

A revision of the genus Cervaphis v. d. Goot, 1917
(Homopt., Aphid.)

by

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So far descriptions of three *Cervaphis* species have been published, viz., *C. schouteniae* v. d. Goot, 1917, typus generis, *C. quercus* Takah., 1918 and *C. cambodiensis* Takah., 1941. According to TAKAHASHI (1931) *Diverosiphum kunugii* Shinji 1922, is a synonym of *C. quercus* Takah. *C. cambodiensis* Takah. appears to be identical with *C. schouteniae* v. d. Goot.

In recent years Ir F. W. RAPPARD, lately of the Forestry Service in Eastern Java, has provided me with large quantities of aphids. This material contained two apparently undescribed species of *Cervaphis*, which are described hereafter as *C. rappardi* nov. spec. and *C. echinata* nov. spec.

VAN DER GOOT'S (1917) description of the genus is rather complete, but contains a few small errors. The processi of apterae are placed marginally and pleurally. Except those on VIIIth abd. tergite all these processi have lateral branches, each with an apical hair, but only the two frontal processi bear also an apical hair on the main stem; the other branched processi have no terminal hair like the lateral branches, but, slightly distally of the last lateral branch they show a minute, almost invisible dorsal hair, which is homologous with the apical hair on the simple processi in first instar larvae. The not branched processi on the VIIIth abd. tergite each have one apical hair. VAN DER GOOT states, that the cauda is not marked, but I find that in all species, including their larvae, the cauda has a more or less elongated conical hairless process, or stylus.

First instar larvae have not been described. Processi comparable to the branched processi of adults are present, but here they are simple, with the exception of those on the front, which each bear two lateral branches; each processus bears an apical hair which except in *C. quercus* Takah. is bifid, often very deeply incised at the tip; a needle-like, inconspicuous part of the processus stands next to the base of the apical hair; the tiny hair which is present on the processi in the adults is absent. The dorsal hairs (on abdomen pleural hairs are present on tergites I—IV) are placed on large, conical bases, and they are usually so deeply bifid that they may be widely Y- or T-shaped with a rather short stem. The antennae have 3 or 4 segments, but the division between segments III and IV is always very indistinct. The siphunculi are hairless, flangeless, smooth and shorter than the tarsi. The cauda has 2 hairs, the subanal plate 4 hairs. The first tarsal joints have 2 long hairs, the second have two long, blunt dorso-apical hairs, which are as long as the similar empodial hairs.

Second and later instar larvae are essentially like adults as to branched processi, dorsal chaetotaxy, siphunculi and chaetotaxy of the tarsi. The first tarsal segments of the fore and middle legs have 4 very long hairs and one short hair, those of the hind legs 4 long hairs, with in adults an additional short hair.

Key to apterae viviparae.

- 1(2) IIIrd ant. segment with some rather normal setaceous hairs which, their sockets included, are not longer than $1\frac{3}{4}$ times the largest diameter of the segment. On each of abd. tergites I or II to V a median 4-branched or stellate processus *C. quercus* Takah.
- 2(1) IIIrd ant. segment with very thick hairs, which, their sockets included, are several times as long as the largest diameter of the segment. Abdomen without median stellate processi.
- 3(4) Frontal branched processi including the apical hair $\frac{3}{4}$ —1 times as long as the antennae. Siphunculi about $1\frac{1}{2}$ times as long as the hind tibiae
..... *C. echinata* nov. spec.
- 4(3) Frontal branched processi including the apical hair hardly more than half as long as the antennae or even shorter.
- 5(6) Dorsal hairs on abdomen all more or less acute, lanceolate or sometimes slightly bifid. Marginal branched processi on abdomen either with one kind of usually bifid hairs on lateral branches or with near the base also one or two dorsal branches with a thin, acute hair *C. schouteniae* v. d. Goot
- 6(5) Dorsal hairs on abdomen very blunt, with nearly globular apices, extremely numerous. Marginal branched processi on abdomen with on top of the lateral branches acute, acuminate or furcate hairs, dorsally with several hairs like those on the dorsum *C. rappardi* nov. spec.

