7 times as long as diameter of the siphunculi near their base; spinules in distinct transverse rows near the apex, basad very scarce and scattered. Cauda with about 5 to 6 long and fine hairs. Tibiae paler than the femora; apices of the tibiae ventrally with 4 thorns which are not very different from normal hairs. Pterostigma extending up to $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Fukien, China, date?, from an unknown host): length of body: 1.74; width: 0.72; ant.: 1.31; siph.: ?; ant. segments: III; IV; V = 0.62; 0.19; (0.16 + 0.24).

N.B. Description of the siphunculi given from a specimen collected near Canton, China.

Host plants. *Quercus cuspidata*, *Q. acuta*, *Q. serrata* (Okajima, 1908); *Q. cuspidata* (Essig et Kuwana, 1918); ? *Castanopsis uraiana* (Maki, 1918); ? *Castanopsis* (Takahashi, 1921); ? *Q. cuspidata*, ? *Q. spec.* (Takahashi, 1923 for *pasaniae*); ? *Castanopsis uraiana* (Takahashi, 1923 for *lithocarpi*); ? *Castanopsis spec.* (Takahashi, 1930); ? *Castanopsis subacuminata*, ? *Elaeocarpus japonicus* (Takahashi, 1931); *Quercus spec.* (Takahashi, 1950).

Distribution. Malaya (alt. 1520 m, Takahashi, 1950), ? Formosa (Maki, 1918; Takahashi, 1921, 1923, 1930, 1931), Japan (Okajima, 1908; Essig et Kuwana, 1918), East China.

Biology. The species attacks the young shoots and under sides of the leaves of the host plants (Okajima, 1908). Takahashi (1923) mentions the same for *lithocarpi*, but on the host plant *Castanopsis uraiana*.

Available material. 8 apterae and 5 alatae; from the collections of the British Museum (Nat. Hist.), London (Theobald's collection, no. 1930-204), identified as *Trichosiphum pasaniae* (from Japan, 1909) and no. 1953-757, identified as *Eutrichosiphum lithocarpi* (from China); of Mr. D. Hille Ris Lambers, identified as *Eutrichosiphum pasaniae* by C. C. Tao (from China); of the Entomological Laboratory, Wageningen (unidentified).

Note. *E. pasaniae* was originally described from Japan, *E. lithocarphae* from Formosa. In 1930 Takahashi remarked that *lithocarphae* is the same as *pasaniae* Okajima, and in 1931 he placed *lithocarphae* as a synonym of *pasaniae*. Material of *pasaniae* from Japan was available for examination and the apterae have decidedly furcated hairs.

In 1950 Takahashi distinguished the new subspec. *malayense* of *lithocarpi*

because in the subspecies the dorsal hairs have furcated apices in the apterae. This suggests that the hairs in true *lithocarpae* have simple apices, but unfortunately no material from Formosa is available and the descriptions of *lithocarpae* contain no reference to the shape of the hairs. But, if Takahashi is right in saying that Formosan *lithocarpi* in the apterae has simple hairs (which he could know because Maki's material was probably available in his research institute in Formosa), then all the material identified as *lithocarpi* which we could examine was really *pasaniae*, and then we never have seen *E. lithocarpae* (Maki). It is unknown to us by which character *E. lithocarpi* subsec. *malayense* Takahashi differs from *E. pasaniae* (Okajima), both of which have furcated hairs in apterae. Therefore *E. lithocarpi* subsec. *malayense* is also tentatively listed as a synonym.

Type. Types of *pasaniae* Okajima unknown. Types of *lithocarpae* Maki probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa. Types of subsec. *malayense* now in the British Museum (Nat. Hist.), London.

***Eutrichosiphum sinense* nov. spec.**

Apterous viviparous female.

Morphological characters. Body elongated, 1.48 mm long, with as maximum width 0.70 mm. Tergum sclerotised, faintly pale brownish, on the thoracal segments and abdomen with very little conspicuous fine spinules in transverse rows. Large dorsal hairs rather thick and stiff, usually with markedly branched or at least furcated apices, intermingled with short ones with blunt or furcated apices; longest hair on the anterior tergites of abdomen about 2.6 times as long as basal diameter of IIIrd antennal segment, the shortest hair about 0.96 times as long as the mentioned diameter; 7th tergite with two long hairs with branched apices; 8th tergite with two long hairs with acute apices, up to about 2.9 times as long as the mentioned diameter. Front strongly convex in the middle. Antennae pale like the head, with the very apex of the IIIrd and the IVth and Vth segments darker, about 0.52 times as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 1.3 times as long as base of Vth segment, about 0.55 times as long as segment III; large hairs with acute apices; longest hair on segment III about 3.5 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum long and acute, about 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.2 times as long as segment 5, with about 10 short and fine hairs. Siphunculi blackish brown on distal half, basad paler, curved outwards, about 0.41 times as long as body, without a trace of reticulation, about 6.7

times as long as their maximum width, at base about 2.2 times as thick as the middle of the hind tibiae, at the middle about 3.7 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, with more or less acute apices; longest hair about 2.8 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows over the whole length, more densely near the apices. Cauda more or less triangular, with 7 hairs of which one placed on the rather acute apex of the cauda. Femora pale like the head, very dispersally and superficially imbricated; tibiae nearly as dark as the IVth and Vth antennal segments, with basal $\frac{2}{3}$ more or less smooth but the apical $\frac{1}{3}$ imbricated like the femora; apices of tibiae with 4 thick thorns which are hardly different from normal hairs.

Measurements of one specimen in mm (collected in Fukien, China, date ?, from an unknown host): length of body: 1.48; width: 0.70; ant.: 0.77; siph.: 0.60; ant. segments: III; IV; V = 0.29; 0.12; (0.12 + 0.16).

Host plant. Not known.

Distribution. East China.

Biology. Not known.

Available material. 1 apterous female; from the collections of the British Museum (Nat. Hist.), London, identified as *Eutrichosiphum lithocarpi* (Maki).

Note. This species is quite distinct from all other species by the very pale body, which in this case cannot be ascribed to clearing. The specimen is in a slide containing many specimens which are identified as *E. lithocarpi* and the apterae of those specimens are as dark as usual. The siphunculi are considerably longer and more slender than in apterae of related species and this might suggest that it was an intermediate form, but there is nothing in its anatomy which supports this suggestion.

Type. Holotype in the British Museum (Nat. Hist.), London.

***Eutrichosiphum vandergooti* nov. spec.**

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.42 to 1.72 mm long, with as maximum width 0.86 to 0.95 mm. Tergum sclerotised, rather dark brown, with the head and pronotum conspicuously paler, completely spinulose excepting the head. Large dorsal hairs rather thick with predominantly branched or furcated apices though some are acute; longest hair on the anterior tergites of abdomen about 2.9 to 3.4 times as long as basal diameter of IIIrd antennal segment; very few short hairs with furcated apices on the

anterior part of the abdomen; shortest hair about 0.75 times to as long as the mentioned diameter; 7th abdominal tergite with amongst others two long hairs with more or less acuminate apices, up to about 2.3 to 2.9 times as long as basal diameter of IIIrd antennal segment; 8th tergite with only two similar hairs, up to about 2.1 to 2.6 times as long as the mentioned diameter. Antennae pale, with slightly darker basal and Vth segments, about 0.52 to 0.56 times as long as body; segment III almost smooth with apical $\frac{1}{4}$ part faintly imbricated and the rest of the flagellum more distinctly imbricated; processus terminalis about 1.5 to 1.8 times as long as base of Vth segment, about 0.45 to 0.50 times as long as segment III; large hairs similar to those on the dorsum but hardly furcated; longest hair on segment III about 2.8 to 2.9 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae; segments 4 + 5 slender and acute, about 2.3 to 2.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.9 to 5.3 times as long as segment 5, with about 8 to 12 rather short and fine hairs. Siphunculi jet black, constricted at base and apex, curved outwards, about 0.24 to 0.26 times as long as body, about 4.7 to 5.2 times as long as their maximum width, at base about 1.7 to 1.8 times as thick as the middle of the hind tibiae, at the middle about 3 to 3.1 times as thick as the middle of the hind tibiae, and at apex about 1.2 to 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous and long, with acute apices, but near their bases a few very short hairs with subacute apices; longest hair about 2.3 to 2.8 times as long as basal diameter of the siphunculi; spinules present over the entire length, densest near the apex. Cauda transversely semioval, with about 6 to 8 long and fine hairs. Legs pale; femora smooth; tibiae smooth.

Measurements of one specimen in mm (collected in Bogor, Java, on 27.7.1918, from *Castanopsis*): length of body: 1.68; width: 0.94; ant.: 0.88; siph.: 0.45; ant. segments: III; IV; V = 0.36; 0.14; (0.11 + 0.16).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 1.64 to 1.84 mm long, with as maximum width 0.63 to 0.74 mm. Tergum sclerotised, brown, on abdomen faintly spinulose on anterior half. Long and short dorsal hairs with acute apices; longest hair on the anterior tergites of the abdomen about 1.5 to 1.6 times as long as basal diameter of IIIrd antennal segment, shortest hair about 0.6 to 0.8 times as long as the mentioned diameter; hairs on 8th tergite up to about 3.2 to 3.6 times as long as basal diameter of IIIrd antennal segment. Antennae as dark as head, with slightly darker basal segments, about 0.80 to

0.85 times as long as body; flagellum lightly imbricated from base to apex; processus terminalis about 0.32 to 0.35 times as long as segment III; segment III with about 20 to 25 strongly transversely oval rhinaria in a row, from base to apex; large hairs similar to those on the dorsum but with finely drawn out apices, on segment III up to about 4 to 4.6 times as long as basal diameter of the segment. Siphunculi about 0.46 times as long as body, with maximum width on distal half, faintly reticulated-imbricated, slightly curved outwards, about 11.1 to 12.4 times as long as their maximum width, at the middle about 2.5 to 2.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi with acute apices; longest hair about 3.5 times as long as diameter of the siphunculi near their base. Cauda more triangular than in apterae. Femora brown, with the apices slightly darker, smooth; tibiae paler than femora excepting the bases and apices, smooth with the very apices slightly imbricated. Pterostigma extending up to about $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Bogor, Java, on 27.7.1918, from *Castanopsis*): length of body: 1.84; width: 0.74; ant.: 1.48; siph.: 0.84; ant. segments: III; IV; V = 0.73; 0.24; (0.15 + 0.24).

Host plant. *Castanopsis* spec.

Distribution. Java.

Biology. Not known.

Available material. Extensive material of apterae and a few alatae; from the collections of the Entomological Laboratory, Wageningen.

Note. This species is described as new because it does not agree with any described species. It comes near *pasaniae* Okajima, from which in the mounts it seemingly differs by its pale colour, but this is almost certainly caused by bleaching during a clearing process. But differences such as smooth femora and relative lengths of the apical rostral segments cannot be ascribed to the clearing process.

Type. Cotypes in the collections of the Entomological Laboratory, Wageningen, and in the collections of Mr. Hille Ris Lambers.

***Eutrichosiphum (Ditrichosiphon) elongatum* Takahashi, 1940**

1940. Takahashi, R., Philipp. Jour. Sci., vol. 72, no. 4, p. 386, *Eutrichosiphum elongatum*.

Apterous viviparous female.

Morphological characters. Body elongated, about 2.16 to 2.60 mm long, with as maximum width about 1.03 to 1.26 mm. Tergum pale yellowish. Thoracal nota locally spinulose, abdominal dorsum spinulose, more prom-

inently so on its anterior half. Long dorsal hairs thick, wavy, mostly with just acuminate, more rarely with furcated or branched apices; longest hair on the anterior tergites of abdomen about 4.6 to 5.5 times as long as basal diameter of IIIrd antennal segment; a few shorter hairs with acuminate or slightly furcated apices also present on the anterior part of the abdomen; shortest hair about 0.82 to 2 times as long as the mentioned diameter; 7th tergite with two lateral and two long spinal hairs with normal apices, the latter up to about 4.4 to 5.6 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two much smaller hairs also with normal apices, up to about 2.6 to 3.4 times as long as the mentioned diameter. Front strongly convex in the middle. Antennae pale, with an area round the primary rhinaria and the processus terminalis slightly darker, about 0.49 to 0.54 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 0.8 to 1.3 times as long as base of Vth segment, about 0.28 to 0.4 times as long as segment III; large hairs similar to those on the dorsum but with finely drawn out acute apices; longest hair on segment III about 4.5 to 6.3 times as long as basal diameter of the segment. Apex of rostrum almost reaching the middle of the body; segments 4 + 5 slender and acute, about 1.7 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.1 to 4.6 times as long as segment 5, with about 10 to 12 short and fine hairs. Siphunculi thickly spindle-shaped, variable, pigmented like the body or darker, about 0.31 to 0.35 times as long as body, without a trace of reticulation, about 4.3 to 5.8 times as long as their maximum width, at base about 2.1 to 2.2 times as thick as the middle of the hind tibiae, at the middle about 3.8 to 4.4 times as thick as the middle of the hind tibiae, and at apex about 1.2 to 1.4 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, with finely drawn out acute apices; longest hair about 2.2 to 2.7 times as long as basal diameter of the siphunculi; spinules present from base to apex, near the apex in distinct transverse rows, basal less numerous. Cauda transversely semioval, with about 8 rather long and fine hairs. Femora pigmented like the body, with a number of spinulose transverse striae on ventral side; tibiae very slightly pale yellowish; fore tibiae smooth, the middle tibiae usually with a few scattered imbrications near the middle; hind tibiae curved outwards, with stridulatory apparatus with about 70 ridges which extend to near the imbricated apex.

Measurements of one specimen in mm (collected in Nagashinoko, Formosa, on 6.8.1939, from *Quercus*): length of body: 1.38; width: 1.15; ant.: 1.19; siph.: 0.76; ant. segments: III; IV; V = 0.51; 0.17; (0.18 + 0.20).

Host plant. *Quercus* spec.

Distribution. Formosa.

Biology. According to Takahashi this species attacks the lower side of young leaves and the young shoots of the host plant.

Available material. 6 apterous females; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. Recognition of this species is very easy because of the presence of stridulatory apparatus on the hind tibiae, in combination with the general characters for *Eutrichosiphum*.

Type. Probably in the collections of Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa, paratypes or cotypes in the collections of Mr. Hille Ris Lambers.

Genus **Greenidea** Schouteden, 1905

A. HISTORY.

The genus was erected by Schouteden for *Siphonophora artocarpi* Westwood, but it is possible that what he understood as *Siphonophora artocarpi* Westw. was a mixture of several species, which at present are even placed in different genera. Schouteden characterizes his genus by the strong bristles which cover the body and siphunculi and by the shape of the siphunculi and cauda. The genus was generally accepted by all later authors, but van der Goot (1917) and later also Takahashi gave a more specific diagnosis, when they reserved the genus for species with a conical process on the apex of the cauda. The process may be smaller or larger, but it is always present also in the larvae.

In 1906 Pergande, apparently not familiar with Schouteden's paper, erected the genus *Trichosiphum* with the species *kuwanai* Perg. and *anonae* Perg. The typus generis as indicated by Pergande (1906) is *Trichosiphum anonae* Pergande. This genus was thought to be distinct by van der Goot (1917), but later authors have considered it a synonym of *Greenidea* Schout. In the present paper *Trichosiphum* Perg. is treated as a subgenus to *Greenidea* because of the different sculpture of the siphunculi in apterae and larvae. The study of *Greenidea viticola* Takahashi made it necessary to erect the subgenus *Paragreenidea* nov. subgen. for the species. Siphunculi and cauda are as in *Greenidea* Schout., but it has wavy antennal hairs, all of about the same length, and a stridulatory apparatus on the hind tibiae.

B. SYNONYMY.

The synonymy of *Greenidea* Schout. s.s. is as follows.

1890. Westwood, J. O., Trans. Ent. Soc. Lond., pt. 4, p. 649, *Siphonophora* Pass. partim.

1905. Schouteden, H., *Spolia Zeylan.*, vol. 2, pt. 8, p. 181, *Greenidea*, typus generis *Siphonophora artocarpi* Westw., 1890.

1917-1953. Various authors, *Greenidea* Schout. partim.

The synonymy of the subgenus *Trichosiphum* Perg. is as follows.

1906. Pergande, Th., *Ent. News*, Philad., vol. 17, p. 207, *Trichosiphum*, typus generis *anonae* Perg., 1906.

1908. Okajima, G., *Bull. Coll. Agric. Tokyo Imp. Univ.*, vol. 8, pt. 1, p. 20, *Trichosiphum* partim.

1917-1953. Various authors, *Greenidea* Schout. partim.

The synonymy of *Paragreenidea* nov. subgen. is as follows.

1929. Takahashi, R., *Trans. Nat. Hist. Soc. Formosa*, vol. 19, no. 100, p. 98, *Greenidea* Schout. partim.

1931. —, *Aph. of Formosa*, pt. 6, p. 30, *Greenidea* Schout. partim.

C. GENERAL BIOLOGY.

The species as far as known live on the twigs and under sides of leaves of various trees. Reproduction seems to be mostly parthenogenetic, but in some species males and oviparous females have been recorded, so that at least locally under certain circumstances bisexual reproduction seems to be possible. The host plants belong to very different orders.

D. GEOGRAPHICAL DISTRIBUTION.

Species belonging to *Greenidea* s.s. have been recorded from an area reaching from Southern India to Java and Southern China, but the subgenus *Trichosiphum*, of which the main area of distribution roughly coincides with that of *Greenidea* s.s., goes further to the north and has been recorded from near Chabarowsk (U.S.S.R.) by Mordvilko (1929). The latter suspected its presence in Spain and the Balkan, but no species of the tribe are known from Europe except from prehistoric times.

E. GENERAL MORPHOLOGY.

I. Head. Antennae of six segments; antennal hairs partly long and partly short, and then the long hairs mostly directed inwards, but in *Paragreenidea* nov. subgen. of about equal length and pointing in all directions, especially on segment III; most of the short hairs are, if present, usually directed outwards. Rostrum distinctly of five segments.

II. Thorax. Normal. Wings with the media in the fore wings twice branched, the sector radii more or less curved, and the hind wings with two obliques; extension of pterostigma rather variable. Tibiae always with 4 distinct spines at their apices which are quite distinct from normal hairs, all smooth, or all tibiae striate-imbricated, but the fore and middle tibiae smooth and the hind tibiae with stridulatory apparatus (in *Paragreenidea*

nov. subgen.); 1st tarsal joints with 7 hairs. Ventrally the thorax may show small groups of spinules.

III. Abdomen. The abdominal tergum in apterae mostly sclerotic, pale to blackish brown, smooth, with a great many stiff hairs of various lengths which nearly always have serrated, furcated or branched apices, especially the longer hairs. In alatae, however, the dorsal hairs have always normal acute apices. Sometimes the bases of these hairs are standing on circular, differently coloured spots on the tergites. Ventrally the abdomen is almost completely smooth but there may be spinules on the anterior sternites and laterally also on other sternites more caudad. Siphunculi variable in shape and length, in apterae always more or less curved outwards, narrowing to the base and more so gradually to the apex, so that the largest width is basad of the middle; in alatae siphunculi more cylindrical on basal half, less curved and at the apex rather suddenly attenuated and curved outwards; siphunculi always covered with long hairs of more or less uniform type, and these hairs at least partly, especially apicad, with normal acute apices in the apterae, always with acute apices in alatae. In *Greenidea* s.s. the whole siphunculus is covered both in apterae and alatae with strongly transverse reticulations except at the very apex, which bears numerous spinules in transverse rows, but in the subgenus *Trichosiphum* all apterous adults and larvae show such reticulations only at the very bases of the siphunculi, whereas spinules, although more numerous at the apex, also occur in great numbers over the whole surface except on the small reticulated area; alatae of *Trichosiphum* in this respect agree completely with those of *Greenidea* s.s. Cauda more or less semicircular with at its apex a stylus-like process which may be only a small point, but which frequently is twice as long as wide at base.

F. TAXONOMY OF SUBGENERA AND SPECIES.

I. KEY TO SUBGENERA.

- 1 (2) Fore and middle tibiae smooth, but the hind tibiae in apterae and alatae on their faintly curved inner side with hardly developed stridulatory ridges which in profile look like very short perpendicular spinules, in dorsal view like transverse striae which at their ends are faintly curved towards the bases of the tibiae. Antennal hairs on all sides of IIIrd antennal segment long, fine and wavy and of about the same length. Siphunculi in apterae with a strongly transverse network over almost the entire length. Dorsal hairs all with fine acute apices *Paragreenidea* nov. subgen., typus subgeneris *Greenidea viticola* Tak.
- 2 (1) Tibiae either all smooth or all normally imbricated; the imbrications in profile look like a fine saw with the teeth strongly directed apicad. Antennal hairs on the inner side of segment III much more numerous, longer and thicker than those on the outer side, all stiff. Siphunculi reticulated either only near base or over

almost their entire length. Dorsal hairs in apterae at least partly with subdivided apices, in alatae acute.

- 3 (4) Siphunculi in apterae reticulated only at their very base, rather densely spinulose over most of their length. . . . subgen. *Trichosiphum* Perg.
 4 (3) Siphunculi in apterae reticulated almost over their entire length, except at the apices, where they are densely spinulose, elsewhere only some scattered spinules on the lines of reticulation. . . . *Greenidea* Schout. s.s.

II. KEY TO THE APTEROUS VIVIPAROUS FEMALES OF *Greenidea* SCHOUT. S.S.

- 1 (2) Siphunculi (usually) shorter than or (rarely) as long as the hind tibiae . . . *ficicola* Tak.
 2 (1) Siphunculi always longer than the hind tibiae.
 3 (4) Venter of abdomen evenly and densely spinulose. . . . *decaspermi* Tak.
 4 (3) Venter of abdomen locally spinulose, so that a broad mid-ventral area is nearly or completely free from spinules.
 5 (6) Hind tibiae nearly $3\frac{1}{2}$ to nearly 4 (3.3 to 3.9) times as long as segments 4 + 5 of rostrum *rappardi* nov. spec.
 6 (5) Hind tibiae 5 to a little over $6\frac{1}{2}$ (5.2 to 6.6) times as long as segments 4 + 5 of rostrum.
 7 (8) Ant. segment III a little over $2\frac{1}{2}$ (2.6) times as long as segments 4 + 5 of rostrum. Siphunculi quite pale. *schimae* Tak.
 8 (7) Ant. segment III nearly $3\frac{1}{2}$ to 4 (3.4 to 4) times as long as segments 4 + 5 of rostrum. Siphunculi pale to dark.
 9 (10) Processus terminalis about $\frac{3}{4}$ (0.75) times as long as ant. segment III. Siphunculi about 14.1 to 15.1 times as long as their maximum width. *sutepensis* Tak.
 10 (9) Processus terminalis longer (1.1 to 1.4) than ant. segment III. Siphunculi about 10.8 to 12.3 times as long as their maximum width.
 11 (12) Siphunculi pale, with dark apices, about 9 to nearly 10 (9 to 9.9) times as long as segments 4 + 5 of rostrum. *brideliae* Tak.
 12 (11) Siphunculi dark, about 5.8 to 6.1 times as long as segments 4 + 5 of rostrum *artocarpi* (Westw.).

III. KEY TO THE APTEROUS VIVIPAROUS FEMALES OF THE SUBGENUS *Trichosiphum* PERG. (INCLUDING ONE *Greenidea* S.S.).

- 1 (4) Venter of abdomen evenly and densely spinulose.
 2 (3) Siphunculi reticulated on at most basal $\frac{1}{9}$ part. *kuwanai* (Perg.).
 3 (2) Siphunculi vaguely reticulated almost over entire length but distinctly so at least on basal half. *Greenidea decaspermi* Tak.
 4 (1) Venter of abdomen locally spinulose, so that a broad mid-ventral area is almost or completely free from spinules.
 5 (6) Siphunculi not or hardly longer than the distance between the outer margins of the compound eyes. Dorsal hairs on the abdomen very numerous, so that per segment, e.g., on segments 1 to 4 over 18 hairs are present. Median processus on the cauda considerably shorter than its basal width, often indistinct. Siphunculi not more than 3 times as long as segments 4 + 5 of rostrum *amonae* (Perg.).
 6 (5) Siphunculi just longer to much longer than the distance between the outer margins of the compound eyes, but if they are only just longer, then the number of dorsal hairs less numerous and the cauda with a very distinct median processus.

- 19 (22) Dorsal hairs on the anterior tergites of abdomen about 3.4 to 4.2 times as long as basal diameter of ant. segment III.
- 20 (21) Siphunculi about 12.8 to 13.3 times as long as their maximum width.
rappardi nov. spec.
- 21 (20) Siphunculi about 19 times as long as their maximum width *quercifoliae* Tak.
- 22 (19) Dorsal hairs on the anterior tergites of abdomen about as long as to nearly twice (1.1 to 1.9) as long as basal diameter of ant. segment III.
- 23 (26) Siphunculi about 8 to nearly 8½ (8 to 8.3) times as long as segments 4 + 5 of rostrum.
- 24 (25) Processus terminalis longer (1.3) than ant. segment III. Ant. segment III with 17 to 20 transversely oval rhinaria *schimae* Tak.
- 25 (24) Processus terminalis nearly 9/10 (0.89) as long as ant. segment III. Ant. segment III with 10 to 12 circular to slightly transversely oval rhinaria.
ficicola Tak.
- 26 (23) Siphunculi about 5.7 to 6.5 times as long as segments 4 + 5 of rostrum.
- 27 (28) Hairs on 7th abdominal tergite nearly 9/10 to as long as (0.88 to 1) basal diameter of IIIrd antennal segment. Siphunculi about 23 to 25.1 times as long as their maximum width *G. (T.) formosana* (Maki).
- 28 (27) Hairs on 7th abdominal tergite about 3½ times as long as basal diameter of IIIrd antennal segment. Siphunculi about 19.1 times as long as their maximum width *sinensis* nov. spec.

