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On Alpine Rose- and grass-infesting species of *Metopolophium* MORDVILKO, 1914, with descriptions of two new species (Homoptera, Aphididae)

by

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Introduction

In 1950 I had to investigate a statement by FENJVES (1945) that the aphids *Myzus* (*Nectarosiphon*) *persicae* (SULZER) and *Macrosiphum euphorbiae* (THOS.) hibernate successfully and in numbers as eggs on *Rosa alpina* near Airolo, Switzerland. Dr. M. MARTIGNONI, then at Zürich, lead me to the rose bushes on which FENJVES had made his observations, and subsequently many more *Rosa alpina* were examined, also near Zeneggen, above Visp.

As I expected, not one specimen of the above mentioned species was found on *Rosa alpina* or other alpine *Rosa* spp. But three aphid species not known from Western Europe appeared to be quite typical for *Rosa* at 1000 m and higher. On one of these, *Chaetosiphon chaetosiphon* NEVSKY, the author reported in 1953. The other two, *Metopolophium montanum* spec. nov. and *Metopolophium alpinum* spec. nov. are described in the present paper, now that their life cycles have been discovered. Notes on other species of *Metopolophium* that have been reported or found in the Alps are added.

1. *Metopolophium gracilipes* BÖRNER, 1950

BÖRNER describes this as follows: "*M. graminum* THEOB. nahestehend, Rüssel etw. länger (0.42–0.44 gegen 0.28–0.35). Ht-Tibien d. ♀ kaum verdickt, grösste Dicke etwa $1\frac{1}{2}$ mal Si-Mitte (bei *graminum* grösste Dicke 2–, fast 3 mal), 1.7–2.1 mm. Von Gras gekätschert, hochalpin. Steiermark (Verf.), Tirol (Janetschek)."

Through the kindness of Dr. H. FRANKHÄNEL of the Deutsches Entomologisches Institut, Eberswalde, I could borrow BÖRNER's material from Styria, and that collected by JANETSCHEK. Besides I could examine what BÖRNER had as *Metopolophium graminum* THEOB. The latter material should be discussed first.

In 1952 BÖRNER records *graminum* from Styria. In BÖRNER & FRANZ (1961) there is a record from Gierenalm (Styria). The BÖRNER slide is No. 40/55 labelled: "Franz gekäsch. / ob Gernalm / graminum / 584." This slide contains two oviparae, not of a *Metopolophium*, but of *Ericaphis latifrons* (BÖRNER). *Metopolophium graminum* BÖRNER, 1950, 1952 therefore is a synonym of *Ericaphis latifrons* (BÖRNER, 1942), and it is with this species that BÖRNER compared his *Metopolophium gracilipes*.

The examined material of *gracilipes* consisted of two slides. 40/24, contains one ovipara, labelled: "Kaiserau / Almen ca. 1050 m / Gras ? gracilipes / unreadable 586." In BÖRNER & FRANZ (1961) one finds that the Styria specimens came from meadows of the Kaiserau. No. 40/23 contains two oviparae and three apterae viviparae in a poor condition labelled: "JANETSCHEK / S.III.21. Metopol / Metopol E 586 / Rüssel, unreadable". The number E 586 is that of *Metopolophium gracilipes* in BÖRNER (1952), where he writes that it was beaten from grass (? *Poa laxa*). The question mark after "Gras" on slide No. 40/24 apparently was for some reason not necessary any more.

Before discussing these slides it is necessary to focus on something else. In 1952, p. 256–257 BÖRNER gives a key to the group of genera to which *Metopolophium* MORDV. belongs, and he separates *Metopolophium* from *Acyrtosiphon* because the former genus as first instar larvae has 2 hairs on the first tarsal joints, while members of *Acyrtosiphon* have 3 hairs in that case. Yet in BÖRNER (1952) we find *Macrosiphum loti* THEOB. in *Acyrtosiphon* MORDV., though like *caraganae* CHOL., which BÖRNER (1952) places in *Metopolophium*, it has only 2 hairs on the first tarsal joints in embryos. This might mean that BÖRNER did not know the real *loti* THEOB. In this respect it may be significant that that species is not mentioned from Styria in BÖRNER & FRANZ (1961) although the species is mostly very common in Alpine meadows.

BÖRNER's description of *Metopolophium gracilipes* is very brief, and he compares it to a non related and little known species. Therefore a description made from his specimens is published here.

