*Fringillidae*
*Emberiza schoeniclus schoeniclus* (L.)
*Plectrophenax nivalis nivalis* (L.)

*Philopterus* sp.
*Menacanthus* sp.
*Ricinus* sp.
*Philopterus hamatus* PACKARD?

**References:** CLAY, T. 1959. Key to the species of Austromenopon Bedford (Mallophaga) parasitic on the Charadriiformes. Proc. Royal Ent. Soc. London (B) 28, p. 157–168. — HOPKINS, G. H. E. & CLAY, T. 1952. A check list of the genera & species of Mallophaga. 362 pp. Norwich. — SÉGUY, E. 1944. Insectes Ectoparasites (Mallophages, Anoplures, Siphonapteres) in Faune de France 43. 684 pp. Paris. — TIMMERMANN, G. 1954. Neue und wenig bekannte Kletterfederlinge von charadriiformen Wirten. Zool. Anz. 152, p. 163–177. — WATERSTON, J. 1922. On the Mallophaga of the Spitsbergen Expedition. Trans. Ent. Soc. London 1922, p 251–253. — ZUNKER, M. 1933. Die Mallophagen des Arktischen Gebietes. Fauna Arctica 4, p. 281–294.

## 10. The Aphid Fauna of Spitsbergen.

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This paper deals with the Aphidoidea collected during the excursion made by Dr. J. KAISILA to Spitsbergen, from July 5 to August 12, 1965. At the same time, other finds of aphids from Spitsbergen are also reviewed, and the causes of the very poor aphidofauna are discussed. The author wishes to express his best thanks for valuable discussions and for loans of material to Dr. D. HILLE RIS LAMBERS, Bladluisonderzoek T.N.O., Bennekom, Nederland, Dr. V. F. EASTOP, British Museum, Natural History, London, England, and Dr. G. PETERSEN, Deutsches Entomologisches Institut, Berlin, DDR.

### Earlier finds of aphids in Spitsbergen.

In the appendix to PARRY's (1828) report, CURTIS (1828) described *Aphis borealis*, which was found on pack ice located lat. 82° 26′ 44″ N., long. 20° 32′ 13″ E., where »a couple of small flies (to us an event of ridiculous importance)» were observed, which »revived by the heat of the hand». HILLE RIS LAMBERS (1947b) first mentioned that the species he erroneously named »*Aphis polaris* CURTIS», was *Tuberolachnus salignus* (GMELIN 1790). Later (1955) he wrote that the same species was observed by ELTON (1925) on Spitsbergen, which is *Cinara piceae* (PANZER 1801), because »a new study of the CURTIS description showed that the aphid found by PARRY could not be *Tuberolachnus salignus*», as he kindly wrote to me in a letter.



The whole description of CURTIS's *Aphis borealis* is as follows:

»Corpus magnum, atrum, hirsutum, femoribus basi ferrugineis: alis magnis, subfuscis, ad costam atris.»

»At first sight this insect might be mistaken for *A. Piceae* of PANZER, which it resembles in size and colour. Upon a closer examination, however, it will be seen that the whole surface, excepting the wings, is covered with rather long and somewhat hoary tomentum or pubescence; and the base only of the thighs is ferruginous; whereas, in *A. Piceae*, the whole insect is naked, and the antennae, thighs, and tibiae are ferruginous or reddish at their base.»

According to a letter, EASTOP suggested that *Aphis borealis* is really *Cinara* (*Todolachnus*) *abieticola* (CHOLODKOVSKY 1899). But he does not think it desirable to replace the name *abieticola* by *borealis* for a number of reasons, the most compelling of which is that just possibly CURTIS had large specimens of *Cinara bogdanovi* (MORDVILKO 1895). The characteristics of the species *borealis* described by CURTIS, the hairiness, the large size, and the coloration of the femora and tibiae agree very well with *abieticola*. The short hairs and the different coloration of the legs of *piceae* are very conspicuous distinctive characters and therefore CURTIS's species cannot hold as a synonym of *piceae*. My view is that *abieticola* would also be more likely to be carried so far north and be discovered there. Such a species must be common and widely distributed in countries nearby, and very numerous, at least periodically. In spite of the commonness of the spruce, *Picea abies*, the species *C. piceae* has been found only occasionally in Finland. If it occurs in dense forests, only single trees are infected with more or less numerous aphids. *C. abieticola*, on the contrary, has occurred for many years in Southern Finland as a common and exceedingly numerous species on *Abies sibirica*, covering the bases of the branches and the middle and upper parts of the trunk with consistent masses of aphids, as *Aphis sambuci* usually does in *Sambucus*. However, *Abies sibirica* is not native to Finland, and although at the time PARRY wrote, at the beginning of the 18th century, it was already somewhat commonly planted in Finland up to lat. 65°, it seems more probable that the aphids had been carried over the Kola Peninsula or from areas eastward of it to the locality where PARRY discovered them from the north-west parts of the native regions of *Abies sibirica*, about lat. 64–66° N., long. 40–60° E. in Northern USSR. In that case the whole distance covered by the aphids would have been about 2200 km. Moreover, these regions are the nearest where *Abies sibirica* is native and occurs as a common tree. It might also be expected that in these regions the aphid *C. abieticola* would also occur as commonly and numerously as it does in Finland.