1. *Cervaphis echinata* nov. spec.

APTEROUS VIVIPAROUS FEMALE.

Morphological characters. Body elongated oval, up to $2\frac{1}{4}$ times as long as its maximum width, with the customary marginal and pleural branched processi; the latter on the Vth abd. tergite usually longer than the maximum width of the body; frontal processi including their apical hair $\frac{3}{4}$ —1 times as long as the antennae. Tergum hardly pigmented, sclerotic. Dorsal hairs numerous, with on abd. tergites III—VI a central group of diverging, larger hairs on a slightly darker part of the tergites; these largest hairs only half as long as the pedestal on which they are placed, elongated obovate, very blunt; numerous smaller hairs on the main stem lanceolate or with oblique apices. Antennae of 4 segments, with on relatively smaller pedestals sometimes slightly acuminate, but not bifurcate; all the hairs on the branched processi more or less acute, those on the lateral branches slender, thorny, stiletto-shaped or with furcate apices, but the few dorsal hairs on the main stem lanceolate or with oblique apices. Antennae of 4 segments, with on segments II and III several long hairs with mostly bifurcate apices, placed on elongated, tapering pedestals; basal part of IVth segment just shorter than the processus terminalis, with one setaceous hair. Rostrum of 5 segments; segments 4 + 5 very nearly as long as IVth ant. segment, very slender and acute. Siphunculi very long and slender, longer than the antennae, with 1—4 scattered long setaceous hairs and 4—5 hairs in a ring just before the dusky apex. Stylus on the cauda slender, considerably longer than wide at base. Other characters as in the *typus generis*.

Colour. Probably evenly greenish yellow.

Measurements in mm:

No.	Length body	Ant.	Siph.	Ant. segments		Processi on	
				III	IV	front	abd. terg. VII
1	1.46	0.52	0.66	0.23	(0.10 + 0.11)	0.49	0.77
2	1.43	0.49	0.63	0.22	(0.09 + 0.11)	0.44	0.72
3	1.23	0.50	0.58	0.21	(0.09 + 0.11)	0.43	0.70
4	1.56	0.54	0.62	0.23	(0.10 + 0.12)	0.41	0.75
5	1.37	0.49	0.64	0.22	(0.08 + 0.11)	0.40	0.72
6	1.32	0.48	0.62	0.21	(0.09 + 0.11)	0.40	0.70
7	1.45	0.49	0.64	0.23	(0.09 + 0.12)	0.43	0.68
8	1.46	0.49	0.61	0.21	(0.09 + 0.11)	0.40	0.72

(1—5, Sambinglo, Southern Banjoewangi, Eastern Java, 50 m a.s.l., 12.VII.1950; 6—8, Djatipapak, South-East Banjoewangi, Eastern Java, 50 m a.s.l., 10.VII.1948, leg. F. W. RAPPARD).

Discussion. Ir RAPPARD twice took this species on *Actinophora fragrans*, where it lived on the undersides of the young leaves. At Sambinglo it occurred mixed with the typus generis, *C. schouteniae* v. d. Goot, which was originally described from this plant, erroneously named *Schoutenia ovata* (Malesian: Wali-koekoen). The species resembles the typus generis rather strongly, but it is more elongated, with thinner and longer legs, branched processi, siphunculi and cauda, and it has many more dorsal hairs. Alatae or nymphs were not collected.

Cotypes in the author's collection.

2. *Cervaphis quercus* Takahashi, 1918.

