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with the author's compliments

Contributions to the Knowledge of Swedish Psyllids (Hem. Psylloidea) 1-4

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Abstract

In the first contribution a new *Psylla* species is described, viz. *P. betulaenanae*, n.sp. On the basis of larval characters this species is stated to be closely related to *Psylla betulae* (L.), *P. alni* (L.), *P. fusca* (Zett.) and the American *P. carpinicola* (Crawford), these species together constituting *Psylla* s.str. (type *Psylla alni*). In the second contribution the larval instars of *Psylla foersteri* Flor are described and this species is made the type of subgenus *Labyrinthopsylla*, n.subg. The third con-

tribution deals with our remaining *Psylla* species which are arranged into three new subgenera, viz. *Cacopsylla* (type *mali* (Schmiedb.)), *Chamaepsylla* (type *hartigi* Flor), and *Hepatopsylla* (type *nigrita* (Zett.)). Also this subdivision is based on larval characters. The fourth contribution is a tentative key to the Swedish *Psylla* species in the 5th larval instar. No tenable characters for the separation of *nigrita* (Zett.), *elegantula* (Zett.), and *klapaleki* Sulc were discovered, however.

1. *Psylla betulaenanae*, n.sp

Synonym: *Psylla betulae-nanae* Heslop-Harrison 1951, nom.nud.—Ossiannilsson 1952, nom.nud.—Lindberg & Ossiannilsson 1960, nom.nud.

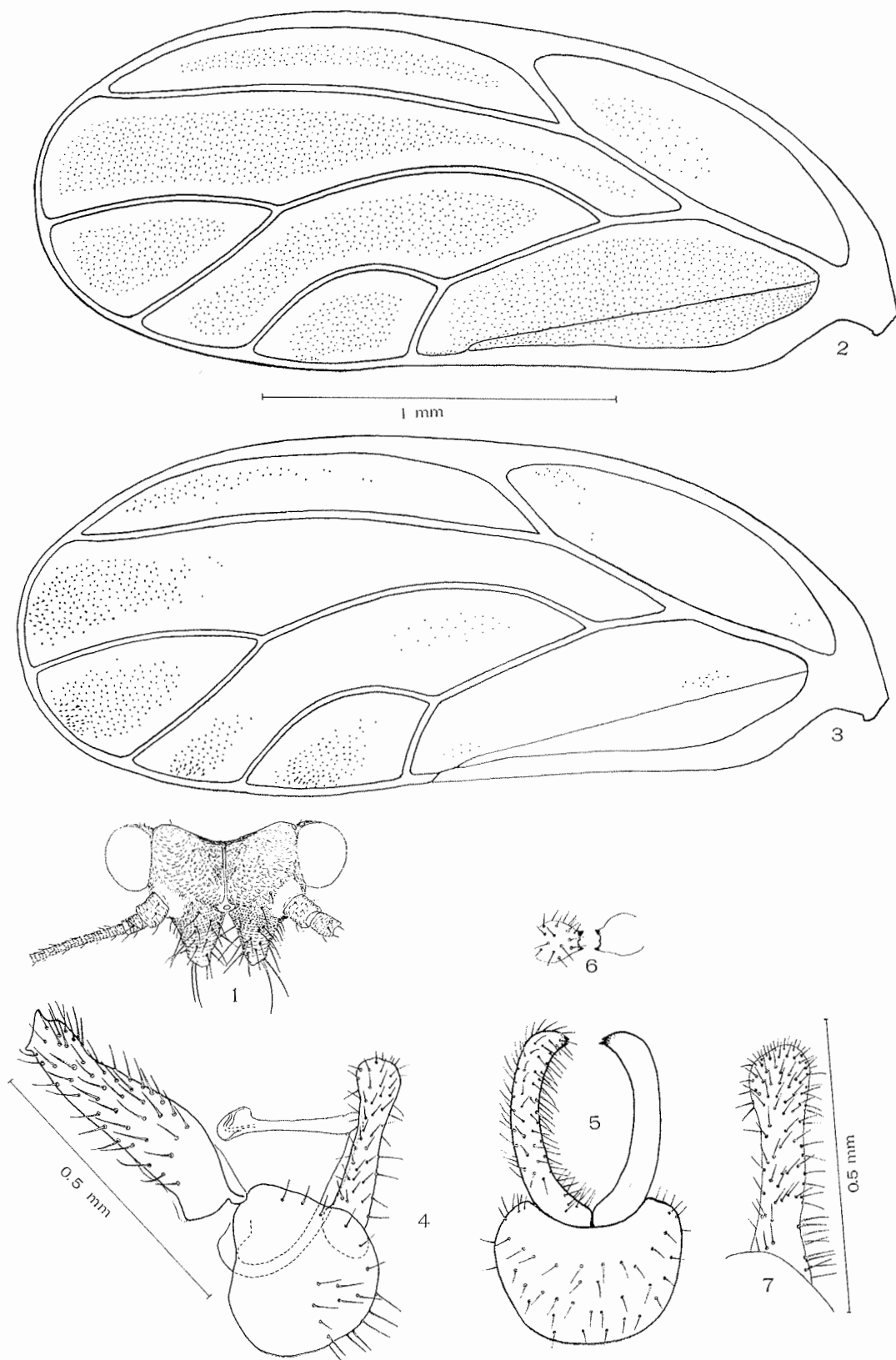
Description. *Adult male and female.* Very like *Psylla betulae* (L.), body smaller and generally darker pigmented. Length in mm without wings: male 1.81 ± 0.03 (1.5-2.5), female 2.37 ± 0.02 (2.0-3.0), with wings: male 3.22 ± 0.09 (2.7-3.5), female 3.48 ± 0.02 (3.0-3.7). (These measurements were made on dried material.) Head (Fig. 1) with facial cones moderately developed. Antennae much longer than half body length and nearly half as long as length with wings, segments I-VIII more or less light, III-VIII with dark apices, IX and X fuscous. Body orange or sordid yellow with diffuse fuscous markings, males generally stronger pigmented than females. Fore wings hyaline, more or less amber-coloured; microtrichiae of fore wing membrane arranged as in Figs. 2-3. Male genitalia as in Figs. 4-6; forceps less hairy than in *betulae* (Fig. 7). Female genitalia (Fig. 8) long and slender but less so than in *betulae* (Fig. 9).