Greenidea artocarpi (Westwood, 1890)

(Pl. I figs. 1 and 2)

1890. Westwood, J. O., Trans. Ent. Soc. Lond., pt. 4, p. 649, *Siphonophora artocarpi*.
1891. —, Trans. Ent. Soc. Lond., pt. 3, p. 413, *Siphonophora artocarpi*.
1905. Schouteden, H., Spolia Zeylan., vol. 2, pt. 8, p. 181, *Greenidea artocarpi*, partim.
1908. Okajima, G., Bull. Coll. Agric. Tokyo Imp. Univ., vol. 8, pt. 1, p. 19, *Siphonophora artocarpi*.
- ? 1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 131, *Greenidea artocarpi* partim.
1918. —, Spolia Zeylan., vol. 11, pt. 40, p. 73, *Greenidea artocarpi*.
1918. —, Tijdschr. Ent., vol. 60, p. 114, *Greenidea artocarpi*.
1927. George, C. J., Proc. Asiat. Soc. Bengal (n.s.), vol. 23, p. 7, *Greenidea artocarpi*.
1930. Krishnamurty, B., Jour. Bombay Nat. Hist. Soc., vol. 34, p. 411-19, *Greenidea artocarpi*.
1931. Takahashi, R., Aph. of Formosa, pt. 6, p. 29, *Greenidea artocarpi*.
1937. Ayyar, T. V. R., Handbook of Ec. Ent., South India, p. 320, *Greenidea artocarpi*.
1956. David, S. K., Madras Agric. Jour., vol. 43, no. 3, p. 104, *Greenidea artocarpi*.

Apterous viviparous female.

Morphological characters. Body elongated, 2.20 to 2.26 mm long, with as maximum width 1.16 to 1.20 mm. Tergum sclerotised, unevenly pale brownish to slightly darker, quite smooth. Large dorsal hairs seemingly placed irregularly, thick and stiff, always with branched apices; from the pronotum up to the 3rd abdominal tergite between the large hairs a few small and thinner hairs also with branched apices; longest hair on the anterior abdominal tergites with branched apex about 2.9 to 3 times as

long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two thick spinal hairs with branched apices, up to about 2.2 to 2.8 times as long as the mentioned diameter; 8th tergite with two finer and thinner hairs with acute apices, up to about 2.9 times as long as the said diameter. Front flat. Antennae brown like the head, gradually becoming considerably darker towards the apex, about 1.1 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2.5 times as long as base of VIth segment, about 1.1 times as long as segment III; large hairs similar to those on the dorsum but with less deeply incised apices; longest hair on segment III about 2.5 to 2.7 times as long as basal diameter of the segment. Apex of rostrum reaching almost the middle of the body; segments 4 + 5 very slender and acute, about 1.7 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4 to 4.5 times as long as segment 5, with about 12 very fine and rather long hairs. Siphunculi blackish brown, with the very base more transparent and paler, about 0.51 to 0.55 times as long as body, very long and rather slender, about 10.8 to 12.3 times as long as their maximum width, curved outwards, at base about 2.3 to 2.6 times as thick as the middle of the hind tibiae, at the middle about 3 to 3.1 times as thick as the middle of the hind tibiae, and at apex about 1.4 to 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, the hairs near the base mostly furcated, those on the distal half usually with normal acute apices; longest hair about 2.2 to 2.5 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows near the apex, but more basad these are extremely scarce and only present along the lines of strongly transverse reticulations which extend from base up to basal $\frac{4}{5}$ part. Cauda with a distinct median process, with about 8 very fine and long hairs. Legs coloured like the head, but tibiae rather darker on basal half; femora rather dispersally and superficially imbricated, more strongly towards the apex; tibiae striate-imbricated.

Measurements of one specimen in mm (collected in South India, on 27.1.1955, from *Artocarpus heterophyllus*): length of body: 2.20; width: 1.20; ant.: 2.44; siph.: 1.20; ant. segments: III; IV; V; VI = 0.66; 0.31; 0.35; (0.28 + 0.70).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 2.32 mm long, with as maximum width 0.94 mm. Abdominal tergum locally sclerotised. Head and thorax dark. Dorsal hairs on abdomen with acute apices, scarcer than in apterae; longest hair on the anterior

tergites of abdomen about 1.6 times as long as basal diameter of IIIrd antennal segment; shortest hair down to about 0.6 times as long as the mentioned diameter; two hairs on 7th abdominal tergite up to about 1.5 times as long as basal diameter of IIIrd antennal segment. Antennae blackish, about 1.29 times as long as body; processus terminalis about 0.83 times as long as segment III; segment III with about 35 transversely oval rhinaria, placed irregularly, along one side. Siphunculi black, about 0.75 times as long as body, more or less cylindrical, slightly curved outwards near apex, slightly thinner at base and at the very apex, about 21.2 times as long as their maximum width, near base about 3.1 times as thick as the middle of the hind tibiae, at the middle about 2.7 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi with acute apices. Femora coloured like the head with slightly darker apices; tibiae much darker than femora, evenly pigmented, about as dark as the IIIrd antennal segment. Wing venation normal.

Measurements of one specimen in mm (collected in South India, on 27.1.1955, from *Artocarpus heterophyllus*): length of body: 2.32; width: 0.94; ant.: 2.72; siph.: 1.76; ant. segments: III; IV; V; VI = 0.87; 0.34; 0.37; (0.28 + 0.72).

Host plants. *Artocarpus heterophyllus* (syn. *A. integrifolia*), *A. incisa*.

Distribution. South India, Ceylon, East China.

Biology. According to David (1956) the aphids live on the under surface of tender leaves of the host plants.

Available material. 5 apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by S. K. David; of the British Museum (Nat. Hist.), London (Theobald's collection); and of the U. S. National Museum, Washington.

Note. Slide no 12198 from the U. S. National Museum is labelled *Greenidea artocarpi* (Westw.), collected in Ceylon, in July, 1900, by Green. It may be pointed out here that the species is not a *Greenidea*, it is *Greenideoida ceyloniae* van der Goot. It is evident that when Schouteden gave for host plants of *artocarpi*, *Artocarpus* and *Onesma*, he misread *Mesua*, for as already van der Goot (1917) stated there is no *Onesma* known. Van der Goot described *Greenidea ficicola* Tak. in 1917, as is clear from his description, but he gave it the name *artocarpi* Westw.

Type. Westwood's material is lost. A neotype, from *Artocarpus heterophyllus* from South India, in the collections of Mr. Hille Ris Lambers.

Greenidea brideliae Takahashi, 1928

1928. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 18, no. 94, p. 46, *Greenidea brideliae*.
 1929. —, Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 100, p. 100, *Greenidea brideliae*.
 1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea brideliae*.

Apterous viviparous female.

Morphological characters. Body elongated, about 2.34 to 2.48 mm long, with as maximum width 1.17 to 1.21 mm. Tergum pale, smooth. Only long, thick and stiff dorsal hairs with branched or acuminate apices present; longest hair on the anterior abdominal tergites about 2.3 to 2.4 times as long as basal diameter of IIIrd antennal segment; each of 7th and 8th abdominal tergites with two long hairs with acute apices, about 2.7 and 2.4 to 2.8 times as long as the mentioned diameter, respectively. Antennae pale, about 0.78 to 0.86 times as long as body; flagellum rather faintly imbricated; processus terminalis about 2.4 to 2.8 times as long as base of VIth segment, about 1.2 to 1.4 times as long as segment III; large hairs similar to those on the dorsum; longest hair on segment III about 2.4 to 3.1 times as long as basal diameter of the segment. Apex of rostrum just reaching the 3rd coxae; segments 4 + 5 short and rather blunt and not very distinctly subdivided, about 1.2 times as long as 2nd joint of hind tarsi; segment 4 about 3.7 to 4.1 times as long as segment 5. Siphunculi pale to brownish, darker at tips, almost cylindrical, very slightly curved outwards near apex, transversely striate-reticulated over their entire length, about 0.63 times as long as body, about 10.8 times as long as their maximum width which is at about basal $\frac{1}{7}$ part, at base about 3.6 to 4.7 times as thick as the middle of the hind tibiae, at the middle about 3.3 to 3.7 times as thick as the middle of the hind tibiae, and at apex about 2.1 to 2.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices or on basal half with slightly branched apices; longest hair about 1.2 times as long as basal diameter of the siphunculi; spinules present on the apical part. Cauda with a distinct median process, with about 12 long and fine hairs. Legs pale; tibiae striate-imbricated; the 4 apical spines on the tibiae are not very different from normal hairs.

Measurements of one specimen in mm (collected in Kagi, Formosa, on 26.4.1928, from *Bridelia tomentosa*): length of body: 2.48; width: 1.17; ant.: 1.91; siph.: 1.57; ant. segments: III; IV; V; VI = 0.41; 0.27; 0.32; (0.23 + 0.58).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body

elongated. Abdominal tergites mostly sclerotised, somewhat wrinkled. Dorsum with both long and short hairs intermingled; longest hair on the anterior abdominal tergites about 2.8 times as long as basal diameter of IIIrd antennal segment; hairs on 7th abdominal tergite up to about 2.5 to 3.1 times as long as basal diameter of IIIrd antennal segment; 8th tergite with 3 or 2 hairs. Front with hardly developed frontal tubercles. Antennae blackish with the very base of segment III pale, about 1.1 to 1.3 times as long as body; flagellum distinctly imbricated from base to apex; segment III with about 28 to 35 irregular to transversely oval rhinaria not in a row, over the whole length of the segment; segment IV sometimes with one rhinarium; large hairs similar to those on the dorsum but with blunt, acuminate or slightly incrassate apices; longest hair on segment III about 2.9 to 3.5 times as long as basal diameter of the segment. Siphunculi blackish, apical paler, about 0.80 to 0.95 times as long as body, reticulated-imbricated, about 20 to 23 times as long as their maximum width, near base about 3.3 to 3.6 times as thick as the middle of the hind tibiae, at the middle about 3 times as thick as the middle of the hind tibiae, and at apex about 1.9 times as thick as the middle of the hind tibiae; longest hair about twice as long as diameter of the siphunculi near their base. Cauda with a distinct, short, broadly conical median process. Femora mottled pale brownish, very superficially imbricated with transverse spinulose striae; tibiae slightly darker than femora, middle and hind tibiae in the middle paler, striate-imbricated. Wing veins dark; pterostigma extending up to $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Formosa on 24.4.1928, from *Bridelia tomentosa*): length of body: 2.43; width: 1.01; ant.: 2.56; siph.: 2.09; ant. segments: III; IV; V; VI = 0.66; 0.32; 0.38; (0.29 + 0.75).

Host plant. *Bridelia tomentosa*.

Distribution. Formosa, Japan, East China.

Available material. 3 apterae and 6 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi; of the Entomological Laboratory, Wageningen (unidentified).

Note. The specimens collected by van der Goot from Hong Kong from the same host plant agree with the description of *brideliae* Tak.

Type. Probably in the Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea decaspermi Takahashi, 1933

(text-fig. 1b, p. 12)

1933. Takahashi, R., Philipp. Jour. Sci., vol. 52, no. 3, p. 294, *Greenidea decaspermi*.
1937. —, Lign. Sci. Jour., vol. 16, no. 2, p. 200, *Greenidea decaspermi*.
1950. —, Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 589, *Greenidea decaspermi*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.70 to 1.96 mm long, with as maximum width 0.95 to 1.12 mm. Tergum sclerotised, brown to blackish brown, quite smooth but ventrally spinules evenly distributed on the abdomen. Large dorsal hairs thick and stiff, with branched, furcated or acuminate apices; longest hair on anterior abdominal tergites about 3.4 to 4.3 times as long as basal diameter of IIIrd antennal segment; a few shorter hairs with slightly furcated or acuminate apices occur on the anterior half of abdomen; shortest hair about 0.5 to 1.2 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two hairs probably with acute apices, up to about 3.1 to 4 times as long as the mentioned diameter; 8th tergite with two much thinner and shorter hairs, also with acute apices, up to about 2 to 2.1 times as long as the mentioned diameter. Antennae coloured like the head, with segments IV to VI darker, about 0.83 to 0.86 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 1.8 to 2.2 times as long as base of VIth segment, about 1 to 1.2 times as long as segment III; large hairs similar to those on the dorsum but with acuminate or faintly incrassate apices; longest hair on segment III about 3.3 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae; segments 4 + 5 short and acute, about 1.4 to 1.5 times as long as 2nd joint of hind tarsi; segment 4 about 3.7 to 3.9 times as long as segment 5, with about 12 to 14 rather short and fine hairs. Siphunculi brownish black with paler apex, about 0.39 to 0.41 times as long as body, about 6.8 to 7.1 times as long as their maximum width, reticulated almost over entire length, but distinctly so near their bases, slightly curved outwards, at base about 2.4 to 2.7 times as thick as the middle of the hind tibiae, at the middle about 3.4 to 3.7 times as thick as the middle of the hind tibiae, and at apex about 1.5 to 1.7 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, mostly long with acute or sub-acute apices, a few near the base shorter with acuminate apices; longest hair about 2.6 to 3.2 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows over a large part distally, gradually diminishing in number towards the base. Cauda with a distinct, fairly slender median process, with about 6 to 8 long and fine hairs. Femora pigmented like the head,

superficially imbricated, with a number of striae; tibiae slightly darker than the femora, striate-imbricated.

Measurements of one specimen in mm (collected in Taihoku, Formosa, on 24.4.1933, from *Decaspermum fruticosum*): length of body: 1.89; width: 1.11; ant.: 1.56; siph.: 0.74; ant. segments: III; IV; V; VI = 0.39; 0.19; 0.23; (0.22 + 0.39).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 2.1 mm long, with as maximum width 0.84 mm. Abdominal tergum mostly sclerotised, somewhat wrinkled. Dorsal hairs on the thorax much longer than those on the abdomen, with acute apices. Long and short dorsal hairs on the abdomen occur intermingled; longest hair on the anterior tergites about 2.3 times as long as basal diameter of IIIrd antennal segment; each of 7th and 8th abdominal tergites with two hairs with acute apices, up to about 1.4 and 2.9 times as long as the mentioned diameter, respectively. Front with poorly developed frontal tubercles. Antennae blackish brown with slightly paler basal segments, about 1.04 times as long as body; processus terminalis about 0.91 times as long as segment III; segment III with 17 to 22 circular to transversely oval, small to rather large rhinaria not in a row, over almost the entire length of the segment; large hairs similar to those on the dorsum but much thicker and longer, with acuminate or sub-acute apices; longest hair on segment III about 4.6 times as long as basal diameter of the segment. Siphunculi brownish black, apicad slightly paler, about 0.75 times as long as body, reticulated-imbricated, almost cylindrical, slightly curved outwards near the apex, about 19.6 times as long as their maximum width, at the middle about 2.9 times as thick as the middle of the hind tibiae; hairs on the siphunculi with acute apices; longest hair about 3.8 times as long as diameter of the siphunculi near their base; spinules in transverse rows only present near the apex. Femora brownish yellow with the apices slightly darker, superficially imbricated, with a number of spinulose striae; bases and apices of the tibiae considerably darker than the femora, rest as dark as or a little darker than femora, striate-imbricated. Wing veins dark; pterostigma extending up to a little more than $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Taihoku, Formosa, on 24.4.1933, from *Decaspermum fruticosum*): length of body: 2.1; width: 0.84; ant.: 2.16; siph.: 1.73; ant. segments: III; IV; V; VI = 0.59; 0.32; 0.32; (0.26 + 0.53).

Host plant. *Decaspermum fruticosum*.

Distribution. Formosa.

Biology. Not known.

Available material. 3 apterae and 1 alate; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea ficicola Takahashi, 1921

1916. Maki, M., Coll. Essays for Nawa, Gifu, p. 13, *Trichosiphum formosanum* partim.
 1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 131, *Greenidea artocarp*i partim.
 1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 66, *Greenidea ficicola*.
 1923. —, Aph. of Formosa, pt. 2, p. 116, *Greenidea ficicola*.
 1925. —, Aph. of Formosa, pt. 4, p. 29, *Greenidea ficicola*.
 1927. Mason, P. W., Suppl. Ent., no. 15, p. 87, *Greenidea ficicola*.
 1930. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 322, *Greenidea ficicola*.
 1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea ficicola*.
 1931. Hardy, G., Proc. R. Soc. Queensland, vol. 43, no. 6, p. 31, *Greenidea ficicola*.
 1936. Takahashi, R., Lign. Sci. Jour., vol. 15, no. 4, p. 596, *Greenidea ficicola*.
 1937. —, Lign. Sci. Jour., vol. 16, no. 2, p. 200, *Greenidea ficicola*.
 1950. —, Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 588, *Greenidea ficicola*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.70 to 1.90 mm long, with as maximum width 0.89 to 1.18 mm. Tergum sclerotised, brown to brownish black, with almost circular, well defined, paler zones round the bases of each of the large hairs, quite smooth. Large dorsal hairs thick, stiff, and always with branched or multifid apices; from the pronotum up to the 3rd abdominal tergite between the large hairs a few small and thick hairs with branched or multifid apices; longest hair on the anterior abdominal tergites about 2.9 to 4.2 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two thick hairs, 8th with two thin and fine ones, which are about 2.9 to 4.2 and 1.6 to 2.8 times as long as the mentioned diameter, respectively. Antennae brown like the head, gradually slightly darker towards the apex, about 0.85 to 0.94 times as long as body; flagellum gradually more distinctly imbricated from base towards apex; processus terminalis about 1.9 to 2.3 times as long as base of VIth segment, about 1.1 to 1.3 times as long as segment III; large hairs similar to those on the dorsum, on segment III up to about 2 to 3.4 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 very long and acute, about 1.6 to 2.04 times as long as 2nd joint of hind tarsi; segment 4 about 3.8 to 4.8 times as long

as segment 5, with about 12 to 14 very fine rather long hairs. Siphunculi with the base brown and the rest towards the apex gradually darker, with the middle as dark as the centre of the abdomen, about 0.34 to 0.40 times as long as body, curved outwards, about 5.5 to 7 times as long as their maximum width, at base about 1.1 to 2.6 times as thick as the middle of the hind tibiae, at the middle about 2.5 to 4.1 times as thick as the middle of the hind tibiae, and at apex about 1.2 to 2 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, the apices of the hairs acute but sometimes furcated, in material from Java very rarely furcated but in specimens from India siphuncular hairs on basal half markedly furcated; longest hair about 2.5 to 4.3 times as long as basal diameter of the siphunculi; spinules in distinct transverse rows near the apex, the spinules on the rest of the siphunculi very scarce and where present placed on the lines of a network of strongly transverse reticulations which extend from base to at least basal $\frac{4}{5}$. Cauda with a distinct median conical process, with about 8 very fine long hairs. Legs pigmented like the head; femora rather dispersally and superficially imbricated; tibiae striate-imbricated.

Measurements of one specimen in mm (collected in Java, on 18.7.1950, from *Ficus* spec.): length of body: 1.78; width: 1.02; ant.: 1.59; siph.: 0.62; ant. segments: III; IV; V; VI = 0.38; 0.22; 0.26; (0.22 + 0.42).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 2.44 mm long, with as maximum width 1.1 mm. Tergum sclerotised, brown, quite smooth. Dorsal hairs of two types, long and short, with acute apices; longest hair on the anterior abdominal tergites about 1.9 times as long as basal diameter of IIIrd antennal segment, shortest hair about 0.9 times as long as that diameter; 7th abdominal tergite with two hairs with acute apices; 8th tergite with two similar hairs. Antennae black with paler basal segments, about 1.1 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 0.89 times as long as segment III; segment III with 10 to 15 circular to transversely oval rhinaria over almost its entire length, almost in a row, sometimes a few very small rhinaria present; large hairs similar to those on the dorsum but with more or less blunt apices. Siphunculi compressed, blackish brown, cylindrical, at their apices slightly curved outwards, about 0.68 times as long as body; hairs on the siphunculi with acute apices. Femora brown; tibiae blackish brown, with darker bases, more distinctly striate-imbricated than the femora. Pterostigma extending up to about $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Java, in 1913, from *Ficus* spec.): length of body: 1.44; width: 1.1; ant.: 2.60; siph.: 1.66; ant. segments: III; IV; V; VI = 0.72; 0.36; 0.40; (0.30 + 0.64).

Host plants. *Ficus* (various species).

Distribution. South India, Australia, Malay Peninsula (alt. 1533 m), Sumatra, Java, Formosa, East China, Russia.

Biology. The species usually attacks the under surface of young leaves and tender shoots of the host plants, but sometimes it feeds only on the fruits, leaving other parts quite free from attack.

Available material. Extensive material of apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by him and by R. Takahashi; of the British Museum (Nat. Hist.), London, identified by R. Takahashi; and of the Entomological Laboratory, Wageningen (unidentified).

Note. Specimens collected from *Scurrula*, in the collections of Mr. Hille Ris Lambers, had been identified by him as *ficicola* Takahashi. This material is described as *G. rappardi* nov. spec., vide p. 40.

Van der Goot (1917) described this species from *Ficus benjamina* from Java under the name of *Greenidea artocarpi* (Westw.). The species has also rather frequently been confused with *G. (Trichosiphum) formosana* (Maki), which is evident from descriptions, where *formosana* is said to live both on *Ficus* and *Psidium*.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea mangiferae Takahashi, 1925

1925. Takahashi, R., Aph. of Formosa, pt. 4, p. 33, *Greenidea mangiferae*.

1929. —, Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 100, p. 100, *Greenidea mangiferae*.

1931. —, Aph. of Formosa, pt. 6, p. 27, *Greenidea mangiferae*.

1933. —, Philipp. Jour. Sci., vol. 52, no. 3, p. 295, *Greenidea mangiferae*.

Alate viviparous female.

Morphological characters. Body elongated, about 2.46 to 2.52 mm long, with as maximum width 1.03 to 1.1 mm. Abdominal tergum mostly sclerotised, brown. Long and short dorsal hairs occur intermingled; longest hair on anterior abdominal tergites about 1.9 to 2 times as long as basal diameter of IIIrd antennal segment, shortest hair about 1.1 to 1.3 times as long as the mentioned diameter; 7th tergite with two hairs which are up to twice as long as basal diameter of IIIrd antennal segment; 8th tergite with two long hairs, up to about 3.1 times as long as the mentioned diameter. Front

with moderately developed frontal tubercles. Antennae dark brown, with slightly paler basal segments and with the very base of IIIrd segment considerably paler; flagellum distinctly imbricated; segment III with about 12 to 14 very small to rather large circular rhinaria irregularly distributed, in a row, over its basal $\frac{3}{4}$ part; large hairs similar to those on the dorsum but much thicker and mostly with acuminate or sometimes with faintly incrassate apices; longest hair on segment III about 5.1 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae; segments 4 + 5 slender and acute, about 1.8 to 2 times as long as 2nd joint of hind tarsi; segment 4 about 3.7 to 3.9 times as long as segment 5, with about 14 to 16 rather long and fine hairs. Siphunculi black, with the very base slightly pale and apical $\frac{1}{2}$ to $\frac{1}{3}$ part considerably paler, about 0.69 times as long as body, reticulated-imbricated, about 24.1 times as long as their maximum width, near base about 2.6 times as thick as the middle of the hind tibiae, at the middle about 2.6 times as thick as the middle of the hind tibiae, and at apex about 1.7 times as thick as the middle of the hind tibiae; hairs on the siphunculi long, mostly with acute apices, a few with slightly acuminate apices; longest hair about 3.8 to 4 times as long as diameter of the siphunculi near their base; spinules in transverse rows only present near the apex. Cauda protracted into a short point, with about 8 to 9 long and fine hairs. Femora brownish with the apices slightly darker, superficially imbricated with a number of transverse striae; tibiae slightly darker than femora, with much darker bases and apices, striate-imbricated. Pterostigma extending up to about $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Kagi, Formosa, in March, 1925, from *Mangifera indica*): length of body: 2.52; width: 1.1; ant.: ?; siph.: 1.76; ant. segments: III; IV; V; VI = 0.69; 0.41; 0.41 + ?; (?).

Host plants. *Mangifera indica*, *Euphorbia longana*.

Distribution. Formosa.

Biology. Not known.

Available material. 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. This species differs from all other *Greenidea* species by having much longer antennal hairs.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Greenidea quercifoliae* Takahashi, 1921**

1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 64, *Greenidea quercifoliae*.

1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea quercifoliae*.

Alate viviparous female.

Morphological characters. Body elongated, 2.52 mm long, with as maximum width 1.14 mm. Abdominal tergum sclerotised, brownish, smooth. Thoracal hairs exceedingly long, mostly with normal apices, a few with acuminate or deeply furcated apices, up to about 4 times as long as basal diameter of IIIrd antennal segment. Dorsal hairs on the abdomen sparse; 6th tergite with one very long hair, about 3.7 times as long as basal diameter of IIIrd antennal segment; abdominal hairs cephalad almost of uniform length, up to about 1.3 times as long as the mentioned diameter; 7th tergite with two hairs up to about 1.4 times as long as the mentioned diameter; 8th tergite with two much longer hairs up to about 2.7 times as long as the mentioned diameter. Front with poorly developed frontal tubercles. Antennae brown, as dark as the front, about 1.2 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2.4 times as long as base of VIth segment, about as long as segment III; segment III with 19 to 21 circular to transversely oval rhinaria in a row, over almost its entire length; large hairs similar to those on the dorsum but much thicker and longer, with sub-acute apices; longest hair on segment III about 4.1 times as long as basal diameter of that segment. Apex of rostrum reaching the hind coxae; segments 4 + 5 slender and acute, about 2.2 times as long as 2nd joint of hind tarsi; segment 4 about 4 times as long as segment 5, with about 12 short and fine hairs. Siphunculi very dark, towards apex paler, about 0.73 times as long as body, reticulated-imbricated with serrated profile, almost cylindrical with the very apex slightly curved outwards, about 19 times as long as their maximum width, near base about 2.5 times as thick as the middle of the hind tibiae, at the middle about 3.1 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; longest hair about 3.5 times as long as diameter of the siphunculi near their base; spinules present only near the apex. Cauda with a distinct median process, with 9 long and fine hairs. Femora faintly brownish with slightly darker apices, superficially imbricated, with a number of faint spinulose striae; tibiae considerably darker than femora, striate-imbricate. Pterostigma extending up to $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Formosa, on 24.4.1933, from *Quercus glauca*): length of body: 2.52; width: 1.14; ant.: 2.88; siph.: 1.84; ant. segments: III; IV; V; VI = 0.77; 0.43; 0.44; (0.32 + 0.77).