Material of this species, identified by TAKAHASHI, collected on *Quercus*, Hori, Formosa, Sept. 1928 by TAKAHASHI is available. In general habitus the species, is intermediate between *C. schouteniae* v. d. Goot and *C. echinata* nov. spec., but it differs from these, and from *C. rappardi* nov. spec. in having very much shorter hairs on the antennae. On abdominal tergites I or II to V the bases of the enormous sockets of 4 spinal hairs are fused so that a row of stellate branched processi is formed on the median line. The dorsal hairs are lanceolate and acute and the branched processi carry almost only lateral branches, except near their bases. First instar larvae have dorsal hairs with normal apices, like adults.

The species lives on *Quercus variabilis* and it has been reported from Japan, Corea and Formosa.

According to TAKAHASHI (1931) *Diverosiphum kunugii* Shinji, 1922, is a synonym of *Cervaphis quercus* Takah., 1918. I cannot verify this as both SHINJI's type material and his original description are inaccessible. So far all other authors have listed *Diverosiphum* Shinji, 1922 as a synonym of *Cervaphis* v. d. Goot, 1917, but considering the fact that first instar larvae and adults of the Indo-Malesian *Cervaphis* spp. show furcated hairs, *C. quercus* Takah. simple hairs, that *Cervaphis quercus* has stellate median hairs, *Diverosiphum* Shinji, 1922, typus generis *D. kunugii* Shinji, 1922 may be used as a subgenus of *Cervaphis* v. d. Goot, 1917. Consequently *Cervaphis quercus* Takahashi, 1918 should be named *C. (Diverosiphum) quercus* (Takah., 1918).

3. *Cervaphis rappardi* nov. spec.

APTEROUS VIVIPAROUS FEMALE.

Morphological characters. Body broadly oval, $1\frac{1}{2}$ —2 times as

long as its maximum width, with the customary marginal branched processi, but with the pleural branched processi especially on IIInd abdominal tergite very much reduced in size and often not easily detectable; processie on Vth abd. tergite little more than half the maximum width of body; frontal processi including their apical hair up to just more than half as long as the antennae. Tergum evenly yellowish, strongly sclerotic, dorsally smooth but below the marginal branched processi conspicuously warty. Dorsal hairs extremely numerous and seemingly evenly distributed, also as to their size; the larger hairs about half as long as the pedestal on which they are placed, elongated obovate, very blunt, but some small ones lanceolate and rather acute to acuminate; marginal branched processi on abdomen laterally with lanceolate, rather acute to bifid hairs, but dorsally up to near the most distal lateral branch with obovate hairs, which are very blunt. Antennae of normally 3 segments, the division between segments III and IV being completely or almost completely obsolete, $\frac{1}{4}$ — $\frac{2}{7}$ length of body, with several long thick hairs, the sockets of which are more than half as high as the largest diameter of the flagellum. Rostrum as in *C. echinata* nov. spec. Siphunculi about as long as the antennae, evenly pale, with one or two scattered setaceous hairs and 4—5 hairs in a ring near the apex, where the siphunculus is suddenly narrowing to the small flange. Stylus on the cauda much shorter than the hairs on the subanal plate.

Colour. Yellowish, some with greenish tinge, with transparent appendages, according to Ir RAPPARD. Larvae green.