1st instar larva: so far unknown.

2nd instar larva (Fig. 10). Body flat, com-

paratively broad. Sclerites with fuscous pigmentation. Antennae 3-segmented, third segment with one rhinarium situated distally of middle. Dorsal hairs generally pointed, ventral hairs with fine apices, marginal hairs of abdomen indistinctly capitate. Sectasetae absent. Anus terminal. Perianal pore field reniform (Fig. 10 A), comparatively large, consisting of one outer belt with 2-5 irregular more or less concentric rows of pores and an inner field with a transverse ring of about 70 less distinct pores.

3rd instar larva (Fig. 11). Body flat and broad. Pigmentation as in 2nd instar larva. Antennae 4-segmented, 3rd and 4th segments each with one sensorium. Dorsal, ventral and marginal hairs pointed or with fine apices, only the longest hairs of middle and hind tibiae indistinctly capitate. Sectasetae absent. Anus terminal or nearly so, surrounded by a large perianal pore field consisting of one outer and one inner zone. Outer zone of perianal field with numerous distinct pores arranged as in Fig. 11 and extending to the dorsal side of abdomen. The outline of the ventral part of this reminds of two bird-heads facing each other. Inner zone with numerous less distinct pores.



4th instar larva (Fig. 12). Body broad and flat. Shape of hairs and pigmentation much as in 3rd instar. Sectasetae absent. Antennae 6-segmented, segments III, V and VI each with one sensorium. Anus terminal, perianal pore field as in the previous instar, only better developed.

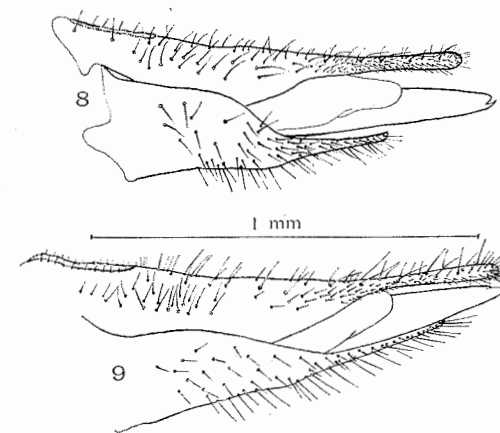
5th instar larva (Fig. 13) Body very broad. Hairs with fine apices, pigmentation as in the previous instars. Antennae 8-segmented, segments III, V, VII and VIII each with one sensorium. 3rd antennal segment near middle slightly swollen, with 3 short hairs around the swelling, reminding of the hairs present on the apices of segments III-VII. Anus terminal, perianal pore field still better developed than in the fourth instar. Sectasetae absent.

The colour of the younger instars is brownish yellow or more rarely olive green, with black sclerites. The older larvae are light green or yellowish green with fuscous or black sclerites.

Host plant: *Betula nana* L.

Biology. Hibernation probably takes place in the egg stage on *Betula nana*. In Härjedalen, Hede, the larval instars II-IV were found on July 18th, 1962, but in 1963 one specimen belonging to the last instar was collected on July 2nd. Specimens of instar V were collected in Jmt., Sunne on July 7, 1966, and in Vb., Umeå as early as on 29.VI.1964. In Pite Lappmark, Arvidsjaur, instars IV and V were available on 23.VII.1955. In Abisko I collected instars II-IV on 4. and 5.VII.1964, instars III-V on 10.VII.1964. Adults were found in July and August, see Types. Like the larvae of *Psylla betulae*, those of *betulaenanae* develop on the shoots or young leaves of its host-plant surrounded by copious white wax.