Apterous viviparous female

Body elongated oval, about 2 mm long, with evenly pale, smooth tergum. No marginal tubercles on abdominal tergites II–V. Spinal hairs of abdominal tergite III about 0.006–0.008 mm long, the 6–8 hairs on tergite VIII about 0.017 mm long. Frontal tubercles smooth, rather low. Median frontal tubercle distinct. Antennae slightly shorter than body, the flagellum faintly brownish yellow with the apices of segments III–V faintly darkened, with base of segment III slightly imbricated, the rest of that segment nearly smooth; segment III with 2 rhinaria rather far from the base of the segment; processus terminalis $2\frac{2}{3}$ –3 times as long as base of segment VI; hairs on segment III about $\frac{2}{7}$ of

basal diameter of that segment. Rostrum 0.53 mm long (measured by length of stylets); last segment 0.12–0.13 mm long, almost precisely as long as second joint of hind tarsi, with 6–7 hairs besides the 3 subapical pairs. Siphunculi about $\frac{1}{5}$ – $\frac{1}{4}$ length of body, pale without darker apices, slightly expanded at base and for the rest almost cylindrical, in the middle about as thick as the hind tibiae, rather evenly imbricated, with small flange, about $1\frac{2}{3}$ – $1\frac{4}{5}$ times as long as cauda. Cauda pale, rather thick, slightly constricted, somewhat blunt, with about 7–8 hairs. First tarsal joints with 3 hairs.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.11	1.91	0.52	0.34	0.31	(0.15 + 0.42)	2 & 2	0.47	0.28
2.	?	1.73	0.45	0.31	0.31	(0.14 + 0.37)	2 & 2	0.43	0.25

(1–2, host unknown, Hintereisferner S.III.21, Austria, JANETSCHEK, BÖRNER slide No. 40/23).

Oviparous female

Specimen in the same slide as the apterae viviparae very similar in structure to these, but hind tibiae considerably swollen to twice the thickness of those in viviparae.

Specimen in slide from Kaiserau with processus terminalis just over 4 times as long as base of antennal segment VI, innerside of segment II distinctly faintly scabrous and hairs on segment III twice as long as in the preceding. One of the 10 caudal hairs with incrassate apex.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	1.88	1.86	0.45	0.31	0.31	(0.16 + 0.47)	3 & 3	0.39	0.25
2.	2.01	2.01	0.48	0.34	0.31	(0.13 + 0.57)	0 & 1	0.45	0.21

(1, with the apterous viviparous females; 2, gras?, Kaiserau Almen Ca 1050).

Discussion. Since no type has been chosen I select apterous viviparous female No. 1 of the measured specimens which is lying on its side, as holotype, the other specimens in that slide as paratypes.

After spending several days of work on this sample I failed to find any character by which to distinguish this sample from *Acyrtosiphon loti* (THEOBALD), and I believe that *Metopolophium gracilipes* BÖRNER, 1950 must be considered a synonym of *loti* THEOBALD.

The ovipara from the slide from Kaiserau may belong to the same species, although its processus terminalis is somewhat too long for oviparous *loti* THEOB.

2. *Metopolophium graminearum* MORDVILKO, 1919

BÖRNER (1952) records this species from the Eastern Alps, and BÖRNER & FRANZ (1961) from numerous spots in the Hohe Tauern.

Types of *Metopolophium graminearum* MORDV. belonging to the Zool. Institute of the USSR. Acad. Science, Leningrad were received on loan, for which we are much obliged to Dr. G. CH. SHAPOSHNIKOV. The specimens are unlike any *Metopolophium* from Europe that I ever saw. The alate male has one incomplete antenna, of which segment IV has 9 rhinaria. The rostrum is very short, only 0.41 mm, and the last segment that of a typical feeder on grass or very smooth leaves, 0.105 mm long with 1 hair besides the 3 subapical pairs. The siphunculi are imbricated, but at the apex there are very distinctly 3–4 rows of reticulation, with more or less isodiametric cells such as no *Acyrtosiphon*-like aphid should have. The ovipara has an elongate (probably partly through a fault in mounting) body of 3.70 mm long, with a very thick blunt cauda of about 0.55 mm long. The gradually tapering siphunculi are 0.70 mm long, imbricated, but at the apex with 1–2 rows of hexagonal cells. The last rostral segment is as in the male, but with 2 hairs besides the 3 subapical pairs and only about $\frac{5}{9}$ of the length of the second joint of the hind tarsus. The processus terminalis is 6 times as long as the base of segment VI, and about $1\frac{1}{2}$ times segment III. The species was collected from grasses, Razdelnoja, IX. 1913, leg. A. MORDVILKO. Also in later papers MORDVILKO gives the host plant as "grasses", and apparently it has not been refound in Russia.

BÖRNER's *Metopolophium graminearum* MORDV. is not related to the original *graminearum*, as it is a true *Metopolophium*, according to the 3 slides that I could borrow from the Deutsches Entomologisches Institut. BÖRNER's aphid is described in this paper as *Metopolophium montanum* nov. spec.

3. *Metopolophium montanum* nov. spec.

