

# ON SOME MAINLY WESTERN EUROPEAN APHIDS

by

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Bennekom

## 1. *Ramitrichophorus* nov. subgen.

*Macrosiphoniella janckei* Börner, 1939 (Arb. phys. angew. Entom., vol. VI, p. 83), found on *Helichrysum arenarium*, differs from all species of *Macrosiphoniella* which I have seen in the structure of its hairs, rostrum and cauda. The dorsal hairs and partly those on the legs and antennae are long and not thicker than in other *Macrosiphoniella*'s but their apex is flattened and ramose, sometimes bifid. The ultimate rostral segment is

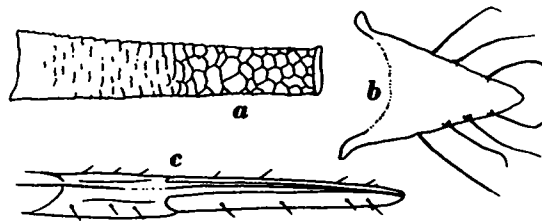


Fig. 1. *Ramitrichophorus janckei* (Börner), apt. viv. fem.: a, siphunculus; b, cauda; c, last rostral segments.  $\times 140$ .

exceedingly long and narrow, about  $1\frac{2}{3}$  times as long as second joint of hind tarsi and nearly  $\frac{5}{8}$  of the siphunculi. The hairs on this joint are very short and thin, while in typical *Macrosiphoniella* the longest hairs stand on basal half. The cauda is shortly triangular and acute. Scleroites are vaguely visible in the specimen which I received, and antesiphuncular sclerites are present. It seems desirable, with regard to the shape of the ultimate rostral segment, hairs and cauda, to erect a separate subgenus for this species, *Ramitrichophorus* nov. subgen., type *Macrosiphoniella janckei* Börner, 1939.

2. *Macrosiphoniella chamomillae* nov. spec.

## Apterous viviparous female.

Morphological characters. Body rather large, spindle-shaped, about 2.70-3.15 mm long. Hairs not on distinct scleroites, rather long; VIIIth abd. tergite with 6 hairs. Antesiphuncular sclerites absent or colourless. Head faintly dusky, with the sides between the bases of the antennae and the eyes fuscous. Frontal tubercles large. Antennae usually considerably longer than body, with the basal segments dark, with IIIrd segment except at apex and IVth segment on basal part pale, remainder dark to black; IIIrd

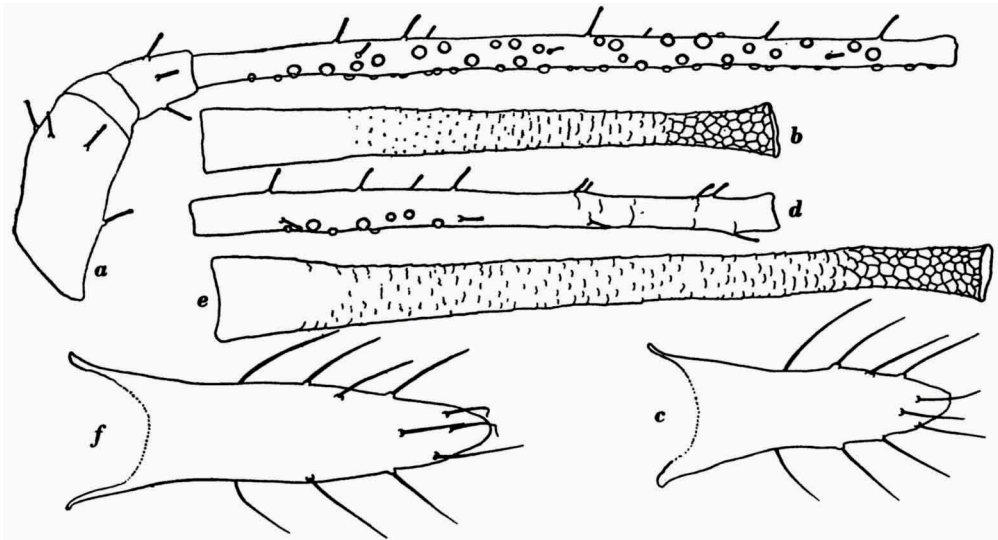


Fig. 2. *Macrosiphoniella chamomillae* nov. spec., al. viv. fem.: a, Isth-IIIrd ant. segment; b, siphunculus; c, cauda; apt. viv. fem.: d, IIIrd ant. segment; e, siphunculus; f, cauda.  $\times 120$ .

segment with about 11-26 partly very small rhinaria bunched on basal half to two-thirds part; interrelation of segments see measurements. Hairs on IIIrd segment about as long as basal diameter of the segment. Rostrum reaching to the hind coxae; apical segment rather slender, black, about  $\frac{6}{7}$  of second joint of hind tarsi, with straight sides and about 6 hairs besides the 3 apical pairs. Siphunculi up to more than  $\frac{1}{4}$  of the body's length, slender, cylindrical with incrassate base, trumpet-shaped at apex, dispersely imbricated from often the very base, with distal  $\frac{2}{13}$ - $\frac{2}{11}$  part reticulated, without distinct flange; basal part pale, remainder dark to black. Cauda a little darker than the bases of the siphunculi, elongated triangular with bluntish apex, not constricted, a little more than half as long as the

siphunculi, with about 8-14 hairs. Subgenital plate with only about 6-8 hairs along its posterior margin. Legs long, with the femora distally as dark as the first antennal segments, tibiae with darkened base and black apices.

Colour. As in *M. tapuskae* (H. & Fr.), slightly powdered and with nude transverse lines.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Rhin. on III	Prop. of ant. segments III:IV:V:VI
1	3.04	3.24	0.76	0.44	22 & 24	100:79:65:(26 + 96)
2	2.94	3.23	0.80	0.48	11 & 16	100:73:58:(21 + 87)
3	2.93	3.30	0.76	0.43	12 & 14	100:97:67:(25 + 105)
4	3.13	3.48	0.81	0.48	16 & 21	100:86:63:(27 + 91)
5	3.06	3.47	0.78	0.47	21 & 22	100:87:64:(23 + 92)
6	3.03	3.17	0.78	0.45	16 & 21	100:82:67:(26 + 94)

(1, 17-IX-'41; 2-6, 16 and 17-VII-'41).

#### Alate viviparous female.

Morphological characters. Head and thorax light brown, the abdomen with very small, faint marginal sclerites. Antennae with 1st segment fuscous, 2nd segment and base of 3rd pale brownish yellow, remainder black; 3rd segment with about 39-70 rhinaria; 4th segment with up to 6 rhinaria (average 0.4, but of 34 antennae 2 have 1 each, and one each 2, 4 and 6 respectively, the others none). Siphunculi black with only the thickened base pale. Cauda faintly constricted, like the siphunculi a little thinner than in apterae. Legs darker than in apterae. Venation of wings normal, the veins pale to mottled brownish, not bordered. Remainder as in apterous viviparous female.

Colour. As in apterous viviparous female.

Measurements of one specimen: Length of body: 2.91 mm; ant.: 3.38 mm; siph.: 0.66 mm; cau.: 0.36 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{91}{IV} : \frac{71}{V} : \frac{(29 + 117)}{VI}$ . Rhin. on 3rd ant. segment: 39 and 40; on 4th: 0 and 0.

#### Apterous male.

Morphological characters. Body narrower and smaller than in apterous viviparous female, otherwise similar. Antennae dark with the exception of base of 3rd segment, which is pale; 3rd segment with about 69 rhinaria; 4th with about 20; 5th with about 10 rhinaria. Siphunculi thin, a little less than  $\frac{1}{4}$  of the body's length. Cauda less than half as long as the siphunculi. Claspers slender, pale brownish.

Colour. As in apterous viviparous female.

Measurements of one specimen: Length of body: 2.42 mm; ant.:

3.16 mm; siph.: 0.56 mm; cau.: 0.25 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{87}{IV} : \frac{68}{V} : \frac{(29+97)}{VI}$ . Rhin. on IIIrd ant. segment: 69 and  $\pm$  55 (abnormal segment); on IVth: 20 and 20; on Vth: 9 and 11.

Hostplant: *Matricaria chamomilla*.

Geographical distribution: Only found near Bergen op Zoom <sup>1)</sup>.

Biology: Lives apparently monophagous on its host. Apterous males and oviparae were numerous from the end of September. Alatae were present in the middle of June. The insects live on the underside of the leaves and also sometimes on the stems under the flower-heads. Oviposition was not yet observed.

Notes. During the summer this species was very common around Bergen op Zoom, where almost every plant of its host was infested. Where *M. inodora* occurred in mixed associations with *M. chamomilla*, the former was not infested, so that apparently that species is not a hostplant. In life the aphids resemble *M. tapuskae* (H. & Fr.) (syn. *Phalangomyzus ceratus* Börner) strongly, but in mounted specimens the shorter reticulated area on the siphunculi (about  $\frac{1}{4}$  of the length in *tapuskae*) and the more numerous rhinaria in both apterae and alatae make the identification easy. Some alatae show rhinaria on IVth ant. segment, which character in *Macrosiphoniella* was hitherto only known in *M. sanborni* (Gill.), which, however, differs very much from the new species.

Types. Cotypes in the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

### 3. *Capitophorus vandergooti* nov. spec.

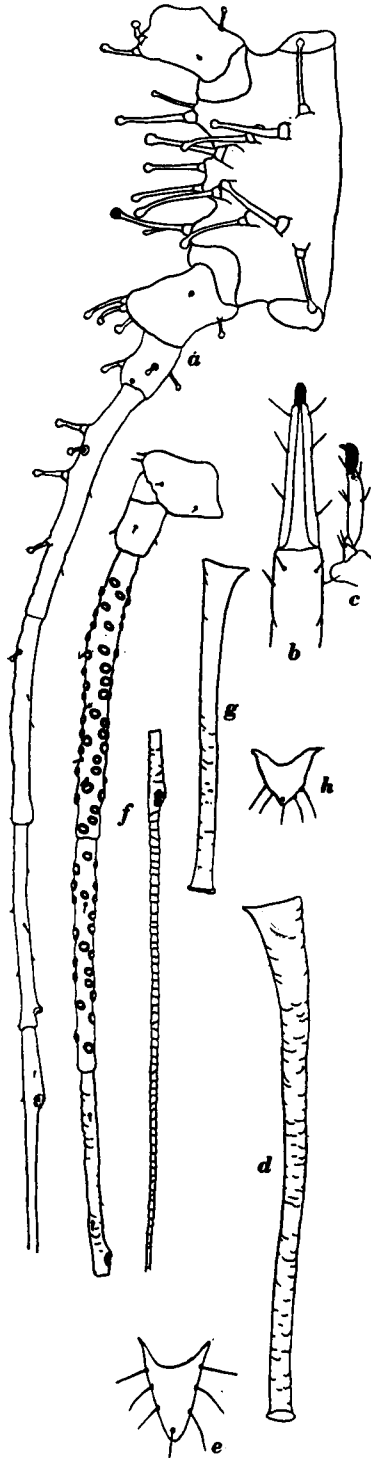
1915. Goot, P. v. d., Beitr. zur Kenntnis d. Holl. Blattläuse, p. 125-127, *Capitophorus inulae*.

1938. Wahlgren, E., Entomologisk Tidskrift, vol. LIX, p. 179, *Capitophorus similis* partim.

#### Apterous viviparous female.

Morphological characters. Body about 1.60-2.10 mm long, rather convex, elongated oval. Tergum membraneous, very slightly wrinkled, covered with long thick hairs on strong bases with almost globular thick apices; these hairs are arranged as follows: on the meso- and metanotum and abd. segments I-IV spinal and pleural hairs cannot be identified, as they are bunched together on a pair of elevations of the dorsum, each with about 6-9 hairs of different length; between them there is a hairless median

<sup>1)</sup> One alata was caught in a trap near Harpenden, England in 1947 by Dr. C. G. Johnson.



stripe along dorsum; marginal hairs on these segments also bunched together, 3-5 on each side of the segments; on the posterior segments the groups are also present, but with 3-5 hairs in the spinopleural groups; on VIIIth tergite there is a median group of 4-6 hairs and some isolated hairs on both sides (vide fig. 4). Longest hairs on abd. tergite I-IV about 3-4 times basal diameter of IIIrd ant. segment, the base on which they stand excluded. Frontal tubercles diverging, with some knobbed hairs on their inner apices. Median frontal tubercle little developed, but conspicuous by some knobbed hairs on it. Antennae about  $\frac{7}{9}$ - $\frac{8}{9}$  of length of body, pale, very slightly imbricated; basal segments with knobbed hairs, the first segment with a very distinct inner tooth, on which 2-3 hairs stand; IIIrd segment always with some long and thick knobbed hairs on strong bases, mostly 3-4, sometimes 2 or 5; IVth segment very rarely with a knobbed hair; remainder of antennae and also outer side of IIIrd segment with short hairs, which on IIIrd segment are only about  $\frac{1}{3}$  basal diameter of the segment; secondary rhinaria absent; processus terminalis 5-6 times base of VIth segment,  $1\frac{1}{2}$ -2 times as long as IIIrd. Rostrum reaching well past hind coxae; apical segment very long and rather slender, about  $2\frac{1}{4}$ - $2\frac{1}{2}$  times as

Fig. 3. *Capitophorus vanderghoeti* nov. spec. (from *Inula helenium*), apt. viv. fem.: a, head and antenna; b, last rostral segment; c, hind tarsus; d, siphunculus; e, cauda; al. viv. fem.: f, antenna; g, siphunculus; h, cauda.  $\times 120$ .

long as second joint of hind tarsi, with 2 hairs besides the 3 apical pairs, of which one pair is placed far basewards; the very tip slightly rostrate. Siphunculi very long and slender, mostly sinuated, sometimes almost straight,