Types: holotype, one male from Dalarne, Malung, Bäcksalen collected on 13.VII.1963. Paratypes: 3 ♂♂ and one ♀ from the same locality and date; 2 ♂♂ 6 ♀♀ from Dlr., Venjan, St. Knubbflyten 17.VII.1963 (author leg.); Dlr., Lima, Bullberget 26.VIII.1931, 1 ♂ (Bo Tjeder leg.); 6 ♂♂, 6 ♀♀ from Vstm., Norberg, Gavelmossen 3.VII.1954 (author);



Figs. 8-9. (8) *Psylla betulaenanae*, n.sp., specimen from Abisko, female genitalia from the left. (9) *Psylla betulae* (L.), specimen from Dlr., Venjan, female genitalia from the left.

31 ♂♂, 41 ♀♀ from Hls., Gnarp, Leska 11.VII.1960 (author); one male from Vb., Jörn 21.VII.1933 (author leg.), and another from Vb., Jörn, Ullbergsträsk 24.VII.1936 (G. Notini leg.); one male from P. Lpm., Arvidsjaur 22.VII.1936 (Notini); one male from Torne Lpm., Torne Tr(äsk) 9.VIII.1918 (R. Malaise leg.); one male from T. Lpm., Abisko 1918 (F. Nordström); one male and one female (pinned) and 8 males (in slide No. 17085) from T. Lpm., Abisko 1948 (G. Heslop-Harrison leg.); 3 males and 2 females from T. Lpm., Abisko 10.VIII.1965 (author, in slide No. 16171). Holotype and 10 paratypes from Hls., Gnarp, Leska in the Entomological Museum of Lund; slides Nos. 16171 and 17085 and 2 males and 2 females (pinned) in the collection of the Department of Plant Pathology and Entomology, Uppsala 7. Remaining paratypes in the author's collection.

Diagnosis. The species just described is closely related to *Psylla betulae* (L.), from which it differs e.g. by its smaller body and darker colour. The fore wings are also darker in *betulaenanae* than in *betulae*. The male for-

Figs. 1-7. (1) *Psylla betulaenanae*, n.sp., head of male from Abisko. (2) same, fore wing of male with microtrichiae of upper surface. (3) same with microtrichiae of lower surface. (4) same, male genitalia from the left. (5) same, subgenital plate and forceps from behind. (6) same, apices of male forceps from above. (7) *Psylla betulae* (L.), specimen from Dlr., Venjan, male forceps from the left.

ceps is less pilose in *betulaenanae* (cf. Figs. 4 and 7) than in *betulae*, and in the female the ventral genital plate is less slender in *betulaenanae* (see Fig. 8) than in *betulae* (Fig. 9). In the larvae, pigmentation is weaker in *betulaenanae* than in *betulae*. In the 5th larval instar the antennae are on an average relatively shorter in *betulaenanae* (index III-VIII: width of head=1.0-1.28) than in *betulae* (same index=1.18-1.36). Generally the dorsal and marginal hairs and the antennal hairs are longer and more fine-pointed in *betulae* than in *betulaenanae*. *Psylla betulae* (L.) is associated with *Betula verrucosa* and *B. pubescens*.

Note. This species was mentioned by Reuter (1881, p. 159-160) as a smaller form of *Psylla betulae*. He stated that Dr. Löw considered it to be fully identical with the latter. In 1948, the late Dr. G. Heslop-Harrison visited Sweden and collected a large material of our species on *Betula nana* in Abisko and possibly more localities in northern Scandinavia. He told me that he was convinced that the present insect was a distinct species which he intended to describe as a new one. He mentioned the species in a paper (1951, p. 658, footnote) under the name of *Psylla betulae-nanae*. But no description ever appeared.

Systematic position. The closest Swedish relatives of *betulaenanae* within the genus *Psylla* are the following species: *betulae* (L.), *alni* (L.), and *fusca* (Zett.). Common to these species are the following morphological characters in the larval instars: anal opening terminal, anal wax pore field very large and extending also to the dorsal surface and shaped more or less exactly as in *betulaenanae* (cf. Figs. 10A, 11, 12, 13); antennae in 3rd instar 4-jointed (*fusca* not examined), in instar IV 6-jointed, and in instar V 8-jointed. (In the last larval instar of *Psylla fusca* there is a tendency of the 8th antennal joint being subdivided into two "secondary" joints.) Last (8th) antennal segment in the 5th instar with only one sensorium. Abdominal sectasetae absent in all stages. Especially the position of the anus and the very characteristic shape of the perianal pore field strongly support the idea