Apterous viviparous female (from Rosa)

In life evenly green, not powdered, and without a median stripe in a different shade of green; antennae with dusky apices to the segments of the flagellum; tarsi brown, the rest pale greenish. In mounted specimens body about 2.00–2.10 mm long, oval, not very slender. Tergum not pigmented, distinctly wrinkled or corrugated. Dorsal hairs on abdominal tergite III very short, about 0.009–0.011 mm long, blunt, the 4 hairs on tergite VIII 0.016–0.022 mm long. Indistinct or distinct flattish marginal tubercles present on tergites II–V. Frontal

tubercles moderately developed, median tubercles broad and very conspicuous. Antennae pale with dusky apices to segments III to V, with the flagellum imbricated from the very base of segment III, about $\frac{2}{3}$ – $\frac{8}{11}$ of length of body; segment III near base with 2–4 rhinaria of very varying size, even on the same antenna; processus terminalis $2\frac{1}{2}$ – $3\frac{1}{4}$ times as long as base of segment VI, shorter than segment III; hairs on segment III excluding their sockets not even $\frac{1}{4}$ of basal diameter of that segment. Rostrum (stylets) about 0.50 mm long; last segment rather slender, about 0.12–0.13 mm long, $\frac{5}{6}$ of the length of second joint of hind tarsi, with about 6–9 hairs besides the 3 subapical pairs. Siphunculi straight, gradually tapering from base to apex, where they are about half as wide as at base, pale with faintly brownish apex, markedly bluntly imbricated from base to apex, about $\frac{2}{11}$ – $\frac{2}{9}$ of length of body, with small flange. Cauda thick, blunt, little constricted, slightly darker than the siphunculi and about $\frac{2}{5}$ – $\frac{1}{2}$ of their length. Legs pale with the apices of the tibiae faintly brownish but the tarsi very dark brown; hairs on tibiae on basal $\frac{1}{3}$ part as short as those on antennal segment III, gradually longer and more spiny apicad; first tarsal joints with 3,3,3 hairs.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.67	1.95	0.55	0.33	0.32	(0.13 + 0.43)	4 & 4	0.52	0.28
2.	2.07	1.60	0.43	0.25	0.23	(0.13 + 0.32)	2 & 3	0.38	0.22
3.	2.43	2.09	0.59	0.38	0.35	(0.15 + 0.44)	3 & 3	0.55	0.27
4.	2.66	1.87	0.52	0.32	0.28	(0.14 + 0.40)	4 & 4	0.56	0.26
5.	2.64	1.81	0.55	0.31	0.28	(0.13 + 0.36)	2 & 3	0.53	0.22
6.	2.32	1.88	0.52	0.37	0.27	(0.13 + 0.42)	2 & 3	0.53	0.27

(1–6, from *Rosa* sp., Visp, Switzerland, 20.V.1950, leg. H.R.L. No 215–50).

Alate viviparous female (spring migrants)

In life with blackish brown head and thorax; abdomen green with conspicuous brown-olive wavy bands and marginal spots on abdomen; antennae with colour of head; legs, siphunculi and cauda dusky green. In mounted specimens body about 2.15–2.55 mm long. Head and thorax dark brown sclerotic; abdomen in fully mature specimens with brown, rather broad spino-pleural sclerotic transverse bars on tergites I–V with some small spinal fragments of a bar on VI and some very vague spinal sclerites on VII but none on VIII; the bars of tergites IV and V tending to coalesce, but always with large membranous holes between them; marginal sclerites on tergites I–V rather large, brown, mostly on some or all of tergites II–V with an almost globular (not semiglobular!) marginal tubercle. Spinal hairs on tergite III up to

0.017 mm long. Antennae dark like head, sometimes with segment IV paler than III, $\frac{4}{5}$ – $\frac{9}{10}$ of length of body, with imbricated flagellum; segment III with about 15–25 mostly rather large, slightly elevated rhinaria more or less in single file along its whole length. Siphunculi over $\frac{3}{4}$ of their length cylindrical, expanding towards base, about as dark as the sclerites on anterior part of abdomen. Cauda pale, more conical than in apterae. Legs with distal half of femora fuscous, base of femora yellowish; tibiae brownish yellow with darker base and blackish brown apices. Wings with normal venation, veins not bordered, rather thin, blackish brown. Other characters as in apterae viviparae.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.45	2.17	0.59	0.37	0.34	(0.15 + 0.51)	20 & 21	0.45	0.23
2.	2.22	1.98	0.54	0.35	0.32	(0.14 + 0.47)	16 & 19	0.39	0.21
3.	2.32	1.96	0.61	0.35	0.28	(0.13 + 0.43)	20 & 23	0.43	0.22
4.	2.51	2.08	0.59	0.37	0.30	(0.15 + 0.46)	17 & 19	0.30	0.22
5.	2.48	2.11	0.60	0.39	0.33	(0.12 + 0.49)	17 & 23	0.44	0.22
6.	2.49	1.98	0.57	0.36	0.32	(0.13 + 0.44)	18 & 20	0.43	0.25

(1–6, with the preceding apterae viviparae).