Host plants. *Quercus variabilis*, *Q. glauca*.

Distribution. Formosa.

Biology. Not known.

Available material. 1 alate; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. Alate form has so far not been described.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea rappardi nov. spec.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.46 to 2.00 mm long, with as maximum width 0.90 to 1.1 mm. Tergum sclerotised, brown to dark brown, quite smooth. Large dorsal hairs thick, stiff, with furcated or branched apices; longest hair on the anterior abdominal tergites about 3.2 to 4.2 times as long as basal diameter of IIIrd antennal segment; also short hairs with branched apices present, shortest hair about 0.85 to 1.1 times as long as the mentioned diameter; 7th abdominal tergite with two hairs with branched apices, up to about 3.8 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two thinner hairs with fine apices, up to about 2.4 times as long as the mentioned diameter. Antennae coloured like the head, apicad darker, about 1.03 to 1.2 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2.5 to 2.9 times as long as base of VIth segment, about 1.4 to 1.9 times as long as segment III; large hairs similar to those on the dorsum but with acuminate or slightly furcated apices, on segment III up to about 2.5 times as long as basal diameter of the segment. Apex of rostrum reaching almost the middle of the body; segments 4 + 5 slender and acute, about 1.7 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.5 to 5.2 times as long as segment 5, with about 8 to 12 rather short and fine hairs. Siphunculi pale brown, with slightly darker apex, curved outwards, about 0.41 to 0.44 times as long as body, reticulated from base to near apex, about 7.8 to 8.4 times as long as their maximum width, at base about 2.2 to 2.7 times as thick as the middle of the hind tibiae, at the middle about 2.9 to 3 times as thick as the middle of the hind tibiae, and at apex about 1.5 to 1.9 times as thick as the middle of the hind tibiae; long and short hairs on the siphunculi both numerous, all with blunt apices; longest hair about 1.7 to 2.8 times as long as basal diameter of the siphunculi; near the apex spinules present in transverse rows, basad scattered. Cauda with a distinct median stylus-like process, with about 10 to 12 long and fine hairs. Femora pale brown, striate-imbricate; tibiae darker than the femora, striate-imbricate, more distinctly so towards the apices.

Measurements of one specimen in mm (collected in Java, on 1.10.1950,

from *Scurrula fusca*): length of body: 1.60; width: 1.1; ant.: 1.66; siph.: 0.66; ant. segments: III; IV; V; VI = 0.34; 0.19; 0.26; (0.22 + 0.54).

A late viviparous female.

Morphological characters. Differs from apterae as follows: — Body elongated, about 2.15 to 2.16 mm long, with as maximum width 0.78 to 1.02 mm. Head and thorax sclerotised, dark. Abdominal dorsum locally sclerotised, faintly irregularly striate. Longest dorsal hair on the anterior tergites of abdomen about 1.4 to 2 times as long as basal diameter of IIIrd antennal segment, shortest hair about 0.55 to 0.75 times as long as that diameter; the two hairs on 7th abdominal tergite up to about 1.7 times as long as basal diameter of IIIrd antennal segment. Antennae blackish brown with slightly paler basal segments; segment III with 20 to 25 irregular to strongly transversely oval rhinaria distinctly not in a row, over almost the entire length of that segment; large hairs similar to those on the dorsum but with more or less blunt apices. Apex of rostrum reaching the middle of the body; segments 4 + 5 about 2 to 2.1 times as long as 2nd joint of hind tarsi. Siphunculi dark, blackish, long, slightly curved outwards near the apex, about 0.73 times as long as body, about 13.9 to 14.9 times as long as their maximum width; near base about 3.1 to 3.2 times as thick as the middle of the hind tibiae, at the middle about 3.5 to 4 times as thick as the middle of the hind tibiae, and at apex about 1.8 to 2.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi with acute to more or less blunt apices. Femora brown with the very apices slightly darker, imbricated more distinctly on their distal parts, with a number of spinulose striae; tibiae slightly darker than femora. Pterostigma reaching to about $\frac{1}{3}$ of the rather straight radial sector.

Measurements of one specimen in mm (collected in Java, on 20.3.1916, from *Loranthus*): length of body: 2.15; width: 0.90; ant.: 2.19; siph.: 1.56; ant. segments: III; IV; V; VI = 0.47; 0.28; 0.34; (0.26 + 0.70).

Host plants. *Loranthus*, *Scurrula atropurpurea*, *Scurrula fusca*, and other species of *Scurrula*.

Distribution. Java.

Biology. Dr. Rappard collected the species several times from the buds, flowers, and bases of the leaves of *Scurrula* species, which shrubs are parasites of trees. Mr. Hille Ris Lambers first suspected that the scurrulas were growing on *Ficus* species, but Dr. Rappard investigated the matter, and stated that no *Ficus* was in sight, and that the *Scurrula* grew on *Swietenia mahagoni*. The material in the Entomological Laboratory, Wageningen, bears as host *Loranthus*, but this may be incorrect.

Available material. Extensive material of apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by him as *G. ficicola* Tak., and from the Entomological Laboratory, Wageningen, identified by van der Goot as *Greenidea loranthi* nov. spec. (manuscript name).

Note. The specimens from *Scurrula* in the collections of Mr. Hille Ris Lambers differ from *ficicola* Tak. by the longer ventral hairs on the abdomen, and the slender siphunculi with all the hairs acute in the apterae. The alatae of this species are quite distinct by the number and arrangement of rhinaria in IIIrd antennal segment.

Type. In the collections of Mr. Hille Ris Lambers.

Greenidea schimae Takahashi, 1929

1929. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 105, p. 528, *Greenidea schimae*.

Apterous viviparous female.

Morphological characters. Body elongated pear-shaped, about 2.30 to 3.48 mm long, with as maximum width 1.17 to 1.70 mm. Tergum sclerotised, pale brownish yellow, quite smooth. Dorsal hairs placed irregularly, thick and stiff, always with branched apices; from pronotum up to the middle of the abdomen between large hairs short and thinner hairs occur, also with branched apices; the longest hair on the anterior abdominal tergites with branched or multifid apices about 2.5 to 3.4 times as long as basal diameter of IIIrd antennal segment, the short hairs from as little as 0.7 times to as long as the mentioned diameter; 7th abdominal tergite with two long and thick spinal hairs with branched apices, up to about 2.3 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs with normal apices, up to about 1.9 times as long as the mentioned diameter. Front slightly convex. Antennae brown like the head, with the apices of segments III, IV, V, an area near the rhinaria on VIth segment, and most of the processus terminalis distinctly darker to dark brown, about 0.93 to 1.1 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2.2 to 2.5 times as long as base of VIth segment, about 1.2 to 1.4 times as long as segment III; long hairs similar to those on the dorsum but with much less deeply incised apices; longest hair on segment III about 2.5 to 3 times as long as basal diameter of the segment. Apex of rostrum hardly reaching the middle of the body; segments 4 + 5 slender and acute, about 1.7 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.3 to 4.8 times as long as segment 5, with about 10 to 12 rather long and fine hairs. Siphunculi about 0.50 to 0.56 times as long as body, curved outwards, pale like the margin of the abdomen, about 8.6 to

10 times as long as their maximum width, at base about 2.1 to 2.3 times as thick as the middle of the hind tibiae, at the middle about 2.6 to 2.9 times as thick as the middle of the hind tibiae, and at apex about 1.3 to 1.4 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, the hairs from base almost to the middle of the siphunculi mostly with furcated apices but those on the distal half with normal, acute apices; longest hair about 2.5 to 2.6 times as long as basal diameter of the siphunculi; spinules in distinct transverse rows present near the apex, more basal these become very sparse, a few spinules present only along the lines of transverse reticulations which extend over basal $\frac{5}{6}$ part. Cauda with a distinct median process, with about 8 to 11 very fine and long hairs. Legs pale like the head; femora rather dispersally and superficially imbricated; tibiae striate-imbricated.

Measurements of one specimen in mm (collected in Java, on 19.6.1951, from *Schima noronhae*): length of body: 2.34; width: 1.17; ant.: 2.23; siph.: 1.33; ant. segments: III; IV; V; VI = 0.55; 0.29; 0.28; (0.32 + 0.79).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 2.94 to 3.18 mm long, with as maximum width 1.04 to 1.1 mm. Abdominal tergum locally sclerotised, brown. Large dorsal hairs with fine and acute apices; longest hair on the anterior abdominal tergites about 1.6 times as long as basal diameter of IIIrd antennal segment; short hairs also with fine apices; shortest hair about as long as the mentioned diameter; 7th abdominal tergite with two thicker and longer hairs also with acute apices. Front with well developed median processes and divergent frontal tubercles. Antennae black, with brown basal segments, about 1.3 times as long as body; segment III with 17 to 20 transversely oval rhinaria almost in a row, almost over whole length of the segment; large hairs similar to those on the dorsum, but with partly acuminate or bluntish apices. Segment 4 of rostrum with about 17 to 18 long and fine hairs. Siphunculi blackish brown with very base and apex slightly paler, about 0.79 times as long as body, reticulated-imbricated, more or less cylindrical, with the apex slightly curved outwards, about 25.1 times as long as their maximum width, near base about 2.2 to 2.6 times as thick as the middle of the hind tibiae, at the middle about 2.3 to 2.6 times as thick as the middle of the hind tibiae, and at apex about 1.2 to 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices; longest hair about 2.8 to 2.9 times as long as diameter of the siphunculi near their base; spi-

nules present, densest near the apex. Femora brown with slightly darker apices, striate-imbricate; tibiae blackish brown, more distinctly striate-imbricated than femora. Pterostigma extending up to $\frac{1}{2}$ the radial sector.

Measurements of one specimen in mm (collected in Poespo, Java, on 1.6.1916, from *Schima* spec.): length of body: 2.94; width: 1.1; ant.: 3.72; siph.: 2.34; ant. segments: III; IV; V; VI = 0.82; 0.56; 0.58; (0.46 + 1.10).

Host plants. *Schima noronhae* and *Schima* spec.

Distribution. Java, Formosa.

Biology. This species attacks the young leaves of the host plants.

Available material. 5 apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by him and by R. Takahashi; of the Entomological Laboratory, Wageningen (unidentified).

Note. The species is easily recognised by its pale integument and appendages. It is possible that *G. sinensis* nov. spec. also has a pale integument, and therefore is similar, but from the slide it would seem as if the latter specimens were merely bleached.

So far the species was only known from Formosa, but there is a slide from Java in the collections of the Entomological Laboratory, Wageningen, presumably collected by van der Goot, and Dr. F. Rappard found an aptera with some larvae on the typical host plant in Eastern Java.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Greenidea sinensis* nov. spec.**

Alate viviparous female.

Morphological characters. Body elongated, 2.40 mm long, with as maximum width 1.00 mm. Dorsum smooth. Dorsal hairs moderately long, with fine and acute apices; longest hair on the anterior part of the dorsum of the abdomen about 1.8 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two very long hairs, up to about 3.5 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs, about twice as long as the mentioned diameter. Front wavy with moderately developed frontal tubercles. Antennae probably with darker apices to the segments and basal segments coloured like the head, about 1.2 times as long as body; processus terminalis about 2.3 times as long as base of VIth segment, about 0.95 times as long as segment III; segment III with about 10 to 12 circular to slightly transversely oval rhinaria in a row, over basal $\frac{2}{3}$ to $\frac{4}{5}$ part of the segment; large hairs much longer than those on the dorsum, on segment III up to about 4 times as long as basal

diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 very slender and acute, about 2.2 times as long as 2nd joint of hind tarsi; segment 4 about 5.6 times as long as segment 5, with about 16 fine and rather long hairs. Siphunculi pale, more or less cylindrical with the very apex slightly curved outwards, about 0.76 times as long as body, reticulated-imbricated over their entire lengths, but more distinctly so on their distal halves, about 19.1 times as long as their maximum width, near base about 2.5 times as thick as the middle of the hind tibiae, at the middle about 2.6 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, with acute apices; longest hair about 3.3 times as long as diameter of the siphunculi near their base; spinules present near the apices. Cauda with a very short but distinct median process, with about 8 long and fine hairs. Femora pale, almost smooth; tibiae pale brownish, imbricated on one side. Wings normal.

Measurements of one specimen in mm (collected in China, from an unknown host): length of body: 2.40; width: 1.00; ant.: 2.81; siph.: 1.82; ant. segments: III; IV; V; VI = 0.78; 0.41; 0.42; (0.32 + 0.74).

Host plant. Not known.

Distribution. China.

Biology. Not known.

Available material. 1 alate; from the British Museum (Nat. Hist.), London, collected in China by Mr. M. S. Yang.

Note. This species can easily be distinguished from other species of this genus by the very long hairs on the 7th abdominal tergite and the very long and slender 4th rostral segment.

Type. Holotype in the British Museum (Nat. Hist.), London; no. 5446.

***Greenidea sutepensis* Takahashi, 1941**

1941. Takahashi, R., Rept. Govt. Agric. Res. Inst. Taiwan, no. 78, p. 4, *Greenidea sutepensis*.

Apterous viviparous female (alatiforms?).

Morphological characters. Body elongated pear-shaped, about 2.17 to 2.41 mm long, with as maximum width about 1.12 to 1.17 mm. Tergum pale, somewhat wrinkled. Large, thick and stiff dorsal hairs, with furcated or acuminate apices, occur intermingled with short hairs with similar apices; longest hair on anterior abdominal tergites about 3.1 to 4 times as long as basal diameter of IIIrd antennal segment, shortest hair about 0.56 to 1.3 times as long as the mentioned diameter; 7th tergite with two similar hairs up to about 3.1 to 3.6 times as long as basal diameter of IIIrd antennal

segment; 8th tergite with two much thinner and finer hairs with normal apices, up to about 1.4 to 2 times as long as the mentioned diameter. Antennae pale, with distal $\frac{1}{3}$ of segment V and distal half of base of VIth segment somewhat darker, about 0.89 to 0.96 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2 to 2.2 times as long as base of VIth segment, about 0.75 times as long as segment III; large hairs similar to those on the dorsum; longest hair on segment III about 2.4 to 3.6 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 about 1.1 to 1.4 times as long as 2nd joint of hind tarsi; segment 4 about 3.8 to 4.1 times as long as segment 5, with about 10 to 14 rather short and fine hairs. Siphunculi pale brownish, with about apical $\frac{1}{3}$ part gradually darker, about 0.55 to 0.58 times as long as body, reticulated over basal $\frac{4}{5}$ part, about 14.1 to 15.1 times as long as their maximum width, at base about 2.4 to 2.9 times as thick as the middle of the hind tibiae, at the middle about 2.4 to 2.7 times as thick as the middle of the hind tibiae, and at apex about 1.5 to 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long hairs on basal half mostly with acuminate or slightly furcated apices, the rest with acute apices; on basal half a few shorter hairs occur, also with slightly furcated or acuminate apices; longest hair about 2 to 2.4 times as long as basal diameter of the siphunculi; spinules in transverse rows densest near the apex, basal soon vanishing. Cauda with a distinct median process, with about 10 long and fine hairs. Femora pale, superficially imbricated, with a number of transverse striae; tibiae slightly darker than the femora, striate-imbricated.

Measurements of one specimen in mm (collected in Chiangmai, Siam, on 5.4.1940, from an unknown host): length of body: 2.41; width: 1.12; ant.: 2.13; siph.: 1.33; ant. segments: III; IV; V; VI = 0.66; 0.28; 0.30; (0.24 + 0.49).

Alate viviparous female.

Morphological characters. Differs from apterae as follows: — Body elongated, about 2.12 to 2.21 mm long, with as maximum width about 0.92 to 0.94 mm. Abdominal tergum sclerotised. Dorsum smooth. Longest hair on the anterior abdominal tergites about 2.6 to 2.8 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two hairs up to about 1.6 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two fine hairs up to about 1.8 to 2.5 times as long as the mentioned diameter. Antennae pale yellowish, with darker basal segments; about 1.1 times as long as body; processus terminalis about 0.68 times

as long as segment III; segment III with 16 to 24 very small to mostly large, circular to mostly transversely oval rhinaria in a row, over whole length of the segment; large hairs similar to those on the dorsum, but much longer and thicker, with acuminate apices; longest hair on segment III about 3.4 to 4.1 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae. Siphunculi (partly broken) dark. Cauda with a distinct but very short median process, with about 8 to 10 long hairs. Femora pale brownish, with darker apices; tibiae coloured like the femora, with much darker bases and slightly darker apices, striate-imbriated. Pterostigma rather pale, extending up to $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Chiangmai, Siam, on 5.4.1940, from an unknown host): length of body: 2.21; width: 0.92; ant.: 2.28; siph.: ?; ant. segments: III; IV; V; VI = 0.74; 0.32; 0.32; (0.24 + 0.50).

Host plant. An undetermined tree (*Dipterocarpus?*).

Distribution. Siam.

Biology. Not known.

Available material. 4 apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea (Trichosiphum) anonae (Pergande, 1906)

(text-fig. 2, p. 48)

1906. Pergande, Th., Ent. News, Philad., vol. 17, p. 208, *Trichosiphum anonae*.
 ? 1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 131, *Greenidea artocarpi* partim.
 1931. Takahashi, R., Aph. of Formosa, pt. 6, p. 29, *Greenidea anonae*.
 1941. —, Ins. Mats., vol. 15, no. 4, p. 147, *Greenidea anonae*.
 1950. —, Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 587, *Greenidea anonae*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.52 to 1.67 mm long, with as maximum width 0.86 to 0.96 mm. Tergum sclerotised, brown to blackish brown, quite smooth. Dorsal hairs of various types which occur intermingled, the large hairs seemingly placed irregularly, very thick and stiff, always with branched or multifid apices; from pronotum up to 6th abdominal tergite small and thinner hairs which are thorny, with quite normal apices; longest hair on the anterior abdominal tergites about 3 to 4 times as long as basal diameter of IIIrd antennal segment, short thorny hairs to as little as 0.60 times that diameter; each of the 7th and 8th abdominal tergites with two thin spinal hairs, up to about 1.1 to 1.5 and

1 to 1.9 times as long as the mentioned diameter, respectively. Front straight or just convex. Antennae brown like the body, gradually darker towards apex, about 0.60 to 0.90 times as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 1.8 to 2.2 times as long as base of VIth segment, about 1 to 1.4 times as long as segment III; large hairs similar to those on the dorsum, on segment III up to about 3.5 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 very slender and acute,

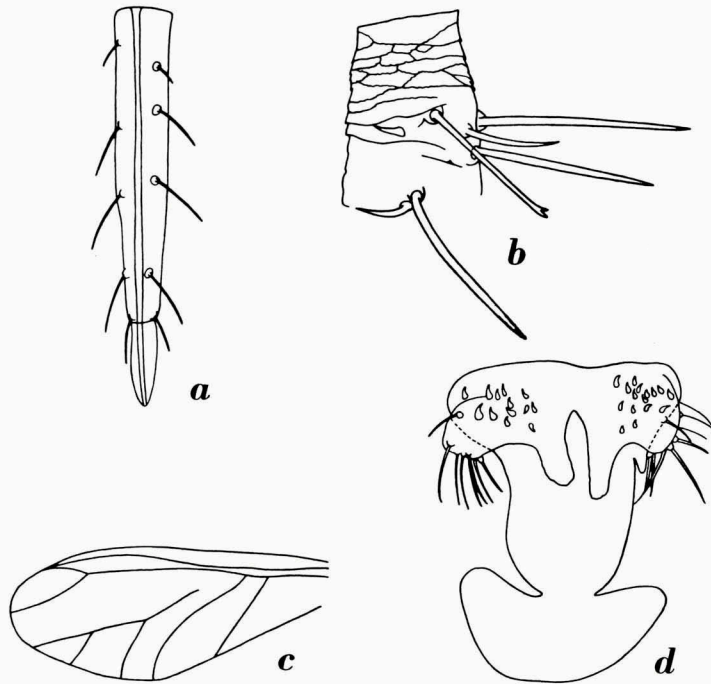


Fig. 2. *Greenidea (Trichosiphum) anonae* (Perg.). *a*, segments 4 + 5 of rostrum; *b*, basal portion of a siphunculus of an aptera, showing reticulation; *c*, fore wing, showing curved radial sector; *d*, male genitalia. *a*, *b*, *d*, $\times 26$; *c*, $\times 22$.

about 1.6 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 3.1 to 3.7 times as long as segment 5, with about 14 very fine and long hairs. Siphunculi about 0.19 to 0.24 times as long as body, with the base brown and the rest towards the apex gradually darker to black, curved outwards, about 4.2 to 5 times as long as their maximum width, at base about 1.8 to 2.2 times as thick as the middle of the hind tibiae, at the middle about 2.8 to 3.6 times as thick as the middle of the hind tibiae, and at apex about 1.4 to 2.2 times as thick as the middle of the hind tibiae; hairs on the

siphunculi numerous, basal hairs with less deeply incised apices than those on the dorsum, those near the apices usually with normal acute apices; longest hair about 1.5 to 2.1 times as long as basal diameter of the siphunculi; spinules in distinct transverse rows, densest near the apex; only on basal $\frac{1}{6}$ part strongly transverse reticulations present. Cauda without a distinct median process, but drawn out into a small point, with about 6 to 10 very fine and long hairs. Legs pigmented like the head; femora rather dispersally and superficially imbricated; tibiae striate-imbricated.

Measurements of one specimen in mm (collected in Java, on 4.8.1948, from *Annona muricata*): length of body: 1.57; width: 0.86; ant.: 0.95; siph.: 0.32; ant. segments: III; IV; V; VI = 0.22; 0.10; 0.14; (0.12 + 0.26).

A late viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 1.56 to 2 mm long, with as maximum width 0.62 to 0.86 mm. Abdominal tergum locally sclerotised, brown. Dorsal hairs with fine apices; longest hair on the anterior abdominal tergites about 2.3 to 3.5 times as long as basal diameter of IIIrd antennal segment; 7th and 8th abdominal tergites, each with two fine, long hairs, up to about 1.5 to 2.3 and 2.5 to 3.6 times as long as the mentioned diameter, respectively. Front slightly wavy with hardly developed frontal tubercles. Antennae blackish, with basal segments and the very base of segment III somewhat paler, about 0.82 to 0.98 times as long as body; flagellum evenly imbricated from base to apex; processus terminalis about 0.72 to 0.86 times as long as segment III; segment III with about 4 to 9 nearly circular to transversely oval, partly very small rhinaria on basal $\frac{1}{3}$ to $\frac{2}{3}$ part, arranged in a row, the rhinaria often grouped very irregularly so that, e.g., on basal $\frac{2}{5}$ there is a series rather close to each other, while some may occur scattered at considerable mutual distances; large hairs similar to those on the dorsum but stouter; longest hair on segment III about 3.3 to 4.5 times as long as basal diameter of the segment. Apex of rostrum reaching a little beyond the hind coxae; segment 4 with about 10 to 12 rather long and fine hairs. Siphunculi black, more or less cylindrical, apical portion slightly curved outwards, about 0.45 to 0.47 times as long as body, reticulated-imbricated, about 20 times as long as their maximum width, at the middle about 2 to 2.7 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, with acute apices; longest hair about 2.2 to 3 times as long as diameter of the siphunculi near their base; spinules present in distinct transverse rows near the apex, basal very rare. Femora at base paler than the head, more distally darker; tibiae almost of the same colour as the head, with slightly darker

apices, more distinctly striate-imbricated than femora. Pterostigma extending up to even less than $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Java, on 10.10.1948, from *Annona* spec.): length of body: 1.62; width: 0.82; ant.: 1.40; siph.: 0.80; ant. segments: III; IV; V; VI = 0.40; 0.20; 0.21; (0.15 + 0.32).

Alate male.

Morphological characters. Differs from the alate viviparous female as follows: — Body elongated, about 1.88 to 2.22 mm long, with the part behind the siphunculi attenuated, with as maximum width 0.65 to 0.86 mm. Longest hair on the anterior part of the abdomen about 1.8 to 2 times as long as basal diameter of IIIrd antennal segment. Front wavy with moderately developed frontal tubercles. Antennae about 1.1 to 1.2 times as long as body; processus terminalis about 1.1 times as long as segment III; segment III with about 2 to 5 circular to slightly transversely oval rhinaria at basal $\frac{1}{7}$ to $\frac{1}{5}$ part, sometimes one rhinarium isolated at basal $\frac{1}{3}$ to $\frac{2}{5}$ part of the segment, other segments without secondary rhinaria. Segment 4 of rostrum about 4.1 to 4.3 times as long as segment 5. Siphunculi dark with the very apex faintly paler, about 0.64 times as long as body, about 23 times as long as their maximum width, at the middle about 1.8 to 1.9 times as thick as the middle of the hind tibiae; longest hair about 4.3 times as long as diameter of the siphunculi near their base. Cauda rounded triangular with a distinct median process; subanal plate rounded rectangular, projecting past the cauda; claspers with a processus at their base caudad (see figure 2d). Legs pale brownish with darker tibiae.

Measurements of one specimen in mm (collected in Pusa, Central India, on Feb. 1934, from ?*Nicotiana tabacum*): length of body: 2.22; width: 0.84; ant.: 2.48; siph.: 1.42; ant. segments: III; IV; V; VI = 0.63; 0.32; 0.37; (0.34 + 0.69).

Host plants. *Annona* spec., *Baccaura motleyana*?, *Polyalthia*, ?*Nicotiana tabacum*.

Distribution. Central India, Malay Peninsula, Sumatra, Java, and Japan.

Biology. This species attacks the lower side of the young leaves of the host plants.

Available material. Extensive material of apterae, a few alate viviparous females from the collections of the British Museum (Nat. Hist.), London, identified by R. Takahashi and one unidentified male from the same source; of Mr. D. Hille Ris Lambers, identified by him and probably by R. Takahashi; of the Entomological Laboratory, Wageningen, probably identified by P. van der Goot.