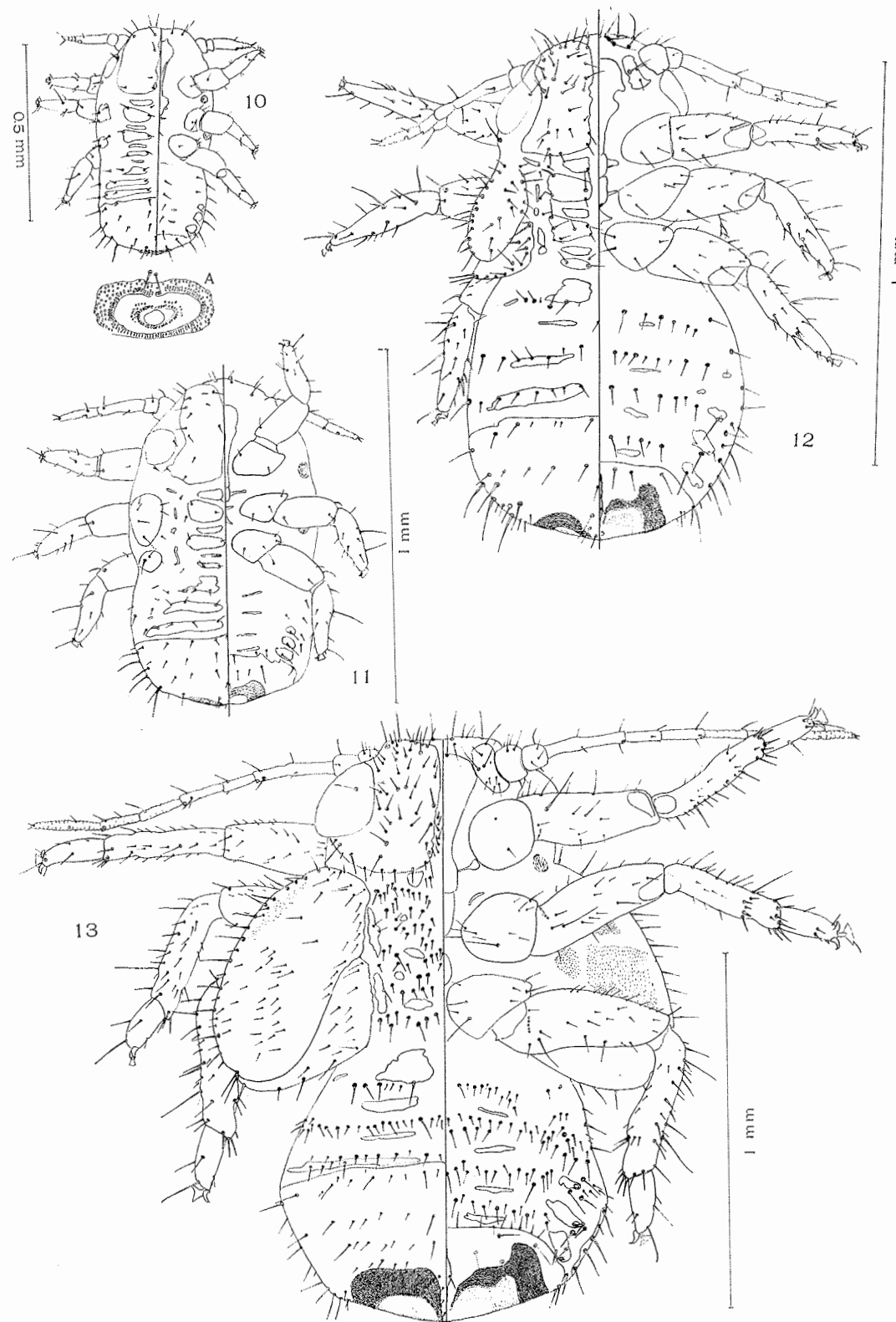
that these species do represent a separate subgenus. Since *Psylla alni* (L.) is the genotype of *Psylla*, this subgenus becomes *Psylla sensu stricto*.—Judging from the description of the fifth stage nymph of *Psylla carpinicola* (Crawford) by Caldwell (1938), also this species does belong to *Psylla s.str.*

2. *On the larval instars and systematic position of Psylla (Labyrinthopsylla, n.subgen.) foersteri* Flor

Description of the larval instars. 1st instar larva (Fig. 14). Body oblong, not very depressed. Colour yellowish, sclerotized parts fuscous. Antennae 3-jointed, 3rd joint with one sensorium situated on the middle. Dorsal hairs short, pointed or stump, marginal hairs on abdomen longer, capitate. Sectasetae absent. Anus ventral, not surrounded by a distinct pore ring (Fig. 14A).

2nd instar larva (Fig. 15). Body broad, depressed. Colour pale yellow. Antennae 3-jointed, 3rd segment with one sensorium situated distally of middle. Hairs on head pointed or with fine apices. Dorsal hairs of thorax short, stump, those of abdomen gradually longer against caudal end, stump or capitate. Most marginal hairs of abdomen long, capitate. Two pairs of sectasetae (Fig. 15, sect) present. Anus ventral, surrounded by a transversely oval or somewhat irregular single-lined ring of wax pores (Figs. 16a-b).