Apterous viviparous female (exul on grass)

In life evenly apple green. In mounted specimens as in apterae from *Rosa*, but body more elongate, about 2.15–2.75 mm long. Tergum very distinctly corrugated. Abdominal tergite VIII with 2–4 hairs of up to 0.042 mm long. Frontal tubercles faintly rough. Antennae up to $\frac{5}{6}$ of length of body; segment I on innerside often slightly brownish and also the flagellum somewhat brownish with darker brown articulations; processus terminalis 3– $3\frac{3}{4}$ times base of segment VI, up to nearly as long as segment III. Siphunculi up to $2\frac{1}{2}$ times length of cauda, more slender and over most of their length nearly cylindrical. Cauda not constricted, thick, blunt, with mostly 7 hairs. Other characters as in apterae viviparae from *Rosa*.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.33	1.95	0.54	0.32	0.28	(0.14 + 0.51)	2 & 2	0.43	0.29
2.	2.27	1.64	0.45	0.25	0.25	(0.13 + 0.39)	2 & ?	0.48	0.22
3.	2.38	2.02	0.56	0.32	0.28	(0.17 + 0.52)	2 & 2	0.49	0.30
4.	2.50	1.83	0.48	0.29	0.28	(0.15 + 0.44)	2 & 3	0.49	0.23

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
5.	2.46	1.80	0.51	0.28	0.30	(0.15 + 0.43)	3 & 3	0.52	0.24
6.	2.58	1.97	0.52	0.32	0.31	(0.15 + 0.49)	2 & 3	0.50	0.24

(1, from BÖRNER collection slide No. 40/52, labelled Schmölzer / Aus 17 / Metopol / graminear ; 2, from BÖRNER collection slide No. 40/53, labelled Schmölzer / aus KSK 4 / graminear ; 3, from BÖRNER collection slide No. 40/54, labelled Schmölzer / IV Metopol / graminear ; 4-6, from *Poa alpina*, Grossglockner (2300 m), Austria, 28. VIII. 1960, leg. H.R.L. No. 615).

Alate viviparous female (gynopara)

In life with black head and thorax and antennae. Abdomen pale green with dark olive brown bars. Siphunculi darker than the dorsal bars. Cauda pale green. In slides much like spring migrants, but bars on abdomen mostly narrower, more often free from the pleural sclerites and somewhat more developed on tergites VI and VII. Siphunculi much darker, more slender and often with smallest diameter at distal two-thirds part. Pigmentation of legs variable, tibiae in one specimen black, in most others dark brown with blackish base and apical part. Other characters as in spring alatae.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.40	2.38	0.70	0.46	0.36	(0.16 + 0.53)	24 & 25	0.40	0.20
2.	2.48	2.39	0.71	0.45	0.37	(0.14 + 0.52)	25 & 27	0.42	0.22
3.	2.31	2.24	0.66	0.40	0.35	(0.15 + 0.50)	20 & 21	0.41	0.21
4.	2.88	2.60	0.75	0.42	0.38	(0.18 + 0.57)	28 & 30	0.49	0.24
5.	2.51	2.33	0.64	0.41	0.37	(0.16 + 0.57)	20 & 24	0.40	0.20
6.	2.44	2.36	0.69	0.41	0.36	(0.16 + 0.56)	16 & 21	0.39	0.20

(1-6, from *Rosa* sp., Schuls, Switzerland, 7.X.1958, leg. H.R.L. No. S 25).

Oviparous female

Colour in life not known. In mounted specimens body about 1.70-2.20 mm long. Tergum smooth, colourless except for dusky, small and easily overlooked pleural intersegmental sclerites on abdomen. Abdominal tergite VIII with 6-7 hairs. Antennae pale brownish yellow with segment VI near the primary rhinaria dark brown, and darker than the middle part of the processus terminalis, the latter distinctly longer than segment III, and more than $3\frac{1}{2}$ times as long as base of VI ; segment III without rhinaria. Legs pale brownish yellow, the tibiae with blackish brown apices ; hind tibiae not darker than the other tibiae, swollen over

nearly their whole length to a maximum of $1\frac{3}{4}$ –2 times that of the middle tibiae, with large numbers of pseudosensoria. Siphunculi pigmented like the legs, rather thin. Cauda almost as in apterae viviparae, with 7, sometimes 8 hairs. Other characters more or less as in apterae viviparae.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Siph.	Cau.
			III	IV	V	VI		
1.	1.99	1.83	0.41	0.32	0.28	(0.12 + 0.52)	0.37	0.20
2.	2.03	1.89	0.44	0.33	0.30	(0.13 + 0.52)	0.40	0.21
3.	2.13	1.79	0.44	0.29	0.27	(0.12 + 0.51)	0.39	0.20
4.	1.73	1.81	0.43	0.30	0.28	(0.13 + 0.50)	0.37	0.20
5.	1.77	1.74	0.42	0.28	0.26	(0.12 + 0.50)	0.37	0.19

(1–5, from *Rosa* sp., Schuls, Switzerland, 7.X.1958, leg. H.R.L. No. S 22).

Discussion. Large colonies of this species were first found on the undersides of the leaves of a wild *Rosa* at about 600 m a.s.l. near Visp, on May 20, 1950. As the colonies consisted of great numbers of alatoid nymphs and alatae, with very few apterae, host alternation was suspected. On Oct. 7, 1958 wild *Rosa* leaves near Schuls had three kinds of *Metopolophium* gynoparae, of which one type closely agreed with the alatae collected at Visp.

The strikingly high number of hairs on the last rostral segment of the *Rosa* aphids was not known in any Western European grass-infesting *Metopolophium*. But collecting on *Poa alpina* along the Grossglockner Pass in Austria on Aug. 28, 1960 yielded a small number of apterae with a structure similar to that of the apterae viviparae from Visp. On grass no alatae were found, only alatoid nymphs, which in rhinarial number of the alata to-be agreed with the gynoparae from Schuls.