On Spitsbergen, in Nordaustland, and in the central part, near Wahlenbergfjorden, visited by his expeditions ELTON (1925) and his colleagues observed several conspicuous large black aphids on the snow. The same observation was also made in the southern part visited by the expedition, all on the same day, August 8, 1924. The observations suggest mass swarming of an aphid species.

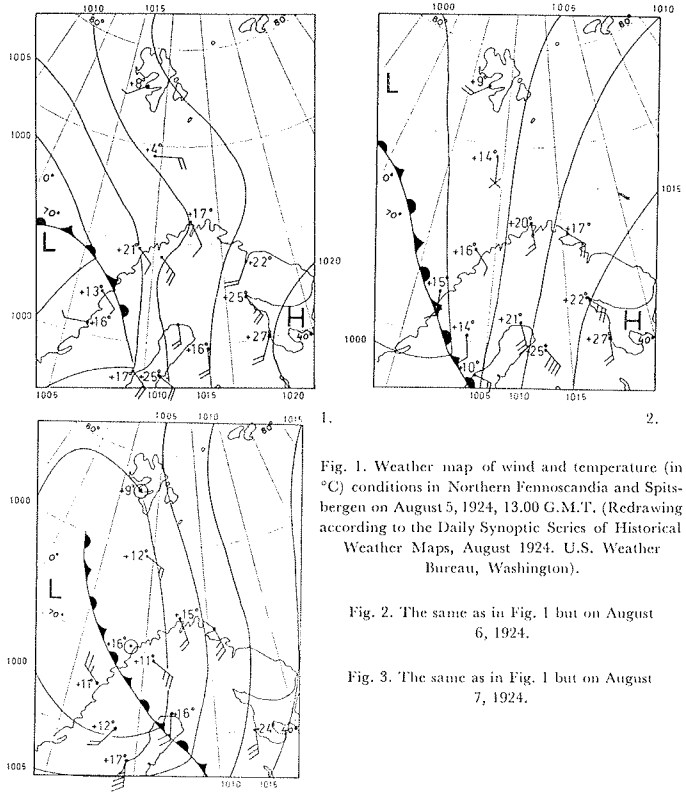


Fig. 1. Weather map of wind and temperature (in °C) conditions in Northern Fennoscandia and Spitsbergen on August 5, 1924, 13.00 G.M.T. (Redrawing according to the Daily Synoptic Series of Historical Weather Maps, August 1924. U.S. Weather Bureau, Washington).

Fig. 2. The same as in Fig. 1 but on August 6, 1924.

Fig. 3. The same as in Fig. 1 but on August 7, 1924.

According to ELTON, meteorological observations on August 6 to 8 (Figs. 1–3) showed that the insects must have been carried with the wind from the Kola Peninsula to Nordaustland, about 1280 km in 12—24 hours. According to ELTON, the aphids were identified by F. LAING as *Cinara piceae* (PANZER), the food plant of which is the spruce, *Picea abies*. HILLE RIS LAMBERS (1955) also believes that the species is *Cinara piceae* PANZER, and the nearest locality where the host plant of the species mentioned occurs, would be lake Inari in Finland,



a distance of 1100 km. According to EASTOP (in litt.), ELTON's material, which is deposited in the British Museum, London, is *Cinara abicticola* CHOLODKOVSKY, whose host plant is *Abies sibirica*. As is to be seen in the meteorological maps (Figs. 1–3), the origin of the aphids discovered by ELTON and his colleagues can be traced back to the Kola Peninsula and beyond it to the same area as in the case of PARRY, about lat. 64 - 65° N., long. 40 - 50° E., a distance of more than 1800 km. The meteorological maps show that on August 5 to 7, 1924, the conditions were optimal for a mass swarming to Spitsbergen from the south-southeast. The exceptionally high daily temperatures before swarming about August 5 to 7, which were observed near the areas from which swarming is conjectured to have originated, indicate possibilities of simultaneous development of enormous masses of winged aphids, which drifted up with turbulent air currents. Because the wind speeds at upper air levels are always greater than the usual meteorological observations indicate, the aphids may have been carried to Spitsbergen in about 20 - 30 hours.