3rd instar larva. Body broad, depressed. Colour pale yellow. Antennae 4-jointed, segments III and IV each with one sensorium, that of III situated apically, that of IV proximally of middle. Hairs on head pointed or with fine apices, dorsal thoracal hairs short, stump, those on margins of wing buds comparatively long, capitate; abdomen dorsally with 4 longitudinal rows of comparatively long, capitate hairs and between these some shorter hairs. Margin of abdomen with 4 pairs of long and a few shorter capitate hairs and 2 pairs of sectasetae. Venter of abdomen with a submarginal row of long or moderately long capitate hairs gradually longer towards the caudal end of the body. Anus ventral, perianal



Figs. 10-13. *Psylla betulaenanae*, n.sp. (10) 2nd instar larva from Abisko. A=perianal pore field. (11) 3rd instar larva from Abisko. (12) 4th instar larva from Abisko. (13) 5th instar larva from Arvidsjaur.

pore field transverse, with one outer single-lined or partly double-lined fringed ovoid ring of large pores and one inner ring of small, irregularly arranged pores.

4th instar larva. Body depressed, oblong, yellowish, sclerotized parts more or less distinctly darker. Antennae (Fig. 17) 6-segmented, 3rd and 5th segments apically with one sensorium each, segment VI with one sensorium situated near middle. Dorsal hairs of head more or less distinctly stump. Fore wing buds each with 4 moderately long and some shorter setae, hind wing buds apically with 2 moderately long setae. Abdomen dorsally with 4 longitudinal rows of setae which are comparatively short on the anterior segments, much longer on the caudal sclerotized plate. Long or moderately long setae are also present on or near the abdominal margin and on the outside of the 2nd and 3rd tibiotarsi. These more or less long setae are quite unlike any setae present in our remaining *Psylla* species. Arising from a basal ring they gradually first increase and then decrease in thickness but their apices are again distinctly broader; they are also conspicuously pigmented. 2 pairs of sectasetae present. Anus ventral, anal pore field as in Fig. 18.

5th instar larva. Shape of body, chaetotaxy &c. as in Fig. 19. Antennae 8-segmented but the 8th segment is more or less distinctly subdivided into 2 secondary joints. Sensoria present on apices of segments III, V, and VII and on the apex of the basal secondary part of segment VIII. Sclerotized parts fuscous (pigmentation not reproduced in Fig. 19), pigmentation of antennae as in Fig. 19A. Most dorsal and marginal and some ventral setae are pigmented and shaped as described in the foregoing instar (Fig. 19s). Two pairs of sectasetae present (Fig. 19, sect). Anus ventral, perianal pore field (Fig. 20) moderately large.

Biology. In Sweden, hibernation of this species takes place in the egg stage in the buds of its hostplants, *Alnus glutinosa* and *incana*. Eggs and young larvae were found e.g. in Upl., Vittinge on May 16, 1965. 5th instar larvae were collected on the same locality on June 21, 1959, and on Gotland, Fårö as late as July 19, 1965. In Upland, adults normally appear in July, but in the southern provinces of Sweden they have been found as early as on June 12 (Bl., Fölkärle 1952, Gyllensvärd leg.).