The material from the BÖRNER collection received on loan under the name *Metopolophium graminearum* MORDV. actually belonged to *M. montanum* nov. spec.

Alatae are easily recognized by the marked banding of the abdominal tergum. Apterae resemble those of *M. festucae* (THEOB.), but the number of hairs on the last rostral segment is far too high, 2–4 on basal half in *festucae*, 6–10 in *montanum*.

The species is apparently widely distributed in the Alps, but possibly only at rather high altitudes. In life specimens on grass will easily be confused with *M. festucae*, but in mounts inspection of the rostrum excludes confusion.

Types. Holotype : Apterous viviparous female from *Rosa* (measurements No. 1), Visp, Switzerland, 20.V.1950, leg. H.R.L. No. 215–1950. Paratypes : Apterae and alatae viviparae with data as for holotype, and

from *Poa alpina*, Grossglockner, Austria, 28.VIII.1960, leg. H.R.L. No. 615, and from *Rosa* sp., Schuls, 7.X.1958, leg. H.R.L. No. S 22.

4. *Metopolophium alpinum* nov. spec.

Fundatrix

In life thick, oval, ventrally rather flat, dorsally very strongly convex, mottled green, dull, opaque with pale antennae, siphunculi, cauda and legs. In mounted specimens body about 2.95–3.55 mm long, with pale yellowish, wrinkled to rather smooth tergum. Dorsal hairs cylindrical and blunt, very short, even those on abdominal tergite VIII less than half long as basal diameter of antennal segment III. Small spinal tubercles sometimes present on tergite VIII. Marginal tubercles, though quite small, often present on an elevated part of tergite V. Frontal tubercles well developed with almost parallel, slightly rough innersides; median frontal process quite small. Antennae brownish yellow with the apices of the segments of the flagellum brown; segment III at base hardly imbricate, usually without rhinaria, in one antenna with a very small rhinarium; processus terminalis very short. Siphunculi long, pale with faintly dusky apex, with small flange. Cauda thick, blunt, constricted or not, with 7–8 hairs of which 1–2 of the apical ones may be stunted and seemingly broken. Legs pale with brown apices to the tibiae. The rest as in the following morph.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	3.03	2.10	0.61	0.34	0.35	(0.18 + 0.39)	0 & 1	0.65	0.37
2.	3.41	2.28	0.68	0.39	0.41	(0.17 + 0.40)	0 & 0	0.85	0.39
3.	3.53	2.34	0.75	0.37	0.37	(0.18 + 0.37)	0 & 0	0.77	0.41
4.	3.07	1.88	0.61	0.32	0.30	(0.14 + 0.32)	0 & 0	0.66	0.42
5.	3.51	2.33	0.70	0.36	0.37	(0.19 + 0.40)	0 & 0	0.78	0.39
6.	3.37	2.46	0.71	0.40	0.43	(0.17 + 0.43)	0 & 0	0.75	0.36

(1–2, from *Rosa alpina*, Airolo (1100 m), Switzerland, 22.V.1950, leg. H.R.L. 204; 3, from *Rosa pomifera*, Nante near Airolo (1700 m), 21.V.1950, leg. H.R.L. No. 198; 4, from *Rosa villosa*, Airolo (1150 m), 21.V.1950, leg. H.R.L. No. 200; 5, from *Rosa* sp., Airolo, 27.V.1956, leg. W. Meier No. 4430; 6, from *Rosa alpina*, Nante near Airolo (1700 m), 21.V.1950, leg. H.R.L. No. 197).

Apterous viviparous female (from *Rosa*)

In life rather like fundatrix, but more slender and ventrally much less flat. In mounted specimens body about 2.65–3.65 mm long. Tergum yellowish, distinctly wrinkled or corrugated, somewhat sclerotic. Dorsal hairs as in fundatrix. Frontal tubercles nearly smooth, well

developed, slightly diverging, and somewhat rounded at inner apex ; median frontal tubercle rather low ; depth of frontal furrow in its middle about $\frac{1}{4}$ of distance between antennae. Antennae $6\frac{7}{8}$ –1 times length of body, pale with brown apex ; segment III near base smooth, or very nearly smooth, with 0–3 mostly small, rather deeply sunk rhinaria on a sometimes slightly incrassate part ; interrelation of segments vide measurements ; longest hairs on segment III about $\frac{1}{6}$ – $\frac{2}{9}$ of basal diameter of that segment. Rostrum reaching to just past the middle coxae ; apical segment rather slender, about 0.13–0.14 mm long, about $\frac{9}{10}$ – $\frac{19}{20}$ of second joint of hind tarsi, with about 7–10 hairs besides the 3 sub-apical pairs. Siphunculi pale, slender, tapering on basal $\frac{1}{3}$ – $\frac{1}{2}$ part, with the rest cylindrical and about as thin as the hind tibiae, imbricated with a few transverse striae below the distinct flange, about $\frac{1}{4}$ – $\frac{2}{7}$ of length of body, 2 – $2\frac{1}{2}$ times as long as cauda. The latter variable in shape, mostly much more slender than in fundatrix, with 7–10 hairs, some of which are often stunted. Legs rather long and slender, yellowish ; tibiae pale brownish yellow with brown apices ; dorsal tibial hairs especially on basal half very short, curved and adpressed ; tarsi blackish brown ; first tarsal joints with 3 hairs.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	3.13	3.14	0.87	0.61	0.55	(0.17 + 0.72)	2 & 2	0.93	0.45
2.	2.74 ¹	2.39	0.64	0.42	0.37	(0.19 + 0.56)	0 & 0	0.73	0.38
3.	3.39	3.06	0.82	0.61	0.53	(0.18 + 0.69)	1 & 1	1.02	0.40
4.	3.09	2.61	0.64	0.48	0.41	(0.15 + 0.71)	1 & 2	0.73	0.37
5.	3.31	2.83	0.83	0.51	0.43	(0.19 + 0.68)	2 & 2	0.85	0.41
6.	3.59	3.11	0.94	0.56	0.48	(0.19 + 0.71)	1 & 2	1.01	0.47