SUMMERHAYES & ELTON (1923, mentioned on pp. 209 and 261 an »*Aphis* sp.» found in the Nordaustland region. I could not discover whether this find was determined or whether the material is still extant.

Five years later than ELTON, THOR (1930) listed three aphids found on Spitsbergen as follows:

»1. *Pemphigus* sp. (*?borealis*). F.: Unter Brettern in Gras und Moos 24. VII. 1928 bei Barentsburg (S.)». »*?Cavariella* DEL GUERCIO 1911). 2. *Siphocoryne salicis*. ♀♀ *Cavariella umbellatarum* C. L. KOCH). F.: Unter Steinen in Moos und Gras den 14. VIII. 1928 bei »Residenzen» in Hiorthhamn). Die Art lässt sich kaum nur der in Doldenblüten lebenden *Cavariella* identifizieren.« »3. *Aphis? salicis*. F.: Unter Steinen auf der Lide den 23. VIII. bei Hotchneset (S.); in Moos den 28. VIII. bei Mosevatnet (B.).»

According to THOR, his aphid collection was sent to the late Dr. C. BÖRNER for identification, but he never received any further information about them. According to Dr. G. PETERSEN (in litt.), Deutsches Entomologisches Institut, Berlin, the aphid material of THOR, unfortunately, could not be found in BÖRNER's aphid collection in Berlin. Therefore, it is uncertain whether this material is still extant.

HILLE RIS LAMBERS (1955, p. 26) listed six species which are only known from the arctic regions. One of these, *Pemphigus groenlandicus* (RUEBSAAMEN 1898), has been found on Spitsbergen. According to a letter he kindly sent to me, no further information about his material from Spitsbergen is published.

OSSIANNILSSON (1958) described a new aphid, *Acyrthosiphon calvulus*, from Spitsbergen, collected by Dr. ÅKE HOLM on *Poa arctica* in Sassendalen on August 1, 1954.

## The aphid material collected by Dr. Jouko Kaisila

In the material collected by Dr. JOUKO KAISILA in Spitsbergen in 1965, there was only one sample containing aphids. But this included two different endemic species belonging to the *Acyrthosiphon — Metopolophium* group of *Aphididae* s. str. In his sample taken from the Isfjorden district, Vestpynten, on July 9, 1965, under stones, there were 12 apterous viviparous females and 1 3rd instar nymph belonging to the species *Acyrthosiphon calvulus* OSSIANNILSSON (1958). Because OSSIANNILSSON's description is based only on two apterous viviparous females, it does not contain any data on the intraspecific variation of characteristics. Therefore, in addition to his description, a supplementary description of the most characteristic features is presented, based on the material taken by KAISILA in Spitsbergen. The other species found by KAISILA is a new one, there being only one apterous viviparous specimen among *A. calvulus*. The description is presented below.

### *Acyrthosiphon calvulus* OSSIANNILSSON 1958

*Apterous viviparous female* (Fig. 4). The lateral frontal tubercles have 0 - 2 hairs. In the specimens examined, four have none, two have one on one side, five have one and one, and one specimen has one and two hairs on the lateral frontal tubercles. When the hairs have been broken right at the base, it is very difficult to decide whether the roughness of the tubercles includes the base of a broken hair. Another characteristic feature is that the posterior margin of the 1st antennal segment has only one hair, and in one case two hairs. Hairs on 3rd ant. segment 0.103 – 0.016 mm long. Processus terminalis 0.87 to 1.13 (mean 0.99) times as long as 3rd segment, and 1.68 – 2.53 (2.01) times as long as basal part of segment 6. Apical segment of rostrum 0.005 – 0.015 mm shorter than second joint of hind tarsi, with 4 – 6 secondary hairs on basal part. Legs dusky, rather long, basal part and apex of tibiae and tarsi only a little darker than other parts of legs, except the very base of the femur, which is a little paler. 1st tarsal joints with 3, 3, 3 hairs. Tergum not pigmented, faintly corrugated, with hairs 0.014 – 0.018 mm long. Abd. tergite VIII usually with 6 hairs. Siphunculi 1.35 – 1.60 (1.48) times as long as cauda, slightly bowed in- and downwards, almost cylindrical, thinnest ¾ from base, then slightly swollen to the apex, without distinct constriction at apex. Imbrication as described by OSSIANNILSSON. Cauda in some specimens with a faint, indistinct constriction near base, with 5 – 8 hairs. Cauda distinctly darker than siphunculi, but the subgenital plate varies in depth of colour, being always paler than the analsternite.