Note. The species is distinguished from *myricae* Tak. by numerous dorsal hairs in apterae and from other species of the subgenus by short siphunculi. Alate viviparous females can easily be distinguished by the few rhinaria on IIIrd antennal segment. Alate males from the British Museum, London, on a slide no. 1937-58, collected in Central India, probably belong to this species because of the few rhinaria on IIIrd antennal segment, though usually males have more rhinaria than the viviparous females. This species has not been recorded from India before. Intermediates of this species are found in the collections of van der Goot; they have rhinaria on IIIrd antennal segment and longer and more slender siphunculi than true apterae. Dr. Sypkens recorded the insect for the first time from *Polyalthia*.

Van der Goot (1917) says that he found *Greenidea artocarpi* (Westw.) on *Annona muricata*. His description refers to *G. ficicola* Tak., but the insects from *Annona* undoubtedly were *Trichosiphum anonae* Perg. It is therefore remarkable that he doubts the occurrence of *Trichosiphum* Perg. on Java, on p. 129 of his book, although Pergande described *Trichosiphum anonae* from Java.

It may be pointed out here that the spelling *anonae* is incorrect as the host plant from which this name is derived is *Annona* and not *Anona*.

Type. Probably in U. S. National Museum, Washington.

Greenidea (Trichosiphum) flacourtia van der Goot, 1917

1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 136, *Greenidea flacourtia*.

Apterous viviparous female.

Morphological characters. Body very broadly pear-shaped, about 1.35 to 2.36 mm long, with as maximum width 0.90 to 1.38 mm. Tergum sclerotised, brown to blackish brown, in life according to van der Goot dark brown, somewhat wrinkled. Dorsal hairs thick and stiff, long, mostly with furcated or branched apices; longest hair on the anterior abdominal tergites about 3.8 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with long hairs probably with similar apices, 8th tergite with two thinner hairs probably with normal apices. Front flat. Antennae brown, apicad darker, about 1.1 times as long as body; flagellum imbricated from base to apex; processus terminalis about 2.5 to 2.8 times as long as base of VIth segment, about 1.4 to 1.6 times as long as segment III; large hairs similar to those on the dorsum but with apices much less deeply incised; longest hair on segment III about 2.4 to 2.6 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae; segment 4 of rostrum about 3.3 to 3.8 times as long as segment 5, with about 10 short

and fine hairs. Siphunculi black to blackish brown, basally over a smaller or larger part much paler, about 0.31 to 0.44 times as long as body, about 4.7 to 9.2 times as long as their maximum width, at base about 2.1 to 2.5 times as thick as the middle of the hind tibiae, at the middle about 3.1 to 3.5 times as thick as the middle of the hind tibiae, and at apex about 1.5 to 1.9 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, mostly with subacute, slightly furcated or acuminate apices; longest hair about 2.3 to 3.3 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows near the apex, basad scattered but present up to the region where reticulations end. Cauda with a distinct median process, with about 10 long and fine hairs. Femora brown, superficially imbricated; tibiae slightly darker than femora, striate-imbricated.

Measurements of one specimen in mm (collected in Java, in 1918, from *Distylium stellare*): length of body: 1.35; width: 0.90; ant.: 1.45; siph.: 0.45; ant. segments: III; IV; V; VI = 0.29; 0.17; 0.22; (0.19 + 0.47).

Host plant. *Distylium stellare*.

Distribution. Java (only known from the Dieng mountain).

Biology. From a note on van der Goot's slide it appears that this species attacks the under sides of the young leaves of its host plant.

Available material. Only apterae from the collections of the Entomological Laboratory, Wageningen, identified by van der Goot as *flacourtia*, and other damaged material identified as *distylii* (nomen nudum) by van der Goot.

Note. Damaged material of *flacourtia* in a slide, labelled and identified by van der Goot, was available and also a slide containing many damaged apterae collected by van der Goot on Pitjisan, the Javanese name for *Distylium*. The latter material contains apterae which are extremely variable as to their siphunculi. Specimens with long, apically dark, rather slender siphunculi, sometimes with rhinaria on IIIrd antennal segment, agree with those in van der Goot's slide of *flacourtia*, but these may be more or less alatiform apterae. Other specimens with much shorter and more cigar-shaped, wholly dark siphunculi look like being a different species, but the two extreme forms are connected by a gradual series of specimens which are intermediates, which leads to the conclusion that there is only one species on *Distylium* in Java.

It is extremely difficult to separate the species from *G. myricae* Tak. of which only very little material could be studied. It is possible that, e.g., a difference exists in the number of siphuncular hairs and also in the number of dorsal hairs, but at present no clear distinction is possible. Takahashi

gives the colour of *myricae* as pale green, while *flacourtae* is a dark brown species.

The name suggests that the host plant is *Flacourtia*, but van der Goot himself in his list of corrections states that this was really *Distylium stellare*.

Type. Lectotypes in the collections of the Entomological Laboratory, Wageningen.

Greenidea (Trichosiphum) formosana (Maki, 1916)

1916. Maki, M., Coll. Essays for Nawa, Gifu, p. 13, *Trichosiphum formosanum* partim.
 1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 138, *Greenidea psidii*.
 1918. Maki, M., Formosan Agric. Rev. (in Japanese), no. 138, p. 340, *Trichosiphum formosanum*.
 1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 65, *Greenidea formosanum*.
 1923. —, Aph. of Formosa, pt. 2, p. 115, *Greenidea formosanum*.
 1924. —, Aph. of Formosa, pt. 3, p. 55, *Greenidea formosana*.
 1924. —, Proc. Ent. Soc. Wash., vol. 26, no. 1, p. 8, *Greenidea formosana*.
 1925. —, Aph. of Formosa, pt. 4, p. 29, *Greenidea formosana*.
 1930. —, Trans. Nat. Hist. Soc. Formosa, vol. 20, no. III, p. 322, *Greenidea formosana*.
 1930. Suenaga, H., Trans. Nat. Hist. Soc. Kagoshima, vol. 2, no. 6, p. 108, *Greenidea formosana*.
 1931. Takahashi, R., Aph. of Formosa, pt. 6, p. 28, *Greenidea formosana*.
 1936. —, Lign. Sci. Jour., vol. 15, no. 4, p. 596, *Greenidea psidii*.
 1937. —, Lign. Sci. Jour., vol. 16, no. 2, p. 200, *Greenidea psidii*.
 1937. —, Konowia, vol. 16, p. 92, *Greenidea psidii*.
 1941. —, Ins. Mats., vol. 15, no. 4, p. 146, *Greenidea eugeniae*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 2.20 to 2.36 mm long, with as maximum width 0.97 to 1.04 mm. Tergum sclerotised, brown to brownish black, quite smooth. Large dorsal hairs thick and stiff, always with branched or multifid apices; from pronotum up to the middle of the body between the large hairs small and thinner hairs also with branched apices; longest hair on the anterior abdominal tergites about 3.1 to 3.8 times as long as basal diameter of IIIrd antennal segment, shortest hair about 0.5 to 0.66 times as long as the mentioned diameter; 7th abdominal tergite with two thick spinal hairs, up to about 2.7 to 3.1 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two fine and thin hairs, up to about 1.6 to 2.3 times as long as the mentioned diameter. Front very slightly convex. Antennae brown like the head, gradually darker towards the apex, about 0.80 to 0.95 times as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 1.9 to 2.4 times as long as base of VIth segment, about 1.2 to 1.3 times as long as segment

III; large hairs similar to those on the dorsum but with much less deeply incised apices; longest hair on segment III about 2 to 3.8 times as long as basal diameter of the segment. Apex of rostrum reaching much beyond the middle of the body; segments 4 + 5 of rostrum very slender and acute, about 2.04 to 2.2 times as long as 2nd joint of hind tarsi; segment 4 about 4 to 4.9 times as long as segment 5, with about 14 very fine and short hairs. Siphunculi considerably paler than the centre of the abdomen, with the very base and apex as dark as the disc of the abdomen, about 0.32 to 0.37 times as long as body, curved outwards, about 5.6 to 6.4 times as long as their maximum width, at base about 2.5 to 2.8 times as thick as the middle of the hind tibiae, at the middle about 3.3 to 3.8 times as thick as the middle of the hind tibiae, and at apex about 1.4 to 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, near the base mostly with furcated apices, on distal $\frac{1}{2}$ to $\frac{2}{3}$ part usually with normal acute apices; longest hair about 2.1 to 2.8 times as long as basal diameter of the siphunculi; spinules in distinct transverse rows near the apex, basal scattered and sparse, present only on the basal $\frac{1}{8}$ part of strongly transverse reticulations. Cauda with a distinct median conical process, with about 8 very fine and long hairs. Legs pigmented like the head; femora rather dispersally and superficially imbricated; tibiae striate-imbricated.

Measurements of one specimen in mm (collected in Malang, Java, on 15.3.1951, from *Psidium guajava*): length of body: 1.76; width: 1.1; ant.: 1.66; siph.: 0.60; ant. segments: III; IV; V; VI = 0.43; 0.24; 0.28; (0.24 + 0.54).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 1.36 to 2.24 mm long, with as maximum width 0.74 to 1.26 mm. Abdominal tergum locally sclerotised, brown. Thick and rather stiff dorsal hairs on the anterior abdominal tergites up to about 1.1 to 1.3 times as long as basal diameter of IIIrd antennal segment; short hairs with acute apices also present at least down to 1st two abdominal segments; hairs on 7th abdominal tergite up to about 0.88 times to as long as basal diameter of IIIrd antennal segment; 8th tergite also with two long and fine hairs. Front wavy, with hardly developed frontal tubercles. Antennae about 1.1 to 1.2 times as long as body, dark with paler basal segments; processus terminalis about 2.4 to 2.5 times as long as base of VIth segment; large hairs similar to those on the dorsum but thicker and stouter; segment III with about 21 to 26 transversely oval rhinaria placed partly in a row, almost over entire length of the segment. Apex of rostrum reaching almost the

middle of the body; segment 4 about 4.5 to 5.4 times as long as segment 5, with about 10 to 12 very fine and long hairs. Siphunculi black, about 0.70 to 0.75 times as long as body, reticulated-imbricated over entire length, almost cylindrical, with the very apex slightly curved outwards, about 23 to 25.1 times as long as their maximum width, near base about 2.1 to 2.3 times as thick as the middle of the hind tibiae, at the middle about 2.4 to 2.9 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, with acute apices; longest hair about 3.9 to 4.1 times as long as diameter of the siphunculi near base; spinules in distinct transverse rows on apical $\frac{1}{5}$ part only. Femora pigmented like the head, superficially and dispersally imbricated; tibiae pigmented like the femora with the very bases and apices darker, striate-imbricated. Pterostigma extending up to about $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Malang, Java, on 15.3.1951, from *Psidium guajava*): length of body: 2.36; width: 1.04; ant.: 2.62; siph.: 1.74; ant. segments: III; IV; V; VI = 0.68; 0.34; 0.36; (0.32 + 0.77).

Host plants. *Psidium guajava*, *Rhodomyrtus tomentosa*, *Eugenia* spec., *Melaleuca leucadendron*, *Eugenia spicata*.

Distribution. Central and South India, Sumatra, Java, Formosa, Japan, East China.

Biology. This species attacks the young shoots and the lower surface of tender leaves of *P. guajava* and *R. tomentosa*.

Available material. Extensive material of apterae and 4 alatae; from the collections of the British Museum (Nat. Hist.), London, identified by R. Takahashi; of Mr. D. Hille Ris Lambers, identified by him and probably by R. Takahashi; and of the Entomological Laboratory, Wageningen.

Note. The apterae of the species differ from those of the allied species in having minute spinulose imbrications on the apices of the hind tibiae. Specimens collected in India and Java, from *Eugenia*, agree with those from *Psidium*. Takahashi (1941) described *G. eugeniae* nov. spec. from Sumatra, collected on *Eugenia spicata*. We were not able to examine his material, but his description of the new species agrees more or less with that of *Greenidea* (*Trichosiphum*) *formosana* (Maki). So Takahashi's *G. eugeniae* is provisionally listed as a synonym of *G. (T.) formosana* (Maki). Further it would be surprising if two species are found on the same host plant at such a close distance like Sumatra and Java.

The name *formosana* Maki should have priority over *psidii* van der Goot as Maki's description was published in December, 1916, and van der Goot's description was published sometime in 1917.

Frequently this species has been recorded from *Ficus* spec., but we are convinced that these records relate to *Greenidea ficicola* Tak., which apparently has been confused with *formosana*.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Greenidea* (*Trichosiphum*) *kuwanai* (Pergande, 1906)**

1906. Pergande, Th., Ent. News, Philad., vol. 17, p. 209, *Trichosiphum kuwanai*.
 1908. Okajima, G., Bull. Coll. Agric. Tokyo Imp. Univ., vol. 8, pt. 1, p. 20, *Trichosiphum kuwanaea*.
 1918. Essig, O. E. and Kuwana, S. I., Proc. Calif. Acad. Sci., 4th ser., vol. 8, no. 3, p. 97, *Trichosiphum kuwanai*.
 1918. Takahashi, R., Dobuts. Zasshi (in Japanese), vol. 30, p. 368, *Trichosiphum kuwanai*.
 1919. —, Proc. Ent. Soc. Wash., vol. 21, no. 7, p. 174, *Greenidea kuwanaea*.
 1920. Kurisaki, Dobuts. Zasshi, vol. 32, p. 379, *Trichosiphum kuwanai*.
 1923. Takahashi, R., Aph. of Formosa, pt. 2, p. 117, *Greenidea kuwanai*.
 1924. —, Proc. Ent. Soc. Wash., vol. 26, no. 1, p. 8, *Greenidea kuwanai*.
 1925. —, Aph. of Formosa, pt. 4, p. 30, *Greenidea kuwanai*.
 1927. Okamoto, H., and Takahashi, R., Ins. Mats., vol. 1, p. 140, *Greenidea kuwanai*.
 1929. Mordvilko, A. K., Food plant Catalogue, p. 40, *Greenidea kuwanai*.
 1931. Takahashi, R., Aph. of Formosa, pt. 6, p. 28, *Greenidea kuwanai*.
 1934. Mordvilko, A. K., Archiv f. Naturg., vol. 3, pt. 1, p. 9, 45, *Greenidea kuwanai*.

Apterous viviparous female.

Morphological characters. Body broadly pear-shaped, about 2.34 to 2.60 mm long, with as maximum width 1.54 to 1.58 mm. Tergum sclerotised, brown to dark brown, quite smooth; spinules are evenly scattered on the abdominal venter up to 7th segment but not marginally. Hairs exceedingly numerous, the large dorsal hairs long, stiff and all or nearly all with furcated or branched apices; longest hair on the anterior abdominal tergites about 3 to 3.5 times as long as basal diameter of IIIrd antennal segment; the hairs on 7th abdominal tergite with normal apices, about 3.5 times as long as the mentioned diameter, those on the 8th tergite about 2.5 times as long as that diameter. Antennae dark with basal $\frac{4}{5}$ of segment III, basal half of IVth segment and the very base of Vth segment paler and coloured like the head, about 0.85 times as long as body; flagellum distinctly imbricated from base to apex; processus terminalis about 2.2 times as long as base of VIth segment, about 0.90 times as long as segment III; large hairs similar to those on the dorsum but finer, with almost blunt apices; longest hair on segment III about 3.1 times as long as basal diameter of the segment. Apex of rostrum almost reaching the middle of the body; segments 4 + 5 slender and acute, about 1.3 to 1.8 times as long as 2nd joint of hind tarsi; segment 4 about 3.1 to 4 times as long as segment 5, with about 16 long and fine hairs. Siphunculi long, curved outwards, with

strongly convex inner margin, about 0.36 times as long as body, reticulated only at base, coloured like the central sclerite of the abdomen with much darker apical $\frac{1}{3}$ part to sometimes evenly blackish brown, about 4.9 times as long as their maximum width, at base about 3 times as thick as the middle of the hind tibiae, at the middle about 3.5 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi with acute apices; longest hair about 2.1 times as long as basal diameter of the siphunculi; numerous acute spinules almost over the entire length but often rather scarce on basal $\frac{1}{2}$ to $\frac{1}{3}$ portion. Cauda with a distinct median conical process, with about 6 to 10 long and fine hairs. Femora brownish yellow, rather superficially and dispersally imbricated; tibiae darker than femora, markedly striate-imbricate, more distinctly so on the distal half.

Measurements of one specimen in mm (collected in Japan, on 23.5.1908, from *Quercus* spec.): length of body: 2.18; width: 1.44; ant.: 1.85; siph.: 0.68; ant. segments: III; IV; V; VI = 0.48; 0.27; 0.30; (0.20 + 0.43).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body oval, about 2.3 to 3.1 mm long, with as maximum width 1.1 to 1.35 mm. Abdominal tergum sclerotised, dark brown, smooth. Dorsal hairs very numerous with extremely fine apices; longest hair on the anterior part of the abdomen about 2.4 to 2.7 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with many hairs; longest hair about 2.9 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs up to about 3.1 to 4.1 times as long as the mentioned diameter. Antennae brown, with the flagellum paler with dark apices to its segments, about 0.64 to 0.67 times as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 1.4 to 1.9 times as long as base of VIth segment, about 0.4 to 0.5 times as long as segment III; segment III with 9 to 14 circular to very slightly transversely oval rhinaria in a row, over basal $\frac{1}{2}$ to $\frac{2}{3}$; large hairs similar to those on the dorsum but thicker and much longer; longest hair on segment III about 3.4 to 4.2 times as long as basal diameter of that segment. Siphunculi blackish brown, apicad very slightly paler, curved outwards, about 0.4 to 0.6 times as long as body, reticulated-imbricated, about 11.5 to 13 times as long as their maximum width, near base about 1.7 times as thick as the middle of the hind tibiae, at the middle about 2.1 to 2.5 times as thick as the middle of the hind tibiae, and at apex about 1.3 to 1.5 times as thick as the middle of the hind tibiae; longest hair about 2.6 to 2.9 times as long as diameter of the

siphunculi near their base; spinules in transverse rows near the apex only. Femora brownish black with the very base slightly paler, with a number of transverse striae; tibiae as dark as or darker than the femora, distad more or less paler, smooth, rather conspicuously more slender towards apex. Wing veins rather pale; pterostigma dark, extending to little more than $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Corea, on 21.6.1922, from *Quercus*): length of body: 3.1; width: 1.33; ant.: 1.95; siph.: 1.29; ant. segments: III; IV; V; VI = 0.75; 0.25; 0.25; (0.19 + 0.37).

Host plants. *Quercus serrata*, *Q. acuta*, *Q. crispula*, *Q. dentata*, *Q. glandulifera*, *Q. variabilis*, *Q. stenophylloides*, and *Castanea* spec.

Distribution. Formosa (alt. 2740 m), Japan, Corea, and Siberia.

Biology. This species is known to attack the young shoots of the host plants. Fundatrix apterous. Oviparous females are known to be produced in winter, but males and intermediates have not yet been recorded. 1st instars have 5-segmented antennae, 2nd have either 5- or 6-segmented antennae, but later instars have always 6-segmented antennae like the adults.

Available material. 2 apterae and 2 alatae; from the collections of the British Museum (Nat. Hist.), London (Theobald's collection); of Mr. D. Hille Ris Lambers, probably identified by R. Takahashi; and of U.S. National Museum, Washington.

Type. In U.S. National Museum, Washington.

Greenidea (Trichosiphum) myricae Takahashi, 1925

1925. Takahashi, R., Aph. of Formosa, pt. 4, p. 31, *Greenidea myricae*.

1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea myricae*.

1937. —, Lign. Sci. Jour., vol. 16, no. 2, p. 200, *Greenidea myricae*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, 2.12 mm long, with as maximum width 1.01 mm. Tergum sclerotised, pale brownish, with the head paler. Large dorsal hairs thick and stiff, with acuminate, furcated or branched apices; longest hair on anterior abdominal tergites about 4.6 times as long as basal diameter of IIIrd antennal segment; a few short hairs with acuminate or furcated apices on anterior half of the abdomen; shortest hair about as long as the mentioned diameter; 7th tergite with two hairs with furcated apices; 8th tergite with two much thinner hairs with acute apices. Antennae coloured like the head, with the very apex of segment III paler and rest of the flagellum darker; flagellum distinctly imbricated; long hairs similar to those on the dorsum but with acuminate or slightly furcated

apices; longest hair on segment III about 3.2 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 slender and acute, about 1.8 times as long as 2nd joint of hind tarsi; segment 4 about 4.1 times as long as segment 5, with about 12 rather short and fine hairs. Siphunculi pale, apical brown, about 0.21 times as long as body, reticulated only near the base, slightly curved outwards near the apex, about 6.6 times as long as their maximum width, at base about 2.3 times as thick as the middle of the hind tibiae, at the middle about 3.4 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi long and numerous, mostly with sub-acute, acuminate or furcated apices; longest hair about 2.8 times as long as basal diameter of the siphunculi; spinules in transverse rows densest near the apex; these occur basad to where the reticulation ends. Cauda with a distinct median process, with about 8 long and fine hairs. Femora coloured like the head, superficially imbricated, with a number of transverse striae; tibiae slightly darker than femora, striate-imbricated.

Measurements of one specimen in mm (collected in Taihoku, Formosa, on 30.3.1922, from *Alnus formosana*): length of body: 2.12; width: 1.01; ant.: ?; siph.: 0.63; ant. segments: III; IV; V; VI = 0.41; 0.23; 0.25; (0.19 + ?).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 2.27 mm long. Abdominal tergum sclerotised, pale brown. Large dorsal hairs on anterior abdominal tergites up to 1.6 times as long as basal diameter of IIIrd antennal segment; 7th tergite with two hairs, up to 3 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs of about the same length as those on the 7th. Front with moderately developed frontal tubercles. Antennae brown, with slightly paler basal segments; flagellum distinctly imbricated; segment III with 15 to 18 rather small to medium sized circular to slightly transversely oval rhinaria in a row, over basal $\frac{3}{4}$ part of the segment; longest hair on segment III about 3.8 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum about 2.3 times as long as 2nd joint of hind tarsi; segment 4 about 4.6 times as long as segment 5. Siphunculi brown, with slightly paler apices, about 0.81 times as long as body, reticulated-imbricated, about 25.7 times as long as their maximum width, near base about 2.1 times as thick as the middle of the hind tibiae, at the middle about 2.3 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the middle

of the hind tibiae; longest hair about 3.8 times as long as diameter of the siphunculi near their base; spinules present in transverse rows only near the apex. Cauda with a distinct median process, with about 9 long and fine hairs. Femora brownish, superficially imbricated, with a number of transverse striae; tibiae darker than the femora, with slightly darker bases and apices, striate-imbricated. Pterostigma extending up to $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Taihoku, Formosa, on 30.3.1922, from *Alnus formosana*): length of body: 2.27; width: ?; ant. ?; siph.: 1.84; ant. segments: III; IV; V; VI = 0.73; 0.41; 0.41; (?).

Host plants. *Alnus formosana*, *Myrica rubra*.

Distribution. Formosa (alt. 2240 m).

Biology. The species attacks the young leaves of the host plant.

Available material. 1 aptera and 1 alate; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. This species perhaps partly through lack of adequate material could not be separated from *Greenidea (Trichosiphum) flacourtae* van der Goot, but it would be premature to consider it a synonym of that species, because according to Takahashi this species in life is green in colour, while *flacourtae* is dark brown.

Takahashi records the species from *Myrica rubra*, but on Takahashi's slide in the collections of Mr. Hille Ris Lambers, *Alnus formosana* is given as host plant. This material was collected in 1922, first only identified by Takahashi as *Greenidea*, but later he added in pencil the name *myricae* Tak.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Greenidea (Trichosiphum) nigra* (Maki, 1916)**

1916. Maki, M., Coll. Essays for Nawa, Gifu, p. 10, *Trichosiphum nigrum*.

1918. —, Formosan Agric. Rev. (in Japanese), no. 138, p. 338, *Trichosiphum nigrum*.

1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 65, *Greenidea nigrum*.

1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea nigra*.

Alate viviparous female.

Morphological characters. Body elongated oval, 2.88 mm long, with as maximum width 1.26 mm. Abdominal tergum sclerotised, brown. Dorsum smooth. Dorsal hairs exceedingly numerous, fine, with very fine apices; longest hair on anterior tergites of abdomen about 3.2 times as long as basal diameter of IIIrd antennal segment. Front with small frontal tubercles. Antennae dark with basal half of segment III paler, about 0.70 times as

long as body; flagellum gradually more distinctly imbricated from distal half of segment III to the apex; processus terminalis about 1.9 times as long as base of VIth segment, about half as long as segment III; segment III with 23 to 25 irregular to mostly transversely oval rhinaria not in a row, over almost the entire length of the segment; large hairs similar to those on the dorsum but stouter; longest hair on segment III about 5.2 times as long as basal diameter of the segment. Apex of rostrum just reaching the hind coxae; segments 4 + 5 long and acute, about 1.5 times as long as 2nd joint of hind tarsi; segment 4 about 3.4 times as long as segment 5, with about 15 rather long and fine hairs. Siphunculi blackish brown with the very base slightly paler and with the apex conspicuously paler, about 0.68 times as long as body, reticulated-imbricated over their entire length, almost cylindrical, slightly curved outwards near apex, about 16.5 times as long as their maximum width, near base about 2.3 times as thick as the middle of the hind tibiae, at the middle about 2.4 times as thick as the middle of the hind tibiae, and at apex about 1.4 times as thick as the middle of the hind tibiae; longest hair about 2.3 times as long as diameter of the siphunculi near their base; spinules present near the apex. Cauda with a hardly developed median process, with about 6 long hairs. Femora brownish yellow with the very apices slightly darker, with a number of faint transverse spinulose striae; bases and apices of the tibiae about as dark as apices of the femora, rest pale brownish yellow, smooth, distinctly thinner towards apex. Pterostigma short and extending hardly up to $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Formosa, on 14.5.1935, from an unknown host): length of body: 2.88; width: 1.26; ant.: 1.94; siph.: 1.93; ant. segments: III; IV; V; VI = 0.74; 0.25; 0.23; (0.19 + 0.37).