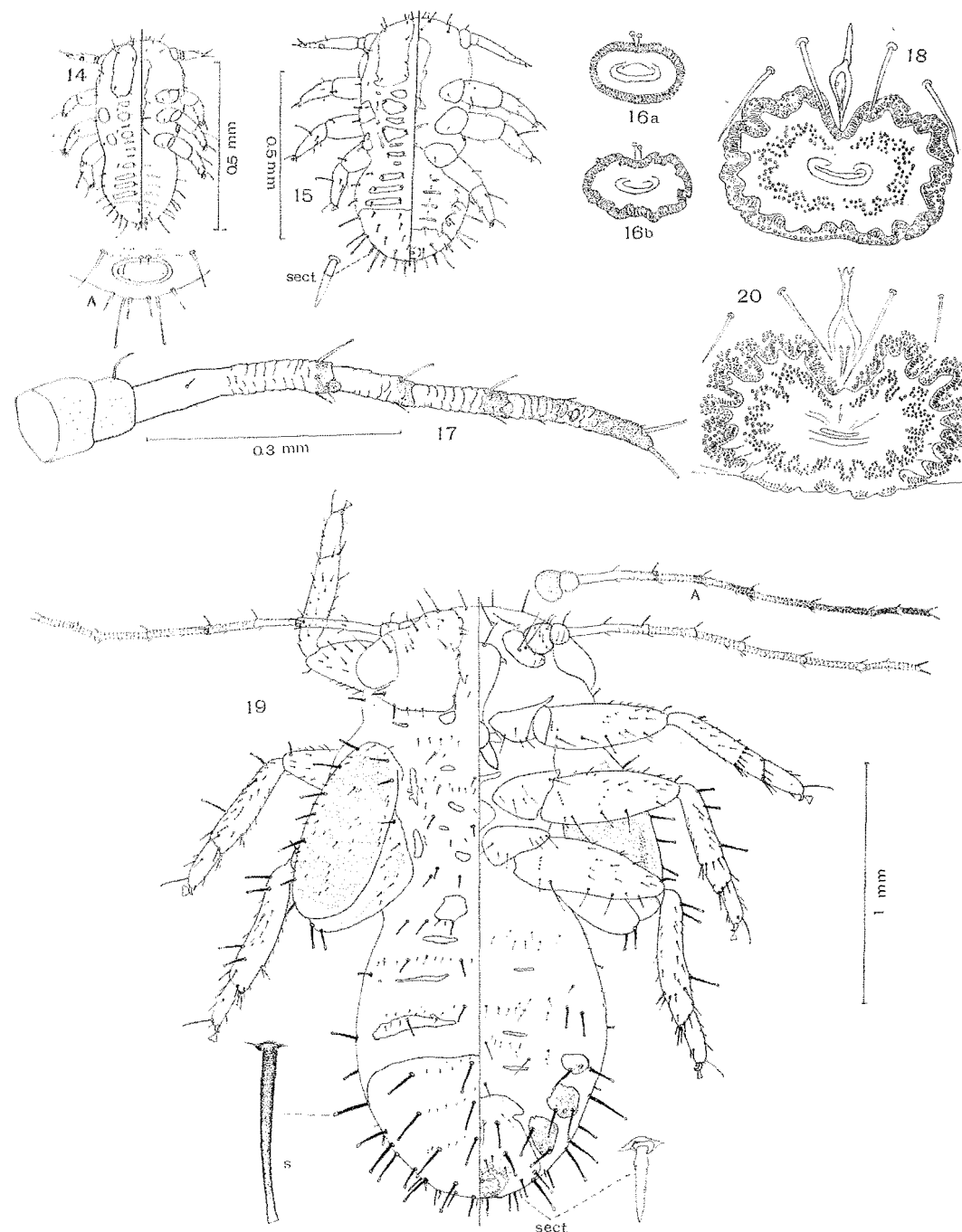
Systematic position. In an earlier paper (Os-

siannilsson 1965, p. 218) I stated that "die *Psylla*-Arten *alni* (Linné), *foersteri* Flor, *betulae* (Linné), *betulae-nanae* Heslop-Harrison (nom. nud.), *fusca* (Zetterstedt) und *buxi* (Linné) bilden eine wohldefinierte Gruppe...". This is quite wrong. On the basis of imaginal characters, Loginova (1964) transferred *Psylla buxi* to *Spanioneura* Foerster. The larval perianal pore field of *buxi* reminds strongly of that of *Psylla* s.str., but the antennae are 3-segmented in the 3rd instar, 5-segmented in the 4th instar and 7-segmented in the 5th instar. Therefore I agree that *buxi* should at least not be reckoned as a *Psylla* s.str. On the other hand *Psylla foersteri* is apparently unique among our *Psylla* species by the absence of perianal wax pores in the first larval instar and by the very peculiar lacinate shape of its perianal pore field in instars III-V. In the number of antennal joints in instars III-V our species agrees with *Psylla* s.str., especially with *fusca* (Zett.), where segment VIII is often secondarily subdivided into two parts. Also the shape of the setae of instars IV-V is a quite characteristic feature. I therefore designate *Psylla foersteri* Flor to be the type of a distinct subgenus, *Labyrinthopsylla* n.subgen., with the characters just mentioned.

3. Taxonomic relations within the genus *Psylla* s. lat. (excluding *Psylla* s.str. and *Labyrinthopsylla* Oss.)

In the fifth larval instar of five Swedish species, viz. *mali* (Schmdbg.), *sorbi* (L.), *peregrina* Foerster, *hartigi* Flor, and *ulmi* Foerster, the outer ring of the perianal pore field consists of two or several rows of pores. In *hartigi*, the antennae are 8-jointed, the terminal joint carrying only one sensorium. I regard this species as the type of a distinct subgenus with these characters, *Chamaepsylla*, n.subg. In *mali*, *sorbi*, *peregrina* and *ulmi*, the antennae of the fifth instar are 7- or 8-jointed, the larger number of segments being the result of a secondary division of the 3rd segment, and the terminal joint carries two sensoria. For these four species I erect the subgenus *Cacopsylla*, n.subgen., (type *Psylla mali* (Schmdbg.)).