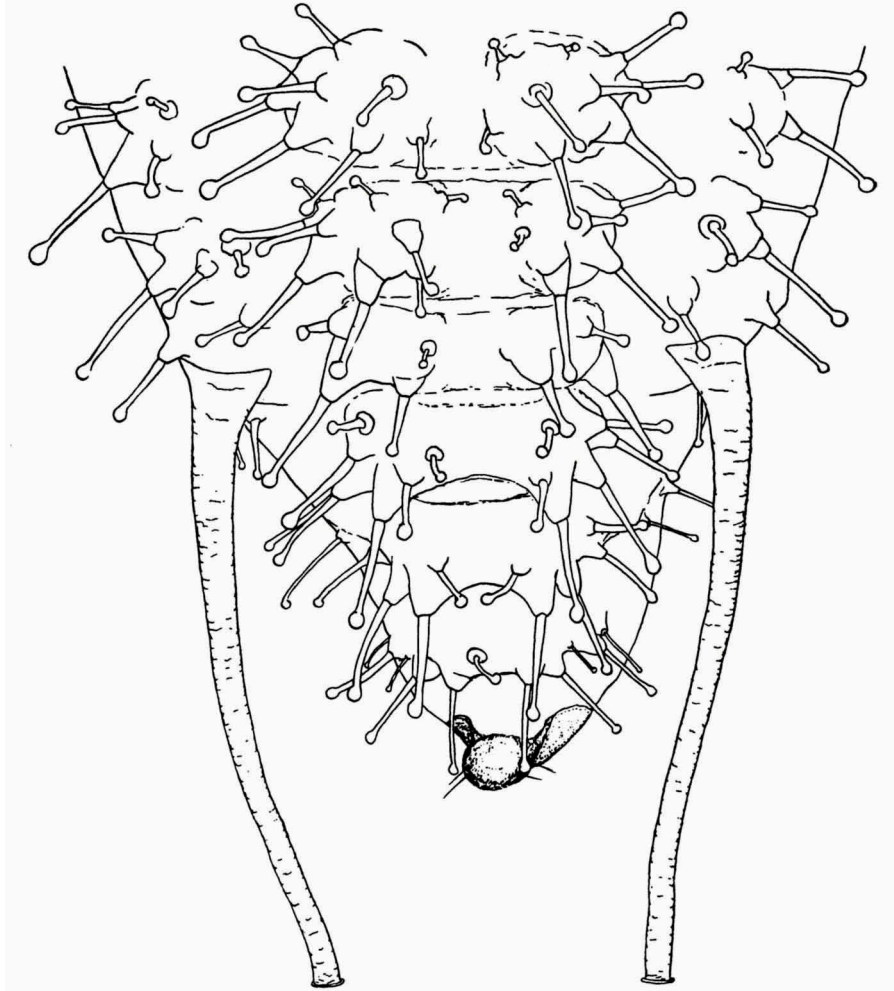


Fig. 4. *Capitophorus vandergooti* nov. spec. (from *Inula helenium*), apt. viv. fem.: hind part of abdomen.  $\times 145$ .

quite pale, very little imbricated, about  $\frac{1}{3}$  body's length, with small flange. Cauda triangular, seldom up to  $\frac{1}{4}$  of the siphunculi, usually shorter, not constricted, with 5-7 hairs. Legs colourless; femora, the bases of the fore and middle tibiae and the basal half of the hind tibiae with rather short knobbed hairs, the other hairs fairly normal; first tarsal joints with 3, 3, 3 hairs.

Colour. Semi-transparent white, slightly greenish. Legs, antennae, etc., with the colour of the body.

Measurements in mm.

No.	Length body	Ant.	Siph.	Cau.	Antennal segments			
					III	IV	V	VI
1	1.73	1.39	0.54	0.13	0.27	0.23	0.22	(0.09 + 0.45)
2	1.72	1.48	0.58	0.14	0.29	0.22	0.24	(0.09 + 0.50)
3	1.82	1.65	0.60	0.15	0.29	0.26	0.27	(0.10 + 0.56)
4	1.84	1.62	0.61	0.15	0.30	0.27	0.27	(0.10 + 0.52)
5	1.94	1.71	0.66	0.15	0.31	0.30	0.29	(0.10 + 0.54)
6	1.88	1.62	0.62	0.14	0.31	0.27	0.27	(0.09 + 0.51)

(all from *Inula helenium*, Wageningen, July 1946).

Alate viviparous female.

Morphological characters. Head and thorax black sclerotic, abdomen with rather pale marginal sclerites and with a rectangular spino-pleural sclerite with almost straight margins, from IIIrd-VIth tergite, with some small isolated sclerites on the anterior segments; the central sclerite is emarginated on its posterior margin and somewhat perforated between segments V/VI. Dorsal hairs mostly with normal, hardly swollen apices, rather thin and on small bases, but sometimes, irregularly, long and thick knobbed hairs may occur; on the abdominal central sclerite the hairs per segment are implanted in two groups of 4-5, rarely 3 hairs each, of which the posterior hairs are always longer; the distance between the groups on each segment is several times that between the hairs in each group mutually. Antennae about as long as body, black sclerotic, with normal hairs; IIIrd segment with about 29-50 rather large, little tuberculous rhinaria allround; IVth segment with about 14-28 rhinaria; Vth with 0-4 rhinaria, average about 1.1, in about 40 % of the antennae without rhinaria. Rostrum as in apterae. Siphunculi distinctly thinnest in the middle, with distal half rather dark, base pale, almost smooth, about  $\frac{1}{4}$  length body, thinner than in apterae. Cauda very short, dark, triangular with convex sides, about  $\frac{1}{6}$ - $\frac{1}{5}$  of the siphunculi, with 5 hairs. Legs thin, pale brownish with blackish apices to the tibiae. Wings with dark, hardly bordered veins. Remainder as in apterous viviparous female.

Colour. Head and thorax, abdominal dark spot, etc., dark greyish black, remainder very pale green.

Measurements of one specimen: Length of body: 1.68 mm; ant.: 1.71 mm; siph.: 0.40 mm; cau.: 0.08 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{84}{IV} : \frac{62}{V} : \frac{(30+149)}{VI}$ . Rhin. on IIIrd ant. segment: 32 and 35; on IVth: 20 and 19; on Vth: 0 and 1.

**Alate male.**

**Morphological characters.** Much like alate viviparous female, but smaller and narrower. Abdomen not with a central sclerite, but this broken up in a number of transverse sclerotic bands across segments III-VI, sometimes VII; of these that on IVth segment is the broadest; those on the VIth and VIIth segment often broken in the middle, less pigmented and a little rough. Those on segments III and IV on both ends with a group of 3-5, usually 4 hairs, on Vth with two groups of 2-3, usually 2 hairs and on VIth with groups of 3-4, usually 3 hairs; VIIIth tergite with a short row of 6-8 hairs and a pair more laterally. Antennae a little longer than body; IIIrd segment with about 42-65 rhinaria; IVth with 18-31; Vth with 10-18. Genitalia normal.

**Colour.** As in alate female, but abdomen more or less brownish red.

**Measurements of one specimen:** Length of body: 1.84 mm; ant.: 1.91 mm; siph.: 0.35 mm; cau.: 0.08 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{67}{IV} : \frac{61}{V} : \frac{(22 + 130)}{VI}$ . Rhin. on IIIrd ant. segment: 53 and 57; on IVth: 20 and 27; on Vth: 13 and 15 (specimen from *Inula helenium*).

**Hostplants:** *Elaeagnus* spp. (I), *Inula helenium* (II).

**Geographical distribution:** Only known from Sweden and Wageningen, Netherlands, but probably widely spread over Europe.

**Biology:** The biology is not yet completely known. On *Inula* I found very large colonies on the undersides of the lowest leaves in the beginning of July, containing numerous alatae. Later I also found them on the higher leaves, and then, in September, there were almost only nymphs with wingpads and alatae. As this suggested migration, I transferred alatae to caged *Elaeagnus argenteus* and *E. spec.* They immediately deposited larvae there, and also larvae, which I transferred by mistake, reached maturity, so that apparently *Elaeagnus* must be regarded as the winterhost, which rôle it plays for all migrating *Capitophorus* spp. of the world. On *Hippophae* no oviparae were produced. Later I reared males from the few nymphs left on the dying leaves of *Inula*. Copulation and oviposition were not yet observed. The species is not visited by ants while living on *Inula*. Its main enemies there were larvae of a Cecidomyid, which badly hampered my work.

**Notes.** This evidently is the species described by Van der Goot (1915, Beiträge z. Kenntnis d. Holl. Blattläuse, p. 125) as *Capitophorus inulae* Pass. *Inulae* Pass. was described from *Inula conyza*, originally. I have examined numerous specimens of Passerini's species, which is quite different and similar to *Cap. similis* v. d. Goot, from *Tussilago*. According



to Thomas & Jacob *inulae* Pass., like all other migrating *Capitophorus* spp. hibernates as egg on *Elaeagnus*. The first material of the new species consisted in a sample of specimens recorded by Wahlgren as *Capitophorus similis* v. d. Goot from *Inula helenium*. The specimens were strongly damaged, but fortunately I found it at Wageningen also.

Like the similar *Cap. archangelskii* Nevsky this species differs from the other species of the genus by having capitate hairs on the IIIrd ant. segment, at least in apterae, while the apterae and the alate forms can easily be recognized by their setal pattern, in alatae on the sclerites, and by the few rhinaria or their absence on Vth ant. segment in alate females. In this respect it resembles also *Capitophorus pakansus* Hottes & Frison from North America, of which only alate females and males are known, so that apparently that species also migrates. It may eventually be proven to be the same species.

Types. In the author's collection, in the Rijksmuseum van Natuurlijke Historie, Leiden, and in the Museum of the Zoological Department of Lund University, Sweden.

#### 4. *Ovatus glechomae* nov. spec.

##### Fundatrix.

Morphological characters. Very much like the following form, but the processus on the inner sides of the frontal tubercles hardly developed, so that the inner sides of the frontal tubercles are parallel or very little diverging. Processus terminalis only 3-3½ times as long as base of VIth segment.

Colour. As in the next form.

Measurements of one specimen; Length of body: 2.10 mm; ant.: 1.68 mm; siph.: 0.32 mm; cau.: 0.15 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{63}{\text{IV}} : \frac{65}{\text{V}} : \frac{(24 + 80)}{\text{VI}}$ .

##### Apterous viviparous female.

Morphological characters. Body rather shortly oval, dorsally and ventrally markedly convex, about 1.60-2.00 mm long. Tergum evenly sclerotic, not smooth but covered with more or less distinct, rather rectangular cells, with the free VIIth and VIIIth tergites and an area behind each siphunculus darker and scabrous, remainder pale to brownish, with darker, small intersegmental sclerites which often form a dotted line between IVth and Vth abd. tergite. Dorsal hairs short, about as long as the antennal hairs, with slightly swollen apices; VIIIth tergite with 4-6 hardly longer hairs. Spinal tubercles irregularly present on VIIth, sometimes on VIIIth abd. tergite. Head rather broad, dark scabrous, with very well developed frontal tuber-

cles, which on their inner sides bear a marked, rather thick and blunt, granulated converging processus, which is about half as long as IInd ant. segment; the processus bear 4-6 short hairs each and 2-3 more are placed on the underside of each frontal tubercle. Median tubercle not or hardly developed, front between the frontal tubercles wide, straight. Antennae about  $1-1\frac{1}{6}$  times as long as body, brown like the head, with scabrous basal segments and imbricated flagellum; Ist segment markedly rounded on inner side; IIIrd segment without rhinaria,  $1-1\frac{1}{3}$  times as long as IVth; processus terminalis  $3\frac{1}{2}-4\frac{1}{4}$  times as long as base of VIth segment. IIIrd segment with very short hairs which are only  $\frac{2}{7}-\frac{1}{3}$  times as long as its basal diameter. Rostrum reaching to past the hind coxae; apical segment rather slender, about  $1\frac{1}{3}$  times as long as 2nd joint of hind tarsi, with 4-6 hairs

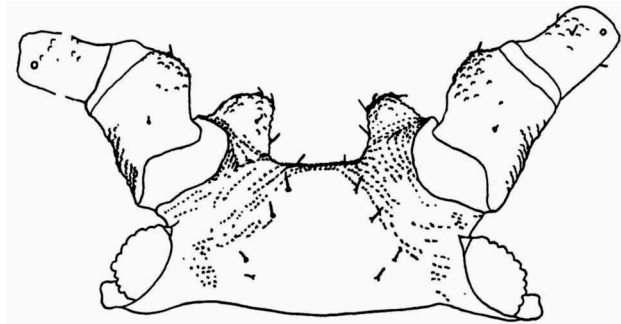


Fig. 5. *Ovatius glechomae* nov. spec., apt. viv. fem.: head.  $\times 145$ .

besides the 3 apical pairs. Siphunculi brownish sclerotic, cylindrical, rather thin, straight or slightly curved inwards, about  $\frac{1}{5}$  length of body, markedly imbricated on basal half, distally less distinctly, with rather large, thin flange. Cauda rather short, elongated triangular, brown like the siphunculi and about  $\frac{2}{5}$  times as long, with 4 or 5, usually 5 hairs. Legs evenly brownish, thin, with rather scabrous femora; first tarsal joints with 3, 3, 3 hairs.

Colour. Rather dark, dirty brownish green, usually with the margins darker. Siphunculi, antennae, cauda and legs dirty green.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V: VI
1	1.72	1.92	0.36	0.15	100: 80: 74: (28 + 104)
2	1.84	1.95	0.37	0.14	100: 83: 72: (26 + 96)
3	1.75	1.95	0.32	0.13	100: 78: 72: (28 + 107)
4	1.81	1.99	0.36	0.14	100: 79: 73: (26 + 108)
5	1.78	2.04	0.37	0.14	100: 79: 75: (29 + 102)
6	1.79	1.82	0.36	0.13	100: 91: 74: (29 + 102)

(All from *Glechoma hederacea*, Wageningen, V-'43).

