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Redescription of *Aphis popovi* and its relations with other Palaearctic species of the genus *Aphis* inhabiting *Ribes* (Hemiptera: Aphidoidea: Aphididae)

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Abstract. The fundatrix of *Aphis popovi* Mordvilko, 1932 is redescribed and lectotype designated. Morphometric analysis of *Aphis popovi* Mordvilko, *A. schneideri* (Börner) and *A. triglochinis* Theobald fundatrices showed similarity of *A. popovi* to *A. schneideri* and of *A. popovi* sensu Szelegiewicz nec Mordvilko to *A. triglochinis*. A key to fundatrices of *Ribes*-inhabiting Palaearctic species of the genus *Aphis* L. is presented.

INTRODUCTION

Mordvilko described *Aphis popovi* in 1932 from material collected by A.M. Popov (zoologist of the hydrological expedition of Yakutian Commission) on the leaves of an unknown currant species (*Ribes* sp.) somewhere between Kirensk and Vitim (on the upper flow of the river Lena in Russia) (Mordvilko, 1932). A relatively large number of papers concerning the genus *Aphis* L. in the Eastern Palaearctics has appeared since then (e.g., Ivanovskaya, 1977, 1978; Babenko, 1980; Pashchenko, 1988; Novikov, 1988; Holman, 1987, 1988), but *A. popovi* was mentioned only once (Szelegiewicz, 1963). Nevertheless, it was considered as a valid species (Eastop & Hille Ris Lambers, 1976: 74).

Specimens on the original Mordvilko's slide are 2 fundatrices and 13 larvae resembling, morphologically, *Aphis schneideri* (Börner, 1940). Specimens collected in Mongolia by R. Bielawski and B. Pisarski, and determined by H. Szelegiewicz as *Aphis popovi* are, in fact, two fundatrices and one larva that are very similar to European *Aphis triglochinis* Theobald, 1926.

In the present paper the lectotype of *Aphis popovi* is designated and its systematic position among the other three Palaearctic *Ribes*-inhabiting species of the genus *Aphis* is discussed.

MATERIAL

Mordvilko's (1932) description of *Aphis popovi* is as follows (in English translation):

"*Aphis popovi* sp. n.

Place of finding – leaves of currants (*Ribes*), on the way from Kirensk to Vitim, 6 VI 1927.

Small, approximately 2 mm long, green *Aphis* with comparatively well-developed marginal tubercles on the prothorax, 1st and 7th abdominal segments, also on 2nd and 5th, although may be absent on some of them. Antennae 5-segmented or even 4-segmented (the 3rd and 4th antennal segments are not separated or even 3rd, 4th and 5th). Processus terminalis of the last antennal segment almost equal to the basal part of this segment. Siphunculi short, approximately 1/10 of the body length. Almost cylindrical, 1,25 × and 1,5 × longer than cauda. Apterous viviparous females and juveniles, including nymphs" (Mordvilko, 1932: 291).

Mordvilko's slide is labelled "*Aphis* sp. and *Glyphina*" (paper label on the left side of the baseglass), "*Aphis* sp. and *Glyphina* 1136" (paper label alongside the first label, nearer the coverglass), and "currant 6/VI.27 on the way from t. Kirensk to Vitim Yakutsk exp. A. Popov" (written in Indian ink on the right side of the baseglass), all written in Cyrillic. The slide contains two adult aphids and 13 larvae of various stages belonging to genus *Aphis*, and one specimen of *Glyphina*.

Both Kirensk and Vitim are on the banks of the Lena, where the rivers Kirenga and Vitim, respectively (approximately 108°E, 57°N and 112°30′E, 59°30′N, respectively) join the Lena. Thus, the aphids have been collected somewhere between Kirensk and Vitim, the latter being approximately 300 km north-east from the Kirensk. The precise locality may be nearer the Kirensk, since on 5th June Popov was still collecting aphids in Kirensk (*Lachnus taeniatus* was collected in Kirensk on 5th June – see Mordvilko, 1932: 290).