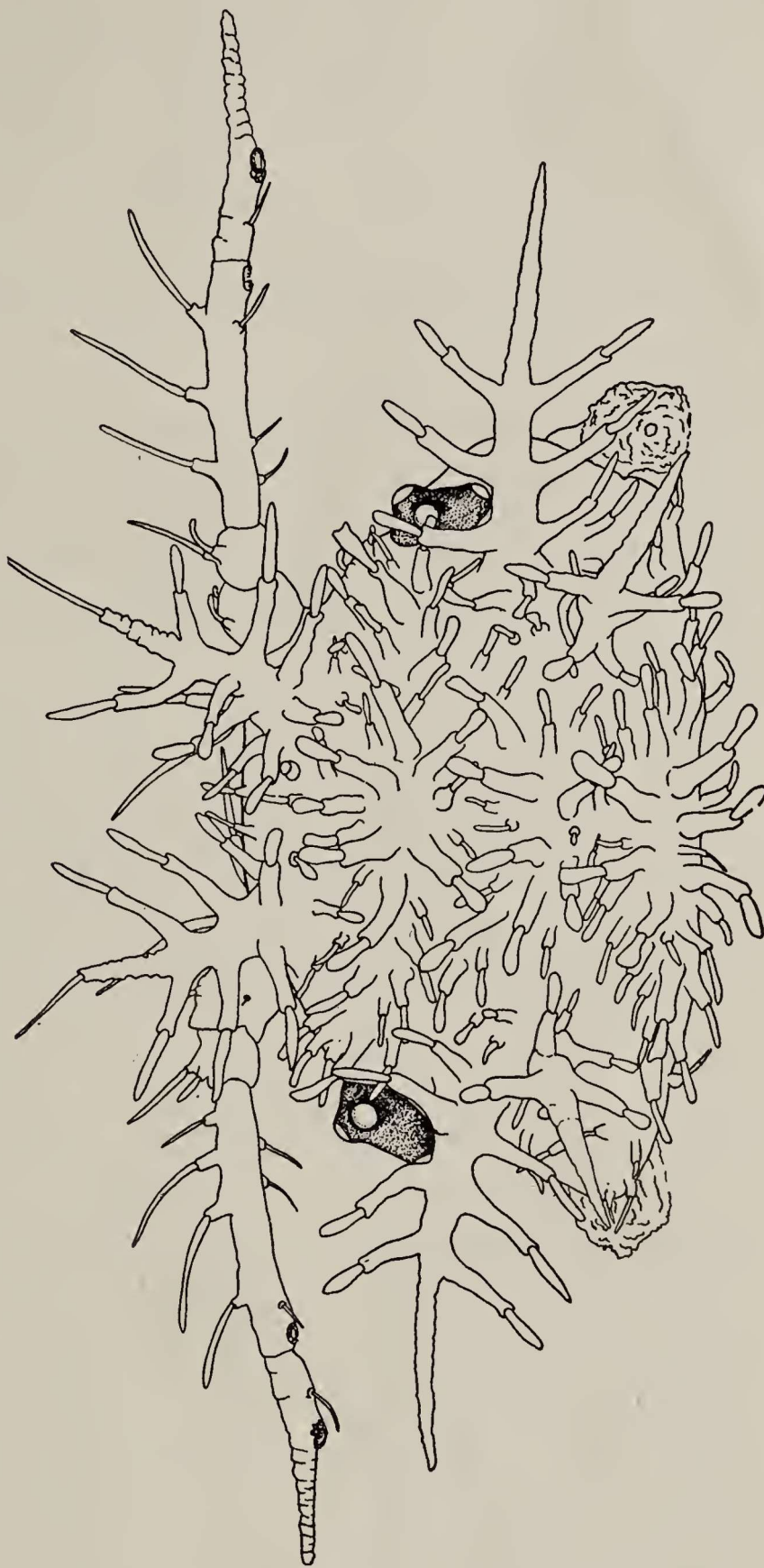


Fig. 1. *Cervaphis rappardi* nov. spec. Apt. viv fem., head and pronotum, $\times 170$.

Measurements in mm:

No.	Length body	Ant.	Siph.	Ant. segments		Processi on	
				III	IV	front	abd. tergite VII
1	1.34	0.39	0.37	(0.21 + 0.06)		0.17	0.53
2	1.19	0.34	0.37	(0.20 + 0.06)		0.14	0.45
3	1.38	0.37	0.39	(0.22 + 0.07)		0.16	0.51
4	1.28	0.33	0.33	(0.20 + 0.06)		0.15	0.49
5	1.49	0.47	0.43	(0.28 + 0.09)		0.23	0.60
6	1.25	0.39	0.37	(0.21 + 0.07)		0.17	0.43
7	1.34	0.36	0.34	(0.22 + 0.06)		0.18	0.49
8	1.49	0.45	0.40	(0.28 + 0.09)		0.20	0.45

(1—4, *Nephelium lappaceum*, Bondowoso, 12.X.1948; 5, *Theobroma cacao*, Lowokwaroe, 25.V.1951; 6—8, idem, 25.XI.1951, leg. F. W. RAPPARD).