(1, from *Rosa alpina*, Nante near Airolo (1700 m), Switzerland, 21.V.1950, leg. H.R.L. No. 197 ; 2, from *Rosa villosa*, Airolo (1150 m), 22.V.1950, leg. H.R.L. No. 200 ; 3–4, from *Rosa alpina*, Zeneggen near Visp (1050 m), Switzerland, 27.V.1950, leg. H.R.L. No. 216 ; 5, from *Rosa* sp., Zeneggen, 29.V.1950, leg. H.R.L. No. 225 ; 6, from *Rosa* sp., Nante, 7.VI.1953, leg. W. Meier).

Alate viviparous female (spring migrants)

In life with mesosternum dark brown, thorax dorsally like the head brownish green, abdomen evenly green but all specimens rather teneral. In mounted specimens body about 2.75–3.35 mm long. Head and thorax unevenly dark brown, abdomen in older specimens with smoky brownish, thin transverse bars on abdomen and with darker marginal

¹ Slightly abnormal specimen.

sclerites. Abdominal tergites II-V often with rather lens-shaped marginal tubercles, with those of tergite V on a rough elevated part. Spinal tubercles irregularly present on tergite VIII and more rarely on vertex. Dorsal hairs as in apterae. Antennae about as long as body, brown to blackish with segment III often just darker than IV; segment III at base hardly more imbricated than more distad, with 11-24 (exceptionally and abnormally 8, other antenna 20) rather variable flattish rhinaria more or less in a row over basal $\frac{2}{3}$ - $\frac{7}{8}$ part. Siphunculi pale brownish yellow to dusky brown with paler base, more or less as in apterae, but thinner and much more imbricated. Cauda slightly dusky, much more slender than in apterae, sometimes subacute, mostly constricted, with 8-10 hairs with fine apices. Legs slender, in older specimen with fuscous femora with pale base; with the tibiae dorsally near base pigmented, the rest pale with dark brown apical part. Wings with normal venation, the veins all thin, clear cut, dark brown, not bordered.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	2.86	2.87	0.80	0.53	0.46	(0.17 + 0.69)	11 & 13	0.67	0.37
2.	2.92	3.01	0.79	0.55	0.49	(0.16 + 0.80)	23 & 24	0.71	0.36
3.	3.31	3.32	0.91	0.64	0.57	(0.19 + 0.79)	21 & 21	0.81	0.40
4.	3.21	3.36	0.95	0.65	0.61	(0.19 + 0.73)	19 & 20	0.83	0.39
5.	3.12	3.10	0.80	0.64	0.53	(0.16 + 0.76)	18 & 21	0.73	0.36
6.	2.82	2.73	0.75	0.51	0.39	(0.17 + 0.71)	17 & 19	0.64	0.34

(1-2, from *Rosa alpina*, Nante near Airolo (1700 m), Switzerland, 21.V.1950, leg. H.R.L. No. 197; 3, from *Rosa alpina*, Zeneggen near Visp (1050 m), Switzerland, 27.V.1950, leg. H.R.L. No. 216; 4, from *Rosa* sp., Zeneggen, 29.V.1950, leg. H.R.L. No. 225; 5, from *Rosa alpina*, Zeneggen, 28.V.1950, leg. H.R.L. No. 220; 6, from *Rosa* sp., Nante, 7.VI.1953, leg. W. Meier).

Apterous viviparous female (exul on grass)

In life evenly green, like specimens from *Rosa*. Mounted specimens about 3.00-3.75 mm long, very much like those on *Rosa*, but dorsal hairs on abdominal tergite III up to $\frac{2}{5}$ of basal diameter of antennal segment III, on tergite VIII and on vertex and front up to as long as, or even longer than that diameter. Antennal segment III at base not more rough than it is near the 1-3 small, bunched rhinaria; processus terminalis up to 5 times as long as base of VI and often longer than segment III. Last rostral segment with 8-11 hairs besides the 3 sub-apical pairs. Siphunculi markedly and rather sharply imbricated, pale, gradually very little darker towards apex, slender, in the middle usually thinner than hind tibiae. Cauda with 9-13 hairs, all with normal, fine apices.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	3.55	3.23	0.87	0.63	0.48	(0.18 + 0.84)	1 & 2	0.83	0.41
2.	3.63	?	0.81	0.63	0.56	(0.19 + ?)	2 & 3	0.77	0.41
3.	3.03	3.17	0.82	0.52	0.52	(0.19 + 0.89)	1 & 3	0.75	0.37

(1-3, from *Poa alpina*, Grossglockner (2300 m), Austria, 28. VIII. 1960, leg. H.R.L. No. 613).