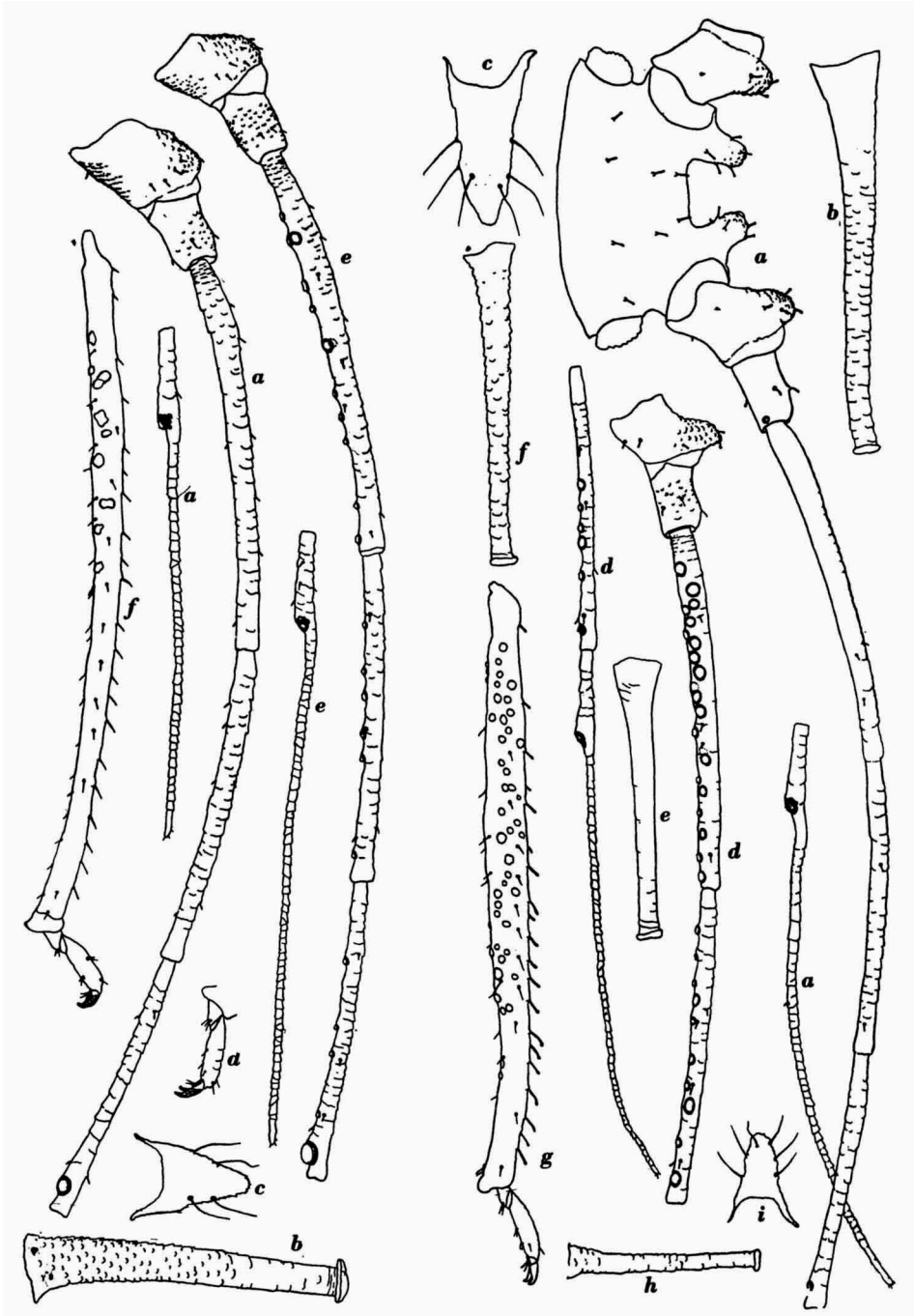


Fig. 6. *Ovatus glechomae* nov. spec., apt. viv. fem.: a, antenna; b, siphunculus; c, cauda; d, hind tarsus; al. viv. fem.: e, antenna; ovip. fem.: f, hind tibia and tarsus.  $\times 120$ .

Fig. 7. *Ovatus menthastri* nov. spec., apt. viv. fem.: a, head and antenna; b, siphunculus; c, cauda; al. viv. fem.: d, antenna; e, siphunculus; ovip. fem.: f, siphunculus; g, hind tibia and tarsus; al. male: h, siphunculus; i, cauda.  $\times 120$ .

**Alate viviparous female.**

Morphological characters. Head and thorax blackish sclerotic. Abdomen with an only little developed sclerotic pattern, consisting of rather large, dark marginal sclerites, vague spino-pleural transverse sclerites from segment I-IV, transverse intersegmental sclerites between segments IV/V and V/VI and sclerotic bands on tergites VII and VIII. Processus on the frontal tubercles much smaller and more acute. Antennae blackish brown, with nearly smooth flagellum; IIIrd segment about as long as IVth, with 10-14 (average 11.5) rather small, hardly tubercular rhinaria nearly in a line; IVth with 5-9 (aver. 6.2), Vth with 2-5 (aver. 3.3) rather inconspicuous rhinaria, which in strong contrast to the longitudinally oval primary rhinarium on Vth segment are very small; processus terminalis  $4-5\frac{1}{4}$  times as long as base of VIth segment. Siphunculi and cauda somewhat thinner and darker than in apterae, otherwise similar. Wings with normal venation, the veins brown, hardly or not shadowed. Other characters about as in apterous form.

Colour. Head and thorax black. Abdomen with dark olive-green dorsal markings, remainder greenish. Antennae black. Remainder about as in apterae viviparae.

Measurements of one specimen: Length of body: 1.74 mm; ant.: 2.01 mm; siph.: 0.31 mm; cau.: 0.12 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{102}{\text{IV}} : \frac{85}{\text{V}} : \frac{(30 + 145)}{\text{VI}}$ . Rhin. on IIIrd ant. segment: 10 and 12; on IVth: 5 and 7; on Vth: 3 and 3.

**Oviparous female.**

Morphological characters. Like apterous viviparous female, but tergum thinner and remarkably wrinkled. Also the venter rather conspicuously wrinkled. Pleural intersegmental sclerites brown, small. Hind tibiae on basal half slightly swollen and there darker than the rest and with some large pseudosensoria of partly very irregular shape.

Colour. Very dark greenish-brown.

Measurements of one specimen: Length of body: 1.58 mm; ant.: 1.77 mm; siph.: 0.32 mm; cau.: 0.13 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{83}{\text{IV}} : \frac{73}{\text{V}} : \frac{(27 + 107)}{\text{VI}}$ .

**Apterous male.**

Morphological characters (from one specimen). Body very small and narrow. Head dark; thorax and abdomen with paler local sclerotisation, which

especially on abdomen shows scattered spinules. Thorax with rather broad and long transverse sclerites, abdomen with small spinal to spino-pleural transverse sclerites on the anterior segments, with a sclerotic transverse bar on VIIth tergite. Antennae with the same remarkable primary rhinaria on Vth segment as in alatae; secondary rhinaria vide measurements. Genitalia normal. Other characters about as in alate female.

Colour. Dark greenish brown.

Measurements of one specimen: Length of body: 1.18 mm; ant.: 1.57 mm; siph.: 0.22 mm; cau.: 0.10 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{78}{IV} : \frac{72}{V} : \frac{(26 + 119)}{VI}$ . Rhin. on IIIrd ant. segment: 15 and 16; on IVth: 10 and 10; on Vth: 4 and 6.

Hostplant: *Glechoma hederacea*.

Geographical distribution: Only known from Wageningen and Bennekom, but probably common.

Biology: This species was found in two localities on superterranean parts of its host growing under and between stones. The aphids sat on young shoots, petioles and the bases of the stems, only on those parts which were not exposed to direct light. Alatae were reared at home. In these cultures also the colonies developed mainly on parts near the soil. The reddish nymphs went higher up and also sucked on the undersides of the lower leaves. Sexuales were taken in the beginning of October, oviparae in the last week of September already. The eggs are laid on the stems of the host-plant; they are yellow when fresh. Though ants were present when this species was found, they did not visit the colonies.

Notes. As far as I know this is the first *Ovatus* of which apterous males are known. The species differs from the other members of this genus which I know by the small number of rhinaria in alate females and the remarkable size of the primary rhinarium of Vth ant. segment in that form. Of *Glechoma* aphids I know only *Myzus ornatus* Laing, *Aulacorthum solani* (Kltb.) and *Cryptomyzus galeopsidis* (Kltb.). What *Aphis glechomae* Wlk. is I do not know, but the description does not agree with the insects which I found.

Types. In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

##### 5. *Ovatus menthastri* nov. spec.

Fundatrix.

Morphological characters. Much like the next from, but frontal tubercles

and processus on 1st ant. segment little developed. Processus terminalis 3-4 times as long as base of VIth segment.

Colour. As in the next form.

Measurements of one specimen: Length of body: 2.06 mm; ant.: 1.74 mm; siph.: 0.50 mm; cau.: 0.24 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{58}{\text{IV}} : \frac{65}{\text{V}} : \frac{(24 + 94)}{\text{VI}}$ .

#### Apterous viviparous female.

Morphological characters. Body oval, 1.20-1.75 mm long. Tergum slightly sclerotic, colourless, covered with more or less circular, shallow pits (coarsely corrugated), head with minute spinules. Dorsal hairs short, markedly thickly clavate; those on IIIrd abd. tergite  $\frac{1}{2}$ - $\frac{2}{3}$  times as long as basal diameter of IIIrd ant. segment; VIIIth tergite with 4 more or less knobbed hairs, which are as long as diameter of IIIrd ant. segment. Frontal tubercles low, on inner sides with very marked, bluntly conical processus which are about  $\frac{2}{3}$  times as long as IInd ant. segment and which converge markedly; each processus with 3-5 rather slender, slightly knobbed hairs; 1-2 more hairs on the underside of each frontal tubercle. Front between processus straight or concave, median tubercle not developed. Antennae about as long as body, brown, paler towards base, somewhat imbricated; 1st segment with a short blunt processus at inner apex, brown, darker on inner apex and there with blunt scales; IIIrd segment without rhinaria; processus terminalis  $1\frac{1}{4}$ - $1\frac{2}{5}$  times as long as IIIrd segment, about 4-5 times as long as base of VIth segment. Hairs on IIIrd ant. segment short, normal,  $\frac{1}{4}$ - $\frac{1}{3}$  times as long as its basal diameter. Rostrum reaching to or just past hind coxae; apical segment about  $1\frac{1}{2}$ -2 times as long as 2nd point of hind tarsi, with 2-4, usually 2 hairs besides the 3 apical pairs. Siphunculi about  $\frac{3}{4}$  times as long as body, very thin, cylindrical, with expanded base, curved inwards and downwards or more rarely straight, pale to brownish yellow with pale base, heavily coarsely and bluntly imbricated (very much as in *Pentatrichopus* spp.), with small flange. Cauda elongated triangular, dusky, about  $\frac{2}{5}$ - $\frac{1}{2}$  times as long as siphunculi, with 5-7 hairs. Legs pale with brown apices to the tibiae, femora dorsally brownish; 1st tarsal joints with 3, 3, 3 hairs of about equal length.

Colour. Pale whitish green.

Measurements of one specimen: Length of body: 1.35 mm; ant.: 1.37 mm; siph.: 0.38 mm; cau.: 0.16 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{68}{\text{IV}} : \frac{61}{\text{V}} : \frac{(32 + 135)}{\text{VI}}$ .

**Alate viviparous female.**

Morphological characters. Head and thorax somewhat brownish pigmented, abdomen only with small brownish marginal sclerites. Frontal tubercles very conspicuous, more slender than in apterae. Antennae about as long as body, dark to black; IIIrd segment with 12-21 rhinaria along one side; IVth with 7-11 in a line; Vth with 0-5 rhinaria, with normal primary rhinarium. Siphunculi very much shorter than in apterae, at most  $\frac{1}{5}$  length of body, nearly smooth, slightly dusky with paler base, rather thin. Cauda slender,  $\frac{1}{2}$ - $\frac{2}{3}$  of the siphunculi. Wings with dark brown veins, which are slightly bordered. Other characters more or less as in apterous viviparous female.

Colour. Green, with blackish antennae.

Measurements of one specimen: Length of body: 1.78 mm; ant.: 1.86 mm; siph.: 0.34 mm.; cau.: 0.16 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{82}{\text{IV}} : \frac{76}{\text{V}} : \frac{(29+161)}{\text{VI}}$ . Rhin. on IIIrd ant. segment: 13 and 15; on IVth: 8 and 7; on Vth: 1 and 0.

**Oviparous female.**

Morphological characters. Tergum membraneous, but usually with the same corrugation as in apterae viviparae; small, but distinct, brownish, oval intersegmental sclerites and stigmal plates present. Siphunculi thinner, cauda thicker than in apterae viviparae. Hind tibiae swollen over most of their length, dark brown, much darker than the other tibiae, with numerous pseudosensoria. Other characters about as in apterous viviparous female.

Colour. Pale greenish yellow.

Measurements of one specimen: Length of body: 1.55 mm; ant.: 1.69 mm; siph.: 0.34 mm; cau.: 0.16 mm. Prop. of ant. segments:  $\frac{100}{\text{III}} : \frac{73}{\text{IV}} : \frac{63}{\text{V}} : \frac{(27+134)}{\text{VI}}$ .

**Alate male.**

Morphological characters (from one specimen). As in apterous viviparous female, but the marginal sclerites on abdomen a little more pigmented. Antennae much longer than body; IIIrd segment with 27 and 32 rhinaria; IVth with 11 and 13 rhinaria; Vth with 7 and 7. Siphunculi very thin, flangeless, rather dark. Cauda dark. Genitalia well developed, claspers blunt.

Colour. About as in apterous viviparous female.

Measurements of one specimen: Length of body: 1.44 mm; ant.: 1.97 mm; siph.: 0.24 mm; cau.: 0.11 mm. Prop. of ant. segments:

$\frac{100}{III} : \frac{85}{IV} : \frac{66}{V} : \frac{(23 + 115)}{VI}$ . Rhin. on IIIrd ant. segment: 27 and 32; on IVth: 11 and 13; on Vth: 7 and 7.

Hostplants: *Mentha sylvestris* L., *Mentha* spec.

Geographical distribution: I found this species at Wageningen and near Merano, Italy, but it has probably also been recorded from England, under other names.

Biology: This species hibernates via eggs on the mentioned species of *Mentha*, to which it is restricted. The second generation is apterous like the first, the 3rd contains a number of alatae, which fly away to other specimens of the hosts. In the autumn males and oviparae develop on *Mentha* and the eggs are laid on and between the plants in the middle of October. The species lives only on the undersides of the leaves. It is not visited by ants.

Notes. Apparently only Van der Goot (1915, Beitr. z. Kenntnis d. Holl. Blattl., p. 135) has noticed that there are two similar insects on *Mentha*, which differ in the degree of development of the processus on the 1st ant. segment. The form on aquatic *Mentha* spp. and *M. arvensis* has hardly a processus: the inner side of 1st ant. segment is merely strongly rounded, about as shown in fig. 6a of *O. glechomae* nov. spec. For the species from aquatic *Mentha* spp. the name *Ovatus menthae* (Wlk.) is available, and Börner (1926, in Abderhalden, Handb. d. biol. Arbeitsmeth., Abt. IX, vol. 1/II, p. 227) was probably the first to discover that that species hibernates as egg on *Crataegus* spp., or rather he discovered that one of the two species on *Crataegus* migrated to *Mentha* in summer. In *menthae* (Wlk.), the migrating species, the number of rhinaria varies from 30-50 on IIIrd segment, 10-20 on IVth, according to my material. Typical for *menthae* is also the existence of very small apterae viviparae during summer, while the alatae of the same generation are much larger; towards the autumn larger apterae develop.