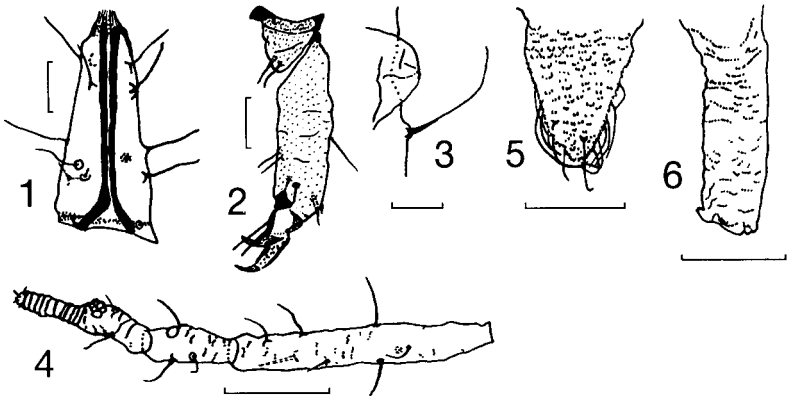
According to Goltsberg (1972), spring in Lithuania comes at an average of three weeks earlier than in Yakutia. Thus, 6th June in Kirensk is approximately the same as mid-May in Vilnius. Fundatrices of *Ribes*-inhabiting *Aphis* species begin reproducing in this period (Rakauskas, 1983: 8). Thus, aphids in Mordvilko's slide are not apterous viviparous females, but fundatrices with their immature progeny. Such a conclusion is supported by the fact that they have 5 segmented antennae with a short processus terminalis (subequal to the basal part of the segment), whilst, in larvae, ratio of processus terminalis: basal part is 1.45–1.85 : 1.

Abbreviations used in the text and tables: ant – antenna, antIII-V – antennal segments III – V respectively, baseV – base of antennal segment V, hantIII – number of hairs on antennal segment III, hcauda – number of hairs on cauda, htergVIII – number of hairs on abdominal segment VIII (tergum), htibia – hind tibia, hurs – number of additional hairs on the apical rostral segment, lhantIII – longest hair on antennal segmentIII, prtV – processus terminalis, tarsII – hind tarsal segment II, urs – apical rostral segment, wantIII – maximum width of antennal segment III.

Aphis popovi Mordvilko, 1932

(Figs 1–6)

REDESCRIPTION. Fundatrix (based on 2 specimens). Body 1.70–2.01 mm long, oval, with maximum width at the second or third abdominal segment. Colour in life is assumed to be green. Body of cleared specimens generally very pale, with urs, tarsi and antV darkened. Siphunculi pale, appearing paler than cauda; cuticular reticulation inconspicuous. Cauda elongate triangular, 1.2 times as long as basal width. Subgenital plate not clearly visible. Dorsum membranous, cuticular reticulation inconspicuous. Abdomen with marginal



Figs 1–6. *A. popovi* Mordvilko, 1932, fundatrix (2–4 lectotype, 5–6 paralectotype) and 4th instar fundatrigenia larva (1). 1 – urs, 2 – tarsII, 3 – marginal tubercle and marginal hair on abdominal tergite I, 4 – antIII-V, 5 – cauda, 6 – siphunculus. Scales: 0.025 mm (1–3); 0.1 mm (4–6).

abdominal tubercles (Table 1). Marginal hair on abdominal segment I 1.66–2.12 times as long as the height of the tubercle on the same segment. Posterior hair on mid-trochanter 0.83 times the diameter of trochantero-femoral suture (0.9 times the diameter on the hind leg); longest anterior hair on mid-femur 0.86 times the same diameter. Crural hairs very long, sub-erect and with evanescent apices like those of the antennal hairs; longest hairs on all leg segments, except the tarsi, are longer than the minimum width of the tibiae (up to about 1.4 times as long). For other morphological characters see Table 2.