Host plants. *Quercus formosana*, *Castanopsis rhombocarpa*.

Distribution. Formosa (Mount Kappan).

Biology. Not known.

Available material. 1 alate; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Greenidea* (*Paragreenidea*) *viticola* Takahashi, 1929**

(text-fig. 3c, p. 62)

1929. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 100, p. 98, *Greenidea viticola*.

1931. —, Aph. of Formosa, pt. 6, p. 30, *Greenidea viticola*.

Apterous viviparous female.

Morphological characters. Body broadly pear-shaped, about 2.57 to 2.93 mm long, with as maximum width about 1.51 to 1.67 mm. Tergum sclerotised, pale brownish yellow, smooth. Ventrally spinules evenly distributed on abdomen and seemingly on sockets. Large dorsal hairs very long and fine, with finely drawn out acute apices; longest hair on the anterior ab-

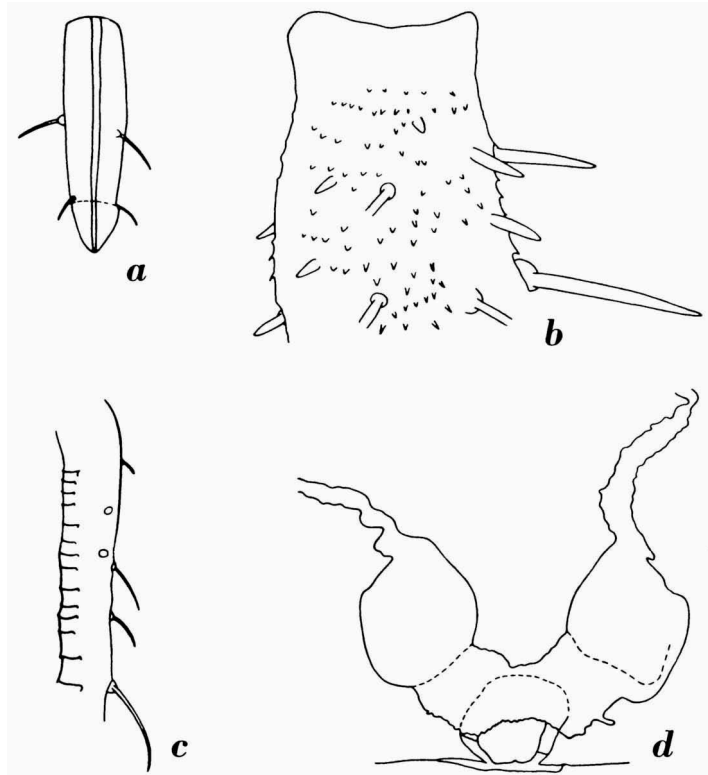


Fig. 3. *a*, *Greenideoida elongata* van der Goot, segments 4 + 5 of rostrum; *b*, *Holotrichosiphon heterotrichus* nov. spec., basal portion of a siphunculus, showing two types of hairs; *c*, *Greenidea* (*Paragreenidea*) *viticola* Tak., basal portion of hind tibia, showing stridulatory apparatus; *d*, *Paratrichosiphum* spec., female genitalia of an oviparous female. *a*, *b*, $\times 26$; *c*, *d*, $\times 13.5$.

dominal tergites about 4.1 to 4.4 times as long as basal diameter of IIIrd antennal segment; the two hairs on 7th tergite up to about 4.3 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two similar hairs, up to about 2.7 times as long as the mentioned diameter. Front slightly concave. Antennae thick, dark, with basal segments and basal half of segment III coloured like the head, about 0.93 times as long as

the body; segment III smooth with the apices very faintly imbricated, rest of the flagellum gradually more distinctly imbricated; processus terminalis about 1.6 times as long as base of VIth segment, about 0.50 times as long as segment III; antennal hairs numerous, long, with finely drawn out apices, rather evenly distributed around the segments; longest hair on segment III about 3.8 to 4 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum short and bluntish, about 1.2 times as long as 2nd joint of hind tarsi; segment 4 about 3.7 to 3.9 times as long as segment 5, with about 8 to 12 short and fine hairs. Siphunculi brown, apicad gradually paler, about 0.57 times as long as body, curved outwards near the apex, reticulated over almost basal $\frac{2}{3}$ part with the rest approximately smooth, about 10.3 times as long as their maximum width, at base about 2.6 times as thick as the middle of the hind tibiae, at the middle about 2.7 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, with finely drawn out apices; longest hair about 1.9 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows only near the apex, in rather small numbers. Cauda with a very small indistinct process, with about 12 long and fine hairs. Femora coloured like the body, about smooth; tibiae slightly darker than the femora; fore and middle tibiae smooth, sometimes middle tibiae with indistinct imbrications on the inner side on distal $\frac{1}{3}$ portion; hind tibiae curved sideways and with about 70 to 85 ridges (stridulatory apparatus).

Measurements of one specimen in mm (collected in Suisha, Formosa, on 2.10.1929, from *Vitis cantonensis*): length of body: 2.93; width: 1.67; ant.: 2.73; siph.: ?; ant. segments: III; IV; V; VI = 0.93; 0.38; 0.39; (0.29 + 0.47).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 2.63 to 2.83 mm long, with as maximum width about 1.1 mm. Abdominal tergum mostly sclerotised, pale brown. Dorsum quite smooth. Ventral spinules very much smaller and less conspicuous. Large dorsal hairs exceedingly long and fine; longest hair on anterior abdominal tergites about 3.6 to 4 times as long as basal diameter of IIIrd antennal segment; each of the 7th and 8th tergites with two long and fine hairs; hairs on the 8th tergite up to about 2.7 to 3.2 times as long as the mentioned diameter. Front with poorly developed frontal tubercles. Antennae brown, with slightly paler basal segments, about 1.04 to 1.1 times as long as body; segment III almost smooth on basal $\frac{3}{4}$ part, rest of the flagellum gradually

more distinctly imbricated; processus terminalis about 1.9 to 2 times as long as base of VIth segment, about 0.50 to 0.55 times as long as segment III; segment III with 14 to 18 small to medium sized transversely oval rhinaria in a row, over basal $\frac{2}{3}$ portion of the segment; longest hair on segment III about 4.1 to 4.5 times as long as basal diameter of the segment. Apex of rostrum hardly reaching the hind coxae. Siphunculi brown, with the apices slightly paler, about 0.75 to 0.81 times as long as body, very slightly curved outwards at apex, reticulated nearly over their entire length, about 15.6 to 17.1 times as long as their maximum width; longest hair about 2.6 to 3.1 times as long as diameter of the siphunculi near their base. Cauda with an even smaller process than in apterae, with about 16 long and fine hairs. Femora yellowish, smooth; tibiae slightly darker than femora; fore and middle tibiae smooth, but the hind tibiae curved sideways, with stridulatory ridges. Sector radii more or less curved; pterostigma extending up to about $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Suisha, Formosa, on 2.10.1929, from *Vitis cantonensis*): length of body: 2.63; width: 1.1; ant.: 2.83; siph.: 2.12; ant. segments: III; IV; V; VI = 0.99; 0.36; 0.41; (0.29 + 0.55).

Host plant. *Vitis cantonensis*.

Distribution. Formosa.

Biology. This species attacks the young stalks and leaves of the host plant.

Available material. 2 apterae and 3 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Genus **Greenideoida** van der Goot, 1917

A. HISTORY.

This genus was erected by van der Goot (1917) for the species *Greenideoida elongata* van der Goot, *Greenideoida hanna* van der Goot, and the then nomen nudum *Greenideoida ceyloniae* van der Goot, with *Greenideoida elongata* van der Goot as *typus generis*. He distinguished this genus from related genera by the following characters: — (1) antennae mostly 6-segmented¹), (2) rostrum normal, without subdivided apex, (3) cauda broadly rounded in both apterae and alatae, (4) in alatae fore wings with media once forked, hind wings only with a longitudinal vein. Later Takahashi also used this genus, without giving additional characters. It is used

1) Van der Goot considers the processus terminalis a separate segment, so that this should read: mostly 5-segmented.

here in exactly the same sense in which van der Goot understood it. Up till now only five species have been described, of which two are synonyms.

A species from the Philippines differs from *Greenideoida* only in the structure of its wings. As differences in wing-venation in aphids recently have appeared not to provide a sound basis for generic distinction (cf. the modern conception of *Toxoptera* Koch), it seems best to erect a subgenus *Neogreenideoida* nov. subgen., typus subgeneris *Neogreenideoida philippensis* nov. spec., for this species, which differs from *Greenideoida* only in the media in the fore wings being twice furcated, while the hind wings show two obliques, and are of normal size. *Greenideoida hanna* van der Goot, 1917, judging by the description and figure probably does not belong in this genus, vide p. 100.

B. SYNONYMY.

The synonymy of *Greenideoida* van der Goot s.s. is as follows.

1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. I, fasc. 3, p. 140, *Greenideoida*, typus generis *Greenideoida elongata* van der Goot, 1917.

C. GENERAL BIOLOGY.

The species of the main genus have so far been recorded from a few woody plant species, e.g., *Streblus* spec., *Bridelia tomentosa*, and *Mesua ferrea*. The species are known to attack the young branches and under sides of the leaves. The species of the new subgenus is recorded from *Crotorylon celebicum*. Reproduction seems to be parthenogetic, but in one species oviparous females are known to occur, so that locally bisexual reproduction seems to be possible.

D. GEOGRAPHICAL DISTRIBUTION.

The species of the main genus have so far been recorded from Ceylon, Malaya, Sumatra, and Java, but the species of *Neogreenideoida* nov. subgen. is recorded from the Philippines.

E. GENERAL MORPHOLOGY.

I. Head. Antennae five- or six-segmented with spinulose basal segments; antennal hairs of uniform length, mostly directed inwards. Rostrum not distinctly five-segmented; the apical segment or combination of segments is always comparatively short and obtuse.

II. Thorax. Dorsally spinulose and also ventrally with small groups of spinules. Wings normal with in the main genus the media in the fore wings once furcated, the sector radii straight to more or less curved, and the hind wings much reduced in size and without oblique veins, but in the subgenus

Neogreenideoida with twice furcated media and the hind wings with obliques; extension of pterostigma rather variable. Femora with transverse rows of spinules; tibiae at apex ventrally with 4 spines, which are not very different from normal hairs; hind tibiae without stridulatory apparatus. 1st tarsal joints with 7, 7, 7 or with 5, 5, 5 hairs.

III. Abdomen. Abdominal tergum in apterae mostly sclerotic, pale to pale brownish; dorsal hairs thick and stiff, scarce, with more or less blunt apices both in alatae and apterae. Ventrally the abdomen is almost completely smooth, but there may be spinules on the anterior sternites, and laterally also on other sternites more caudad. Siphunculi variable in shape and length, in apterae curved outwards, tapering towards the base and apex, in alatae siphunculi more or less cylindrical on basal half and at apex rather suddenly attenuated and curved outwards, always covered with long hairs of more or less uniform type and with normal acute apices, without a trace of reticulation, but covered with spinules in transverse rows which are densest near the apices. Cauda either rounded triangular or semicircular, without stylus-like process.

F. TAXONOMY OF SUBGENERA AND SPECIES.

I. KEY TO SUBGENERA.

- 1 (2) Alatae with media in the fore wings once furcated and hind wings without oblique veins *Greenideoida* van der Goot s.s.
- 2 (1) Alatae with media in the fore wings twice branched and hind wings with two obliques *Neogreenideoida* nov. subgen., typus subgeneris
Neogreenideoida philippensis nov. spec.

II. KEY TO THE SPECIES OF *Greenideoida* VAN DER GOOT S.S.

(a) Apterous viviparous females.

- 1 (2) Antennae six-segmented, processus terminalis nearly twice to twice (1.8 to 2) as long as base of VIth segment. Siphunculi brownish to dark brown with the very base and apex paler. 1st tarsal joints with 7 hairs (in fundatrix antennae five-segmented, even then processus terminalis nearly twice (1.8) as long as base of Vth segment. Siphunculi of the same colour as in adult morph, but then about 8 times as long as their maximum width). *ceyloniae* van der Goot.
- 2 (1) Antennae always five-segmented, processus terminalis about as long as or longer (1.1 to 1.4) than base of Vth segment. Siphunculi pale with about apical 1/8 part dark, about 14.8 to 16.5 times as long as their maximum width. 1st tarsal joints with 5 hairs *elongata* van der Goot.

(b) Alate viviparous females.

- 1 (2) Antennae six-segmented; antennal segment III with 23 to 30 (Takahashi) circular to slightly transversely oval rhinaria not exactly in a row, over entire length of the segment. Siphunculi about 27.6 times as long as their maximum width *ceyloniae* van der Goot.

- 2 (1) Antennae five-segmented; antennal segment III with 4 to at most 17 (van der Goot) circular rhinaria in one row, over its basal $\frac{5}{8}$ to full length. Siphunculi about 20.6 times as long as their maximum width.
elongata van der Goot.

Greenideoida ceyloniae van der Goot, 1917

1905. Schouteden, H., Spolia zeylan., vol. 2, pt. 8, p. 181, *Greenidea artocarpi* partim.
 1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 141, *Greenideoida ceyloniae* nomen nudum.
 1918. —, Spolia Zeylan., vol. 11, pt. 40, p. 73, *Greenideoida ceyloniae*.
 1950. Takahashi, R., Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 590, *Greenideoida mesuae*.

Fundatrix(?)

Morphological characters. Body broader than in the next morph, 2.28 mm long, with as maximum width 1.12 mm. Tergum much darker except at the very margin and in a spindle-shaped median area; muscle-plates conspicuously pale. Antennae 5-segmented, about 0.7 times as long as body; processus terminalis about 1.8 times as long as base of Vth segment, about 0.39 times as long as segment III. Siphunculi brown to dark brown, with the very apices pale, curved outwards, about 0.42 times as long as body, much shorter, and wider in the middle than in the next morph, about 8 times as long as their maximum width; very apices spinulose; the imbrications basad shorter and less straight. Other characters as in the next morph.

Measurements of one specimen in mm (collected in Malaya, on 14.8.1945, from an unknown host): length of body: 2.28; width: 1.12; ant.: 1.60; siph.: 0.96; ant. segments: III; IV; V = 0.76; 0.22; (0.17 + 0.30).

Apterous viviparous female.

Morphological characters. Body elongated, about 1.82 to 2.14 mm long, with as maximum width 0.90 to 0.98 mm. Tergum sclerotised, pale, on the abdomen especially laterally somewhat brownish, completely spinulose but spinules mediad much less distinct. Dorsal hairs very scarce with on, e.g., abdominal tergite 4, 2 to 4 spinal hairs, 2 pleural hairs, and about 10 marginal hairs; all these hairs thorny, acute, up to about as long as basal diameter of IIIrd antennal segment; on the anterior tergites a few shorter and thinner but similar hairs present which are up to about $\frac{2}{3}$ of the mentioned diameter; spinal hairs on 7th and 8th tergites hardly different from the long dorsal hairs on anterior abdominal tergites. Front slightly concave, convex in the middle, with poorly developed frontal tubercles. Antennae pale like the head, with the area round the rhinaria on last segment and the very tip of the processus terminalis slightly darker, about 0.90 to 1.1 times as long as body; flagellum distinctly imbricated from base to apex;

processus terminalis about 1.8 to 2 times as long as base of VIth segment, about 0.45 to 0.56 times as long as segment III; large hairs mostly directed inwards; longest hair on segment III about 1.2 to 1.3 times as long as basal diameter of the segment. Apex of rostrum reaching a little beyond the hind coxae; segments 4 + 5 rather short and obtuse, about 1.1 to 1.3 times as long as 2nd joint of hind tarsi; segment 4 not clearly separated from segment 5, about 3.4 to 4.6 times as long as segment 5, with about 8 to 10 fine and rather long hairs. Siphunculi brownish to dark brown with the very base and apex paler, tapering towards base and apex, curved outwards, about 0.65 to 0.75 times as long as body, about 14.8 to 16.5 times as long as their maximum width, at base about 2 to 2.1 times as thick as the middle of the hind tibiae, at the middle about 2.1 to 2.4 times as thick as the middle of the hind tibiae, and at apex about 1.3 to 1.4 times as thick as the middle of the hind tibiae; largest width at basal $\frac{1}{3}$ part, about 2.5 times the width at the middle of the hind tibiae; hairs on the siphunculi numerous, with acute apices; longest hair about 1.1 to 1.2 times as long as basal diameter of the siphunculi; spinules present in distinct transverse rows on the apical $\frac{1}{8}$ part, basad these spinules become less distinct and more sparse and they gradually change into indistinct, almost linear imbrications; no reticulation present. Cauda rounded triangular, with about 6 to 8 fine and long hairs. Legs pale like the body; femora distinctly spinulosely imbricated; fore and middle tibiae spinulosely imbricated, hind tibiae at least on basal $\frac{1}{3}$ part with transverse smooth imbrications on their caudal surface; all tibiae spinulosely imbricated to spinulose towards their apices; the 4 apical spines not different from normal hairs; 1st tarsal joints with 7 hairs.

Measurements of one specimen in mm (collected in Malaya, on 20.9.1945, from an unknown host): length of body: 1.82; width: 0.98; ant.: 1.96; siph.: 1.36; ant. segments: III; IV; V; VI = 0.69; 0.25; 0.28; (0.22 + 0.39).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body 1.96 mm long, with as maximum width 0.50 mm. Tergum locally sclerotised; head and thorax dark brown, abdomen yellowish brown. Dorsum almost smooth. Longest hair on the anterior abdominal tergites about 0.83 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with slightly longer hairs, up to about as long as basal diameter of IIIrd antennal segment; the hairs on 8th tergite much longer with normal apices, up to about 2.8 times as long as the mentioned diameter. Front flat with

well-developed divergent frontal tubercles. Antennae brown with darker basal segments; processus terminalis about 0.60 times as long as segment III; segment III with 23 to 30 (Takahashi) small to medium sized circular to slightly transversely oval rhinaria not exactly in a row, over the entire length of the segment; large hairs similar to those on the dorsum. Segment 4 of rostrum about 2.7 times as long as segment 5. Siphunculi brown with paler apex, about 0.89 times as long as body, more or less cylindrical, slightly curved outwards especially near the apex, with faint transverse striae on basal half, about 27.6 times as long as their maximum width; hairs on the siphunculi numerous, long, mostly with bluntish or subacute apices, basad a few slightly shorter hairs; longest hair about 1.8 times as long as diameter of the siphunculi near their base. Cauda transversely semioval. Femora pale yellowish; tibiae pigmented like the femora with darker apices, striate-imbricated. Pterostigma extending up to $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Ceylon, in July, 1900, from *Mesua ferrea*): length of body: 1.96; width: 0.50; ant.: 2.22; siph.: 1.76; ant. segments: III; IV; V; VI = 0.75; 0.28; 0.33; (0.27 + 0.45).

Host plant. *Mesua ferrea*.

Distribution. Ceylon, Malay Peninsula.

Biology. This species attacks the young leaves and branches of the host plant.

Available material. 3 slides from the collections of the British Museum (Nat. Hist.), London, one of the slides no. 756/55, identified by R. Takahashi as *Paratrichosiphum mesuae* Tak. and the other two as *Greenideoida mesuae* Tak.; from the collections of U.S. Nat. Museum, Washington, identified as *Greenidea artocarp*i (Westw.), probably by Schouteden, collected in Ceylon on *Mesua ferrea*.

Note. All the slides in the British Museum, London, identified and labelled by Takahashi are from the same plant, date, and locality. In his description Takahashi mentions that the antennae have 5 or 6 segments, but apparently he had then already labelled the slides containing insects with 5 antennal segments as *Greenideoida*, those with 6-segmented antennae as *Paratrichosiphum*. In our opinion it is possible that those with 5-segmented antennae are fundatrices.

Greenideoida ceyloniae van der Goot was first mentioned without description as a *Greenideoida* from *Mesua ferrea* in 1917 and later described in detail. Takahashi says that his material is different from *ceyloniae* by having different hairs and a different number of rhinaria. Van der Goot's original material is lost, but an American slide from Ceylon was available,

collected by E. E. Green on *Mesua ferrea* and this material agrees in all respects with Takahashi's types of *mesuae*. Because it is unlikely that in Ceylon two exceedingly similar species should live on *Mesua*, there is no reason to consider *mesuae* Tak. as a species different from *ceyloniae*.

This species differs from all known members of the tribe in having 5 hairs on the 1st tarsal joints.

Type. Van der Goot's original material is lost. A slide from the U.S. Nat. Museum, Washington, no. 12198, collected on *Mesua ferrea*, Paradeniya, Ceylon, VII. 1900, by E. E. Green, I design as neotype. The types of *Greenideoida mesuae* Tak. are now in the British Museum (Nat. Hist.), London.

Greenideoida elongata van der Goot, 1917

(text-fig. 3a, p. 62)

1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 142, *Greenideoida elongata*.

1935. Takahashi, R., Misc. Zool. Sumatr., pt. 97, p. 1, *Greenideoida vandermeermohri*.

1950. —, Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 590, *Greenideoida vandermeermohri*.

Apterous viviparous female.

Morphological characters. Body very elongated, about 1.66 to 2.32 mm long, with as maximum width 0.60 to 0.90 mm. Tergum pale, very faintly dispersally nodulose. Dorsal hairs rather long and stiff, in single transverse rows per segment, with somewhat blunt or faintly incrassate apices; longest hair on the anterior abdominal tergites about 1.6 to 1.7 times as long as basal diameter of IIIrd antennal segment; short hairs present down to the middle of the body, up to about 0.66 to 0.88 times as long as the mentioned diameter; the two hairs on 7th and 8th abdominal tergites much longer, up to about 1.8 to 2.3 times and 2.2 to 2.6 times as long as the mentioned diameter, respectively; those on 8th tergite drawn out into fine apices and together placed on an elevated part of the tergite. Front with hardly developed frontal tubercles. Antennae 5-segmented, about 0.70 times as long as body, pale like the head, with the very apices of segments III and IV, the area near the rhinaria on segment V, and the apex or the whole of the processus terminalis dark; flagellum distinctly imbricated from base to apex; processus terminalis about 1.1 to 1.4 times as long as base of Vth segment, about 0.40 to 0.54 times as long as segment III; long hairs similar to those on the dorsum, but with more acute apices, on segment III up to about 1.5 to 1.9 times as long as basal diameter of the segment. Apex of rostrum reaching just past the hind coxae; segments 4 + 5 rather short and bluntish, about 1.1 to 1.3 times as long as 2nd joint of hind tarsi; segment

4 about 3.3 to 3.7 times as long as segment 5, with about 6 to 8 fine and long hairs. Siphunculi long and slender with the maximum width at basal $\frac{1}{3}$ to $\frac{1}{4}$ part, with the very apex strongly curved outwards, about 0.65 to 0.70 times as long as body, pale like the body with about apical $\frac{1}{9}$ part very dark, without a trace of reticulation, about 14.8 to 16.5 times as long as their maximum width, at base about 2.3 to 2.5 times as thick as the middle of the hind tibiae, at the middle about 2.7 to 2.8 times as thick as the middle of the hind tibiae, and at apex about 1.3 to 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices; longest hair about 1.3 times as long as basal diameter of the siphunculi; between the hairs acute spinules present in distinct transverse rows, basad less numerous. Cauda semicircular, with about 6 to 8 long and fine hairs; sub-anal plate much broader than cauda. Legs pale like the head; femora spinulose; all tibiae imbricated on the inner side; apices of tibiae ventrally provided with 4 thorns, which are hardly or not different from normal hairs; 1st tarsal joints with 5 hairs.

N. B. In specimens from Sumatra the siphunculi are more slender than in specimens from Malaya.

Measurements of one specimen in mm (collected in Malaya, on 28.6.1944, from *Bridelia tomentosa*): length of body: 2.32; width: 0.80; ant.: 1.70; siph.: 1.58; ant. segments: III; IV; V = 0.70; 0.24; (0.28 + 0.32).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body 2.22 mm long, with as maximum width 0.80 mm. Head and thorax sclerotised, like most of the abdominal dorsum brownish pigmented. Longest hair on the anterior tergites of the abdomen about 1.3 times as long as basal diameter of IIIrd antennal segment; shortest hair about 0.6 times as long as the mentioned diameter. Front flat with low frontal tubercles. Antennae about 0.84 times as long as body, darker than the head, with paler basal segments; processus terminalis hardly longer than the base of Vth segment; segment III with 4 to 17 (van der Goot) circular rhinaria in a row, over its basal $\frac{5}{8}$ portion to over its full length (van der Goot), not of equal size, sometimes some not larger than the papilla of a hair. Siphunculi coloured like the head on their basal half and pale on their distal half, about 0.76 times as long as body, more or less cylindrical, but near the very apex slightly curved outwards, faintly imbricated to transversely striated, about 20.6 times as long as their maximum width, near base about 3 times as thick as the middle of the hind tibiae, at the middle about 2.6 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the

middle of the hind tibiae. Cauda more produced than in apterae. Femora pale; tibiae coloured like the head. Fore wings with media once furcated; radial sector hardly curved; pterostigma dark, long; hind wings with only the longitudinal vein.

Measurements of one specimen in mm (collected in Malaya, on 28.6.1944, from *Bridelia tomentosa*): length of body: 2.22; width: 0.80; ant.: 1.87; siph.: 1.64; ant. segments: III; IV; V = 0.80; 0.32; (0.29 + 0.30).

Alate oviparous female.

Morphological characters. Almost indistinguishable from alate viviparous female, but subanal plate very broad, with instead of a few hairs as in viviparae, a great number of hairs, approximately 80; the median gonapophyses are much enlarged, cleft and tubercular, so that 4 gonapophyses are present of which the middle two are very different; subgenital plate densely covered with fine hairs.

Measurements of one specimen in mm (collected in Malaya, on 28.6.1944, from *Bridelia tomentosa*): length of body: 1.54; width: 0.56; ant.: 1.57; siph.: 1.32; ant. segments: III; IV; V = 0.62; 0.28; (0.27 + 0.28).

Host plant. *Bridelia tomentosa*.