The unborn 1st instar nymphs have 3, 3, 3 hairs on the 1st tarsal joints.



Measurements of the apterous viviparous specimens in mm:

| No. | Length of body | Length of ant. | sipho | cauda | Rhin. on 3rd ant. segm. | Length of ant. segments 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.36 | 1.48 | 0.32 | 0.22 | 1 & 1 | 0.37 | 0.25 | 0.27 | 0.17 + 0.32 |
| 2 | 2.25 | 1.35 | 0.30 | 0.21 | 0 & 0 | 0.33 | 0.24 | 0.27 | 0.19 + 0.30 |
| 3 | 2.47 | 1.37 | 0.32 | 0.22 | 1 & 1 | 0.36 | 0.25 | 0.27 | 0.17 + 0.32 |
| 4 | 2.50 | 1.51 | 0.38 | 0.23 | 1 & 1 | 0.40 | 0.26 | 0.30 | 0.19 + 0.38 |
| 5 | 2.40 | 1.57 | 0.35 | 0.25 | — & 1 | 0.39 | 0.33 | 0.29 | 0.19 + 0.38 |
| 6 | 2.44 | 1.35 | 0.32 | 0.23 | 1 & 0 | 0.33 | 0.24 | 0.27 | 0.17 + 0.31 |
| 7 | 2.30 | 1.45 | 0.35 | 0.24 | — & 1 | 0.38 | 0.26 | 0.30 | 0.20 + 0.34 |
| 8 | 2.32 | 1.50 | 0.36 | 0.23 | 1 & 0 | 0.38 | 0.27 | 0.31 | 0.17 + 0.36 |
| 9 | 2.31 | 1.45 | 0.35 | 0.22 | — & 1 | 0.37 | 0.25 | 0.27 | 0.19 + 0.35 |
| 10 | 2.26 | 1.50 | 0.35 | 0.23 | 1 & 0 | 0.38 | 0.25 | 0.29 | 0.17 + 0.43 |
| 11 | 2.30 | 1.45 | 0.32 | 0.23 | 0 & 1 | 0.39 | 0.24 | 0.28 | 0.19 + 0.36 |
| 12 | 2.15 | 1.30 | 0.32 | 0.20 | 0 & 0 | 0.32 | 0.24 | 0.27 | 0.16 + 0.31 |

| No. | Length of femora I | II | III | tibiae I | II | III |
|---|---|---|---|---|---|---|
| 1 | 0.50 | 0.51 | 0.81 | 0.72 | 0.75 | 1.05 |
| 2 | 0.47 | 0.49 | 0.60 | 0.70 | 0.75 | 1.02 |
| 3 | 0.51 | 0.52 | 0.61 | 0.73 | 0.81 | 1.11 |
| 4 | 0.52 | 0.55 | 0.61 | 0.80 | 0.83 | 1.10 |
| 5 | 0.54 | 0.58 | 0.65 | 0.81 | 0.88 | 1.18 |
| 6 | 0.50 | 0.50 | 0.69 | 0.73 | 0.77 | 1.01 |
| 7 | 0.50 | 0.54 | 0.61 | 0.76 | 0.83 | 1.09 |
| 8 | 0.52 | 0.55 | 0.65 | 0.81 | 0.88 | 1.16 |
| 9 | 0.53 | 0.54 | 0.64 | 0.78 | 0.84 | 1.10 |
| 10 | 0.53 | 0.53 | 0.63 | 0.86 | 0.84 | 1.13 |
| 11 | 0.50 | 0.53 | 0.62 | 0.75 | 0.82 | 1.10 |
| 12 | 0.47 | 0.46 | 0.58 | 0.67 | 0.73 | 0.98 |

Nos. 1–12 taken by Dr. J. O. KAISILA in Vestspitsbergen, Isfjorden distr., Vestpynten, July 9, 1965.