Re *menthastris*, it is certainly this species which Van der Goot (1915) and possibly Theobald (1926) described as *Phorodon menthae* Buckt. *Menthae* Buckt. is preoccupied by the congeneric species *menthae* Wlk., so that a new name is wanted. From the published descriptions it is difficult to find out which of the two *Mentha* aphids lives in North America and Formosa, but it looks as if that is *menthae* Wlk.

Types. In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

#### 6. *Ovatomyzus* nov. gen.

*Ovatomyzus* nov. gen. is erected for *O. stachyos* nov. spec. The genus is



more or less intermediate between *Ovatus* v. d. Goot and *Myzus* Pass. The alatae show the abdominal sclerotisation as typical for *Myzus* Pass., but the nymphs have no spinules between the hairs at the apices of the hind tibiae. The frontal tubercles in apterae are angular, with each one long, stiff, slightly knobbed hair and one shorter hair at inner apices; in the frontal furrow, which is flat-bottomed, also a pair of rather long hairs is placed, but the hairs on vertex and the rest of the dorsum are very short, except a very long pair on VIIIth abd. tergite; even the new-born larvae show this chaetotaxy. The head is not scaly or scabrous. In all forms the complete absence of a triommatidion to the multicorneal eyes is very conspicuous. The rhinaria are distributed as in *Ovatus* v. d. Goot, absent in apterae, numerous on segments III, IV and V in alatae. Hairy fringe around the primary rhinaria hardly developed. Siphunculi in apterae flangeless with narrow, reduced porus. Cauda constricted at base and often in the middle. Wings with normal venation. First tarsal joint with 3, 3, 2 hairs.

***Ovatomyzus stachyos* nov. spec.**

**Apterous viviparous female.**

Morphological characters. Body oval, small, about 1.10-1.40 mm long in specimens taken in the autumn. Tergum, and in general the whole exoskeleton, quite colourless, on abdomen with large papillae, which, however, are hardly visible. Dorsal hairs very short, as long as the antennal hairs; VIIIth tergite with only 2 hairs, which are curved, with acute apices, about  $1\frac{1}{2}$ -2 times as long as basal diameter of IIIrd ant. segment. Head smooth. Frontal tubercles vide figure; hairs on inner apices as long as basal diameter of IIIrd ant. segment. Antennae thin, longer than body, almost smooth, a little imbricated towards apex, quite pale: Ist segment rounded on inner side; IIInd with a more or less conspicuous tubercle on basal half, ventrally; IIIrd segment at the very base not narrowing but just delating; processus terminalis much longer than IIIrd segment, about  $4\frac{1}{4}$ -6 times as long as base of VIth segment. Antennal hairs very short, blunt, on IIIrd segment rather numerous, about  $\frac{2}{7}$  of its basal diameter long. Rostrum reaching to the hind coxae, pale; last segment not very slender, about  $1\frac{1}{3}$ - $1\frac{2}{5}$  times 2nd joint of hind tarsi, with 2-4, usually 2 hairs besides the 3 apical pairs. Siphunculi curved near base, converging to the cauda, thin, dilated towards base, about  $\frac{2}{9}$ - $\frac{1}{4}$  length body, hardly, bluntish imbricated, quite pale, with thicker, flangeless apex and atrophied porus. Cauda pale,  $\frac{2}{5}$ - $\frac{1}{2}$  siphunculi, constricted at base and often in the middle, blunt, with 4-5, usually 5 hairs. Legs thin, with the apices of the tibiae sometimes faintly

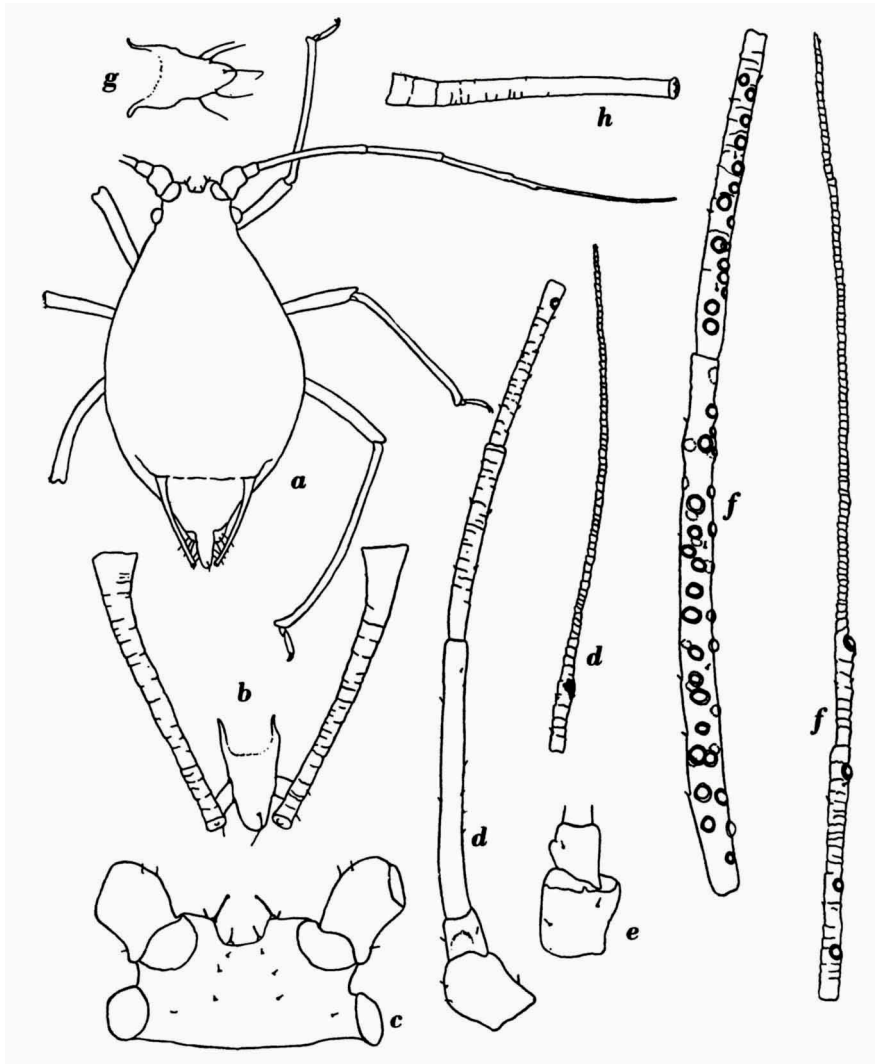


Fig. 8. *Ovatomyzus stachyos* nov. spec. a, apt. viv. fem.; idem: b, siphunculi and cauda in situ; c, head; d, antenna; e, antenna, basal segments, laterally; al viv. fem.: f, antenna; g, siphunculus; h, cauda. a,  $\times 35$ ; b-h,  $\times 120$ .

dusky, with inconspicuous hairs but towards the apices of the tibiae more bristly; first tarsal joints with 3, 3, 2 hairs. Rudimentary gonapophyses very well developed.

Colour. Very pale, rather transparent greenish-white with colourless antennae, etc.

## Measurements in mm.

No.	Length body	Ant.	Siph.	Cau.	Antennal segments			
					III	IV	V	VI
1	1.24	1.54	0.30	0.12	0.33	0.25	0.21	0.08 + 0.51
2	1.21	1.52	0.30	0.12	0.34	0.25	0.23	0.09 + 0.50
3	1.25	1.51	0.29	0.12	0.34	0.26	0.21	0.09 + 0.48
4	1.20	1.26	0.26	0.11	0.28	0.20	0.18	0.09 + 0.49
5	1.36	1.60	0.32	0.14	0.41	0.26	0.22	0.09 + 0.48
6	1.28	1.44	0.31	0.13	0.36	0.23	0.21	0.09 + 0.44

## Alate viviparous female.

Morphological characters. Rather larger than apterous form (which makes it likely that as in *Ovatus menthae* Wlk. larger apterae than those described here occur in the spring). Head and thorax blackish sclerotic; abdomen with a dark sclerotic pattern as in *Myzus* Pass., the central sclerite distinctly reticulated, ventrally without sclerites. Head with very conspicuous median tubercle bearing the median ocellus; also the lateral ocelli on marked tubercles. Antennae blackish like the head, only the very base of IIIrd segment

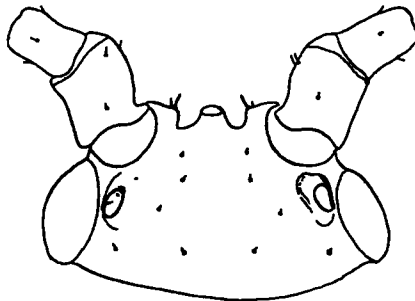


Fig. 9. *Ovatomyzus stachyos* nov. spec.,  
al. viv. fem.: head.  $\times 120$ .



Fig. 10. *Ovatomyzus stachyos* nov. spec.,  
al. viv. fem.: abdomen.  $\times 25$ .

a little paler; IIIrd segment with normal base, rather thick, and more tuberculous than the figure shows, with about 30-44 rather large, slightly tuberculous rhinaria; IVth segment with 10-20 rhinaria; Vth with 0-5, normally 1-3 rhinaria in a line. Siphunculi about smooth, straighter than in apterae and not converging, from base to apex gradually darker smoky, about  $\frac{1}{6}$  length body, with more normal apices. Cauda  $\frac{2}{5}$  of siphunculi, more acute, as dark as the bases of the siphunculi. Legs long and slender, with the fore femora brownish yellow with dark apices, the other femora almost wholly blackish; tibiae brownish yellow to blackish, apices darker. Wings with usually normal venation; veins dark and all slightly bordered with brown.

Rudimentary gonapophyses very conspicuous, particularly the median one slender and elongated. Other characters about as in apterous form.

Colour. Rather bright light green, with shiny black head and thorax, blackish brown abd. sclerites, black antennae; siphunculi and cauda smoky green; legs see morphological characters. Veins in the wings dark, conspicuous.

Measurements of one specimen: Length of body: 1.55 mm; ant.: 1.97 mm; siph.: 0.26 mm; cau.: 0.10 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{60}{IV} : \frac{48}{V} : \frac{(24 + 119)}{VI}$ . Rhin. on IIIrd ant. segment: 38 and 41; on IVth: 15 and 18; on Vth: 2 and 4.

Hostplant: *Stachys* ? *germanica* (the cultivated species sold as *Stachys lanata*).

Geographical distribution: Only found in the Arboretum, Wageningen, Netherlands.

Until now only viviparous forms are known. These live dispersed on the undersides of the felty leaves, between and under the long silky hairs, in often very large numbers. In the autumn many alatae were reared from nymphs collected. The production of alatae went on till the beginning of October, but males were not yet found.

Notes. The species is easily recognisable by the structure of its front and siphunculi in apterae.

Types. In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

## 7. *Cavariella* Del Guercio

In Europe and North America approximately the same species seem to occur, which probably means that North America has mostly imported species, especially because Eastern Asia has its own *Cavariella* species. The European and North American species key as follows:

Apterous viviparous females.

- 1(2) Processus terminalis only  $\frac{7}{8}$ - $1\frac{1}{4}$  times as long as base of VIth ant. segment. Siphunculi swollen, about twice as long as the cauda. On *Salix* species and various Umbelliferae. *C. aegopodii* (Scop.).
- 2(1) Processus terminalis more than  $1\frac{1}{4}$  times as long as base of VIth segment, or if shorter, then the siphunculi about  $1\frac{1}{2}$  times as long as cauda and very little swollen.
- 3(4) Siphunculi less than twice as long as cauda. On aquatic Umbelliferae (*Cicuta*, *Sium*, *Berula*). *C. cicutae* (Koch)
- 4(3) Siphunculi more than twice as long as cauda.
- 5(6) Siphunculi cylindrical or diminishing in diameter from base to apex, not swollen.

On *Salix* species, *Pastinaca*, *Heracleum* and allied Umbelliferae.

*C. theobaldi* (Gill. & Bragg).

- 6(5) Siphunculi always a little swollen on distal half.  
 7(8) Processus terminalis 3-4 times as long as base of VIth segment. On *Salix* species, *Heracleum* and *Pastinaca*, etc. *C. pastinacae* (L.).  
 8(7) Processus terminalis only  $1\frac{1}{2}$ -2 times as long as base of VIth segment. On *Salix* species and *Angelica* spp., *Zizia aurea*?. *C. archangelicae* (Scop.).

Alate viviparous females.

- 1(2) Processus terminalis only  $\frac{7}{8}$ - $1\frac{1}{2}$  times as long as base of VIth ant. segment. IIIrd ant. segment with 15-28 rhinaria, the IVth without rhinaria or exceptionally with 1-2. On *Salix* spp. and various Umbelliferae. *C. aegopodii* (Scop.).  
 2(1) Siphunculi at least twice as long as base of VIth segment and if exceptionally it is not longer, then also the IVth and even the Vth segment with a number of rhinaria.  
 3(4) Siphunculi only  $1\frac{1}{2}$  times as long as cauda. IIIrd, IVth and Vth ant. segment with numerous rhinaria. On *Cicuta*, *Berula* and *Sium*. *C. cicutae* (Koch).  
 4(3) Siphunculi at least twice as long as cauda. Sometimes rhinaria on IVth ant. segment, but very rarely on the Vth.  
 5(6) Siphunculi cylindrical, not swollen on distal half. Processus terminalis more than twice as long as base of VIth ant. segment. IVth ant. segment with 0-3 rhinaria. On *Salix* spp. and *Pastinaca*, *Heracleum* and allied Umbelliferae. *C. theobaldi* (Gill. & Bragg).  
 6(5) Siphunculi distinctly swollen on distal half.  
 7(8) Processus terminalis 3-4 times as long as base of VIth ant. segment. IVth ant. segment with at most 3 rhinaria, usually without rhinaria. On *Salix* spp. and *Heracleum* and *Pastinaca*. *C. pastinacae* (L.).  
 8(7) Processus terminalis only  $1\frac{1}{2}$ -2 times as long as base of VIth ant. segment. IVth ant. segment always with numerous rhinaria, 8-16 in number. On *Salix* spp. and *Angelica* spp., *Zizia aurea*?. *C. archangelicae* (Scop.).