TABLE 1. Presence and shape of marginal abdominal tubercles (basal width/height in mm, a – absent, ? – not clearly visible) in lectotype (L) and paralectotype (P) fundatrices and in paralectotype larvae (1–9) of *A. popovi* Mordvilko, 1932: Russia, Irkutsk region, surroundings of Kirensk, 6.vi.1927 (upper line – left side, lower line – right side).

Specimen	Abdominal segment No.						
	I	II	III	IV	V	VI	VII
L	0.053/0.026	a	a	a	a	a	0.038/0.028
	0.045/0.028	a	0.030/0.023	a	a	a	?
P	0.050/0.035	a	a	a	a	a	0.030/0.038
	0.040/0.035	?	a	a	a	a	0.030/0.047
1	0.028/0.020	0.025/0.015	0.025/0.013	0.025/0.015	?	?	?
	0.023/0.021	0.020/0.018	0.023/0.013	?	?	?	?
2	0.033/0.035	0.025/0.020	0.025/0.020	0.020/0.023	?	0.028/0.038	?
	0.040/0.030	0.020/0.018	?	0.018/0.015	0.015/0.015	?	?
3	0.043/0.030	0.025/0.023	0.015/0.028	0.018/0.018	a	0.028/0.025	a
	0.040/0.038	0.025/0.013	0.023/0.015	a	0.028/0.018	0.030/0.025	a
4	?	0.023/0.013	0.020/0.010	0.025/0.015	0.025/0.013	a	0.030/0.030
	?	?	?	?	?	?	0.030/0.023
5	0.035/0.020	0.023/0.013	0.015/0.008	0.018/0.010	0.008/0.005	?	0.020/0.015
	0.028/0.020	0.023/0.013	0.023/0.010	0.013/0.008	a	?	?
6	0.033/0.033	0.025/0.023	0.020/0.015	0.023/0.013	a	?	?
	0.038/0.025	0.023/0.013	0.013/0.013	0.020/0.010	a	?	?
7	0.038/0.025	0.015/0.013	0.018/0.015	?	?	0.028/0.018	0.030/0.023
	0.038/0.028	0.035/0.018	0.018/0.013	0.015/0.013	a	?	0.030/0.025
8	0.055/0.028	0.020/0.018	0.025/0.013	0.020/0.015	0.023/0.023	?	0.030/0.025
	0.043/0.025	0.033/0.023	0.020/0.015	?	0.023/0.020	?	0.035/0.020
9	0.038/0.020	0.025/0.015	0.018/0.013	a	a	?	0.035/0.020
	0.033/0.025	0.030/0.020	0.023/0.015	0.028/0.015	0.010/0.013	0.025/0.018	?

A.K. Mordvilko did not establish a holotype. Therefore, the specimen (fundatrix) mounted at the mid-base of slide No. 1136 is hereby designated as the lectotype of *Aphis popovi* Mordvilko, 1932. The specimen has broken left antenna (only first and second antennal segments are present) and right mid-leg and end of the left hind tarsus are absent. The ultimate rostral segment and cauda are not clearly visible. Another fundatrix and larvae in the same slide are to be treated as paralectotypes.

TYPE MATERIAL. Lectotype, fundatrix: "Na puti iz g. Kirenska k Vitimu, Yakutsk. ekspd., 6/VI.27., smorodina, A. Popov; *Aphis* sp. i *Glyphina*, 1136" (Russia, Irkutsk district, surroundings of town Kirensk [approximately 108°E, 57°N], on *Ribes*); collection of Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia. Paralectotypes: 1 fundatrix and 13 larvae, data as lectotype.

ETYMOLOGY. The species was named after the surname of collector, A.M. Popov, zoologist of the hydrological expedition of Yakutian Commission.