*Systematic relationships.* As OSSIANNILSSON (1958) pointed out, his species very much resembles *Acyrthosiphon brevicornis* HILLE RIS LAMBERS (1960) from Greenland. In the four apterous cotype specimens which HILLE RIS LAMBERS kindly lent me for inspection, the most striking character of *brevicornis* is the exceptionally short 1st antennal segment, which is distinctly shorter than in *calvulus*. In *brevicornis* its inner side is almost straight, and basal and distal margins parallel, so that the whole segment is almost quadratic.

The hairlessness of the lateral frontal tubercles of *A. calvulus* is a character not displayed by all the specimens. The basal part of antennal segment 6 is distinctly longer than in *brevicornis*, and the antennal flagellum relatively shorter. The apical rostral segment of the two species is of almost the same shape, in

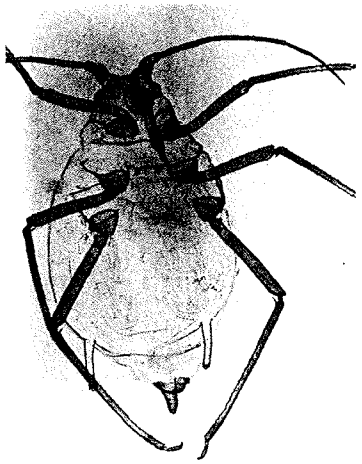

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Fig. 4. *Acyrthosiphon calvulus* Oss. Apterous viviparous female. Spitsbergen, July 9, 1965, J. KAISILA leg. (27 x)

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Fig. 5. *Acyrthosiphon svalbardicus* n. sp. Apterous viviparous female (Holotype). Spitsbergen, July 9, 1965, J. KAISILA leg. (37 x).

*brevicornis* only a little narrower, but the second joint of the hind tarsi is distinctly shorter in *brevicornis* than in *calvulus*. In *brevicornis* the siphunculi are straight and cylindrical, in *calvulus* thinnest near the middle and distinctly bowed. The holotype of OSSIANNILSSON seems to have exceptionally long siphunculi and low frontal tubercles as compared with the specimens described above.

### *Acyrthosiphon svalbardicus* n. sp.

*Apterous viviparous female* (figs. 5—6). Colour in life unknown, probably pale with darker pigment markings on the dorsum.

Body broadly spindle-shaped, not flattish. Head short and broad, lateral frontal tubercles distinct but low. Median tubercle low but distinct. Frontal tubercles slightly rough; other parts of the head smooth. Lateral frontal tubercles with 4 hairs about 0.025 – 0.035 mm long in front. Vertex with 2 small, low spinal tubercles. Antennae short, about 0.43 of the length of the body, pale at the base, gradually darkening towards the apex; apices of the antennal segments a little



darker than the other parts of each segment. 1st segment short, its anterior margin gently convex, the posterior margin with 1 – 2 hairs. Antennal segment 3 indistinctly, segments 4 to 6 distinctly imbricated. 3rd antennal segment without secondary sensoria, 1.35 – 1.7 times as long as segment 4, 1.32 – 1.43 times as long as the processus terminalis of segment 6, and 0.66 – 0.75 times the length of segments 4 and 5 together. Segment 4 0.78 – 0.97 times the length of segment 5. Processus terminalis 1.25 – 1.52 times as long as the basal part of 6th antennal segment. Hairs of antennae short, the longest, on segment 3, 0.016 mm long, about 0.57 of the diameter of the segment in the middle.

Rostrum short, reaching just to the middle coxae, its apical segment 0.095 mm long, about twice as long as broad, 0.83 of second joint of hind tarsi, with a blunt apex, and with 2 + 3 secondary hairs on its basal part besides the six primary hairs near the apex.

Legs relatively short, as dusky as the apical part of the antennae. Tarsi and distal part of tibiae a little darker than the other parts of the legs, almost smooth. 1st joint of tarsi with 3, 3, 3 hairs.

Pro- and mesonotum dorsally with broad sclerotized and pigmented transverse bands; metanotum and abdominal segments I to VI with distinct pigmented spinopleural segmental sclerites, divided in the middle into two transverse spots except in segments V and VI. Abdominal segments VII and VIII with broad transverse bands, which are not fused together. Marginal spots on abdominal segments II—IV are small, apart from other pigment markings, with 1 – 2 hairs. Pre- and postsiphuncular sclerites present, the former narrowish and curved, the latter larger and broader. Marginal tubercles very small on segments II – IV; some of them lacking on one side. Spinal tubercles on the abdomen absent. Hairs on the tergum very short, 0.020 mm long on abdominal segment III and 0.033 on segment VIII, respectively. Segment VIII with 6 dorsal hairs.