Alate viviparous female (gynopara)

In life in young specimens with brownish head and thorax and evenly green abdomen, in old ones with distinct, narrow, olive-green bands on abdomen. In mounted specimens thorax darker brown than in spring migrants on *Rosa* and with the abdominal sclerotisation more developed and more distinct. Antennae $\frac{9}{10}$ – $1\frac{1}{5}$ times as long as body; segment III with about 18–26 rhinaria; processus terminalis 4–5 times as long as base of segment VI. Siphunculi pigmented like the spino-pleural abdominal transverse bars, more slender and more cylindrical than in spring migrants. Cauda shorter and more acute. Other characters as in spring migrants, but dorsal hairs as in apterae viviparae from grass.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on III	Siph.	Cau.
			III	IV	V	VI			
1.	3.32	3.21	0.84	0.60	0.52	(0.20 + 0.82)	22 & 26	0.67	0.33
2.	2.99	2.89	0.79	0.53	0.44	(0.17 + 0.72)	23 & 25	0.59	0.28
3.	2.32	3.02	0.84	0.57	0.46	(0.17 + 0.76)	18 & 19	0.65	0.31
4.	3.13	3.66	0.94	0.71	0.59	(0.20 + 0.99)	26 & 26	0.69	0.34
5.	3.25	?	0.92	0.67	0.57	(0.19 + 0.83)	24 & 24	0.67	0.34
6.	2.86	3.45	0.92	0.67	0.49	(0.19 + 0.97)	22 & 23	0.63	0.32

(1-5, from *Poa alpina*, Grossglockner (2300 m), Austria, 28. VIII. 1960, leg. H.R.L. No. 613; 6, from *Rosa* sp., Schuls, Switzerland, 8. X. 1958, leg. H.R.L. No S 24).

Oviparous female

In life colour unknown. In mounted specimens body only about 1.95–2.25 mm long, with membranous, not pigmented tergum, but head dusky. Dorsal hairs on disc of abdomen more or less as in apterous exules, on posterior abdominal tergites up to twice as long as basal diameter of antennal segment III, but on front and vertex shorter than that diameter. Antennae brownish yellow with the apex from distal part of segment V very dark; segment III without rhinaria; processus

terminalis long, 4 times as long as base of segment VI, up to $1\frac{1}{2}$ times as long as segment III. Siphunculi about $\frac{1}{4}$ of length of body, nearly cylindrical, evenly brownish yellow. Cauda, thick, very blunt, $\frac{2}{5}$ – $\frac{1}{2}$ of siphunculi in length, slightly darkened, with 9–13 hairs. Hind tibiae rather evenly swollen to a maximum width of about $1\frac{1}{2}$ times that of the middle tibiae, with very many pseudosensoria over about $\frac{4}{5}$ of their length, not more pigmented than the other tibiae. Other characters much as in apterous exules.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Siph.	Cau.
			III	IV	V	VI		
1.	1.98	2.19	0.48	0.35	0.37	(0.16 + 0.67)	0.50	0.18
2.	2.20	2.04	0.45	0.33	0.32	(0.15 + 0.62)	0.51	0.22
3.	2.05	2.14	0.47	0.37	0.33	(0.16 + 0.64)	0.47	0.24
4.	2.03	2.09	0.46	0.36	0.35	(0.15 + 0.59)	0.51	0.20

(1–4, from *Rosa* sp., Schuls, Switzerland, 7.X.1958, leg. H.R.L. No. S 22).

Alate male

In life with head and thorax dark brown, abdomen pink with distinct rather broad, dark brown wavy transverse bars; antennae black; legs dark; siphunculi dark smoky. In mounted specimens head and thorax blackish brown; abdomen with very marked, rather thick, blackish spinopleural sclerotic bars, and with rather large, dark, marginal sclerites. Antennae black, up to $1\frac{2}{5}$ times as long as body; segment III with about 45–55 rhinaria along one side; segment IV without rhinaria; segment V on distal $\frac{3}{4}$ part with in a row about 12–18 rhinaria which are smaller than nearly all those on segment III; processus terminalis up to 6 times as long as base of segment VI. Siphunculi dark, cylindrical, slender, much less distinctly imbricated than in other morphs. Cauda dark, more or less triangular, rather acute, $\frac{2}{5}$ – $\frac{1}{2}$ of the siphunculi in length. Genitalia normal. Other characters as in gynoparae.

Measurements in mm.