Distribution. Malay Peninsula, Sumatra, and Java.

Biology. This species attacks the lower side of the leaves of the host plant along the midrib.

Available material. Extensive material of apterae and a few alatae; from the collections of the British Museum (Nat. Hist.), London and of Mr. D. Hille Ris Lambers, identified by Takahashi as *vandermeermohri* Tak.; of the Entomological Laboratory, Wageningen (unidentified).

Note. Van der Goot (1917) described *elongata* from Java, from *Cassia alata*, but in the addenda he corrected the name of the host plant into *Bridelia tomentosa*. Later Takahashi (1935) described *vandermeermohri* from Sumatra from the same host plant and in 1950 also from Malaya. Examination of material from Java and that described by Takahashi both from Sumatra and Malaya shows that there is only one species. Also in the description of *elongata* and *vandermeermohri* there is no significant difference. Therefore *vandermeermohri* is listed as a synonym. In a slide from the British Museum, London, besides an alate viviparous female an alate oviparous female was found. This material was collected at Kuala Lumpur on 28.6.1944. The latter morph was undescribed and Takahashi, who made and labelled this slide, apparently did not notice its nature.

This species can easily be recognised by its 5-segmented antennae in both apterae and alatae; a chance, however, remains to confuse it with the fun-

datrix (?) of *Greenideoida ceyloniae* van der Goot, which has also 5-segmented antennae, but then the apterae of the present species differ from the apterous fundatrix (?) of *ceyloniae* van der Goot by their long and more slender siphunculi.

Type. Van der Goot's types are lost. A slide in the Entomological Laboratory, Wageningen, containing an alate viviparous female is designed by me as neotype. The types of *Greenideoida vandermeermohri* probably are in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa, while one slide from the type sample, presumably containing paratypes, is in the collections of Mr. D. Hille Ris Lambers.

***Greenideoida (Neogreenideoida) philippensis* nov. spec.**

Apterous viviparous female.

Morphological characters. Body elongated, 2.25 mm long, with as maximum width 0.99 mm. Tergum pale yellowish, very faintly locally spinulose. Dorsal hairs very short, with acute apices, very sparse; longest hair on the anterior abdominal tergites about 0.22 times as long as basal diameter of IIIrd antennal segment; 7th tergite probably with two very long hairs (vide alata), and with very short hairs like those on the anterior segments; 8th tergite probably with two thin and long hairs. Antennae pale like the body, with an area round the primary rhinaria on Vth segment and the whole of VIth segment brown, about 0.66 times as long as body; flagellum imbricated from base to apex; processus terminalis about 1.3 times as long as base of VIth segment, about 0.55 times as long as segment III; large hairs similar to those on the dorsum, but with acuminate or bluntish apices; longest hair on segment III about 1.1 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum short and blunt, about 1.03 times as long as 2nd joint of hind tarsi; segment 4 about 4.8 times as long as segment 5, with about 8 short and fine hairs. Siphunculi yellow, probably with the very apices slightly darker, about 0.67 times as long as body, without a trace of reticulation, curved outwards near the apices, about 13.3 times as long as their maximum width, at base about 3.7 times as thick as the middle of the hind tibiae, at the middle about 3.7 times as thick as the middle of the hind tibiae, and at apex about 1.8 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long and mostly with acute apices; longest hair about 1.5 times as long as basal diameter of the siphunculi. Cauda rounded triangular, with about 8 long and fine hairs. Femora pale like the body, almost smooth; tibiae pigmented like the siphunculi, smooth, with serrate-imbricated apices.

Measurements of one specimen in mm (collected in Luzon, Philippines, on 14.3.1919, from *Crotorylon celebicum*): length of body: 2.25; width: 0.99; ant.: 1.50; siph.: 1.39; ant. segments: III; IV; V; VI = 0.49; 0.17; 0.23; (0.20 + 0.27).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body 1.67 mm long, with as maximum width 0.63 mm. Tergum locally sclerotised, deep brown, smooth. Dorsal hairs more numerous than in apterae, on the anterior abdominal tergites up to about 0.6 times as long as basal diameter of IIIrd antennal segment; 7th and 8th abdominal tergites each with two very long hairs. Front with two hairy processes in the middle and two well developed frontal tubercles. Antennae blackish brown with slightly darker basal segments; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 0.46 times as long as segment III; segment III with about 21 large transversely oval rhinaria in a row, over the entire length of the segment; large hairs similar to those on the dorsum, but longer with bluntish or slightly incrassate apices; longest hair on segment III about 2.7 times as long as basal diameter of the segment. Siphunculi blackish brown with slightly paler apex, about 0.86 times as long as body, with faint transverse striae especially on basal half, more or less cylindrical with the apex very slightly curved outwards, about 16.3 times as long as their maximum width, near base about 2.2 times as thick as the middle of the hind tibiae, at the middle about 2.6 times as thick as the middle of the hind tibiae, and at apex about 1.5 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, mostly with acute apices; longest hair about 2.4 times as long as diameter of the siphunculi near their base; spinules in transverse rows densest near the apex, basad very scarce and sparse. Cauda obtusely conical, without a median stylus-like process. Legs coloured like the head, with darker tibiae. Pterostigma extending almost from $\frac{1}{3}$ to $\frac{1}{2}$ the radial sector; media in the fore wings twice branched; hind wings of normal size, with two obliques.

Host plant. *Crotorylon celebicum*.

Distribution. Philippines.

Biology. Not known.

Available material. 1 aptera and 1 alate; from the collections of U.S. National Museum, Washington, collected by Mr. L. B. Uichanco, on 14.3.1919, in Luzon, Philippines.

Type. Holotype in U.S. National Museum, no. Q. 19582.

Genus **Holotrichosiphon** nov. gen.

A. HISTORY.

Typus generis is *Holotrichosiphon heterotrichus* nov. spec. This species resembles *Eutrichosiphum* Essig et Kuwana in the shape of the body and siphunculi, but differs in having six-segmented antennae, in which respect it agrees with *Paratrichosiphum* Takahashi. But the chaetotaxy of the body and especially of the siphunculi separates this genus from all the allied genera. The siphunculi are provided over their entire length with both long and very short hairs with acute, bluntish, or acuminate apices. Also *Trichosiphum dubium* van der Goot, 1917 is included in the genus because of the chaetotaxy of the body and siphunculi.

B. SYNONYMY.

1917. Goot, P. van der, Rec. Ind. Mus., vol. 13, pt. 4, no. 11, p. 178, *Trichosiphum* Perg. partim.
1929. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 105, p. 527, *Greenidea* Schout. partim.
1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum* Tak. partim.

C. BIOLOGY.

The species so far known occur only on Fagaceae. Parthenogenetic reproduction seems to be usual and males or oviparous females are as yet unknown.

D. GEOGRAPHICAL DISTRIBUTION.

Species have been recorded from North East India, Java, and Formosa.

E. GENERAL MORPHOLOGY.

I. Head. Antennae of six segments; antennal hairs partly long and partly short, with the long hairs mostly directed inwards, and the short ones directed outwards. Rostrum distinctly of five segments.

II. Thorax. Tibiae always with 4 distinct spines at their apices, which are quite distinct from normal hairs. Hind tibiae without stridulatory apparatus. 1st tarsal joints with 7 hairs. Ventrally the thorax may show small groups of spinules.

III. Abdomen. Tergum in apterae sclerotic, brownish yellow to dark brown, locally spinulose on anterior half, with a number of thick and stiff hairs of very different length; the longer hairs usually with subacute and acuminate apices, sometimes some slightly furcated; short hairs more or less thorny, with acuminate apices. Ventrally the abdomen is also spinulose, at least laterally if not over the entire surface. Siphunculi variable in length, constricted at base and apex, more or less curved outwards, without

reticulation or sometimes with indistinct reticulation at the very base only on the under side. Long and short hairs occur intermingled over the entire length of the siphunculi; both these types of hairs with acute, subacute, acuminate, or bluntish apices. Cauda transversely semioval or obtusely conical, without a median stylus-like process.

F. TAXONOMY OF THE SPECIES.

KEY TO THE APTEROUS VIVIPAROUS FEMALES.

- 1 (2) IIIrd antennal segment imbricated. Femora with transverse spinulose striae on the ventral side. Siphunculi hardly $\frac{1}{4}$ (0.23 to 0.24) the length of the body, indistinctly reticulated at the very base on the under side, about 3.7 to 4.7 times as long as their maximum width. *dubius* (van der Goot).
 2 (1) IIIrd antennal segment smooth. Femora without spinulose striae. Siphunculi almost $\frac{3}{10}$ to $\frac{1}{3}$ (0.30 to 0.33) the length of the body, without a trace of reticulation even at the very base, about 5.6 to 7.5 times as long as their maximum width *heterotrichus* nov. spec.

Holotrichosiphon dubius (van der Goot, 1917)

1917. Goot, P. van der, Rec. Ind. Mus., vol. 13, pt. 4, no. 11, p. 178, *Trichosiphum dubium*.

1929. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 19, no. 105, p. 527, *Greenidea dubius*.

1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum dubium*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.99 to 2.71 mm long, with as maximum width 1.02 to 1.48 mm. Tergum sclerotised, yellowish brown to dark brown, paler in the middle, spinulose, but the spinules often indistinct and scattered, marginally almost smooth. Long and short dorsal hairs numerous, intermingled; the longer ones with subacute or acuminate apices; longest hair on the anterior abdominal tergites about 2.2 to 2.8 times as long as basal diameter of IIIrd antennal segment; short ones much more numerous, thorny; shortest hair about 0.4 to 0.53 times as long as the mentioned diameter; 7th abdominal tergite with a great many hairs of very different lengths, the longest ones about 3.1 times as long as basal diameter of IIIrd antennal segment; 8th tergite with only two thicker hairs up to about 3 times as long as basal diameter of IIIrd antennal segment. Antennae pale with basal segments as dark as head and with the very apex of segment V and the whole of segment VI blackish, about 0.43 to 0.49 times as long as body; flagellum imbricated from base to apex; processus terminalis about 1.6 to 1.8 times as long as base of VIth segment, about 0.61 to 0.77 times as long as segment III; large hairs similar to those on the dorsum but with bluntish or acuminate apices; longest hair on segment III about 1.9 to 2.8 times as long as basal diameter of the segment. Apex of

rostrum reaching the middle of the body; segments 4 + 5 very long and acute, about 2.7 to 3 times as long as 2nd joint of hind tarsi; segment 4 about 6.6 to 7.1 times as long as segment 5, with about 18 to 24 hairs of very different lengths. Siphunculi blackish brown, with paler bases, about 0.23 to 0.24 times as long as body, constricted at base and apex, slightly curved outwards at apex, about 3.7 to 4.7 times as long as their maximum width, indistinctly reticulated only at the very base on the under side, at base about 1.6 to 2 times as thick as the middle of the hind tibiae, at the middle about 3.5 times as thick as the middle of the hind tibiae, and at apex about 1.6 times as thick as the middle of the hind tibiae; long and short hairs with acute, acuminate, or bluntish apices, occur intermingled over the entire length of the siphunculi; longest hair about 2 to 2.8 times as long as basal diameter of the siphunculi; spinules present from almost the very base to the apex, becoming much longer near the apex. Cauda obtusely conical, without a median process, with about 6 to 8 long and fine hairs. Legs pale yellowish brown; femora with transverse striae on the ventral side; tibiae smooth.

Measurements of one specimen in mm (collected in Suisha, Formosa, on 25.5.1929, from *Castanopsis*): length of body: 2.76; width: 1.48; ant.: 1.22; siph.: 0.67; ant. segments: III; IV; V; VI = 0.41; 0.12; 0.18; (0.14 + 0.25).

Host plants. *Quercus glauca*, *Castanopsis* spec.

Distribution. North East India (alt. 2100 m), Formosa.

Available material. 4 apterae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. Apart from the differences mentioned in the key this species differs very much from *heterotrichus* nov. spec. in the shape of the hairs, which in the latter species are thick and stubby.

Type. Van der Goot deposited the type material in the Indian Museum, Calcutta, but as a result of flood damage at Benares, during evacuation, this material was lost. Neotypes in the collections of Mr. Hille Ris Lambers.

Holotrichosiphon heterotrichus nov. spec.

(Pl. I fig. 3; text-fig. 3b, p. 62)

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 2.80 to 3.15 mm long, with as maximum width 1.50 to 1.85 mm. Tergum sclerotised, rather dark brown, on abdomen locally spinulose on anterior half. Dorsal hairs stiff and spiny, with long and short ones intermingled, nearly all with acuminate

apices but some sometimes slightly furcated; shorter ones more or less thorny; longest hair on the anterior abdominal tergites about 2 to 2.2 times as long as basal diameter of IIIrd antennal segment, the shortest one about 0.4 to 0.5 times as long as the mentioned diameter; 7th abdominal tergite with two longer and finer hairs besides a great many hairs of very different lengths; the longest of these hairs about 1.8 to 2.3 times as long as basal diameter of IIIrd antennal segment; the two hairs on 8th abdominal tergite up to about 1.6 to 1.9 times as long as the mentioned diameter. Antennae six-segmented, pale brownish with distal half of base of VIth segment and the processus terminalis slightly darker, about 0.5 times as long as body; segment III smooth, rest of the flagellum gradually more distinctly imbricated towards the apex; processus terminalis about 1.8 to 2 times as long as base of VIth segment, about 0.40 to 0.45 times as long as segment III; large hairs numerous, similar to those on the dorsum but much thinner; longest hair on segment III about 1.6 to 1.8 times as long as basal diameter of that segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 very long and acute, about 2.6 to 3.1 times as long as 2nd joint of hind tarsi; segment 4 about 5.8 to 7 times as long as segment 5, with about 18 to 24 hairs of different lengths. Siphunculi brownish black, constricted at base and apex, without a trace of reticulation, curved outwards, about 0.30 to 0.33 times as long as body, about 5.6 to 7.5 times as long as their maximum width, at base about 1.8 to 1.9 times as thick as the middle of the hind tibiae, at the middle about 2.5 to 2.8 times as thick as the middle of the hind tibiae, and at apex about 1.5 to 1.7 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, with long and very short ones intermingled throughout the entire length of the siphunculus; the longer hairs with more or less subacute apices, the short ones with acuminate or bluntish apices; longest hair about 1.3 to 1.5 times as long as basal diameter of the siphunculi; spinules present in transverse rows from base to apex. Cauda transversely semi-oval, without a median process, with about 6 long and fine hairs. Femora pigmented like the dorsum, smooth, with very irregular dorsal profile on distal half; tibiae darker than the femora, very faintly imbricated near the apices; apices of the tibiae ventrally provided with 4 thick, very acute thorns.

Measurements of one specimen in mm (collected in Java, from *Quercus*, on 8.8.1919): length of body: 3.12; width: 1.66; ant.: 1.63; siph.: 1.00; ant. segments: III; IV; V; VI = 0.68; 0.16; 0.19; (0.16 + 0.28).

Host plant. *Quercus* spec.

Distribution. Java.

Biology. Not known.

Available material. Extensive material of apterae; from the collections of the Entomological Laboratory, Wageningen, and the collections of Mr. D. Hille Ris Lambers.

Note. This species can very easily be distinguished from all other members of the tribe by the occurrence all over the body, legs, and siphunculi, etc., of thick and more or less stunted hairs of very different lengths.

Type. Cotypes in the Entomological Laboratory, Wageningen, and in the collections of Mr. Hille Ris Lambers.

Genus **Metatrichosiphon** nov. gen.

A. HISTORY.

This genus is erected with *Trichosiphum nigrofasciatum* Maki, 1916, as *typus generis*. This species was placed by Takahashi (1931) in *Paratrichosiphum* Tak. It appears that *T. nigrofasciatum* differs from the *typus generis* of *Paratrichosiphum*, *Greenidea tattakana* Tak., in having a stridulatory apparatus in the form of transverse cuts or ridges on the hind tibiae; the latter are curved outwards. The chaetotaxy of the antennae and the wing venation justify further division of the new genus into two subgenera, viz., into *Neotrichosiphon* nov. subgen., *typus subgeneris* *Trichosiphum tenuicorpus* Okajima, in which the antennal hairs are very numerous and point in all directions and where the radial sector is almost straight, and into *Metatrichosiphon* s.s., in which the long antennal hairs are mainly directed inwards, while those directed outwards are much shorter than those directed inwards; the radial sector is curved.

B. SYNONYMY.

The synonymy of *Metatrichosiphon* s.s. is as follows.

1916. Maki, M., Coll. Essays for Nawa, Gifu, p. 16, *Trichosiphum* Perg. partim.
 1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 65, *Greenidea* Schout. partim.
 1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum* Tak. partim.
 1931-53. —, various papers, *Paratrichosiphum* Tak. partim.

The synonymy of *Neotrichosiphon* nov. subgen. is as follows.

1908. Okajima, G., Bull. Coll. Agric. Tokyo Imp. Univ., vol. 8, pt. 1, p. 22, *Trichosiphum* Perg. partim.
 1924. Takahashi, R., Aph. of Formosa, pt. 3, p. 55, *Greenidea* Schout. partim.
 1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum* Tak. partim.

C. BIOLOGY.

The species are so far known to live on the young shoots and on the under sides of the leaves of plants mostly belonging to the Fagaceae. No oviparous females or males have so far been recorded in the main genus, and parthenogenetic reproduction seems to be usual.

D. GEOGRAPHICAL DISTRIBUTION.

Species belonging to the main genus have so far been recorded from Formosa, Japan, and Eastern China. The subgenus *Neotrichosiphon* occurs in the same area, but has also been found in Java.

E. GENERAL MORPHOLOGY.

I. Head. Antennae six-segmented; antennal hairs in the subgenus *Neotrichosiphon* all long and pointing in all directions, in *Metatrichosiphon* s.s. with long hairs mostly directed inwards and with short hairs mainly directed outwards. Rostrum distinctly of five segments.

II. Thorax. Wings normal, with the media in the fore wing twice branched, the sector radii in the subgenus *Neotrichosiphon* almost straight, in *Metatrichosiphon* s.s. curved. Hind tibiae in both alatae and apterae curved outwards, with stridulatory apparatus which look like a series of transverse cuts in dorsal view and as ridges directed upwards in lateral view. Ventrally the thorax may show small groups of spinules.

III. Abdomen. Abdominal tergum in apterae mostly sclerotic, pale to dark brown, usually spinulose, but sometimes smooth, with a great many long, usually stiff hairs with branched, furcated, or acuminate apices, but sometimes these hairs may be wavy with normal apices; shorter hairs either with normal or slightly furcated apices; in alatae dorsal hairs always with normal acute apices. Abdomen ventrally spinulose, more densely so laterally. Siphunculi variable in shape and length, in apterae usually more or less curved outwards, sometimes also inwards, narrowing to the base and more so gradually to the apex, in alatae more or less cylindrical on basal half and at apex rather suddenly attenuated and slightly curved outwards, covered with long hairs of always more or less uniform type and with normal acute apices; siphunculi in apterae always without a trace of reticulation, in alatae of the subgenus *Neotrichosiphon* indistinctly reticulated but in *Metatrichosiphon* s.s. also the alatae without reticulation on the siphunculi; spinules present from base to apex in apterae and alatae or rarely only at the very apices. Cauda without a median stylus-like process.

F. TAXONOMY OF SUBGENERA AND SPECIES.

I. KEY TO THE SUBGENERA.

- 1 (2) Radial sector almost straight. Antennal hairs very numerous and pointing in all directions, all of about the same length . . . *Neotrichosiphon* nov. subgen.
 2 (1) Radial sector curved. Antennal hairs mainly directed inwards, and those few which are directed outwards much shorter than those directed inwards. . . .
Metatrichosiphon s.s.

II. KEY TO THE SPECIES.

(a) Apterous viviparous females.

- 1 (2) Abdominal dorsum smooth. Dorsal hairs very long, wavy, with acute apices, up to nearly 6 (5.8) times as long as basal diameter of IIIrd antennal segment
nitakaensis (Tak.).
- 2 (1) Abdominal dorsum locally spinulose. Dorsal hairs rather short, thick and stiff, mostly with furcated apices, nearly 3 to at most $3\frac{1}{2}$ (2.9 to 3.4) times as long as basal diameter of IIIrd antennal segment.
- 3 (4) Tergum dark brown, with a more or less extensive pale median area from the head up to about the 3rd abdominal segment and also with pale last 3 abdominal segments. 7th abdominal tergite with two lateral and two spinal hairs only. .
nigrofasciatus (Maki).
- 4 (3) Tergum more or less uniformly pale brownish. 7th abdominal tergite with many long and short hairs.
taiwanus (Tak.).

(b) Alate viviparous females.

- 1 (2) Antennal hairs long, between 7 to 8 times as long as basal diameter of IIIrd antennal segment. Antennal segment III with 5 to 10 circular to transversely oval rhinaria
nigrofasciatus (Maki).
- 2 (1) Antennal hairs rather short, between $4\frac{1}{2}$ to at most 6 (4.7 to 6.1) times as long as basal diameter of IIIrd antennal segment. Antennal segment III always with more than 10 rhinaria.
- 3 (4) Hind tibiae with about 80 ridges (stridulatory apparatus). Siphunculi about 14.4 times as long as their maximum width. Longest hair on the siphunculi about $3\frac{1}{2}$ times as long as diameter of the siphunculi near the base *nitakaensis* (Tak.).
- 4 (3) Hind tibiae with about 30 ridges (stridulatory apparatus). Siphunculi about 16.4 times as long as their maximum width. Longest hair on the siphunculi nearly twice (1.9) as long as diameter of the siphunculi near the base *taiwanus* (Tak.).

Metatrichosiphon nigrofasciatus (Maki, 1916)

1916. Maki, M., Coll. Essays for Nawa, Gifu, p. 16, *Trichosiphum nigrofasciatum*.
1918. —, Formosan Agric. Rev. (in Japanese), no. 138, p. 342, *Trichosiphum nigrofasciatum*.
1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 65, *Greenidea nigrofasciata*.
1925. —, Aph. of Formosa, pt. 4, p. 29, *Greenidea nigrofasciata*.
1930. —, Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 322, *Greenidea nigrofasciata*.
1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum nigrofasciatum*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.44 to 1.67 mm long, with as maximum width about 0.85 to 0.90 mm. Tergum dark brown, with a more or less extensive median area from the head up to about the 3rd abdominal segment and also the last 3 abdominal segments pale, locally spinulose on thorax and abdomen. Thick and stiff, long and short, dorsal hairs occur intermingled, long hairs mostly with furcated or branched apices, a few with acuminate apices; longest hair on the anterior abdominal tergites

about 3.3 to 3.4 times as long as basal diameter of IIIrd antennal segment; short hairs with similar apices, up to about 1.1 to 1.8 times as long as the mentioned diameter; two long spinal hairs with acuminate apices on the 7th tergite up to about 3.3 to 3.4 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two much thinner and finer hairs with normal apices, up to about 2.3 to 2.6 times as long as the mentioned diameter. Front flat. Antennae pale, with darker basal segments and apices, about 0.72 times as long as body; outer side of segment III smooth almost to the apex, inner side gradually more distinctly imbricated, rest of the flagellum distinctly imbricated; processus terminalis about 1.5 times as long as base of VIth segment, about 0.61 times as long as segment III; large hairs similar to those on the dorsum but with acuminate, furcated or branched apices; longest hair on segment III about 3.1 to 3.3 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 slender and acute, about 1.8 times as long as 2nd joint of hind tarsi; segment 4 about 3.9 times as long as segment 5, with about 11 rather short and fine hairs. Siphunculi blackish brown, hardly curved outwards near apex, about 0.35 times as long as body, without a trace of reticulation, about 5.7 to 7.1 times as long as their maximum width, at base about 2.5 times as thick as the middle of the hind tibiae, at the middle about 2.6 to 3.1 times as thick as the middle of the hind tibiae, and at apex about 1.6 to 1.7 times as thick as the middle of the hind tibiae; long hairs on the siphunculi mostly with acute apices, a few with acuminate apices; sometimes a very few shorter hairs present near the bases with acuminate apices; longest hair about 1.9 to 2.1 times as long as basal diameter of the siphunculi; spinules present from base to apex, near the apex in distinct transverse rows, basal less numerous. Cauda semicircular, with about 9 long and fine hairs. Legs pale brownish; femora with a number of spinulose transverse striae on ventral side; fore tibiae smooth, middle ones very lightly imbricated on distal half; hind tibiae curved outwards, with stridulatory apparatus with about 30 ridges which extend over basal $\frac{2}{3}$ parts, apex faintly imbricated; the 4 apical thorns not very different from normal hairs.

Measurements of one specimen in mm (collected in Formosa, on 22.9.1932, from an unknown host): length of body: 1.44; width: 0.85; ant.: 1.11; siph.: 0.54; ant. segments: III; IV; V; VI = 0.34; 0.14; 0.17; (0.14 + 0.21).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated pear-shaped, about 1.42 to 1.96 mm long, with as maximum width

0.59 to 0.88 mm. Abdominal tergum mostly sclerotised, pale, with a broad rather dark brown transverse band from 3rd to 5th segment, quite smooth. Large dorsal hairs with acute apices; longest hair on the anterior tergites of abdomen about 2.3 to 3 times as long as basal diameter of IIIrd antennal segment; each of the 7th and 8th abdominal tergites with two long hairs with acute apices, up to about 2.1 to 3 times and 3.3 to 4.3 times as long as the mentioned diameter, respectively. Front wavy with moderately developed frontal tubercles. Antennae blackish, with darker basal segments, about 0.80 to 0.94 times as long as body; flagellum only imbricated from segment V apicad, about 0.38 to 0.43 times as long as segment III; segment III with 5 to 10 transversely oval rhinaria widely spaced and arranged in one row, over its basal $\frac{5}{6}$ part; large hairs similar to those on the dorsum but longer and finer; longest hair on segment III about 7.1 to 8 times as long as basal diameter of the segment. Apex of rostrum reaching the hind coxae; segments 4 + 5 about 1.3 to 1.7 times as long as 2nd joint of hind tarsi; segment 4 about 3 to 3.8 times as long as segment 5. Siphunculi blackish brown, thick, more or less cylindrical, about 0.49 to 0.62 times as long as body, very indistinctly imbricated, about 11.7 to 13.5 times as long as their maximum width, near base about 1.3 to 2.6 times as thick as the middle of the hind tibiae, at the middle about 2.3 to 2.8 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous and all with acute apices; longest hair about 3 to 4.1 times as long as diameter of the siphunculi near their base; spinules present almost only at the apices. Cauda semicircular, with about 4 long and fine hairs. Femora pale, with darker apices, hardly imbricated; tibiae slightly darker than femora, with darker bases, smooth excepting the slightly imbricated apices; apices with 4 rather long spines ventrally. Pterostigma blackish brown, extending up to about $\frac{1}{3}$ the radial sector.