Siphunculi dusky, quite straight, cylindrical, distinctly imbricated and crumpled except at the very base, which is distinctly broader and almost smooth. Flange of siphunculi distinct. Siphunculi 1.26 – 1.30 times as long as cauda and 1.12 – 1.30 times as long as 3rd antennal segment.

Cauda moderately broad and bluntish, about 1.8 times as long as breadth at very base, without distinct constriction near base, with 7 hairs.

The unborn 1st instar nymphs seem to have only 2 hairs on 1st tarsal joints.

Measurements of the apterous viviparous female in mm:

Length of body 1.86, antennae 0.810, ant. segments 3; 0.215, 4: 0.160, 5: 0.165, 6: 0.120 + 0.150, siph. 0.230, cauda 0.215, apical segm. of rostrum 0.095, second joint of hind tarsi 0.115, fore femur 0.38 and tibia 0.51, middle femur 0.40 and tibia 0.58, hind femur 0.49 and tibia 0.81.

Host plant: Unknown, probably a gramineous plant.

Biology: Unknown.

Locality: Svalbard, Vestspitsbergen, Isfjorden Distr., Vestpynten, July 9. 1965, J. KAISILA leg.

Habitat: Under a stone 1 apterous viviparous female, together with *Acyrthosiphon calvulus* OSS.

Holotype in the collection of the Zoological Museum, Helsinki, Finland.

The above description was made from material preserved in alcohol, so that the shape of the body could be seen before mounting on a microscope slide.

*Systematic relationships.* In many characters the new species resembles the other arctic species of the genus *Acyrthosiphon* (HILLE RIS LAMBERS 1952, 1955, 1960, OSSIANNILSON 1958, HEIKINHEIMO 1966). In the shape of the frontal tubercles it resembles the species of *Metopolophium*, but the abdominal tergum seems not to be sclerotic as a whole, as in *Metopolophium* (HILLE RIS LAMBERS 1947 a). The most striking characters are the very short antennae and the pigmented spinopleural segmental patterns, which are somewhat sclerotized, and the presence of spinal tubercles on the head and in some of the marginal tubercles on abdominal segments II – V. In pigmentation this species differs from all other *Acyrthosiphon*

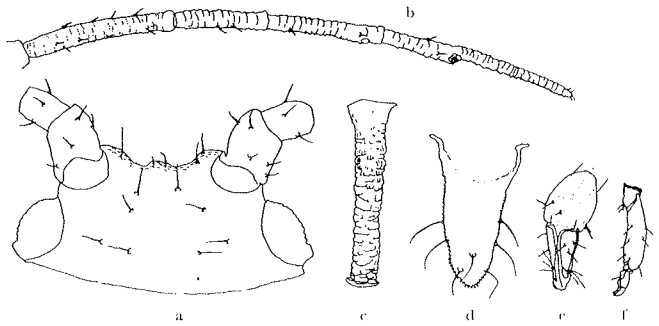


Fig. 6. *Acyrthosiphon svalbardicus* n. sp. Apterous viviparous female (Holotype): a) head, b) antenna, c) siphunculus, d) cauda, e) apical segments of rostrum, f) hind tarsus (125 x). — Orig.

species known to me. In this character it resembles an intermediate alate morph, but it has no sensoria on the third antennal segment nor signs of wing buds on the thoracic segments, as such intermediate morphs usually have.

The generic position of the new species is very difficult to decide. HILLE RIS LAMBERS (pers. comm.) suggests that it may belong to the *Metopolophium* group of the genus *Acyrthosiphon* according to the general shape of the specimen (Fig. 6) (HILLE RIS LAMBERS 1947 a). I have placed it in *Acyrthosiphon*, but in my opinion the generic complex of *Acyrthosiphon* – *Metopolophium* needs revision, especially in regard to the arctic species. These seem to be more or less apart from the genero-type species of *Acyrthosiphon* and *Metopolophium*, but rather near one another.