In North America descriptions of the species *C. pastinacae* (L.), *C. aegopodii* (Scop.), *C. archangelicae* (Scop.) and *C. theobaldi* (Gill. & Bragg) have been published, but they are usually described under wrong names. *C. theobaldi* is named *C. umbellatarum* Koch by Theobald and Börner; apparently they overlooked the facts that Koch described the siphunculi as somewhat swollen and that in the figure the processus terminalis is about  $1\frac{1}{2}$  times as long as the base of VIth ant. segment, which makes Koch's species a synonym of *Cavariella archangelicae* (Scop.). Koch's *Rhopalosiphum cicutae* has been placed in *Cavariella* by Del Guercio, but it has never been redescribed. I found it in the Netherlands.

### 8. *Appelia tragopogonis* (Kltb., 1843)

I have succeeded in transmitting both *Appelia schwartzi* Börner (*A. amygdali* Buckt.) and *Appelia prunifex* Theob. to *Tragopogon pratensis*. Spring migrants from either winterhost immediately went to the bases of the leaves where they deposited larvae. These larvae developed into apterae. Börner reports that he could not transmit the species from one winterhost to another,

which is quite normal in migrating aphids. *Appelia schwartzi* Börner, *A. prunifex* Theob. and their respective synonyms should be listed as synonyms of *Appelia tragopogonis* Kltb. The species can also pass the summer on *Prunus persica*, in which case the alate males are born on peach instead of on *Tragopogon*.

#### 8. *Longiunguis luzulella* nov. spec.

##### Fundatrix.

Morphological characters. Much like apterous viviparous female, but antennae only about  $\frac{3}{8}$  of the length of body; processus terminalis about  $1\frac{1}{2}$ - $1\frac{3}{4}$  times as long as base of Vth segment.

Colour. As in the next form.

Measurements of one specimen: Length of body: 1.78 mm; ant.: 0.64 mm; siph.: 0.16 mm; cau: 0.13 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{48}{IV} : \frac{(44 + 66)}{V}$ .

##### Apterous viviparous female.

Morphological characters. Body small, 1.30-1.80 mm long, rather elongated. Tergum membranous with rather conspicuous reticulation, with the

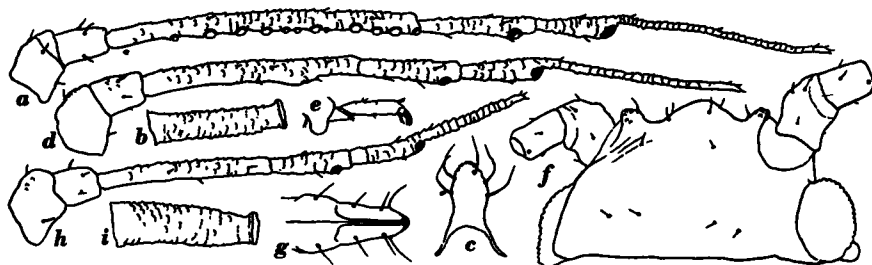


Fig. 11. *Longiunguis luzulella* nov. spec., al. viv. fem.: a, antenna; b, siphunculus; c, cauda; apt. viv. fem.: d, antenna; e, hind tarsus; f, head, dorsally; g, last rostral segments; fundatrix: h, antenna; i, siphunculus.  $\times 120$ .

head, some parts of the mesonotum and -pleura, a broad, long, very distinct transverse bar on VIIIth abd. tergite and sometimes also paler, shorter and rather more rudimentary ones on the VIIth and VIth tergite dark sclerotic. Rather small marginal tubercles on abdominal segments I, VI and VII, smaller ones normally present on segments II-V; the tubercles on VIIth tergite not ventrally, but just caudad or a little more dorsally of the stigmata of that tergite. Dorsal hairs partly blunt, rather stout, with usually 4 spinal hairs, 2 pleural ones and 4 marginal ones on each of the 3 anterior

abd. tergites; VIIIth tergite with 4, rarely 2 hairs. Head with very pronounced median frontal process and inconspicuous frontal tubercles as typical for the *Rhopalosiphum-Schizaphis* group. Antennae in all my specimens of 5 segments (in most with a swelling where the division between the IIIrd and real IVth might be expected, if 6 segments were present), about  $\frac{5}{8}$ - $\frac{2}{3}$  of the body's length, dusky with darker apex, conspicuously imbricated; processus terminalis  $2\frac{1}{4}$ - $2\frac{3}{4}$  times as long as base of last segment. Antennal hairs about  $\frac{2}{3}$ - $\frac{3}{4}$  of the diameter of the IIIrd segment at its constricted base. Rostrum reaching to the middle coxae; apical segment rather blunt, just longer than second joint of hind tarsi, with 2 hairs besides

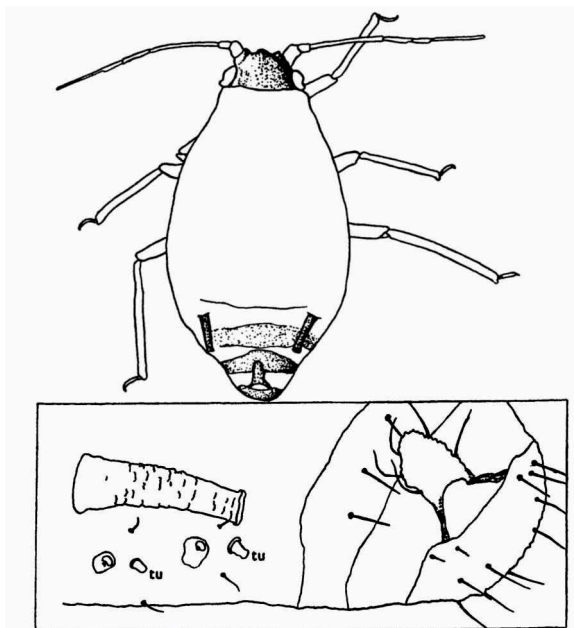


Fig. 12. *Longiunguis luzulella* nov. spec., apt. viv. fem.,  $\times 35$ ; idem, lateral caudal part of abdomen, tu, marginal tubercles of VIth and VIIth segments,  $\times 145$ .

the 3 apical pairs. Siphunculi about  $\frac{1}{11}$ - $\frac{1}{9}$  of the length of the body, dusky with blackish apex or wholly black, more or less tapering from base to apex or a little constricted just below the hardly developed flange, distinctly imbricated. Cauda dark, slender, constricted, blunt, about  $\frac{5}{7}$ - $\frac{7}{8}$  of the siphunculi, with 5-7 hairs. Legs short, with rather spiny hairs; first tarsal joints of fore- and mid-legs with 2 extremely short lateral hairs and one long, conspicuous median hair; those of hind legs only with the lateral hairs and therefore seemingly hairless.

Colour very dark green, almost black.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V
1	1.49	0.80	0.15	0.11	100: 36: (29 + 75)
2	1.36	0.80	0.14	0.10	100: 37: (32 + 82)
3	1.37	0.70	0.14	0.11	100: 83: (33 + 83)
4	1.40	0.77	0.14	0.11	100: 40: (30 + 88)
5	1.44	0.78	0.15	0.10	100: 37: (32 + 78)

(Bennekom, 11-V-'44).

Alate viviparous female.

Morphological characters. Much like apterous viviparous female. Head and thorax blackish brown sclerotic, abdomen with sclerotic transverse bands on tergites VII and VIII, of which the one on VIIIth much darker than the anterior one; marginal sclerites rather large, about as dark as the band on VIIth tergite. Antennae usually of 5 segments, and then IIIrd segment with about 7-11 rhinaria in a line, IVth with 0-3; but if 6 segments present, then Vth usually without rhinaria. Siphunculi completely dark, cylindrical. Cauda distinctly constricted. Wings slightly smoky, veins rather dark, with very variable furcation of the media, so that the second furcation may be close to the first or close to the margin of the wing.

Colour. As in apterous viviparous female, but head and thorax black.

Measurements of one specimen: Length of body: 1.44 mm; ant.: 0.86 mm; siph.: 0.14 mm; cau.: 0.10 mm. Prop. of ant. segments:  $\frac{0}{V} : \frac{39}{IV} : \frac{(30 + 79)}{V}$ . Rhin. on IIIrd ant. segment: 7 and 10; on IVth: 1 and 0.

Hostplant: *Luzula campestris*.

Geographical distribution: Rather rare in the Netherlands (Deventer, Bennekom)<sup>2)</sup>.

Biology: Lives on the bases of the stems and leaves of its host, underground or under earthen shelter built by ants, in autumn in the shoots. Fundatrices with mature apterous progeny were found in the beginning of May. The generation after this apterous one contained a number of alatae, which in later generations seem to be very rare. Sexuials were not yet observed<sup>1)</sup>. I did not find the species without attending ants (*Tetramorium caespitum*, *Myrmica* spec., *Lasius alienus*), except in autumn.

Notes. Quite possibly this species is not very rare, but it lives well hidden and is difficult to detect. It is not Kalténbach's *Aphis luzulae*, because he describes it with a white tuft of wax above the cauda, so that

1) Recently apterous males and oviparae were found on *Luzula campestris*.

2) Specimens from Wales were just received from Mr. A. W. Colling, Cambridge.



apparently his species is a synonym of *Ceruraphis eriophori* (Wlk.). *Longiunguis* v. d. Goot is used here to replace *Piraphis* Börner, for *Schizaphis*-like species with twice furcated media and with siphunculi without a swelling or a distinct constriction at the tip.

Types. In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

### 9. *Schizaphis* Börner

Since my notes on this genus in Zool. Meded., vol. XXII, 1939, p. 90-95, I have made further studies on Dutch species of this genus and considerably more material has been examined. On the basis of this the following subdivision of the genus is proposed:

I. Subgen. *Schizaphis* Börner sensu stricto. Hairs on antennae and dorsum very short and scarce, in single transverse rows per segment. VIIIth abd. tergite with 2 hairs. Marginal tubercles on abd. segments I and VII, sometimes II (in fundatrices also on segments II-VI). Alatae with few rhinaria on IIIrd segment, sometimes a few on IVth. Species living on Gramineae.

II. Subgen. *Paraschizaphis* nov. subgen., type *Toxoptera typhae* Laing, 1923. Hairs on antennae and dorsum very long and fine, with fine, acute apices, numerous, in multiple transverse rows per segment. VIIIth abd. tergite with 6-10 hairs. Marginal tubercles on abdominal segments I to VII. Alatae with numerous rhinaria on segments III, IV and sometimes V. On Cyperaceae, Typhaceae and exceptionally Iridaceae growing near Typhaceae.

III. Subgen. *Euschizaphis* nov. subgen., type *Aphis palustris* Theob., 1928. Tergum in all mature forms somewhat sclerotic, with a very curious and unusual pattern of reticulations. Hairs as in *Schizaphis* sensu stricto. Marginal tubercles completely absent. On Scheuchzeriaceae, Juncaceae and *Poa annua*.

#### I. *Schizaphis* sensu stricto

Some new species of this subgenus were discovered in the Netherlands and they probably occur all over Western Europe. According to Mordvilko the siphunculi in apterous *Schizaphis graminum* are almost twice as long as the cauda. If that is correct I have never seen true *graminum* Rondani, as also in a few specimens from Africa which I possess the siphunculi are less than 1½ times as long as the cauda. I assumed that Mordvilko is right and therefore I identified the Western European material as *Schizaphis jaroslavi* Mordv., 1921. Mordvilko described his *Toxoptera jaroslavi* from

*Calamagrostis*, with apterous males. During the war I have made a detailed study of the hostplants of what I called *jaroslavi* Mordv. and found that only two genera of hostplants are typical, viz., *Holcus* and *Agrostis*. I found that also *Poa annua* can be infested, but *Poa annua* is a species which can serve as host for almost any aphid living on any species of grass.

It was found that the aphids on *Holcus mollis* and *H. lanatus* in the autumn developed apterous males, in all parts of the country. But those on *Agrostis* spp. produced only alate males, even when their hostplants grew intermingled with *Holcus*. This seems to suggest that two different forms occur, one on *Holcus* spp. (and *Poa annua*) and one on *Agrostis* spp. (and *Poa annua*). The form on *Holcus* is usually more yellow, that on *Agrostis* more greenish, but no further constant differences could be found. Though Van der Goot (1915) recorded *graminum* from *Phalaris canariense* in the Netherlands, it is remarkable that both in England and the Netherlands no *Schizaphis* infests cereals, though in my country a *Schizaphis* is quite common on *Holcus* and *Agrostis*. This too seems to suggest that the noxious, Southern, *Schizaphis graminum* (Rond.) does not occur in England and the Netherlands. I will give a description of *Schizaphis agrostis* nov. spec. and some of the forms of *S. holci* nov. spec.

#### *Schizaphis agrostis* nov. spec.

##### Fundatrix.

Morphological characters. Much as in the following form. Marginal tubercles, sometimes rather large, low-conical or semiglobular ones, present on abd. segments I to VII, rarely only on segments I and VII. Antennae  $2\frac{1}{5}$ - $1\frac{1}{2}$  of the length of the body, sometimes of 5 segments; processus terminalis  $1\frac{3}{4}$ - $2\frac{1}{4}$  times as long as base of last segment, about as long as IIIrd or a little longer. Sometimes siphunculi, cauda, antennae and legs rather dark sclerotic (as in *Sch. weingaertneriae* nov. spec.).

Colour. As in the next form, more rarely with a distinct darker median line.

Measurements of one specimen: Length of body: 1.62 mm; ant.: 0.82 mm; siph.: 0.18 mm; cau.: 0.17 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{52}{IV} : \frac{58}{V} : \frac{(50 + 110)}{VI}$ . (*Agrostis canina*, Bennekom, 25-IV-'44).