In our remaining *Psylla* species, the outer pore ring of the perianal field in instar V consists of a single row of pores and the antennae are 7-segmented with 2 sensoria on their ter-



Figs. 14-20. *Psylla foersteri* Flor. (14) 1st instar larva from Gstr., Valbo, A=anus with surrounding ventral integument. (15) 2nd instar from Valbo, sect=sectaseta. (16a) and (16b) 2nd instar, perianal field of two individuals from Upl., Vittinge. (17) 4th instar, antenna of specimen from Upl., Upsala-Näs. (18) 4th instar, perianal pore field, same locality. (19) 5th instar, specimen from Upsala-Näs, A=antenna with pigmentation, s=marginal abdominal seta, sect=sectaseta. (20) 5th instar, perianal pore field (hind margin incomplete) of another specimen from the same locality.

mental joint. Though this group is doubtless heterogeneous I refrain from trying to subdivide it, provisionally placing all these species in one new subgenus, *Hepatopsylla* n. subg. (Typus subgeneris *Psylla nigrita* (Zetterstedt).)

4. A preliminary key to 5th instar larvae of Swedish *Psylla* species

1. Anus terminal, circumanal pore field very large, extending to the dorsal surface of abdomen (Fig. 13). Antennae with 8 or 9 joints, eighth segment with one sensorium (*Psylla* s.str.) 2
- Anus ventral, perianal pore field smaller, not extending to dorsum 5
2. Large species, 1.85–3.15 mm. On *Alnus* 3
- Smaller species, length rarely exceeding 2.40 mm. On *Betula* 4
3. Antennae long, 3rd joint $> 2 \times$ terminal joint of rostrum. Practically all setae on dorsal surface of anterior wing pads very short *alni* (L.)
- Antennae shorter, 3rd joint $< 2 \times$ terminal rostral joint. Anterior wing pads dorsally with a few longer setae *fusca* (Zett.)
4. Body larger, length 1.80–2.40 mm. Antennae longer, index flagellum (segments III–terminal): width of head including eyes = 1.18–1.36. Length of anterior wing pads 750–825 μ . Dorsal pilosity of thorax thinner and finer. On *Betula verrucosa* and *pubescens* *betulae* (L.)
- Body smaller, length 1.50–2.10 mm. Antennae shorter, index flagellum: width of head 1.0–1.28. Length of anterior wing pad about 675 μ . Dorsal pilosity of thorax coarser and denser. On *Betula nana* *betulaenanae* Oss.
5. Perianal pore field as in Fig. 20. Antennae with 8 or 9 segments. Abdomen with 2 pairs of setae (Fig. 19, sect.). (Subgenus *Labyrinthopsylla* Oss.) *foersteri* Flor
- Perianal pore field not as in Fig. 20, much simpler. Antennae never with more than 8 segments. Setae present or absent 6
6. Outer ring of perianal pore field consisting of one single row of pores (Subgenus *Hepatopsylla* Oss.) 11
- Outer ring of anal pore field consisting of 2 or more rows of pores 7
7. Setae present on margin of abdomen .. 8
- Setae absent 9
8. Outer margin of fore wing pads with several setae approximately as long as those of hind wing pads ... *P. (Cacopsylla) sorbi* (L.)
- Most marginal setae of fore wings short, only 1–3 of them being nearly as long as those of hind wing pads *P. (C.) mali* (Schmdbg.)
9. Abdominal dorsum with numerous tubercles arranged in irregular transverse rows 10
- Abdominal dorsum without tubercles. Terminal antennal joint with one sensorium only *P. (Chamaepsylla) hartigi* Fl.
10. Abdominal dorsum between the tubercles with numerous short setae, the length of these being up to $1/3$ of longest marginal setae *P. (Cacopsylla) ulmi* Foerster
- No distinct setae between dorsal abdominal tubercles .. *P. (Cacopsylla) peregrina* Foerster
11. Setae present on margin of abdomen .. 12
- Setae absent 18
12. Margin of fore wing pads with at most one long or half-long seta 13
- Fore wing pads each with more than one longer marginal seta 14
13. Body strongly pigmented. Perianal pore field comparatively small, its width being below length of longest marginal setae *pyrisuga* Foerster
- Pigmentation weak. Perianal pore field large, its width exceeding length of longest marginal hairs *rhannicola* Scott
14. Hairs on antennal flagellum shorter than diameter of 3rd antennal joint at its middle, little conspicuous. Abdomen with 5 pairs of long marginal setae 15
- At least one hair on antennal flagellum distinctly longer than the diameter of 3rd antennal joint 16
15. Longest marginal abdominal setae shorter than width of perianal pore field. Dorsal hairs on abdomen minute. Pigmentation of body weak *melanoneura* Foerster
- Longest marginal abdominal setae longer than width of perianal pore field. Dorsum of abdomen often with one, two or three half-long setae. Body normally distinctly pigmented *subferruginea* Edwards
16. Caudal abdominal tergal plate broad, its width twice its length. Pigmentation strong. 3rd antennal joint with one capitate hair being longer than the diameter of this joint, remaining hairs on flagellum short *crataegi* (Schrank)
- Caudal abdominal tergal plate narrower .. 17
17. Antennae short, their length approximately = width of head, segments III and V each with one capitate hair being considerably longer than the diameter of these segments; remaining hairs on flagellum shorter than this dia-