## Discussion

Regrettably, it has been impossible to check many of the Aphid finds made in Spitsbergen. For this reason, we are unable to list the aphids of Spitsbergen. It seems obvious that the aphids found on snow both by PARRY (1828) and by ELTON (1925) are conspecific, namely *Cinara* (*Todolachnus*) *abieticola* (CHOL.), unless, in ELTON's sample, more than one species was involved (EASTOP in litt.). As regards the aphids reported by SUMMERHAYES & ELTON (1928) and THOR (1930), we have been unable to trace the specimens in question. Obviously four species are involved, of which the *Pemphigus* sp. reported by THOR may be conspecific with HILLE RIS LAMBERS's (1955) *Pemphigus groenlandicus* (RUEBS.). The other two reported by THOR, as well as the *Aphis* sp. of SUMMERHAYES & ELTON, are probably native to Spitsbergen, but one cannot, of course, venture any assumptions about their general distribution. It appears plainly from the localities of KAISILA's *Acyrthosiphon* records that these species are indigenous. Their endemic nature also seems indisputable, unless later findings should alter the picture.

We therefore conclude that the total number of aphids so far recorded from Spitsbergen is seven or eight.

HILLE RIS LAMBERS (op. cit.) grouped the Icelandic aphids into six different zoogeographical categories on the basis of their known distribution. Employing the same system, the aphids of Spitsbergen can be grouped as follows:

a) Endemic species. Known from Spitsbergen only.
*Acyrthosiphon calculus*
„ *svalbardicus*
b) Arctic species. Known also from Iceland and Greenland.
*Pemphigus groenlandicus*
c) Boreal, arctic or holarctic species. Distribution unknown.
?*Cavariella* sp. of THOR (1930)
?*Aphis* sp. „
?*Aphis* sp. of SUMMERHAYES & ELTON (1928)
d) Boreal species. Migrating, not native species. They cannot exist in Spitsbergen because of the absence of the essential host plants.
*Cinara abieticola*

According to ELTON (1925), the land fauna of Spitsbergen comprises only species which have somehow been transported there from climatically more favourable regions. However, the aphid records so far made from Spitsbergen show that the islands also support species which are able to survive the long winter and reproduce during the short cool summer, species not encountered elsewhere. The aphids found by PARRY and ELTON reveal that, if the weather is suitable, aphids as well as other insects may be transported as far north as northern Spitsbergen, i.e. up to 2000 km. beyond the forest zone of Northern Europe. Meteor-

ological observations indicate that, enormous as this distance sounds, in suitable weather it can be covered in less than two days (by the insects). Aphids which have been transported in this way from a different kind of environment to a region where no suitable food plants exist for them, are able to survive only a short time, as ELTON's observations indicate. I consider it possible that the alpine areas of Fennoscandia, where the flora is very similar to that of Spitsbergen, may have some arctic species in common with the latter. The aphid fauna of the Fennoscandian arctic has been very inadequately studied. In the arctic, aphids mostly occupy sheltered habitats, being found either on low plants, among mosses and plant roots, or under stones and pieces of wood, etc., even apart from their food plant, as HILLE RIS LAMBERS (in litt.) has observed in the alpine region of the Swiss Alps. These hiding species include, besides root-inhabiting species, species whose southern relatives live freely higher above the ground, on plant leaves and shoots. Accordingly, it is as difficult to detect aphids in the arctic as it is to find root-dwelling aphids in general. But there is an additional difficulty in the arctic, since the numbers of aphids are much lower in the alpine and arctic areas than, say, in the forest zones (SUMMERHAYES & ELTON 1928, HEIKINHEIMO 1966).

The aphids of arctic regions are obviously adapted to withstand long periods of cold with temperatures below zero. Low temperature and high humidity in summer also enable them to survive for a long time without contact with their food plants. Their dwelling sites indicate that they persist best in the underground parts of plants or in otherwise sheltered places.

## Summary

A total of seven or eight aphid species has been recorded from Spitsbergen so far. Two of them (*Acyrthosiphon calvulus* Oss. and *A. svalbardicus* sp. nov.) are endemic, one (*Pemphigus groenlandicus* RUEBS.) is arctic and one a boreal species transported from the south (*Cinara abieticola* CHOL.); the remaining four have not been identified. The description of *Acyrthosiphon calvulus* is revised. Of the new species recorded (*Acyrthosiphon svalbardicus*, sp. nov.) one apterous viviparous female was found.