TABLE 2. Morphological characters of lectotype (L) and paralectotype (P) fundatrices of *A. popovi* Mordvilko, 1932: Russia, Irkutsk region, surroundings of Kirensk, 6.vi.1927 (left/right side respectively). The same characters of fundatrices of *A. schneideri* (Börner, 1940) are given after Rakauskas (1993) for comparison.

Characters	*A. popovi*		*A. schneideri*
	L	P	(19–20 specimens)
body	2.01	1.70	1.784–2.385
htibia	0.65/0.63	—/—	0.516–0.762
tarsII	—/0.108	—/—	0.083–0.103
siphon	0.185/0.188	0.218/0.225	0.157–0.223
urs	?	0.151	0.123–0.150
cauda	?	0.163	0.163–0.200
ant	—/0.628	0.718/0.360+	0.534–0.780
antIII	—/0.276	0.254/0.215+	0.147–0.257
antIV	—/0.100	0.139/—	0.097–0.137
baseV	—/0.084	0.086/—	0.063–0.120
prtV	—/0.079	0.094/—	0.080–0.153
wantIII	—/0.038	0.035/0.035	0.023–0.035
lhantIII	—/0.043	0.042/broken	0.030–0.055
hantIII	—/8	5/4?	2–7
hurs	6?	5?	5–8
hcauda	13?	14	9–17
htergVIII	2?	2	2
lhantIII/wantIII	—/1.13	1.20/—	1.00–1.77
prtV/baseV	—/0.94	1.09/—	1.02–1.35
antIII/prtV	—/3.49	2.70/—	1.19–2.22
antIII/lhantIII	—/6.42	6.05/—	3.74–5.18
body/siphon	10.86/10.69	7.80/7.56	9.07–12.24
siphon/tarsII	—/1.74	—/—	1.82–2.40
siphon/cauda	—/—	1.34/1.38	0.83–1.28
urs/baseV	—/—	1.76/—	1.17–2.27
tarsII/baseV	—/1.29	—/—	0.75–1.48
urs/cauda	—	0.92	0.69–0.88
antIII/urs	—/—	1.68/—	1.05–1.82

BIOLOGY. *Ribes*-inhabiting species. The life cycle is not known.

SYSTEMATIC NOTES. *A. popovi* belongs to the *A. grossulariae*-group characterized by more than 4 additional hairs on the apical rostral segment. The presence of very long, finely acute and suberect antennal and crural hairs, a short processus terminalis and the host association suggests that this species is related to *Aphis schneideri* (Börner, 1940). Most of the characters of *A. popovi* are in accordance with those of *A. schneideri* fundatrices from Lithuania and Poland (Table 2). Descriptions of *A. schneideri* fundatrices from Great Britain (Stroyan, 1955), Fennoscandia (Heie, 1986) and Latvia (Rupais, 1969, drawings on p. 201) are also very similar to that of *A. popovi*. Some authors (Shaposhnikov, 1964; Stroyan, 1984; Rupais, 1969) use the presence and shape of marginal abdominal tubercles to discriminate between *A. schneideri* and *A. grossulariae*. In *A. schneideri* these are large, subconical, their height usually does not exceed their basal width, and they are present on abdominal segments I–VII. Usually, in *A. grossulariae* large abdominal tubercles are present only on segments I and VII, and there may be small tubercles on the other segments. Usually, the height of tubercles exceeds their basal width. Data concerning marginal

tubercles of lectotype and paralectotypes of *A. popovi* are presented in Table 1. They are not typical for *A. schneideri*, but resemble it. Neverthless, there are also some differences. In *A. popovi*, tarsII appears to be longer, antIII : prtV, antIII : lhantIII, urs : cauda and siphunculus length : cauda length are greater, the siphunculus length : tarsII is lesser. Therefore, and considering the distribution of both species, it is suggested that there is no strong evidence to synonymize *A. popovi* with *A. schneideri* at present. More data concerning morphology, host-plants and life cycle of *A. popovi* are needed.