##### Apterous viviparous female.

Morphological characters. Body narrow oval, about 1.40-2.10 mm long. Tergum membraneous, colourless, smooth. Dorsal hairs short and blunt, those on IIIrd abd. tergite as long as the antennal hairs, VIIIth tergite with 2 about  $3\frac{1}{2}$ - $4\frac{1}{2}$  times longer hairs. Marginal tubercles very small,

usually just smaller than the stigmata, present on Ist and VIIth, more rarely also IIInd abd. segment, as typical for the genus. Front as typical for the genus, but the small tubercles near the antennal bases often hardly developed. Antennae about  $\frac{2}{3}$ - $\frac{6}{7}$  times as long as body, dark brown to blackish with paler base; processus terminalis  $3\frac{1}{2}$ -4 times as long as base of VIth segment,  $1\frac{1}{5}$ - $1\frac{1}{2}$  times as long as IIIrd segment. Hairs on IIIrd segment very sparse,  $\frac{1}{3}$ - $\frac{2}{5}$  times as long as basal diameter of the segment. Rostrum reaching just past the middle coxae; apical segment short, somewhat constricted at base and rather acute,  $\frac{3}{4}$ - $\frac{7}{8}$  times as long as 2nd joint of hind tarsi, a little less than half as long as Vth ant. segment, with 2 hairs besides the 3 apical pairs. Siphunculi  $\frac{1}{7}$ - $\frac{1}{6}$  times as long as body, slightly tapering from base to just before the dilated very apex, pale, to pale brown with dark to blackish apex, without distinct flange, hardly imbricated. Cauda rather cylindrical to elongated conical, blunt, pale,  $\frac{2}{3}$ - $\frac{3}{4}$  times as long as the siphunculi, with 4-5 hairs. Legs evenly pale yellowish with dark brown tarsi; first tarsal joints with 3, 3, 2 hairs; second tarsal joints dorsally only with apical hairs.

Colour. Grass-green to yellowish green with greener median line, smooth, not shiny. Antennae blackish with green base. Siphunculi greenish with brown apices. Remainder with the colour of the body.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V: VI
1	1.97	1.49	0.28	0.21	100: 69: 68: (36 + 132)
2	1.51	1.32	0.24	0.18	100: 57: 56: (38 + 138)
3	1.58	1.31	0.26	0.19	100: 62: 56: (34 + 134)

(1, *Agrostis* spec., Swalmen, 29-VI-'36; 2-3, *Agrostis* spec., Kockenge, 23-IX-'41).

#### Alate viviparous female.

Morphological characters. Head and thorax pale brownish to blackish brown sclerotic. Abdomen only with just visible marginal sclerites. Antennae black with only base of IIIrd segment pale; IIIrd segment with 4-10 rhinaria more or less in a row; IVth with 0-2 rhinaria. Siphunculi and cauda about as in the preceding form, but thinner. Legs brownish yellow with dark apices to the tibiae. Wings with brownish veins; media once branched. Other characters as in apterous viviparous female.

Colour. As in the preceding form, but head and thorax brownish.

Measurements of one specimen: Length of body: 1.80 mm; ant.: 1.46 mm; siph.: 0.22 mm; cau.: 0.18 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{61}{IV} : \frac{54}{V} : \frac{(34 + 130)}{VI}$ . Rhin. on IIIrd ant. segment: 8 and 8; on IVth: 1 and 1.

## Oviparous female.

Morphological characters. Tergum very finely and rather distinctly wrinkled. Cauda rather thick and often rather conical near apex. Hind tibiae considerably swollen, with about 45-70 large pseudosensoria, rather much darker than the other tibiae. Other characters as in apterous viviparous female.

Colour. Greenish yellow to yellowish green.

Measurements of one specimen: Length of body: 1.53 mm; ant.: 1.02 mm; siph.: 0.21 mm; cau.: 0.14 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{58}{IV} : \frac{63}{V} : \frac{(39 + 160)}{VI}$ .

## Alate male.

Morphological characters. Very much like alate viviparous female, but smaller and narrower. Antennae up to nearly as long as body; IIIrd segment with 12-24 rhinaria; IVth with 9-16 rhinaria; Vth with 8-15 rhinaria; the rhinaria partly much smaller than in alate female, the cauda rather acute, triangular. Genitalia well developed.

Colour. Head and thorax blackish, remainder as in alate female.

Measurements of one specimen: Length of body: 1.51 mm; ant.: 1.37 mm; siph.: 0.14 mm; cau.: 0.12 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{79}{IV} : \frac{76}{V} : \frac{(35 + 138)}{VI}$ . Rhin. on IIIrd ant. segment: 16 and 19; on IVth: 14 and 13; on Vth: 12 and 13.

Hostplants: *Agrostis* spp. div., *Poa annua* and, possibly, other Gramineae.

Geographical distribution: Netherlands, where it is widely distributed on *Agrostis* spp.; England?

Biology: During the whole year this species lives on *Agrostis* especially on plants growing in very dry, sandy spots, but also in salt marshes or saline meadows, between *Arundo phragmites* along ditches, etc. Often large families are present on the uppersides of the leaves, where usually the aphids sit in single rows with their heads towards the stems. Ants may be present, but not nearly regularly. Alatae are formed in the 3rd generation, but later they are rather rare. I collected sexuales on *Agrostis* spec. growing on dry sand in the beginning of October. Only few alate males were present, but numerous oviparae. Eggs were deposited on the leaves and stems of *Agrostis*.

Once I found this species on *Poa annua* and Van der Goot's material from *Phalaris* apparently also is this species.

Notes. The only difference between this species and *holci* seems to be in the alate males of *agrostis*, while also the colour may help to identify

material. In slides identification of all other forms than males is not possible.

Types: In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

### *Schizaphis holci* nov. spec.

1939. Hille Ris Lambers, D., Zool. Mededeelingen, vol. XXII, p. 90, *Schizaphis jaroslavi* partim.

#### Apterous viviparous female.

Morphological characters. As in the preceding species, but usually ventral hairs on abdomen somewhat longer than in that species.

Colour. Greenish yellow to pale yellow.

Measurements in mm.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V: VI
1	1.88	1.34	0.27	0.21	100: 58: 53: (33 + 114)
2	1.90	1.20	0.27	0.19	100: 59: 57: (41 + 133)
3	1.67	0.96	0.24	0.19	100: 56: 60: (40 + 128)
4	1.61	1.12	0.24	0.18	100: 63: 56: (40 + 152)
5	1.86	1.36	0.27	0.21	100: 72: 62: (38 + 145)

(1-3, from *Holcus mollis*, Bennekom, 26-V-'46; 4-5, from *H. lanatus*, Bennekom, 29-IX-'34).

#### Alate viviparous female.

Morphological characters. As in the preceding species.

Colour. As in the preceding form.

Measurements of one specimen: Length of body: 1.78 mm; ant.: 1.49 mm; siph.: 0.23 mm; cau.: 0.18 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{67}{IV} : \frac{67}{V} : \frac{(34 + 120)}{VI}$ . Rhin. on IIIrd ant. segment: 7 and 8; on IVth: 0 and 0.

#### Oviparous female.

Morphological characters. As in the preceding species. Also hind tibiae with about the same number of pseudosensoria.

Colour. Greenish yellow.

Measurements of one specimen: Length of body: 1.86 mm; ant.: 0.98 mm; siph.: 0.22 mm; cau.: 0.18 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{57}{IV} : \frac{57}{V} : \frac{(43 + 152)}{VI}$ .

## Apterous male.

Morphological characters. Slightly smaller and narrower than an apterous viviparous female. Pigmentation rather variable; in some specimens the head and pronotum are not markedly darker than the rest, in others the head is fuscous. Antennae up to  $\frac{9}{16}$  body's length; IIIrd segment along one side with 12-18 small rhinaria; IVth with 10-14; Vth with 4-10. Siphunculi as in apterae, cauda of the same slender shape, but shorter, both little pigmented if the head is pale, pigmented if the head is dark. Genitalia small, pale or dark like the head.

Colour. Like apterae viviparae, but slightly darker.

Measurements of one specimen: Length of body: 1.55 mm; ant.: 1.38 mm; siph.: 0.20 mm; cau.: 0.13 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{63}{IV} : \frac{54}{V} : \frac{(33 + 120)}{VI}$ . Rhin. on IIIrd ant. segment: 15 and 17; on IVth: 13 and 12; on Vth: 10 and 8.

Hostplants: *Holcus lanatus*, *H. mollis*.

Geographical distribution: In the Netherlands widely spread over the country, not rare.

Biology: Lives during the whole year on *Holcus lanatus*, possibly also on *H. mollis*, where I found it until now only in summer. The leaves on which the aphids live turn brown and die. The colonies are usually visited by ants. Alatae were found only in the 2nd generation, as usual in this genus, where they are rare later in the year.

Notes. In my material those specimens of which the host is undoubtedly correctly identified, differ from those collected on *Agrostis* in having somewhat longer hairs on the venter and the undersides of the basal halves of the femora. It will want further investigation to decide whether this character can be used for differentiating *holci* and *agrostis* nov. spp.

Types. In the author's collection and the Rijksmuseum van Natuurlijke Historie, Leiden.

On *Corynephorus canescens* (*Weingaertneria coerulea*) another new species of *Schizaphis* sensu stricto was found, which especially in life differs much from the other species which I know, by being covered by a thin layer of waxpowder so that the aphids look bluish-grey like the host plant. It lives monophagously on its host, can morphologically be distinguished from the other species and is never visited by ants, even if these visit other species of *Schizaphis* on Gramineae between the hostplants. I give this species the name

*Schizaphis weingaertneriae* nov. spec.

## Fundatrix.

Morphological characters. Like the next form, but usually somewhat larger. Antennae of 5 segments, sometimes with a subdivision of the IIIrd segment indicated, only  $\frac{3}{8}$ - $\frac{4}{9}$  body's length; processus terminalis  $1\frac{3}{4}$ - $2\frac{1}{8}$  times as long as base of last segment, much shorter than IIIrd segment. Siphunculi thin, usually curved inwards,  $\frac{1}{17}$ - $\frac{1}{12}$  body's length. Cauda  $1\frac{1}{2}$ - $1\frac{1}{3}$  times the siphunculi.

Colour. As in the next form.

Measurements of one specimen: Length of body: 1.74 mm; ant.: 0.65 mm; siph.: 0.11 mm; cau. 0.17 mm. Prop. of ant. segments:

$$\frac{100}{\text{III}} : \frac{47}{\text{IV}} : \frac{(40 + 82)}{\text{V}}.$$

## Apterous viviparous female.

Morphological characters. Body rather narrow oval, very small, 1.20-1.65

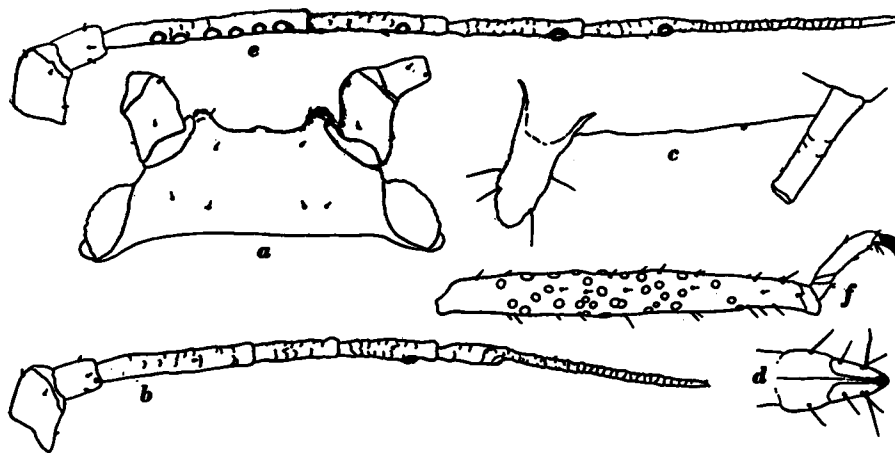


Fig. 13. *Schizaphis weingaertneriae* nov. spec., apt. viv. fem.: a, head; b, antenna; c, siphunculus, marginal tubercle on VIIth segment and cauda; d, ultimate rostral segment; al. viv. fem.: e, antenna; ovip. fem.: hind tibia and tarsus.  $\times 120$ .

mm long. Tergum membraneous, colourless, without ornamentation; head smoky on anterior part to wholly dark. Hairs on IIIrd abd. tergite as long as those on IIIrd ant. segment, VIIIth tergite with 2 little longer hairs. Ist and VIIth abd. tergite usually, but not regularly, with very small, low, hardly perceptible marginal tubercles, which on VIIth tergite are placed as typical for the genus. Front as typical for the genus. Antennae of 6 seg-

ments, with the segmentation between IIIrd and IVth segment often obsolete, dark smoky to blackish, with basal segments and base of IIIrd segment a little paler,  $\frac{3}{7}$ - $\frac{4}{7}$  times as long as body; IVth segment usually shorter than Vth; processus terminalis  $1-1\frac{1}{3}$  times as long as IIIrd segment, about  $2\frac{2}{5}$ -3 times as long as base of last segment. IIIrd segment with a few hairs which are about  $\frac{1}{3}$  times as long as its basal diameter. Rostrum reaching just past the middle coxae; apical segment short, but rather acute, a little shorter than 2nd joint of hind tarsi, with 2 hairs besides the 3 apical pairs of which one pair stands about in the middle of the segment. Siphunculi cylindrical, often a little curved inwards, rather evenly dark smoky or darker towards apex, about  $\frac{1}{11}$ - $\frac{1}{9}$  times as long as body, nearly smooth, without flange but with often just dilated apex. Cauda long, about cylindrical, blunt, as dark as the siphunculi and  $1-1\frac{1}{7}$  times as long, with 4 or sometimes 5 hairs. Legs rather dark to blackish with the apices of the tibiae darker; first tarsal joints with 3, 3, 2 hairs; second tarsal joint dorsally only at apex with one pair of hairs.

Colour. Rather dark green, always bluish grey by a distinct waxy exudation. Antennae, legs, siphunculi and cauda dark, greenish.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V: VI
1	1.57	0.71	0.14	0.14	100: 38: 62: (44 + 116)
2	1.44	0.75	0.13	0.14	100: 42: 61: (42 + 116)
3	1.51	0.78	0.14	0.16	100: 50: 64: (45 + 105)
4	1.31	0.77	0.14	0.14	100: 50: 65: (41 + 110)
5	1.34	0.71	0.13	0.14	100: 44: 58: (44 + 131)

(1, *Corynephorus canescens*, Bergen op Zoom, 16-VI-'41; 2-3, idem, 17-VI-'41; 4-5; idem, 23-VI-'42).

#### Alate viviparous female.

Morphological characters. Head and thorax dark brown to blackish sclerotic, otherwise very much like apterous viviparous female. Antennae longer; IIIrd segment with 5-8 rather large rhinaria in a line; IVth with 0-2. Siphunculi and cauda thin. Wings with the media once furcated.

Colour. As in apterous viviparous female.

Measurements of one specimen: Length of body: 1.48 mm; ant.: 0.90 mm; siph.: 0.12 mm; cau.: 0.15 mm; Prop. of ant. segments:  $\frac{100}{III} : \frac{51}{IV} : \frac{63}{V} : \frac{(41 + 104)}{VI}$ . Rhin. on IIIrd ant. segment: 6 and 7; on IVth: 0 and 0.