ALATE VIVIPAROUS FEMALE.

Morphological characters. Very different from apterae. Head and thorax, a band covering abd. tergites III + IV but slightly perforated marginopleurally, narrow spino-pleural bands on tergites VI and VIII and a few mainly intersegmental sclerites blackish or black. Marginal branched processi absent, or rather reduced to low tubercles bearing a great number of tiny hairs, but the frontal branched still recognisable as short, nearly acute horns, about half as long as 2nd ant. segment and provided with numerous tiny hairs. Hairs on dorsum still very numerous, but very small and on normal sockets, not placed in a recognisable pattern. On vertex a group of 5—6 small hairs near each of the multicorneal eyes and between those 2 pleural hairs and two groups of each 4—5 spinal hairs. Antennae of 5 segments, black; IIIrd segment with 9—11 very large, bulging, somewhat tuberculate, mainly transversely oval rhinaria along one side; primary rhinaria very large, round, nude. Antennal hairs up to as long as diameter of IIIrd seg-

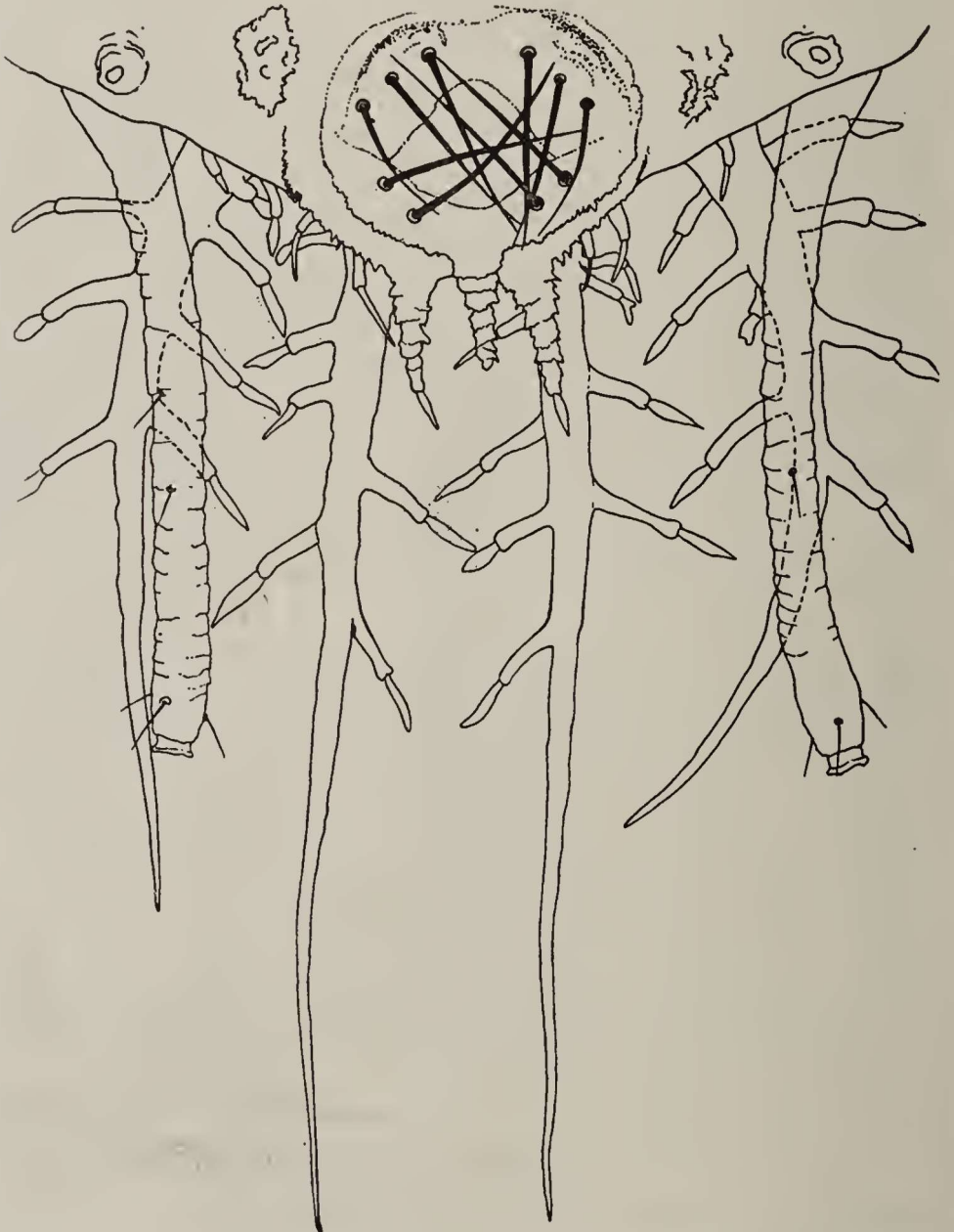


Fig. 2. *Cervaphis rappardi* nov. spec. Apt. viv, fem., hind part of abdomen in ventral view, $\times 170$

ment between the rhinaria. Siphunculi blackish, thin. Stylus on cauda just visible. Wings as in *C. schouteniae*, with the veins in the fore wings quite black but not bordered, and with the anterior half of the pterostigma colourless; veins in the hind wing paler.

Colour. Black with the membranous parts green.

Measurements of one specimen: Length of body: 1.65 mm; ant.: 0.93 mm; siph.: 0.49 mm. Ant. segments: $\frac{0.39, 0.14, (0.13 + 0.16)}{\text{III IV V}}$ mm. Rhin. on IIIrd ant. segment: 10 and 11 (*Theobroma cacao*, Lowokwaroe, 25.X.1951, leg. F. W. RAPPARD).