Measurements of one specimen in mm (collected in Formosa, on 22.9.1932, from an unknown host): length of body: 1.68; width: 0.63; ant.: 1.43; siph.: 0.90; ant. segments: III; IV; V; VI = 0.52; 0.22; 0.22; (0.14 + 0.22).

Host plants. *Quercus formosana*, *Q. serrata*, *Q. variabilis*, *Q. glauca*, and *Castanopsis* spec.

Distribution. Formosa, East China.

Biology. Not known.

Available material. 4 apterae and 5 alatae; from the collections of the British Museum (Nat. Hist.), London, identified by R. Takahashi; of Mr. D. Hille Ris Lambers, probably identified by C. C. Tao.

Note. The most conspicuous character of the apterae is in the pigmentation

of the dorsum as mentioned in the description. Such ornamentation is not known in other species of the genus. Alatae similarly can be recognised by the broad dark brown band across the abdomen from which the name of the species is derived.

Type. Perhaps in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Metatrichosiphon niitakaensis (Takahashi, 1937)

1937. Takahashi, R., Philipp. Jour. Sci., vol. 63, no. 1, p. 5, *Paratrichosiphum niitakaense*.

Apterous viviparous female.

Morphological characters. Body elongate, 2.73 mm long, with as maximum width 1.26 mm. Tergum pale, smooth. Large dorsal hairs wavy, with finely drawn out acute apices; longest hair on the anterior abdominal tergites about 5.8 times as long as basal diameter of IIIrd antennal segment; a few shorter hairs with similar apices on the anterior part of the abdomen; shortest hair about as long as the mentioned diameter; 7th tergite with two long hairs with acute apices up to about 3.9 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs with similar apices up to about 2.8 times as long as the mentioned diameter. Antennae pale, probably with darker apices, about 0.63 times as long as body; flagellum imbricated from base to apex; processus terminalis about 1.2 times as long as base of VIth segment, about 0.39 times as long as segment III; large hairs similar to those on the dorsum; longest hair on segment III about 5.6 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum slender and acute, about 1.5 times as long as 2nd joint of hind tarsi; segment 4 about 4.3 times as long as segment 5, with about 10 short and fine hairs. Siphunculi elongated spindle-shaped, about 0.46 times as long as body, with largest width just past the middle, about 7.4 times as long as their maximum width, at base about twice as thick as the middle of the hind tibiae, at the middle about 3.5 times as thick as the middle of the hind tibiae, and at apex about 1.4 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, with normal apices; longest hair about $2\frac{1}{2}$ times as long as basal diameter of the siphunculi; spinules in distinct transverse rows near the apex, basal more scattered. Cauda obtusely conical, with about 8 rather short and fine hairs. Legs pale yellowish; femora with spinulose transverse striae on one side; fore and middle tibiae smooth; hind tibiae with stridulatory apparatus with about 80 ridges up to near the apex, the latter imbricated.

Measurements of one specimen in mm (collected in Formosa, on 6.8.1939,

from *Quercus*): length of body: 2.73; width: 1.26; ant.: 1.74; siph.: 1.28; ant. segments: III; IV; V; VI = 0.68; 0.17; 0.24; (0.22 + 0.27).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated. Abdominal tergum mostly sclerotised, brown. Dorsum smooth. Longest dorsal hair on the anterior tergites of abdomen about 3.6 times as long as basal diameter of IIIrd antennal segment. Antennae brown, with darker basal segments; flagellum imbricated from distal half of segment III; segment III with 24 to 26 large strongly transversely oval, exceptionally round rhinaria in a row, over the entire length of the segment; large hairs similar to those on the dorsum but much longer and sometimes with bluntish apices; longest hair on segment III about 6.1 times as long as basal diameter of the segment. Segments 4 + 5 of rostrum slender and acute, about 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.6 times as long as segment 5. Siphunculi dark brown, slightly curved outwards, without a trace of reticulation but dispersally imbricated, about 14.4 times as long as their maximum width, at the middle about 2.9 times as thick as the middle of the hind tibiae; longest hair about 3.5 times as long as diameter of the siphunculi near their base; spinules in transverse rows near the apex, basad these become scattered and very small. Cauda transversely semioval. Femora mottled brown, apical darker, with faint spinulose striae on one side; tibiae darker than the femora, fore and middle ones smooth; hind tibiae with stridulatory apparatus with about 80 ridges. Wing veins rather pale; pterostigma extending well over $\frac{1}{3}$ the radial sector, the latter strongly curved.

Measurements of one specimen in mm (collected in Formosa, on 6.8.1939, from *Quercus*): length of body: ?; width: ?; ant.: ?; siph.: 1.57; ant. segments: III; IV; V; VI = 0.88; 0.25; 0.29; (0.21 + ?).

Host plants. Fagaceae (various species).

Distribution. Formosa (alt. 1980 m).

Biology. Not known.

Available material. 1 aptera and 1 alate; from the collections of Mr. D. Hille Ris Lambers.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

***Metatrichosiphon taiwanus* (Takahashi, 1921)**

1921. Takahashi, R., Aph. of Formosa, pt. 1, p. 67, *Greenidea taiwana*.

1925. —, Aph. of Formosa, pt. 4, p. 29, *Greenidea taiwana*.

1931. —, Aph. of Formosa, pt. 6, p. 32, *Paratrichosiphum taiwanum*.

Apterous viviparous female.

Morphological characters. Body broadly pear-shaped, about 1.82 to 2.02 mm long, with as maximum width near the siphunculi about 1.1 to 1.17 mm. Tergum sclerotised, pale brownish, slightly darker caudad, very faintly locally spinulose. Large dorsal hairs thick and stiff, with furcated, branched or acuminate apices; longest hair on the anterior abdominal tergites about 2.9 times as long as basal diameter of IIIrd antennal segment; short hairs with similar apices present; shortest hair about 0.7 to 0.9 times as long as the mentioned diameter; 7th tergite, besides others, with two long hairs with normal, acuminate or furcated apices, up to about 2.6 to 2.9 times as long as basal diameter of IIIrd antennal segment; 8th tergite with only two hairs with acute apices, up to about 2.4 times as long as the mentioned diameter. Front with hardly developed frontal tubercles. Antennae pale brownish, dark brown near the primary rhinaria and with darker processus terminalis, about 0.63 to 0.67 times as long as body; segment III only on outer side imbricated up to about basal $\frac{1}{3}$ part, rest of the flagellum distinctly imbricated; processus terminalis about 1.3 to 1.5 times as long as base of VIth segment, about 0.42 to 0.46 times as long as segment III; large hairs similar to those on the dorsum but much longer and with normal or faintly bluntish apices; longest hair on segment III about 3.3 to 3.6 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segments 4 + 5 slender and acute, about 1.8 to 1.9 times as long as 2nd joint of hind tarsi; segment 4 about 4.5 to 5 times as long as segment 5, with about 12 to 14 rather short and fine hairs. Siphunculi pale brown, near distal $\frac{1}{3}$ to $\frac{1}{4}$ part rather suddenly dark, about 0.49 to 0.52 times as long as body, curved outwards near the apex, without a trace of reticulation, about 7.2 times as long as their maximum width, at base about 2.8 to 3.1 times as thick as the middle of the hind tibiae, at the middle about 3.1 to 3.4 times as thick as the middle of the hind tibiae, and at apex about 1.1 to 1.8 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long, with finely drawn out apices; longest hair about 1.3 to 1.5 times as long as basal diameter of siphunculi; spinules present in distinct transverse rows near the apex, basad more scattered, till they are nearly absent on a short area past the middle, and then again increasing in number further basad. Cauda transversely semioval, with about 7 to 9 long and fine hairs. Femora pale brownish, with spinulose striae on ventral side; tibiae rather short and thick, slightly darker than the femora, the fore and middle ones smooth, hind tibiae with stridulatory apparatus with about 30 ridges.

Measurements of one specimen in mm (collected in Formosa, on 20.6.1920,

from *Meliosoma rhoifolia*): length of body: 1.87; width: 1.1; ant.: 1.24; siph.: 0.97; ant. segments: III; IV; V; VI = 0.47; 0.15; 0.16; (0.14 + 0.19).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, about 2.35 to 2.53 mm long, with as maximum width 0.77 to 0.86 mm. Abdominal tergum mostly sclerotised, blackish brown. Dorsum smooth. Dorsal hairs on abdomen with normal fine apices; longest hair on the anterior abdominal tergites about 4.4 times as long as basal diameter of IIIrd antennal segment; shortest hair about 1.7 times as long as the mentioned diameter; 7th tergite with two hairs, up to about 2.6 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two hairs on a ridge, up to about 3.7 times as long as the mentioned diameter. Front with poorly developed frontal tubercles. Antennae blackish, with the very apex of segment III and basal $\frac{1}{2}$ to $\frac{2}{3}$ of segments IV and V conspicuously paler; flagellum gradually more distinctly imbricated from the middle of segment III to apex; segment III with 20 to 21 very small to rather large circular to mostly transversely oval rhinaria in a row, over the entire length of the segment; large hairs similar to those on the dorsum but slightly longer, and with normal or bluntish apices; longest hair on segment III about 4.7 times as long as basal diameter of the segment. Apex of rostrum reaching the hind coxae. Siphunculi blackish brown, with slightly paler apex, about 0.81 times as long as body, slightly curved outwards at apex, without a trace of reticulation, about 16.4 times as long as their maximum width; longest hair about 1.9 times as long as diameter of the siphunculi near their base; spinules in transverse rows near the apex; these, though very scattered, also present near the base where, moreover, serrated imbrications are found. Cauda obtusely conical. Femora pale brownish, with darker apices, with a number of spinules on one side; tibiae slightly darker than femora, fore and middle ones smooth; hind tibiae with stridulatory apparatus, with about 30 ridges. Sector radii moderately curved; pterostigma dark, extending up to about $\frac{1}{4}$ the radial sector; subcosta conspicuously dark.

Measurements of one specimen in mm (collected in Formosa, on 20.6.1920, from *Meliosoma rhoifolia*): length of body: 2.35; width: 0.86; ant.: ?; siph.: ?; ant. segments: III; IV; V; VI = 0.73; 0.17; 0.23; (?).

Host plants. *Meliosoma rhoifolia*, *M. rigida*.

Distribution. Formosa.

Biology. Not known.

Available material. 3 apterae and 2 alatae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Note. The apterae of this species differ from those of *niitakaensis* by shorter, thicker dorsal hairs on abdomen, mostly with furcated apices, and by the shape of the siphunculi. Alatae differ in having shorter and thicker antennal hairs.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa; a slide labelled "type", probably a paratype or cotype, in the collections of Mr. Hille Ris Lambers.

Metatrichosiphon (Neotrichosiphon) tenuicorpus (Okajima, 1908)

(text-fig. 4, p. 89)

1908. Okajima, G., Bull. Coll. Agric. Tokyo Imp. Univ., vol. 8, pt. 1, p. 22, *Trichosiphum tenuicorpus*.
 1919. Takahashi, R., Proc. Ent. Soc. Wash., vol. 21, no. 7, p. 174, *Trichosiphum tenuicorpus*.
 1924. —, Aph. of Formosa, pt. 3, p. 55, *Greenidea tenuicorpus*.
 1925. —, Aph. of Formosa, pt. 4, p. 29, *Greenidea tenuicorpus*.
 1930. —, Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 325, *Greenidea tenuicorpus*.
 1931. —, Aph. of Formosa, pt. 6, p. 32, *Paratrichosiphum tenuicorpus*.
 1940. —, Philipp. Jour. Sci., vol. 72, no. 4, p. 386, *Paratrichosiphum tenuicorpus*.

Apterous viviparous female.

Morphological characters. Body elongated (shrunken), about 1.88 mm long, with as maximum width about 0.79 to 0.84 mm. Tergum sclerotised, pale brownish yellow, smooth. Abdomen ventrally with two large fields of irregularly arranged spinules or nodules which leave a median area free. Large dorsal hairs on abdomen thick with finely drawn out apices; longest hair on the anterior abdominal tergites about 3.7 to 4.7 times as long as basal diameter of IIIrd antennal segment; (hairs on 7th and 8th abdominal tergites not clearly visible). Antennae coloured like the body, with the flagellum darker towards the apex, about 1.03 to 1.2 times as long as body; segment III on the outer side spinulose, more distad this spinulosity passes into spinulose imbrications, but only on the outer side, inner side of the flagellum almost smooth unto the Vth antennal segment; processus terminalis about 1.6 to 1.7 times as long as base of VIth segment, about 0.33 to 0.35 times as long as segment III; antennal hairs very long and fine, equally numerous on all sides; longest hair on segment III about 4.7 to 5.8 times as long as basal diameter of the segment. Apex of rostrum reaching almost the middle of the body; segments 4 + 5 slender and acute, about twice as long as 2nd joint of hind tarsi; segment 4 about 5.3 times as long as

segment 5, with about 16 long and fine hairs. Siphunculi brownish black, with paler basal half, about 0.79 to 0.83 times as long as body, articulated with abdomen, curved outwards, very faintly imbricated on their distal halves; hairs on the siphunculi numerous with acute apices; rather long

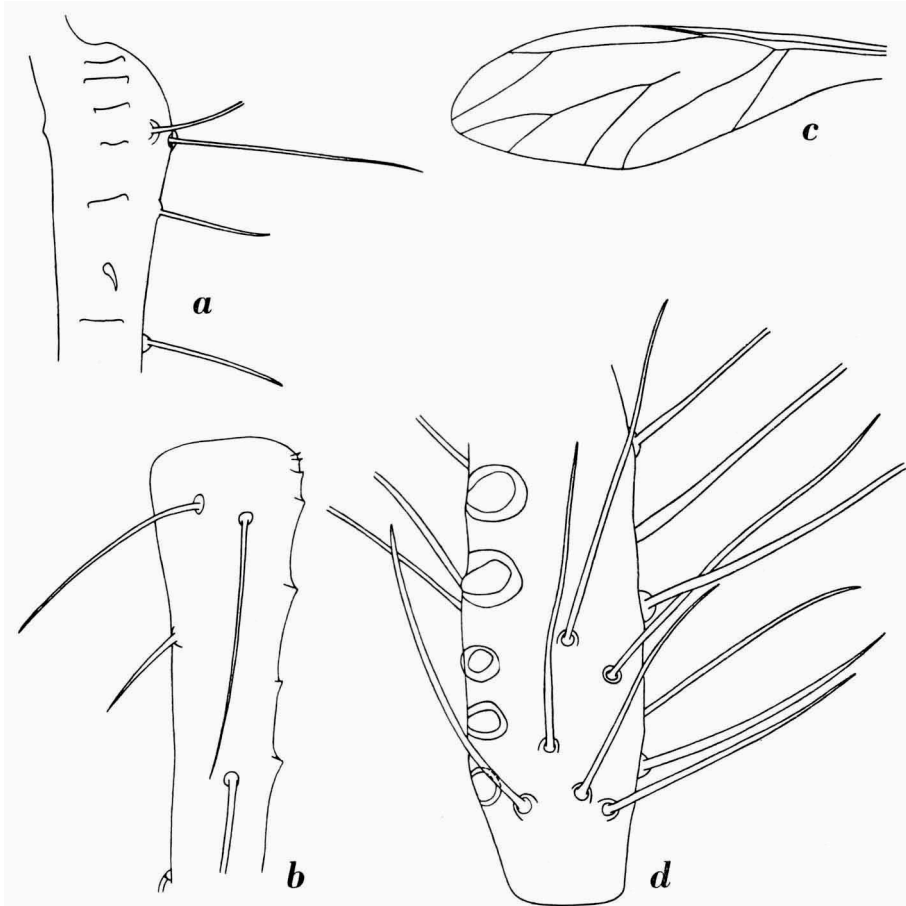


Fig. 4. *Metatrichosiphon* (*Neotrichosiphon*) *tenuicorpus* (Okajima). *a*, basal portion of hind tibia, showing stridulatory apparatus as transverse ridges in dorsal view, *b*, basal portion of hind tibia, showing stridulatory apparatus in lateral view; *c*, fore wing, showing a more or less straight radial sector; *d*, basal portion of ant. segment III, showing distribution of antennal hairs. *a*, *b*, *d*, $\times 26$; *c*, $\times 22$.

spinules densest near the apex, near base very few and small spinules present. (Siphunculi in these specimens depressed). Cauda without a median process. Femora pale brownish yellow, dorsally smooth, ventro-laterally with spinules; tibiae darker than femora, the fore and middle ones almost smooth

with the very apices faintly imbricated; hind tibiae with stridulatory apparatus with about 17 ridges; spinules also present, on the fore tibiae up to about distal $\frac{3}{4}$ part, on the middle tibiae up to about distal $\frac{5}{6}$ part, and on the hind tibiae up to about distal $\frac{3}{4}$ part; apices of the tibiae provided with 4 thorns which are not very different from normal hairs.

Measurements of one specimen in mm (collected in Bogor, Java, on 12.12.1931, from *Quercus fagiformis*): length of body: 2.35; width: 0.84; ant.: 2.44; siph.: 1.94; ant. segments: III; IV; V; VI = 1.10; 0.26; 0.30; (0.22 + 0.38).

Alate viviparous female.

Morphological characters. Differs from apterae as follows: — Body very elongated, about 2.96 to 3.56 mm long, with as maximum width 0.98 to 1.16 mm. Tergum sclerotised, brownish. Head and thorax dark. Large dorsal hairs blackish, thick and stiff, with acute apices; longest hair on the anterior abdominal tergites about 2.4 to 2.9 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite on its posterior border with two long and stiff hairs with acute apices, up to about 1.6 to 2.1 times as long as basal diameter of IIIrd antennal segment; two hairs on the 8th tergite also with acute apices, also long and stiff, about 1.5 to 1.7 times as long as the mentioned diameter. Front flat. Antennae blackish, with basal segments slightly more transparent and the very base of the IIIrd segment paler, about 0.80 to 0.99 times as long as body; flagellum imbricated only from IVth segment onwards; processus terminalis about 1.4 times as long as base of VIth segment, about 0.28 to 0.29 times as long as segment III; segment III with 18 to 25 nearly round rhinaria arranged in a row, over almost its entire length; antennal hairs exceedingly numerous, black with pale apices, rather evenly spread in all directions, on segment III up to about 3.9 to 5 times as long as basal diameter of the segment. Apex of rostrum long and acute, hardly reaching the base of the hind coxae; segments 4 + 5 about 1.7 to 1.9 times as long as 2nd joint of hind coxae; segment 4 with about 12 long and fine hairs. Siphunculi jet black excepting the slightly paler tips, about 0.95 to 1.01 times as long as body, curved outwards, articulated with the abdomen, very indistinctly reticulated, the reticulations extending from base to apex excepting the apical $\frac{1}{8}$ part, about 15 to 16.7 times as long as their maximum width, near base about 3.3 to 4 times as thick as the middle of the hind tibiae, at the middle about 2.6 to 3.9 times as thick as the middle of the hind tibiae, and at apex about 1.8 to 2.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices; longest hair about 1.5 to 1.6

times as long as diameter of the siphunculi near their base; long spinules present in distinct transverse rows on the apical $\frac{1}{8}$ portion, below which they are almost absent. Cauda obtusely conical, with about 6 to 8 rather long and fine hairs. Femora unevenly yellowish brown, with darker apices, very indistinctly superficially imbricated on one side, and on the other side dorsally and ventrally spinulose on distal $\frac{3}{5}$ of the fore femora, on distal $\frac{2}{3}$ of the middle femora, and only ventrally on distal $\frac{1}{3}$ part of the hind femora; hind tibiae at least along one of their sides more distinctly imbricated than the fore and the middle ones, which are superficially imbricated; the 4 apical thorns on the tibiae hardly different from other hairs near the apex; hind tibiae with stridulatory apparatus with about 15 ridges.

Measurements of one specimen in mm (collected in Suisha, Formosa, on 2.10.1929, from *Castanopsis* spec.): length of body: 3.22; width: 1.10; ant.: 2.58; siph.: 3.36; ant. segments: III; IV; V; VI = 1.18; 0.32; 0.33; (0.24 + 0.33).

Host plants. *Quercus cuspidata*, *Q. fagiformis*, *Castanopsis formosana*, *C. subacuminata*, and a few unidentified species of *Quercus* and *Castanopsis*.

Distribution. Java, Formosa, Japan.

Biology. This species attacks the young shoots of the host plants. Sexual reproduction is possible as oviparous females are known to occur.

Available material. Rather extensive material of alatae and 2 apterae; from the collections of Mr. D. Hille Ris Lambers, identified by R. Takahashi; of the Entomological Laboratory, Wageningen (unidentified).

Note. It is very easy to recognise the species, particularly the alatae, by their chaetotaxy, the stridulatory apparatus, and the venation of the wings with its almost straight radial sector. Apteræ are surprisingly different by their pale colour and one could easily be mistaken to consider them different species. But their chaetotaxy is as in the alatae, and also the stridulatory apparatus is the same. It was not known until now that the species occurred outside China and Japan. Fransen in 1931 collected the species in Java from *Quercus fagiformis*, as appears from the collections of the Entomological Laboratory, Wageningen.

Type. Location of types unknown.

Genus **Paratrichosiphum** Takahashi, 1931

A. HISTORY.

This genus was erected by Takahashi in 1931 for six species, with *Greenidea tattakana* Tak., 1925, as *typus generis*. From his key to the

species it is evident that the genus is very heterogeneous. In the present paper Takahashi's species are distributed over several genera. Within the group of species the following groups can be recognised: — species, in all adult forms, with a stridulatory apparatus on the hind tibiae, hairs on the antennae either of uniform lengths or of two types, and siphunculi covered with hairs of two different lengths. Besides there are species without stridulatory apparatus and to the later category the genotype of *Paratrichosiphum* belongs. Species with stridulatory apparatus are removed to the genus *Metatrichosiphon* nov. gen., and species with siphuncular hairs of very different lengths to the genus *Holotrichosiphon* nov. gen. At present this genus besides the genotype comprises one more species, i.e., *Paratrichosiphum javanicum* nov. spec.

B. SYNONYMY.

1925. Takahashi, R., Aph. of Formosa, pt. 4, p. 30, *Greenidea* Schout. partim.
 1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum*, typus generis *Greenidea tattakana* Tak., 1925.
 1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum* Tak. partim.

C. GENERAL BIOLOGY.

The known species are restricted to plants belonging to the Fagaceae. One oviparous female, a stray on Tomato (*Solanum lycopersicum*) I refer to this genus, so that apparently bisexual reproduction occurs.

D. GEOGRAPHICAL DISTRIBUTION.

The species are recorded only from Central India, Java, and Formosa.

E. GENERAL MORPHOLOGY.

I. Head. Antennae of six segments; long antennal hairs mostly directed inwards, those directed outwards shorter. Rostrum distinctly of five segments.

II. Thorax. Dorsally smooth, but ventrally locally spinulose. Wings in alatae normal, with the media in the fore wings twice branched, sector radii more or less curved; hind wings with two obliques; pterostigma extending up to $\frac{2}{5}$ the radial sector. The 4 apical spines on the tibiae rather long and not very different from normal hairs. Hind tibiae more or less straight, without stridulatory apparatus. 1st tarsal joints with 7 hairs.

III. Abdomen. Abdominal tergum sclerotised, in apterae pale to dirty yellowish, smooth or somewhat wrinkled, in alatae with many coalescing striae. Dorsal hairs either uniform or of varied lengths; long hairs in apterae may have normal or furcated apices, short ones subacute apices; in alatae, however, long hairs always with normal apices. Ventral spinules

in apterae rather evenly distributed, in alatae on the anterior sternites and laterally also on sternites more caudad. Siphunculi rather variable in shape and length, in apterae more or less curved outwards, narrowing to the base and more so to the apex; in alatae these are more or less cylindrical, slightly curved outwards at the very apex; in apterae there is no trace of reticulation, in alatae reticulation is present nearly over the entire length; in both apterae and alatae the siphuncular hairs are more or less of uniform length, with acute apices; in apterae spinules present over the entire length, in alatae spinulosity much reduced, present only near the very apex. Cauda without a median stylus-like process.

F. TAXONOMY OF THE SPECIES.

KEY TO THE APTEROUS VIVIPAROUS FEMALES.

- 1 (2) Abdominal dorsum quite smooth. Dorsal hairs on the anterior abdominal tergites long, probably all with finely drawn out acute apices, up to about 5 to 6 times as long as basal diameter of IIIrd antennal segment
javanicum nov. spec.
- 2 (1) Abdominal dorsum somewhat wrinkled. Dorsal hairs on the anterior abdominal tergites shorter, with branched or multifid apices, up to about 3 to nearly 4 times (3 to 3.8) as long as basal diameter of IIIrd antennal segment.
tattakanum (Tak.).

***Paratrichosiphum javanicum* nov. spec.**

Apterous viviparous female.