#### Oviparous female.

Morphological characters. Much like apterous viviparous female, but an-



tennae comparatively slightly shorter. Cauda rather thick. Hind tibiae short, about twice as thick as the other tibiae, with about 40-50 large pseudosensoria over nearly their whole length.

Colour. As in apterous viviparous female.

Measurements of one specimen: Length of body: 1.62 mm; ant.: 0.80 mm; siph.: 0.15 mm; cau.: 0.16 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{59}{IV} : \frac{69}{V} : \frac{(50 + 156)}{VI}$ .

#### Apterous male.

Morphological characters. Body narrower and smaller than in apterous viviparous female, otherwise similar. Antennae to  $\frac{10}{11}$  length of body; IIIrd segment along one side with 12-18 small rhinaria; IVth with 6-11; Vth with 4-10 secondary rhinaria. Siphunculi about  $\frac{1}{12}$ - $\frac{1}{10}$  length of body; cauda rather conical.

Colour. Very dark green to blackish green under the thin wax-cover.

Measurements of one specimen: Length of body: 1.22 mm; ant.: 1.07 mm; siph.: 0.11 mm; cau.: 0.13 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{62}{IV} : \frac{54}{V} : \frac{(35 + 119)}{VI}$ . Rhin. on IIIrd ant. segment: 14 and 17; on IVth: 9 and 8; on Vth: 6 and 10.

Hostplant: *Corynephorus canescens*.

Gegographical distribution: Only known from Bergen op Zoom and Bennekom, Netherlands.

Biology: Lives on the undersides of the bristly leaves of its host, where the aphids usually sit in single file. Fundatrices were taken in the end of April. The second generation is partly alate; afterwards alatae are rather rare. Oviparae and males were taken in the beginning of October. The colour of the eggs was not noted. Though *Lasius alienus* was always present in the localities where I found this species, it did not bother about this aphid, though both *S. holci* and *agrostis* on their hosts were visited nearby.

Notes. This species in slides looks like very dark pigmented specimens of *S. holci* or *agrostis* nov. spp., but it differs from both species in its shorter siphunculi, which only seldom are as long as the cauda, by the tubercles on the abdomen, which, if they are at all present, are not much larger than the papilla of a hair, while in the other species they have about the size of a stigmal apparatus. The antennae are comparatively shorter in all forms, except the males. In life the species is very different.

As all its forms, also the larvae, are covered with grey wax-powder, this species is very difficult to find on its host. Moreover, the aphids let fall

themselves immediately on disturbance. The best way is threshing the plants on a slip of paper, which in such cases gives very satisfactory results.

Types. In the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden.

## II. *Paraschizaphis* nov. subgen.

I recognize two species, belonging in this group: *Toxoptera scirpi* (Pass.) (*T. typhae* Laing) and *Aphis caricis* Schouteden. I choose *Toxoptera typhae* Laing as type, because of that species the typical material still exists, while Passerini's types are hidden, and Schouteden's material seems to have been destroyed in the first world war.

*Schizaphis* (*Paraschizaphis*) *scirpi* was mentioned before in this periodical. *Schizaphis* (*Paraschizaphis*) *caricis* Schouteden lives on some species of *Carex*, but is practically limited to the bases of the leaves of *Carex hirta*, on which it is rather common in the Netherlands, Belgium and Italy. This species differs from *scirpi* in having the hairs on IIIrd ant. segment up to 2 times as long as basal diameter of the segment, in *scirpi* up to 3 times that diameter. In the alatae the IIIrd segment bears 12-20 rhinaria, the IVth 6-12, the Vth 0-4 rhinaria, while in *scirpi* these segments bear 8-16, 0-4 and 0 rhinaria, respectively. The sexuales I have not yet found. The species is always attended by ants, which build mud-shelters over the half-subterraneous colonies.

From the description it seems possible that also the North American species "*Toxoptera*" *viridi-rubra* Gillette & Palmer, 1932 (Ann. Ent. Soc. America, vol. XXV, p. 136, also page 495) belongs in this subgenus.

## III. *Euschizaphis* nov. subgen.

Of *Aphis palustris* Theob. only apterous forms have been described. I have found all forms, but the material of the sexuales was stolen with the suitcase in which it was transported. The males are apterous. The alatae which I obtained from various plants, have the media once furcated. All forms are characterized by a particular type of reticulation of the abdomen. *Schizaphis* is characterized by the position of the marginal tubercles on the VIIth abd. segment. As, however, in the species under consideration no marginal tubercles on abdomen could be found, it seems rather queer to bring it in *Schizaphis*, but the structure of its front, with the minute processus on the frontal tubercles, so typical for *Schizaphis* and related genera, make its position as a relative of this group certain. In the alatae the antennae show 5-9 rhinaria in a row on IIIrd segment, 1-4 on the IVth. Especially in the apterae the siphunculi with their conical shape and strong constriction before

the wide, thick flange are more like those of *Rhopalosiphum* (e.g., *Rh. insertum* Wlk. on roots of Gramineae) than of *Schizaphis*. Also the shape of the cauda is rather different from that of the other species of *Schizaphis* and more like *Rhopalosiphum* Koch, as it is conical and rather pointed.

In the Netherlands this species is very common on *Juncus bufonius*, *J. tenageia*, *J. lamprocarpus* and an unidentified species. I also collected it on *Triglochin palustre*, its typical host, and it is rather numerous on *Poa annua* growing in the shadow and in moist places. On *Juncus* it lives on the leaves and between the flowers. Also on this hostplant it is found only on moist soil, along ditches, etc.

#### 10. *Aphis audax* nov. spec.

*Apterous viviparous female.*

Morphological characters. Body small, oval, 1.00-1.40 mm long. Head and subgenital plate dark sclerotic, remainder of body membraneous, smooth. Hairs on tergum shorter than basal diameter of IIIrd ant. segment; VIIIth tergite with 4 hairs; 1-2 pairs of marginal hairs on segments I-IV. Marginal tubercles on abd. segments I and VII, very small, low, blunt. Front convex. Antennae rather thin, about half as long as body, dark, with the base of IIIrd segment paler, imbricated; processus terminalis about  $1\frac{1}{2}$ -2 times as long as base of VIth segment, about as long as IIIrd segment. Hairs on IIIrd segment  $\frac{1}{2}$ - $\frac{5}{8}$  times as long as its basal diameter. Rostrum reaching to just past hind coxae; apical segment rather short, only  $1\frac{1}{2}$  times as long as the short 2nd joint of hind tarsi, with two hairs besides the 3 apical pairs. Siphunculi short, slightly conical to cylindrical,  $\frac{1}{16}$ - $\frac{1}{12}$  times as long as body, darkish with paler base, slightly imbricated, with small flange. Cauda blunt, elongated triangular, as dark as the siphunculi,  $1\frac{1}{3}$ - $1\frac{5}{8}$  times as long as siphunculi, with usually 5 hairs. Subgenital plate with 2 hairs on anterior half. Legs short, brownish with darker apices to the tibiae; first tarsal joints with 3, 3, 2, sometimes 3, 2, 2, hairs.

Colour. Green, rather dark. Siphunculi and cauda very dark green. Antennae and legs more or less like the body.

Measurements in mm and proportions of ant. segments.

No.	Length body	Ant.	Siph.	Cau.	Prop. of ant. segments III: IV: V: VI
1	1.29	0.66	0.09	0.14	100: 60: 57: (57 + 100)
2	1.34	0.67	0.10	0.14	100: 63: 56: (50 + 91)
3	1.10	0.54	0.08	0.13	100: 59: 62: (73 + 113)
4	1.15	0.57	0.075	0.13	100: 56: 56: (52 + 88)
5	1.23	0.65	0.10	0.13	100: 62: 59: (55 + 103)
6	1.11	0.62	0.08	0.125	100: 64: 64: (51 + 112)

(1-6, *Drosera* spp., Hoogeveen, VIII-1936).

**Alate viviparous female.**

Morphological characters. Head, thorax and abdominal marginal sclerites dark, blackish sclerotic. Antennae up to  $\frac{2}{3}$  times as long as body, rather thick; IIIrd segment with about 35-40 rhinaria allround; IVth with 12-17; Vth with 4-7. Siphunculi cylindrical, about  $\frac{1}{15}$  times as long as body. Wings with normal, brown veins, without shadowy borders. Other characters as in apterous viviparous female.

Colour. Head and thorax black, remainder as in apterous viviparous female.

Measurements of one specimen: Length of body: 1.36 mm; ant.: 0.82 mm; siph.: 0.09 mm; cau.: 0.12 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{58}{IV} : \frac{48}{V} : \frac{(35 + 69)}{VI}$ . Rhin. on IIIrd ant. segment: 37 and 39; on IVth: 16 and 14; on Vth: 5 and 6.

Hostplants: *Drosera rotundifolia* L., *D. intermedia* Hayne.

Geographical distribution: Only found near Hoogeveen, Netherlands.

Biology: Lives in large colonies on the undersides of the leaves, along the flowerstems and sometimes between the glandular hairs on the leaves of its hosts which die after turning brown. Alatae were obtained from nymphs collected in the second half of August. The aphids were not visited by ants. The hostplants were growing in very wet *Sphagnum* where I found them infested.

Notes. As the material was destroyed by the Germans during the war and only the description of the two forms was left, I have to omit the usual comparison with similar species, as also my key to *Aphis* spp. was destroyed. Another *Aphis* from *Drosera* was described by Takahashi from Formosa as *Aphis droserae* Takah., 1921, but our species is very different in number of rhinaria in alatae and its shorter siphunculi. Zirnits, 1930 (Latvijas augu aizsardzibas instituta raksti, vol. I, p. 50) has observed an *Aphis* spec. on *Drosera anglica* Hudson, and in his case as well the plants were severely damaged, though some alatae, but no apterae were eaten. He saw, however, that plants with aphids caught many more specimens of the aphid parasites *Aphidius* than plants without aphids. I tried to investigate this near Hoogeveen, but there no *Aphidius* could be found on the leaves. Anyhow the interrelation plant-insect-parasite is highly unusual in this case.

**11. *Aphis abnobae* Engelberg, 1811**

In a long article J. M. von Engelberg (Wetterauer Annalen, vol. II, p. 21-37) describes the damage done to cereals by his *Aphis abnobae* nov. spec.

From his description of the insect it is evident that it was not an aphid, but another Homopteron, possibly *Liburnia pellucida* F., which according to Tullgren in Sweden damages oats in about the same way as Engelberg describes. *Aphis abnoba* does not occur in the various lists of described aphids.

#### 12. "*Aphis cichorii* Dutrochet"

Various authors use the name *Aphis cichorii* Dutrochet for a black aphid on *Cichorium intybus*. Also Wilson & Vickery, "A species list of Aphididae of the World" (Trans. Wisconsin Acad. Sciences, vol. XIX, part I, 1918) quote on p. 56 "*Aphis cichorii* Dutrochet, 1833. Ann. Soc. Nat., XXX, p. 204" and the absence of an asterisk indicates that the quotation has been verified.

Though Dutrochet mentions an aphid from *Cichorium* in his paper of 1833 he did not give it a name. His species evidently was a *Dactynotus* species. The so called *Aphis cichorii* Dutrochet of authors should be named *Aphis intybi* Koch, 1855 (Die Pflanzenläuse Aphiden, p. 148).

#### 13. *Aphis polaris* Curtis, 1828

This species is not mentioned in any of the lists of Aphids. It is described in the Appendix of Parry, Narrative of an attempt to reach the North Pole. According to the description *polaris* Curtis is a synonym of *Tuberolachnus salignus* (Gmelin, 1790). The locality where the insects were taken is of supreme interest. On p. 87 of the Narrative it is stated how after weeks of struggling over the ice the expedition on 82° 26' 44" lat., 20° 32' 13" long. found "a couple of small flies (to us an event of ridiculous importance)". The insects were stiff with cold but "revived by the heat of the hand". As the nearest locality where *Salix*, the host of this species, grows is Spitzbergen, the aphids apparently have been capable of surviving a flight of at least 180 km.

#### 14. *Pterocomma morio* nov. spec.

Apterous viviparous female.

Morphological characters. Body rather small for a species of this genus, only about 2.5 mm long. Hairs long, fine, numerous. Sclerotic and pale brownish pigmented are: the head, pronotum, large paired spinal and marginal sclerites on mesonotum; small, irregular marginal sclerites on abd. segments II-VI; small, irregular narrow spinal sclerites on tergite VI; an interrupted transverse bar on tergite VII and a complete one on VIII; very

small sclerites around the marginal tubercles of VIth tergite; the stigmal plates, which are a little darker than the other sclerites. Marginal tubercles present on abd. segments I-VII, those on Ist and VIIth segment smaller, the latter sometimes absent; these tubercles are high-conical to almost cylindrical with blunt, corrugated apex. Antennae brownish with darker apex, very hairy; interrelation of length of segments vide measurements; IIInd segment dorsally with one hair, ventrally with about 8-12 hairs; IIIrd segment allround with a great number of hairs, always with at least 8 hairs directed to the side which bears the 1-6 rhinaria, which are placed near the middle; processus terminalis on its base with 1-3 very long

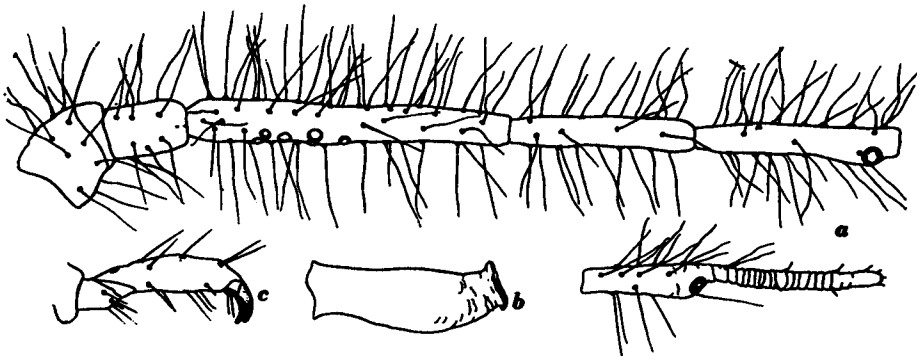


Fig. 14. *Pterocomma morio* nov. spec., apt. viv. fem.: a, antenna; b, siphunculus; c, hind tarsus.  $\times 120$ .

hairs; remainder as in other species of the genus. Rostrum very long, reaching far past the hind coxae; apical segment with about 10 hairs besides the 3 apical pairs, about  $1\frac{1}{8}$  times as long as second joint of hind tarsi. Siphunculi much paler than the abdominal sclerites, about  $\frac{1}{12}$ - $\frac{1}{10}$  of the body's length, swollen, basally and apically constricted, with distinct flange; surface not imbricated but rather finely wrinkled, with some transverse striae at apex, about  $1\frac{1}{4}$ - $1\frac{2}{7}$  times as long as second joint of hind tarsi. Cauda dark, roundish, about  $\frac{3}{5}$  of its basal width long, dorsally a little constricted at its very base, very hairy. Legs hairy, with the femora and tibiae pale brownish at base and darker to black towards apex; first tarsal joints of mid- and especially hind legs often with 4 instead of 5 hairs, the median thick spine about  $\frac{2}{5}$  of the lateral ones; second joint with the apical dorso-lateral pair of hairs about  $\frac{1}{3}$  of the empodial hairs.