Discussion. Ir RAPPARD collected several large samples of this species. He first found it on *Nephelium lappaceum* (Malesian: Ramboetan), a fruit tree, on which it was very numerous between the flowers, sometimes also on the green, unripe fruits. It occurred only on one tree, near Bondowoso, Eastern Java, 300 m a.s.l. Later he found it on various but not on all varieties of Cacao (*Theobroma cacao*) in the Experimental Gardens at Lowokwaroe near Malang, 450 m a.s.l. Here it occurred in large numbers on the flowerstems, sometimes in the flowers, and on the trunks near the base of the cauliflorous flowers, in smaller number on young shoots or young fruit. It was attended by *Dolichoderus*. He adds, that on Cacao it was decidedly noxious, causing shrivelling of the flower buds, which did not develop and fell off.

The species can easily be distinguished from its relatives. Apteræ are conspicuous by the greater width, particularly of the anterior part of the body, and by the very numerous and rather homogeneously distributed hairs. Other characters are mentioned in the key. Alatae resemble those of *C. schouteniae* to a surprising extent, but the chaetotaxy of the vertex is quite different, and probably also different from that in the alatae of *C. echinata* nov. spec. and *C. quercus* Takah., though these could not be studied.

The specimens from *Nephelium* are broader and on an average have all appendages shorter than those from *Theobroma*, but I could not find a consistent difference between the samples from both plants.

It is probable that VAN DER GOOT's (1917) record of *Cervaphis schouteniae* v. d. G. from *Theobroma* relates to the present species. Ir RAPPARD failed to find *Cervaphis* species on *Guazuma tomentosa*, which VAN DER GOOT (1917) also mentions as a host plant of *C. schouteniae* v. d. Goot. It should be mentioned that both *Theobroma* and *Guazuma* belong to the Sterculiaceae and are imported from South America, where *Cervaphis* spp. have not been found.