Key to fundatrices of Palaearctic species of *Aphis* inhabiting *Ribes*

1 Hurs 2, or exceptionally 3. LhantIII 0.013–0.025 mm ..... *triglochinis* Theobald
– Hurs 5–8. LhantIII 0.020–0.055 mm 2
2 Ratio antIII/lhantIII more than 7. LhantIII 0.020–0.035 mm ..... *grossulariae* Kaltenbach
– Ratio antIII/lhantIII less than 7. LhantIII 0.030–0.055 mm 3
3 Ratio antIII/lhantIII 3–6. Ratio antIII/prtV 1.2–2.5. Ratio siphunculus length/tarsII length more than 1.8. Ratio urs/cauda less than 0.9 ..... *schneideri* (Börner)
– Ratio antIII/lhantIII from 6 to 7. Ratio antIII/prtV 2.7–3.5. Ratio siphunculus length/tarsII length less than 1.8, urs/cauda more than 0.9 ..... *popovi* Mordvilko

TABLE 3. Morphological characters of *A. popovi* sensu Szelegiewicz nec Mordvilko fundatrices from Mongolia, Ulan Bator, 6.vi.1962, *Ribes* sp., leg. R. Bielawski et B. Pisarski, det. H. Szelegiewicz, slide No 1735 (left/right side respectively). The same characters of fundatrices of *A. triglochinis* Theobald, 1926 are given after Rakauskas (1993) for comparison.

Characters	*A. popovi* sensu Szelegiewicz nec Mordvilko		*A. triglochinis*
	1	2	(17–20 specimens)
body	1.796	1.707	1.903–2.453
htibia	0.592/0.572	0.603/0.582	0.635–0.753
tarsII	0.095/0.090	0.088/0.090	0.087–0.100
siphon	0.132/0.133	0.158/0.153	0.170–0.240
urs	0.110	0.108	0.117–0.127
cauda	0.160	0.180	0.167–0.197
ant	0.301+/0.562	0.552/0.547	0.563–0.719
antIII	0.188+/0.190	0.203/0.198	0.190–0.253
antIV	—/0.078	0.073/0.085	0.083–0.117
baseV	—/0.093	0.083/0.085	0.090–0.103
prtV	—/0.093	0.088/0.085	0.083–0.103
wantIII	0.029/0.028	0.030/0.030	0.023–0.038
lhantIII	—/0.020	0.015/0.018	0.013–0.025
hantIII	5	5	2–5
hurs	2	2	2
hcauda	8	5	10–13
htergVIII	5	5	3–5
lhantIII/wantIII	—/0.71	0.50/0.60	0.45–0.93
prtV/baseV	—/1.00	1.06/1.00	0.83–1.08
antIII/prtV	—/2.04	2.31/2.33	2.08–2.93
antIII/lhantIII	—/9.5	13.53/11.00	8.64–15.92
body/siphon	13.61/13.50	10.80/11.16	9.36–12.67
siphon/tarsII	1.39/1.48	1.80/1.70	1.00–2.67
urs/tars	1.16/1.22	1.23/1.20	1.17–1.38
siphon/cauda	0.83/0.83	0.88/0.85	0.98–1.39
urs/baseV	—/1.18	1.30/1.27	1.17–1.33
tarsII/baseV	—/0.97	1.06/1.06	0.87–1.00

Apart from Mordvilko's material, *A. popovi* has been noted from Mongolia (Szelegiewicz, 1963). A slide containing 2 fundatrices and 1 larva from Szelegiewicz's material (slide No 1735, Ulan Bator, 6.vi.1962, *Ribes* sp., leg. R. Bielawski et B. Pisarski, det. H. Szelegiewicz) has been examined. These fundatrices appear similar to those of *A. triglochinis* from Poland and Lithuania (Table 3), although they have fewer hcauda and the siphunculi are shorter in comparison with the cauda. The drawings and photograph in Szelegiewicz's paper support such a conclusion. Material of *A. popovi* other than Mordvilko's original slide is unknown.

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