Colour. Dorsally brownish black; with fine grey spinal line, thin grey intersegmental transverse lines between all segments; a broad grey band across Vth tergite; large, sometimes medially coalescing grey pleuro-spinal

spots on posterior half of mesonotum; grey pleural and marginal spots on abdomen; head dirty dark olive-green. Ventrally greyish white. Siphunculi bright orange. Legs yellowish brown with femora and tibiae distally blackish brown. In alcohol, which removes the wax, body dirty greenish brown with blackish spots which correspond with the sclerites. Antennae coloured like the legs.

Measurements in mm.

No.	Length	Ant. body	Siph.	Cau.	Rhin. on		Antennal segments			
					III	III	IV	V	VI	
1	2.64	1.49	0.22	0.14	2 & 2	0.43	0.25	0.26	0.15 + 0.20	
2	2.47	1.35	0.23	0.15	5 & 6	0.38	0.21	0.24	0.15 + 0.17	
3	2.53	1.50	0.24	0.16	1 & 3	0.43	0.24	0.24	0.17 + 0.20	
4	2.51	1.23	0.20	0.15	1 & 2	0.33	0.22	0.25	0.15 + 0.20	

Hostplant; *Salix repens*, only found near Bergen op Zoom, Netherlands.

Biology; A small colony was found on the underground parts of *Salix repens*, together with more numerous *Chaitophorus hypogaeus* Schouteden, attended by *Lasius alienus*, October 4th, 1943. Attempts to rear more failed.

Notes. The species is rather distinct from other European forms by:

1. The number of hairs on IIInd ant. segment, where in other species dorsal hairs are often absent and ventral hairs in most species much less numerous. Also the IIIrd segment is much more hairy than in most other species, where usually only 4-5 hairs are directed outwards (to the side of the rhinaria).

2. The long hairs on the base of the processus terminalis, on which in other species only the normal short hairs are present, which in some species extend to the Vth segment.

3. The length and shape of the siphunculi.

The colour of the live insects is very striking and reminds of *P. salicis* (L.).

Types. Cotypes in the author's collection and in the Rijksmuseum van Natuurlijke Historie, Leiden, in total 4 apterae viviparae.

#### 15. *Stomaphis radicicola* nov. spec.

*Apterous viviparous female.*

Morphological characters. Body large, rather broadly oval, about 4.5-6.0 mm long. Abdominal tergum membranous, with small, brownish intersegmental pleural sclerites, with rather small, dark, paired, spinal sclerites only on VIIth tergite, with the VIIIth tergite wholly brownish sclerotic; ventrally median unpaired, oval, dark, nude sclerites on each sternite present. Antennae a little less than half as long as body, dark sclerotic; Ist and IIInd

segment both tapering towards base; IIIrd segment sometimes with up to 2 small rhinaria, usually without rhinaria; IVth segment with 0-5, average 2.9 rhinaria; Vth and VIth each only with one large primary rhinarium; VIth segment always longer than Vth, about  $1\frac{1}{4}$ - $1\frac{2}{5}$  times as long, slender; Vth very little longer than IVth. Siphuncular cones very large, about  $0.70 \times 0.48$  to  $0.80 \times 0.60$  mm; diameter of the porus about  $\frac{2}{5}$  of the length of IIInd ant. segment. Other characters as in the genotype.

Colour. In life powdered with grey dust, in alcohol whitish with the sclerotic areas brownish.

Measurements of one specimen: Length of body: 5.34 mm; ant.: 2.42 mm; diam. siph.: 0.10 mm; Prop. of ant. segments:  $\frac{100}{III} : \frac{51}{IV} : \frac{60}{V} : \frac{77}{VI}$ . Rhin. on IIIrd ant. segment: 0 and 0; on IVth: 3 and 3.

Hostplant: *Betula* spec.

Geographical distribution: Only known from Leersum, collected by Prof. Docters van Leeuwen.

Biology: The only facts known about the biology of this species is, that rather large colonies occurred on the roots of *Betula* spec., well under the soil. *Lasius umbratus* attended the aphids.

Notes. I have not seen all the European species of the genus *Stomaphis* so that I have to rely on a key by Mordvilko in Filipjev's Russian Key to Insects (Opredelitel Nasekomich, Moscou, 1928). With this key the following synopsis has been constructed.

- 1(4) VIth ant. segment longer than Vth. Median nude areas on the abd. sternites dark sclerotic, also in alcohol or macerated specimens.
- 2(3) Abdominal tergites always with large paired spinal sclerites on all segments; sometimes these sclerites are partly broken up into small, scattered sclerites. Body very large, dark, brownish or brownish green, never powdered, 5.5-7.5 mm long, elongated and rather cylindrical. On *Quercus* spp. and *Betula* spp., usually on the trunks, sometimes on the roots, always accompanied by *Lasius fuliginosus*.  
*S. quercus* (L.).
- 3(2) Abdomen only with paired dorsal sclerites on segments VII and with a complete sclerotic transverse band across tergite VIII; Body smaller, 4.5-6.0 mm long, whitish, powdered with grey dust, rather broadly oval, depressed. On the roots of *Betula* spec., accompanied by *Lasius umbratus*. *S. radicola* nov. spec.
- 4(1) VIth ant. segment shorter than Vth. Median nude areas on the abdominal sternites pigmented or not pigmented.
- 5(6) Nude areas on the abd. sternites dark pigmented. On the bark of *Populus alba*.  
*S. longirostris* (Pass.).
- 6(5) Nude areas on the abd. sternites not pigmented, quite colourless.
- 7(8) IVth ant. segment as long as VIth, considerably shorter than Vth. On *Populus nigra*, *Salix* spp., accompanied by *Lasius brunneus* <sup>1)</sup>. *S. bobretzkyi* Mordv.

1) Specimens from *Salix alba* recently received from France, were found with *Lasius fuliginosus*.



- 8(7) IVth ant. segment longer than VIth and about as long or a little shorter than Vth.  
 Body whitish, powdered. On the bases of the trunks of *Acer campestre*, sub-  
 terraneously, accompanied by *Lasius brunneus*. *S. graffi* Chol.

It is impossible to say what Fabricius meant with his *Aphis longirostris*. Evidently it was a *Stomaphis*, but as no hostplant is indicated identification is impossible. In 1860 Passerini describes a *Lachnus longirostris* as new species from *Salix vitellina*, *S. alba*, *Populus alba* and *Acer campestre*. Apparently several species were included. The species from *Salix* and *Acer* have since been described as *bobretzkyi* Mordv. and *graffii* Chol. respectively. Mordvilko retains the name *longirostris* with author's name Passerini for the species living on the bases of the trunks of *Populus alba*. There are no objections against this procedure. Remains the question what *Aphis longirostris* F. is. With the exception of *S. quercus* L. all the European species live quite hidden, below or just above the soil, but then covered by shelters of mud. Therefore, and particularly because the other species live farther Southwards it is not very likely that Fabricius saw any other species than *Stomaphis quercus* (L.). I therefore place *Aphis longirostris* F. as a synonym of *Aphis quercus* L. *Lachnus longirostris* Pass. is not preoccupied, for it was described as a *Lachnus* and as new species. Therefore the name *Stomaphis longirostris* can still be used with Passerini as author. *Phylloxera longirostris* Fonsc., 1841, and *Rhynchoscles longirostris* Altum, 1881, are both synonyms of *Stomaphis quercus* (L.).

#### 16. "Agrioaphis Walker, 1852"

In his interesting article "Beiträge zu einem neuen System der Blattläuse", Arch. f. klass. u. phyl. Entom., vol. I, 1930, Börner speaks on p. 130 of *Agrioaphis* Wlk., 1852, type *Aphis coryli* Goeze, and on p. 161 and 166 mentions *Aphis myricae* Klth. as type. *Aphis coryli* Goeze is the genotype of *Myzocallis* Pass., 1860, and apparently Börner changed the generic name while correcting proofs without changing the genotype.

On p. 161 Börner says: "'*Agrioaphis* Walker (1852). In den "List Homopt. Brit. Mus. IV, 128, 1003" hat Walker "*Aphis myricae* Kalt." als *Agrioaphis myricae* aufgeführt. Dadurch fällt *Myzocallis* Passerini (1860), da dessen Typus *coryli* Goeze mit *Agrioaphis myricae* kongenerisch ist, als Synonym zu *Agrioaphis*".

In Walker's book of 1852 no reference is made to a genus *Agrioaphis* and on the page which Börner quotes the mentioned insect is named *Aphis myricae* Kalt. Therefore *Agrioaphis* Wlk., 1852, is a mystification. The name seems not to have been used before 1870 by Walker.

17. *Clethrobius comes* (Walker, 1848)

This species has not been mentioned since Walker described it as *Aphis comes*. It is, however, possible that *Callipterus giganteus* Chol. is the same insect. Mordvilko places the latter species in his genus *Clethrobius* and evidently Walker's species belongs in the same genus. I redescribe some of its forms here.

**Fundatrix.**

Morphological characters. Body large, 3.8-4.5 mm long, elongated, slender. Head and thorax brownish sclerotic with the mesoscutal lobes fuscous to black. Abdomen with paired transversely oval dark dorsal sclerites on the posterior half of each of which about 8-12 hairs are placed; these sclerites are usually mutually free on tergites IV and V; on their posterior margin they bear groups of granulated waxpores; marginal sclerites large, with 14-20 hairs each, on anterior margin with a membraneous incision, in which a small free sclerite lies; the marginal sclerites are at their dorsal apex protracted into a short protuberance with 2-3 hairs and one or more small tubercles. Antennae blackish sclerotic, about  $\frac{2}{3}$  of the length of the body; IIIrd segment with basal  $\frac{1}{2}$ - $\frac{1}{3}$  part on one side covered with about 30-45 transversely oval rhinaria, most of which are narrow-oval, a few more roundish; processus terminalis short, constricted at its very base, about half as long as base of VIth segment. Antennal hairs like those on dorsum, long and fine, spreading at right angles, on IIIrd segment about  $1\frac{1}{5}$ -2 times as long as its diameter below the basal rhinarium. Rostrum very short, hardly or just reaching the middle coxae; apical segment short, blunt, about  $\frac{5}{7}$  of the length of the 2nd joint of the hind tarsi, with numerous hairs. Siphunculi dark sclerotic, shortly conical,  $\frac{4}{7}$  times as long as their basal width, very faintly imbricated, with dilated porus, without flange. Cauda with broad, pale basal  $\frac{2}{3}$  part and globular, knobbed apical part, which bears about 14 hairs. Anal plate in the middle of its posterior margin a little concave. Legs cloudy dark sclerotic to black, the tibiae at their very apices with 4 thick thorns, distally with small spinules between the hairs; first tarsal joints of all legs with 2 dorsal hairs and 7 ventral hairs. Wings with normal venation; veins blackish brown, not shadowed, without dusky spots at their apices; stigma evenly dark.

Colour. Brown, with paler, green bands across the abdominal dorsum. Thorax black, head paler. Antennae and cauda black. Siphunculi dark green. Legs black with the basal half of the femora brownish.

Measurements of one specimen: Length of body: 4.30 mm; ant.:

2.82 mm; siph.: 0.09 mm; cau.: 0.21 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{48}{IV} : \frac{38}{V} : \frac{(16+8)}{VI}$ . Rhin. on IIIrd ant. segment: 37 and 38.

**Alate viviparous female.**

Morphological characters. Very much like the preceding form. The body as a rule smaller and narrower. The sclerites on the abdominal tergum mutually quite free and reduced, so that sometimes only sclerites are left at the bases of the spinal hairs; the wax-pores are here distinctly concentrated around the bases of the spinal hairs. The number of spinal hairs is smaller, sometimes only 10 in total per segment. Processus terminalis about  $\frac{2}{3}$ - $\frac{3}{4}$  of the length of the base of VIth segment.

Colour. Head dirty brownish green. Thorax blackish brown. Abdomen blackish green with pale olive-green mottlings. Cauda black. Siphunculi with the colour of the abdomen. Antennae and legs black, the latter with the bases of the femora dirty greenish yellow.

Measurements of one specimen: Length of body: 4.86 mm; ant.: 3.64 mm; siph.: 0.11 mm; cau.: 0.23 mm. Prop. of ant. segments:  $\frac{100}{III} : \frac{63}{IV} : \frac{54}{V} : \frac{(18+13)}{VI}$ . Rhin. on IIIrd ant. segment: 36 and 37.

Hostplants: *Betula* spp. (*Alnus* spec., collected by F. Hartig).

Geographical distribution: Europe (England; Netherlands, common; Italy), Western Asia?

Biology: The species lives during the whole year on 1-4 year old branches of *Betula*; often in enormous families. All the fundatrices are alate, and like in *Euceraphis* Wlk., no apterous viviparous forms seem to exist. Oviposition was not yet observed. It is characteristic for this species that it is frequently attended by ants, contrary to *Euceraphis nigratarsis* v. Heyden.

Notes. *Clethrobius comes* is intermediate between *Euceraphis* Wlk. and *Symydobius* Mordv. It has the cauda and the wax-glands of *Euceraphis*, but the chaetotaxy of *Symydobius*. Like *Symydobius* it is visited by ants, but it has no apterous viviparous females. Most certainly the species has often been mistaken for a form of *Euceraphis nigratarsis* (Heyd.) (*betulae* auctt. nec Linné), which it resembles in general habitus and which in the spring lives on the same twigs. But in the summer the green *Euceraphis nigratarsis* remains on the youngest twigs and goes to the leaves, while *Clethrobius comes* goes to older branches, where it may occur together with *Symydobius oblongus*. It is not excluded that *Clethrobius giganteus* Chol. will eventually appear to be a synonym of *C. comes*.