Cotypes in the author's collection.

4. *Cervaphis schouteniae* v. d. Goot.

Though VAN DER GOOT's original material is lost, his figures and description make it possible to decide which of the two *Cervaphis* spp. from *Actinophora* he described, as he mentions dark spots on the dorsum and stiletto-shaped or furcated dorsal hairs in apteræ. Also his figure of the abdomen with the branched lateral processi can only relate to one of the two species, but it is misleading in as far as the two simple and slender processi on the VIIth abd. tergite are drawn with a thin hair on top, and the stylus on the cauda is much longer than the subanal hairs. The

description of the alata should be completed with the following data. Eyes with enormous triommatidia on a short stalk directed obliquely upwards. Frontal processi indicated as large tubercles each bearing a dense group of about 10 short hairs of which one is thicker and quite blunt; between the compound eyes two pairs of lateral hairs, one pair of pleural hairs and one pair of spinal hairs, the rest of the vertex nude (except the hairs on the rudimentary frontal processi). Processi on pronotum and abdomen reduced to hairy knobs, the hairs very short. Cauda without stylus-like process.

Ir RAPPARD collected this species at several localities in Eastern Java from young leaves of *Actinophora*, from which plant I also received it from Western Java (Margasari, leg. VERBEEK). VAN DER GOOT (1917) records it from *Guzuma tomentosa* and *Theobroma cacao*. The species from Cacao is described above as *C. rappardi* nov. spec.

Three samples from the undersides and sometimes uppersides of the leaves and young shoots of *Pterospermum javanicum* (Malesian: Wadang or Bajoer), collected from the same tree at different times by Ir RAPPARD near Malang are conspicuous by having a considerable amount of brown pigmentation dorsally, but consistent anatomical differences from specimens from *Actinophora* could not be found.

TAKAHASHI (1941) described *Cervaphis cambodiensis*. I could not get hold of his types, but through the kindness of the Director of Museums, Kuala Lumpur, I could examine specimens from *Grewia tomentosa* identified by TAKAHASHI and recorded in his paper of 1950. I cannot distinguish these specimens from typical *C. schouteniae* from *Actinophora* and therefore consider *Cervaphis cambodiensis* Takah., 1941, a synonym of *C. schouteniae* v. d. Goot, 1917. If this is accepted the species occurs from Java via Malaya to Cambodia.

Literature

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 TAKAHASHI, R., 1931. *Aphid. Formosa*, vol. VI.
 ———, 1941, *Gout. Agr. Res. Inst. Formosa, Rept.* 78.
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Overdrukken. Bij de Bibliotheek, Zeeburgerdijk 21, Amsterdam-O., zijn een groot aantal overdrukken te koop. Aanvragen vóór 1 september a.s.

Aanbieding literatuur. Uit de nalatenschap van wijlen de heer KOORNNEEF zijn een groot aantal entomologische publicaties te koop. Wie de lijsten hiervan ter inzage wil ontvangen, vrage deze aan bij het Zoölogisch Museum, Zeeburgerdijk 21, Amsterdam-O.

Te koop. OUDEMANS, Nederl. Insecten (grote platen ontbreken) f 15; TASCHENBERG, Die Hymenopteren Deutschlands (1866) f 5; GÜNTHER, Het leven der insecten (1938) f 2,50; FABRE, Les Merveilles de l'instinct chez les insectes (1924) f 1; SCHOLZ, Bienen und Wespen (1913, ongebr.) f 4.

G. VAN DER ZANDEN, N. Brabantlaan 21, Eindhoven.

Te koop. NORDSTRÖM & WAHLGREN, Svenska Fjärilar, z.g.a.n., f 60.—; FORSTER & WOHLFAHRT, Die Schmetterlinge Mitteleuropas, deel 1 en 2, gebonden, z.g.a.n., f 30.—.
 H. HAGEMAN, Wijborghstraat 20, Katwijk aan Zee.