No.	Length body	Ant.	Ant. segments				Rhin. on segment		Siph.	Cau.
			III	IV	V	VI	III	V		
1.	2.62	3.26	0.76	0.57	0.53	(0.18 + 1.01)	48 & 48	15 & 16	0.53	0.24
2.	2.70	3.57	0.88	0.69	0.54	(0.18 + 1.06)	49 & 50	14 & 14	0.52	0.21
3.	2.36	3.44	0.85	0.61	0.53	(0.21 + 1.02)	51 & 52	16 & 15	0.45	0.20
4.	2.54	3.54	0.88	0.69	0.57	(0.18 + 1.01)	48 & 49	13 & 16	0.53	0.26

(1–4, from *Rosa* sp., Schuls, Switzerland, 7.X.1958, leg. H.R.L. No. S 25).

Discussion

The present species appeared to be very common on various species of *Rosa* at about 1000 m a.s.l. or higher. FENJVES (1945) stated that *Macrosiphum solanifolii* (now *M. euphorbiae* THOS.) hibernates as eggs on these rose bushes, which I could not confirm. Possibly he mistook the present species for this *Macrosiphum*, as the identical bushes on which he made his observations, near Nante above Airolo, were swarming with *Metopolophium alpinum* when I examined them. The species (1953) I first identified as *Acyrtosiphon catharinae* NEVSKY, 1928, a species described from Central Asia from *Rosa*, but that apparently is a smaller species with longer antennal hairs, more rhinaria in apterae but fewer in alatae, relatively much longer siphunculi, etc. The composition of the population of our species on *Rosa* in spring suggested that it had host alternation. For alatoid nymphs and alatae were abundant, apterae of the second generation rather rare. Because the median frontal tubercle was small, the last rostral segment fairly slender and hairy, the species was at first not recognized as a *Metopolophium*, but remounting brought to light the typical sclerotic bars on the alata's abdomen, and this was even more clear in a gynopara found on *Rosa* near Schuls, 8 years later. In 1960 Dr. R. VAN DEN BOSCH provided an opportunity to examine grasses on the Grossglockner in Austria and there we found on *Poa alpina* some old apterae, and a number of alatoid nymphs from which gynoparae were reared.

The oviparae are ascribed to this species, but there is no complete certainty that they belong here. On *Rosa* leaves near Schuls I found three different kinds of *Metopolophium* oviparae, and three different kinds of gynoparae. Whitish oviparae could without difficulty be classified as those of *M. dirhodum* (WLK.). Shiny ochreous oviparae and light green oviparae, which must have come from gynoparae of *M. montanum* n. sp. and *M. alpinum* n. sp. were mixed in pickling and were later sorted on morphological differences. Therefore I do not know which colour went with which of the latter two species.

It is surprisingly difficult to distinguish the large apterous exules from apterae viviparae of *Acyrtosiphon loti* (THEOB.). This has convinced me that *Metopolophium* MORDV. cannot readily be distinguished in all morphs of its species from *Acyrtosiphon* MORDV., and that there are reasons for considering *Metopolophium* MORDV. a subgenus of *Acyrtosiphon* MORDV., as MORDVILKO (1914) himself did.

Confusion of apterae with those of *Acyrtosiphon loti* (THEOB.) can be avoided by examining the base of antennal segment III which is sharply imbricated in *loti*, the number of rostral hairs, the length of the rostral segment, and the length of the processus terminalis. Confusion with other *Metopolophium* spp. is most unlikely because of the large body, long antennae and siphunculi, and the hairy last rostral segment.

Types. Holotype : Apterous viviparous female from *Rosa* (measurements No. 1), Nante near Airolo (1700 m), Switzerland, 21.V.1950, leg. D. HILLE RIS LAMBERS No. 200-1950. Paratypes : Fundatrices, apterous and alate viviparous females with data as for holotype, and fundatrices, apterous viviparous females, alate viviparous females, oviparae and males with collecting data mentioned under the various measurements.

5. *Metopolophium dirhodum* (WALKER, 1848)

This aphid alternating between *Rosa* spp. and grasses has apparently not yet been reported from Switzerland. I found one fundatrix on *Rosa* near Airolo (1150 m), and gynoparae and oviparae on *Rosa* near Schuls. Apparently the species can maintain itself and hibernate as eggs at altitudes of 1000 m and higher in the Alps. A description was given in HILLE RIS LAMBERS (1947).

6. *Metopolophium festucae* (THEOBALD, 1917)

Also this species occurs in the Alps. A single fundatrix was collected near Airolo, Switzerland, from unidentified grass. An alate specimen was caught by Dr. W. MEIER in a yellow trap near Frienisberg, Switzerland on 26.VII.1954 and submitted for identification. The species infests various grasses. It was fully described by HILLE RIS LAMBERS (1941).

7. *Metopolophium albidum* HILLE RIS LAMBERS, 1947

I collected specimens of this pale greenish yellow species on its typical host plant, *Arrhenatherum elatius*, near Vigolo Vattaro, Italy, on 10.VI.1965. It is in Western and Central Europe quite common where its host plant occurs, but one has to thresh the plants for finding it. An extensive description was published in HILLE RIS LAMBERS (1947).

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