**References:** CURTIS, J. 1828. (Aphis borealis), p. 201 in: ROSS, J. C. Zoology in: PARRY, W. E. Narrative of an attempt to reach the North Pole, Appendices p. 149 – 229. London. — ELTON, C. S. 1925. The dispersal of insects to Spitsbergen. Trans. Ent. Soc. London, 1925. p. 289 – 299. — HEIKINHEIMO, O. 1966. Aphids (Hom., Aphidoidea) caught in Norway SE: Aurland under an excursion of the 13th congress of Fennoscandian entomologists, in August 14 – 16, 1965. Norsk Ent. Tidskr. 13, p. 387 – 392. — HILLE RIS LAMBERS, D. 1947 a. Contributions to a monograph of the Aphididae of Europe III. Temminckia 7, p. 179 – 1947 b. On some mainly Western European aphids. Zool. Mededel. 28, p. 291 – 333. The aphid fauna of Greenland. Medd. Grønland 136, p. 1 – 33. — 1955. Hemiptera



didae. The zoology of Iceland III, 52a, p. 1 – 29. — 1960. Additions to the aphid fauna of Greenland. Medd. Grønland 159, 5, p. 1 – 18. — OSSIANNILSSON, F. 1958. Acyrthosiphon calvulus, n. sp. A new aphid (Hem. Hom.) from Spitzbergen. Ent. Tidskr. 79, p. 66 – 68. — PARRY, W. E. 1828. Narrative of an attempt to reach the North Pole in boats fitted for the purpose, and attached to His Majesty's ship Hecla. 229 + 23 pp. London. — SUMMERHAYES, V. S. & ELTON, C. S. 1928. Further contributions to the ecology of Spitsbergen. J. Ecol. 16, p. 193 – 268. — THOR, S. 1930. Beiträge zur Kenntnis der Invertebratenfauna von Svalbard. Skrifter om Svalbard og Ishavet 27, p. 1 – 56.

## 11. Diptera: Empididae, Acalyptratae families and Scatophagidae.

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The material of the above families of *Diptera* collected in Spitsbergen by Dr. JOUKO KAISILA in 1965 comprises 283 specimens, all from Vestspitsbergen. A few specimens were taken by Mr. E. KEMILÄ in the same area in 1965. Some samples collected in 1964 by Dr. E. NYHOLM and Mr. M. NURMINEN and a part (*Scatophagidae*) taken by members of the Swedish Spitsbergen Expedition of 1954 are also included here.

The following abbreviations have been used in the list of species: J. K. — J. KAISILA, E. N. — E. NYHOLM and SSE — Swedish Spitsbergen Expedition.

### *Empididae.*

*Rhamphomyia* (*Pararhamphomyia*) *caudata* ZETTERSTEDT (*longestylata* FREY)

Longyearbyen 4. VII. 1964 3 ♂♂ 2 ♀♀ (E.N.), 5. VII. 1964 1 ♂ 1 ♀ (E.N.), 6 – 7. VIII. 1965 1 ♂ 1 ♀ (J.K.), Hotellneset 12. VII. 1965 1 ♂ (J.K.), Vestpynten 9. VII. 1965 2 ♂♂ (J.K.). Longyeardalen 8. VII. 1965 1 ♀ (J.K.). Isfjorden distr., Hanaskogdalen 9. VII. 1965 2 ♀♀ (J.K.). Moskushamna 4. VIII. 1964 1 ♂ 4 ♀♀ (E.N.), 4. VIII. 1965 3 ♂♂ 2 ♀♀ (E.N.). Adventdalen, Indre Hjorthamn 5 – 6. VIII. 1965 1 ♂ 1 ♀ (J.K.). Fivelflyane 10. VII. 1965 5 ♂♂ 10 ♀♀ (J.K.). Helvetiafjellet 5 – 6. VIII. 1965 5 ♂♂ 11 ♀♀ (J.K.). Arctowskifjellet 5 – 6. VIII. 1965 4 ♂♂ 5 ♀♀ (J.K.). Coloradofjellet 9 – 10. VIII. 1965 2 ♂♂ 2 ♀♀ (J.K.). Sassendalen, Gjelrabbane 8 – 10. VIII. 1965 1 ♂ 1 ♀ (E. KEMILÄ), 9 – 10. VIII. 1965 4 ♂♂ 8 ♀♀ (J.K.). Ny-Ålesund 31. VII. 1965 1 ♀ (J.K.). Kongsfjorden, Blomstrandhalvøya 31. VII. 1965 2 ♀♀ (J.K.). Bockfjorden 18. VII. 1965 4 ♂♂ 6 ♀♀ (J.K.), Varme kildene 18. VII. 1965 1 ♂ 2 ♀♀ (J.K.).

COLLIN's (1961) interpretion of the species has been followed here. Earlier records from Spitsbergen by BOHEMAN (1866) from Isfjorden and Belsund, by HOLMGREN (1869) from Adventfjorden (Advent Bay), by COLLIN (1923) from the same locality and by KIEFFER & LUNDBECK (1911) from Kongsfjorden. General