Morphological characters. Body elongated, very narrow up to metanotum, about 1.86 to 2.22 mm long, with as maximum width 0.78 to 0.90 mm. Tergum pale, quite smooth. Dorsal hairs thick and very long, and probably all with finely drawn out, acute apices; longest hair on the anterior abdominal tergites about 5.2 to 6 times as long as basal diameter of IIIrd antennal segment; 7th abdominal tergite with two long hairs up to about 5 to 5.6 times as long as basal diameter of IIIrd antennal segment; 8th tergite with two much shorter hairs, about 2.9 to 3.6 times as long as the mentioned diameter. Front strongly convex in the middle with moderately developed frontal tubercles. Antennae 6- or sometimes 5-segmented, pale, apicad darker, about 0.61 to 0.73 times as long as body; flagellum distinctly slightly imbricated from base to apex; processus terminalis about 1.5 to 1.8 times as long as base of last segment, about 0.41 to 0.50 times as long as segment III in 6-segmented antennae, and 0.37 to 0.45 times as long as segment III in 5-segmented antennae; large hairs similar to those on the dorsum, mainly directed inwards and on segment III up to about 5.1 to 6 times as long as basal diameter of the segment. Apex of rostrum reaching almost the middle

of the body; segments 4 + 5 slender and acute, about 1.8 to 2 times as long as 2nd joint of hind tarsi; segment 4 about 5 to 5.2 times as long as segment 5, with about 8 to 12 rather short and fine hairs. Siphunculi pale, elongated spindle-shaped, without reticulation, 0.37 to 0.41 times as long as body, about 7.5 to 8.6 times as long as their maximum width, at base about 1.6 to 2 times as thick as the middle of the hind tibiae, at the middle about 2.9 to 3.1 times as thick as the middle of the hind tibiae, and at apex about 1 to 1.3 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, long and with finely drawn out apices; longest hair about 2.8 to 3.6 times as long as basal diameter of the siphunculi; probably spinules in transverse rows densest near the apex. Cauda transversely semioval, without a median process, with about 8 long and fine hairs. Legs pale; femora smooth; tibiae smooth, probably with very apices very faintly imbricated.

Measurements of one specimen with 5-segmented antennae in mm (collected in Dieng Mts., Java, on 20.9.1916, from *Castanopsis*): length of body: 1.86; width: 0.88; ant.: 1.37; siph.: 0.76; ant. segments: III; IV; V; VI = 0.58; 0.13; 0.16; (0.14 + 0.24).

Measurements of one specimen with 5-segmented antennae in mm (collecting data as in the preceding specimen): length of body: 2.00; width: 0.90; ant.: 1.38; siph.: 0.80; ant. segments: III; IV; V = 0.65; 0.19; (0.16 + 0.24).

Host plant. *Castanopsis* spec.

Distribution. Java.

Biology. Not known.

Available material. Extensive material of apterae; from the collections of the Entomological Laboratory, Wageningen, and the collections of Mr. Hille Ris Lambers.

Note. This new species differs from *tattakanum* Tak. by its elongated, rather slender body, and perhaps also by its paleness. Other differences are mentioned in the key.

Type. Cotypes in the collections of the Entomological Laboratory, Wageningen, and in the collections of Mr. D. Hille Ris Lambers.

***Paratrichosiphum tattakanum* (Takahashi, 1925)**

1925. Takahashi, R., Aph. of Formosa, pt. 4, p. 30, *Greenidea tattakana*.

1931. —, Aph. of Formosa, pt. 6, p. 31, *Paratrichosiphum tattakanum*.

1934. Mordvilko, A. K., Archiv f. Naturg., vol. 3, pt. 1, p. 9, 45, *Paratrichosiphum tattakanum*.

1940. Takahashi, R., Philipp. Jour. Sci., vol. 72, no. 4, p. 386, *Paratrichosiphum tattakanum*.

Apterous viviparous female.

Morphological characters. Body pear-shaped, about 1.88 to 2.14 mm long, with as maximum width 0.94 to 1.10 mm. Tergum sclerotised. Abdomen dorsally only somewhat wrinkled but ventrally evenly covered with spinules. Dorsal hairs numerous and of various lengths; large dorsal hairs rather thick and stiff, on the anterior tergites of the abdomen about 3 to 3.8 times as long as basal diameter of IIIrd antennal segment; short dorsal hairs with subacute apices also occur; the shortest hair about 0.8 to 1.3 times as long as the mentioned diameter; the two hairs on 7th abdominal tergite with branched or acute apices up to about 2.4 to 2.9 times as long as basal diameter of IIIrd antennal segment; the two hairs with acute apices on 8th tergite up to about 2.9 to 3.3 times as long as the mentioned diameter. Front with a flat median processus. Antennae about 0.50 to 0.55 times as long as body; flagellum gradually more distinctly imbricated from base to apex; processus terminalis about 1.4 to 1.7 times as long as base of VIth segment, about 0.63 to 0.75 times as long as segment III; large hairs similar to those on the dorsum, but thinner and mostly with normal apices; longest hair on segment III about 2.4 to 3.1 times as long as basal diameter of the segment. Apex of rostrum reaching the middle of the body; segment 4 + 5 very slender and acute, about 2.2 to 2.8 times as long as 2nd joint of hind tarsi; segment 4 about 6 times as long as segment 5, with about 10 to 14 fine and rather long hairs. Siphunculi curved outwards, about 0.27 to 0.33 times as long as body, faintly imbricated near the base, without a trace of reticulation, about 7 times as long as their maximum width, at base about 1.9 to 2.1 times as thick as the middle of the hind tibiae, at the middle about 2.5 to 3.1 times as thick as the middle of the hind tibiae, and at apex about 1.4 to 1.6 times as thick as the middle of the hind tibiae; hairs on the siphunculi numerous, all with acute apices; longest hair about 1.7 to 2.7 times as long as basal diameter of siphunculi; acute spinules present, in distinct transverse rows on about apical $\frac{2}{5}$ part and more dispersed over the rest of the surface. Cauda semicircular, with 8 to 12 long and fine hairs. Femora rather dispersally and superficially imbricated on apical half; tibiae only at their very apices imbricated like the femora; apices of the tibiae with 4 rather long thorns ventrally.

Measurements of one specimen in mm (collected in Formosa, on 22.8.1936, from an unknown host): length of body: 1.96; width: 0.97; ant.: 1.1; siph.: 0.62; ant. segments: III; IV; V; VI = 0.32; 0.14; 0.16; (0.14 + 0.22).

Alate viviparous female.

Morphological characters. Differs from the apterae as follows: — Body elongated, 2.18 mm long, with as maximum width 0.88 mm. Abdominal tergum locally sclerotised, brown, without spinules but with many coalescing striae. Large dorsal hairs long and fine; longest hair on the anterior abdominal tergites about 2.8 times as long as basal diameter of IIIrd antennal segment; the two long hairs on 7th and 8th abdominal tergites up to about 3.2 and 4.5 times as long as the mentioned diameter, respectively. Antennae coloured like the head, about 0.79 times as long as body; processus terminalis about 0.54 times as long as segment III; segment III with 10 to 11 slightly transversely oval rhinaria in one row, over the entire length of the segment; longest hair on segment III about 4 times as long as basal diameter of the segment. Siphunculi coloured like the mesothorax, more or less cylindrical, slightly curved outwards near the apices and about 0.42 times as long as body, distinctly reticulated throughout their entire length, about 11.5 times as long as their maximum width, at apex about twice as thick as the middle of the hind tibiae; acute spinules in distinct transverse rows only present near the apices, with a few scattered ones more basad. Legs coloured like the head. Pterostigma extending up to $\frac{2}{5}$ the radial sector.

Measurements of one specimen in mm (collected in Formosa, on 22.8.1936, from an unknown host): length of body: 2.18; width: 0.88; ant.: 1.53; siph.: 0.92; ant. segments: III; IV; V; VI = 0.52; 0.18; 0.23; (0.19 + 0.28).

Host plants. *Quercus serrata*, *Q. stenophylloides*, *Castanopsis formosana*.

Distribution. Formosa.

Biology. Not known.

Available material. 8 apterae and 1 alate; from the collections of the British Museum (Nat. Hist.), London, and of Mr. D. Hille Ris Lambers, identified by R. Takahashi.

Type. In Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Paratrichosiphum spec.

(text-fig. 3d, p. 62)

Alate oviparous female.

Morphological characters. Body elongated, 2.38 mm long, with as maximum width 1.00 mm. Abdominal tergum locally sclerotised, almost smooth, head and thorax darker, brown; marginal tubercles present from segments 3 to 5 of abdomen. Large dorsal hairs on the thoracal segments rather thick and

stiff, those on the abdomen much thinner and with acute apices; longest hair on the anterior tergites of the abdomen about 2.7 times as long as basal diameter of IIIrd antennal segment; short dorsal hairs with acute apices occur, and the shortest hair is about 1.2 times as long as the mentioned diameter; 7th abdominal tergite without spinal hair; 8th tergite with two very long hairs with acute apices, up to about 3.7 times as long as basal diameter of IIIrd antennal segment. Antennae blackish brown, with slightly paler basal segments, about 0.95 times as long as body; flagellum more distinctly imbricated from base towards apex; processus terminalis about 2.3 times as long as base of VIth segment, about 1.1 times as long as segment III; segment III with about 20 transversely oval rhinaria not exactly placed in a row, over about $\frac{6}{7}$ of the length of the segment, the rhinaria are unequal in size and not placed equidistantly; large antennal hairs with more or less blunt apices; longest hair on segment III about 3.6 times as long as basal diameter of the segment. Siphunculi (distal part missing) blackish brown, reticulated-imbricated; near base about 2.7 times as thick as the middle of the hind tibiae. Apex of rostrum reaching a little beyond the hind coxae; segments 4 + 5 slender and acute, about 1.75 times as long as 2nd joint of hind tarsi; segment 4 about 4 times as long as segment 5, with about 12 long and fine hairs. Cauda transversely rectangular with rounded posterior angles, without a median process, with several long and fine hairs. Subanal plate semicircular, projecting far past the cauda, with a very large number of hairs on its dorsal surface, also the subgenital plate exceedingly hairy. Femora pale brownish, the very apices as dark as the head, rather dispersally and superficially imbricated; tibiae darker than the femora, with the very bases and apices much darker, striate-imbricate on basal $\frac{2}{3}$ part, from where the imbrications begin to disappear and spinules are plainly visible; apices of tibiae ventrally provided with 4 thorns. Pterostigma extending up to a little more than $\frac{1}{4}$ the radial sector.

Measurements of one specimen in mm (collected in Pusa, Central India, from *Solanum lycopersicum*): length of body: 2.28; width: 1.00; ant.: 2.18; siph.: ?; ant. segments: III; IV; V; VI = 0.54; 0.27; 0.32; (0.29 + 0.64).

Host plant. Found on *Solanum lycopersicum*, but it is most unlikely that this is really the host as the group is restricted to woody plants.

Distribution. Central India.

Biology. Not known.

Note. An ovipara in a slide from the British Museum (Nat. Hist.), London, in all respects shows the general characters of *Paratrichosiphum*, so that I refer it to that genus. I cannot identify it with a known species, but

in view of the fact that oviparae of the other species of the genus are not known and the material of the present species is poor, I prefer not to give it a name.

Material. In the British Museum (Nat. Hist.), London, no. 1955.550.

REVISION OF THE SPECIES NOT EXAMINED

Eutrichosiphum lithocarpae (Maki, 1918)

1918. Maki, M., Formosan Agric. Rev. (in Japanese), no. 138, p. 344, *Trichosiphum lithocarpae*.

Vide *E. pasaniae*, p. 15.

Eutrichosiphum lithocarpi subsp. **malayense** Takahashi, 1950

1950. Takahashi, R., Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 589, *Eutrichosiphum lithocarpi* subsp. *malayense*.

Vide *E. pasaniae*, p. 15.

Eutrichosiphum szechuenensis Omeishan, 1941

1941. Tsen and Tao, Rep. Govt. Agric. Res. Inst. Taiwan, no. 78, p. 8.

Description not accessible.

Greenidea eugeniae Takahashi, 1941

1941. Takahashi, R., Ins. Mats., vol. 15, no. 4, p. 146, *Greenidea eugeniae*.

Vide *G. (T.) formosana* (Maki), p. 53.

Greenidea fici Takahashi, 1937

1937. Takahashi, R., Lign. Sci. Jour., vol. 16, no. 2, p. 199, *Greenidea fici*.

Description from literature. Apterous viviparous female. — Antennal hairs longer than dorsal hairs, blunt or fimbriated at tip. Ant. segments: III: IV: V: VI = 22: 13: 15: (13 + 29). Rostrum long and slender. Body with many hairs fimbriated apically. Femora imbricate; tibiae striate with 2 or 3 slender spines. Siphunculi reticulate basally, broadest at the middle, about 6 times as long as wide, shorter than ant. segments III + IV. Cauda with a distinct process. Measurements in mm: length: 1.8; width: 1.0; ant.: 1.6; segment III: 0.35; siph.: 0.51, width at base: 0.06, at the middle: 0.09, at apex: 0.046; hind tibia: 0.6.

Host plant. *Ficus retusa*.

Distribution. East China.

Taxonomy. This species belongs to the subgenus *Trichosiphum* Perg. as the siphunculi are reticulated only at base. It can easily be separated from *anonae* Perg. by the distinct process in the cauda and the more slender

siphunculi, though it agrees in some respects with *anonae*; it can be distinguished from *G. (T.) myricae* Tak. by the antennal hairs, which are longer than the dorsal hairs, and by its longer siphunculi, although the length in relation to the maximum width is more or less the same; it is very difficult to separate this species from *formosana* Maki except for a little shorter siphunculi; in most respects the two species are similar.

Type. Probably in the British Museum (Nat. Hist.), London.

Greenidea hirsuta Takahashi, 1950.

1950. Takahashi, R., Ann. Ent. Soc. Amer., vol. 43, no. 4, p. 588, *Greenidea hirsuta*.

Description from literature. Apterous viviparous female:— Ant. segment III little striate; processus terminalis somewhat longer than ant. segment III, about twice or slightly over twice as long as base of VIth segment. Venter of abdomen spinulose basad. Tibiae indistinctly a little striate. Siphunculi blackish brown, darker on distal half, with a few translucent striae at the base, with many bristles, mostly branched at tips, with spinules almost over entire length, about 5 times as long as wide. Cauda with a slender process. Measurements in mm: length: 1.8; width: 1; siph.: 0.6. Body hairs mostly branched.

Host plant. An undetermined tree.

Distribution. Malay Peninsula (alt. 1520 m).

Taxonomy. This species belongs to the subgenus *Trichosiphum* Perg. because the siphunculi are only reticulated at the base. From the relation of the length of the siphunculi to the body and the length of the siphunculi to their maximum width, it seems that this species is closely related to *G. (T.) formosana* (Maki).

Type. Now in the British Museum (Nat. Hist.), London.

Greenidea luchuana Takahashi, 1930.

1930. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 20, no. III, p. 322, *Greenidea luchuana*.

Description from literature. Apterous viviparous female:— Ant. segments: III: IV: V: VI = 30: 10: 10: (9 + 15). Body with very long, stout hairs with normal apices. Venter of abdomen with many granules (spinules). Cauda broadly conical, rounded at tip, without a process. A late viviparous female: Antennae with some long bristles. Ant. segment III with 11 to 18 rather small to medium sized circular or oval rhinaria in a row, over whole length or on basal $\frac{3}{4}$ part. Ant. segments: III: IV: V: VI = 41: 13: 13: (10 + 16). Abdomen with many minute granules (spinules) on venter. Siphunculi about 17 to 20 times as long as wide. Wing

veins normal, pterostigma reaching the tip of the wing. Hind tibiae with some striae (stridulatory apparatus) on basal half, somewhat curved. Measurements in mm: length: 2.25; ant.: 1.8; siph.: 2.0.

Host plant. *Quercus* spec.

Distribution. Formosa.

Taxonomy. This species evidently belongs to the genus *Metatrichosiphon* nov. gen. s. l., because the hind tibiae are somewhat curved, with some striae (stridulatory apparatus) on basal half, the cauda is without a median process, and the venter of the abdomen in apterae and alatae has many granules (spinules); this species seems to be closely related to *nitakaensis* Tak. because of the very long hairs on the body with normal apices, in the apterae, but it differs as follows: — (in apterae) processus terminalis a little more than $1\frac{1}{2}$ times as long as base of VIth segment; (in alatae) rather smaller number of rhinaria in ant. segment III, and more slender siphunculi.

Only examination of material can show whether these differences are really of specific importance.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenidea mushana Takahashi, 1925

1925. Takahashi, R., Aph. of Formosa, pt. 4, p. 35, *Greenidea mushana*.

1931. —, Aph. of Formosa, pt. 6, p. 28, *Greenidea mushana*.

Description from literature. Alate viviparous female: — Ant. segment III with about 55 oval or irregular rhinaria over whole length. Ant. segments: III: IV: V: VI = 26: 25: 23: (19 + 32). 3rd oblique in the fore wings twice forked; stigmatic vein somewhat curved. Siphunculi cylindrical, with minute setae on distal part. Cauda with a small process. Measurements in mm: length: 4; ant.: 3.25; siph.: 2.7.

Host plant. *Quercus* spec.

Distribution. Formosa.

Taxonomy. Clearly it is a species of *Greenidea* Schout. s. l. It apparently differs from all other known species of this genus in having so numerous rhinaria on the IIIrd antennal segment.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Greenideoida hannae van der Goot, 1917

1917. Goot, P. van der, Contrib. Faune Indes Néerl., vol. 1, fasc. 3, p. 145, *Greenideoida hanna*e.

Description from literature. Apterous viviparous female:— Body elongated. Whole dorsal side with numerous irregularly arranged moderately long spiny hairs, which at their apices are mostly somewhat enlarged. Antennae half as long as body; proportion of last antennal segments: 105: 63: (50 + 52). Rostrum somewhat surpassing the 3rd coxae. Siphunculi moderately long (about $\frac{1}{4}$ length of body), rather thick, towards the apex distinctly attenuated, with long bristles, which at their apices are slightly enlarged, with transverse rows of spinules which especially near the apex are very pronounced. Cauda only slightly rounded, acuminate. Measurements in mm: length: 2.35; width: 1.26; ant.: 1.40; siph.: 0.68.

Host plant. *Streblus* spec.

Distribution. Java.

Taxonomy. This species is probably not a *Greenideoida*, because the siphunculi are far too short, its dorsal hairs too long and especially too numerous. It might be a *Eutrichosiphum* because of its spinulose and thick siphunculi, the 5 antennal segments, etc. But van der Goot gives as one of the characters of *Greenideoida* that the rostrum has no separated 5th joint, and we must assume that this also holds for *Greenideoida hanna*. If this is correct, the species is certainly not a *Eutrichosiphum*.

Type. Probably lost.

***Paratrichosiphum flavum* Takahashi, 1941**

1941. Takahashi, R., Rep. Govt. Agric. Res. Inst. Taiwan, no. 78, p. 8, *Paratrichosiphum flavum*.

Description from literature. Apterous viviparous female: — Body orange yellow. Antennae pale, dusky on the distal 2 segments. Siphunculi yellow. Legs pale. Body elongate with many stiff setae with slightly bifid or blunt apices. Long antennal hairs blunt or slightly bifid; ant. segments: III: IV: V: VI = 32: 14: 15: (18 + 18). Rostrum reaching the hind coxae, with distal segment very long and narrow. Abdomen little sclerotised on the dorsum; venter lacking granules. Siphunculi short, about thrice as long as wide, broadest at the middle, much shorter than the width of the head including the eyes, with many rows of microtrichiae except on the basal part, neither reticulate nor striate, with many long setae except on the basal and distal parts, which are slightly or scarcely bifid apically and longer than the width of the siphunculi. Cauda rounded with about 10 long setae. Tibiae not striate, with 3 slender spines. Measurements in mm: length: 1.6; width: 0.85; ant.: 0.55; abdominal seta: 0.069; siph.: 0.26.

Host plant. *Castanopsis* spec.

Distribution. Siam.

Taxonomy. This species belongs to the genus as suggested by Takahashi because of the 6-segmented antennae and the smooth hind tibiae. It can easily be distinguished from related species by its short processus terminalis and the very short and thick siphunculi.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Paratrichosiphum lithocarpi Takahashi, 1931

1931. Takahashi, R., Aph. of Formosa, pt. 6, p. 32, *Paratrichosiphum lithocarpi*.

Description from literature. Apterous viviparous female: — Antennae with many fine hairs. Ant. segments: III: IV: V: VI = 43: 14: 15: (10 + 20). Body with many long bristles which are not branched nor capitate. Hind tibiae almost straight or slightly curved with 15 short transverse striae (stridulatory apparatus) in a single row mostly on basal $\frac{1}{2}$ or basal $\frac{3}{4}$ part. Cauda without a process. Siphunculi about 11 times as long as wide. Measurements in mm: length: 2.5; ant.: 2.0; siph.: 1.5; hind tibia: 0.95.

Host plant. *Castanopsis* spec.

Distribution. Formosa (alt. 1300 m).

Taxonomy. This species belongs to *Metatrichosiphon* nov. gen. because of the transverse striae (stridulatory apparatus) on the hind tibiae. It is related to *nitakaensis* Tak., as it possesses long bristles on the body with normal apices, but it differs in the proportion of the antennal segments, in the much smaller number of stridulatory ridges on the hind tibiae, and in the more slender siphunculi.

Type. Probably in Taiwan Agricultural Research Institute, Taipeh (Taihoku), Formosa.

Trichosiphum minutum van der Goot, 1916

1916. Goot, P. van der, Rec. Ind. Mus., vol. 12, pt. 1, no. 1, p. 2, *Trichosiphum minutum*.

1930. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 325, *Greenidea minuta*.

Description from literature. Alate viviparous female: — Antennae nearly as long as body, 7-jointed (6-jointed); ant. segments: III: IV: V: VI = 43: 13: 15: (12 + 16); ant. segment III with about 20 broadly oval rhinaria. Siphunculi long, about $\frac{3}{4}$ the length of the body, with many fine bristles. Cauda obsolete, without a small point at the apex. Wing venation as in *Greenidea* Schout., with media II curved. Measurements in mm: length: 2.07; width: 0.86; ant.: 1.98; siph.: 1.53.

Host plant. Unknown.

Distribution. North East India (alt. 1430 m).

Taxonomy. Genus *Paratrichosiphum* Takahashi?

Type. Van der Goot deposited the type material in the Indian Museum, Calcutta. This was lost due to the flood damage at Benares, during evacuation.

Trichosiphum montanum van der Goot, 1917

1917. Goot, P. van der, Rec. Ind. Mus., vol. 13, pt. 4, no. 11, p. 179, *Trichosiphum montanum*.

1930. Takahashi, R., Trans. Nat. Hist. Soc. Formosa, vol. 20, no. 111, p. 323, *Greenidea montana*.

1937. —, Philipp. Jour. Sci., vol. 63, no. 1, p. 6, *Paratrichosiphum montanum*.

Description from literature. Alate viviparous female: — Ant. segment III with 17 broadly oval rhinaria on basal $\frac{3}{4}$. Siphunculi very long, cylindrical, with many long hairs and with distinct spinule rows only on the extreme tip. Cauda nearly obsolete, broadly rounded, slightly conical. Sector radii curved, media twice branched (from figure). Measurements in mm: length: 3.05; width: 1.15; siph.: 1.98.

Host plant. Unknown.

Distribution. North East India (alt. 1430 m).

Taxonomy. Genus *Paratrichosiphum* Takahashi? The definite generic position cannot be ascertained from the brief description.

Type. Van der Goot deposited the type material in the Indian Museum, Calcutta. This was lost due to flood damage at Benares, during evacuation.

Trichosiphum roepkei van der Goot, 1918

1918. Goot, P. van der, Tijdschr. Ent., vol. 60, p. 115, *Trichosiphum roepkei*.

Description from literature. Apterous viviparous female: — Body ovate. Dorsum with 4 longitudinal rows of moderately long simple bristles. Antennae apparently 6-jointed (5-jointed); ant. segments: III: IV: V = 40: 18: (24 + 18). Rostrum reaching far beyond the 3rd coxae, thin and the tip as usually forming a distinct separate rostral joint (5th joint). Siphunculi relatively short, thick, widest towards the middle, furnished with long bristles and on apex with transverse rows of spinules. Cauda very broadly rounded, without small apical point. Measurements in mm: length: 1.62; width: 0.90; ant.: 0.67; siph.: 0.32. Alate viviparous female: — Antennae broken off. Rostrum, siphunculi, as in apterae. Media in the fore wings twice branched, sector radii more or less

curved (from figure); hind wings with two obliques. Measurements in mm: length: 2.16; width: 0.81; ant.: ?; siph.: 0.72.

Host plant. *Eurya* spec.

Distribution. Malay Peninsula.

Taxonomy. From the description at first glance the species would seem to be a *Eutrichosiphum* (5-segmented antennae, rostrum, wings, size), but no known *Eutrichosiphum* shows anything like 4 longitudinal rows of hairs on dorsum. It may belong to an unknown genus.

Type. Probably lost.

Trichosiphum vandergooti Fransen, 1930

1930. Fransen, C. J. H., *Natuurh. Maandbl.*, vol. 19, no. 8, p. 92, *Trichosiphum vandergooti*.

Description from literature. A late viviparous female: — Antennae 7-jointed (6-jointed), with many long hairs. Ant. segments: III: IV: V: VI = 36: 10: 12: (9 + 16); ant. segment III with 15 to 17 rounded, rather large rhinaria over entire length, ant. segment IV sometimes with one rhinarium. Rostrum long and thin, tip distinctly separated as a 5th joint. Siphunculi very long, somewhat broadened in the middle, with numerous long hairs, skin with scales and with rows of fine spinules at the tips. Cauda only slightly demarcated, very broadly rounded and crescent-shaped.

Host plant. *Meliosoma ferruginea*.

Distribution. Java (alt. 800 m).

Taxonomy. Genus *Paratrichosiphum* Takahashi? The description is not distinct enough to permit further identification.

Type. Lost.

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1) This paper is quoted as of 1916, because Maki himself in Formosan Agric. Rev., no. 138, 1918, stated the date as December, 1916, although the paper itself bears the date of publication October 8, 1917.

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EXPLANATION OF THE PLATE

- Fig. 1. *Greenidea artocarpi* (Westw.), apterous viviparous female. $\times 32$.
- Fig. 2. *Greenidea artocarpi* (Westw.), alate viviparous female. $\times 24\frac{1}{2}$.
- Fig. 3. *Holotrichosiphon heterotrichus* nov. spec., apterous viviparous female $\times 27$.