- meter. Abdomen normally with 6 pairs of long marginal setae. Body brownish pigmented *pruni* (Scop.)
- Antennae longer than width of head. 3rd antennal joint with one longer capitate hair, a few additional hairs on segments III, IV, and V being approximately as long as the diameter of III. Abdomen with 5 pairs of long marginal setae *costalis* Flor
18. Longest setae of abdominal dorsum less than half as long as longest marginal setae. Not on *Salix*, nor on *Ledum* 19
- Longest setae of abdominal dorsum at least half as long as longest marginal setae. On *Ledum* (*ledi* Flor) or *Salix* 24
19. Margin of fore wing buds with 1–3 long or half-long setae 20
- Margin of fore wing with more long or half-long setae 21
20. Fore wing buds each with only one half-long marginal seta, no long setae present *pyri* (L.)
- Fore wing buds each with 3 half-long marginal hairs *pyricola* Foerster
21. Abdomen above with a few half-long setae, the longest ones about $1/3$ of the length of the longest marginal hairs .. *hippophaes* Foerster
- Longest hairs on abdominal dorsum at most $1/4$ of length of longest marginal setae .. 22
22. Longest hairs on abdominal dorsum about $1/4$ of length of longest marginal hairs. Strongly pigmented *zetterstedti* (Thomson)
- Dorsal abdominal hairs very short, often little longer than the width of their own basal rings. Pigmentation weaker 23
23. Dorsal hairs few, their number on each of the hind wing buds about 15. Medial thoracic tergites each with one seta considerably longer than the dorsal abdominal setae, about $1/4$ of the length of longest marginal hairs on fore wing buds. Seta on complex eye about $1/3$ of longest fore wing hair .. *myrtilli* W. Wagner
- Dorsal setae numerous, their number on each of the hind wing buds about 25. Setae on thoracic tergites shorter than longest setae on abdominal dorsum. Seta on eye shorter, about $1/5$ of longest marginal seta of fore wing buds *corcontum* Šulc
24. Perianal pore field small, its length (in longitudinal direction of body) about equal to its distance to caudal margin of body or smaller 25
- Perianal pore field larger, its length exceeding its distance to caudal margin of body 29
25. Long hairs on abdominal dorsum few in number, in all 18–20 pairs present (including marginal setae) 26
- Long dorsal and marginal setae more numerous 27
26. Dorsal hairs on fore wing pads normally very short, inconspicuous, rarely one or a few of them being a little longer. Hairs on antennal flagellum short, at most as long as diameter of segment III *zaicevi* Šulc
- Fore wing buds with several short and half-long setae. At least one or two hairs on flagellum longer than diameter of segment III *parvipennis* Löw
27. Outer ring of perianal pore field anteriorly more or less open, broadly horseshoe-shaped. Longest hairs on abdominal margin approximately as long as antennal segment VII. Most dorsal hairs on wing pads short, only few longer hairs present. Body often strongly pigmented *palmeni* Löw
- Outer ring of perianal field normally complete or almost complete. Longest hairs on abdominal margin approximately as long as antennal segments VI and VII together. Dorsum of wing pads often with some comparatively long hairs. Body faintly pigmented 28
28. Antennal joints IV–VI together at most as long as VII (excluding terminal setae) *propinqua* Schaefer
- Antennal joints IV–VI together distinctly longer than VII (excluding terminal setae) .. *moscovita* Andrianova
29. Long hairs on abdominal dorsum few in number, in all 17–20 pairs (including marginal setae) 30
- Abdominal dorsum with at least 22 pairs of long setae (including marginal setae) 31
30. Length of perianal field little greater than its distance to hind margin of body .. *zaicevi* Šulc
- Length of perianal field at least twice its distance to hind margin of body *ledi* Flor
31. Hairs on antennal flagellum short, at most as long as diameter of antennal segment III. Long dorsal and marginal hairs capitate but apices very delicate so that they do not appear to be distinctly capitate in preparations *ambigua* Foerster
- Antennal flagellum with some hairs longer than diameter of ant. segment III. Long dorsal and marginal hairs distinctly capitate 32
32. Perianal pore field comparatively small, its width less than half length of longest marginal abdominal hairs, its anterior incision shallow.

Normally weakly pigmented .. *pulchra* (Zett.)
 - Perianal pore field a little larger, its width exceeding half length of longest marginal hairs of abdomen. Anterior incision of perianal field often deep and angular *nigrita* (Zett.), *elegantula* (Zett.), and *klapaleki* Sulc.

Note. I failed to find tenable larval characters separating the last-mentioned three species. *Klapaleki* is often, but not always, strongly pigmented. In my material of *nigrita* and *elegantula* all specimens are pale, but then the *elegantula* material is insufficient for generalizations.

Second note. Ball & Jensen (1966) found a character useful for sexing 5th instar larvae of *Psylla pyricola*. This character, a roughly Y-shaped suture visible in front of the perianal pore field in female larvae only, can also be used for determining the sex of at least instar V in all Swedish *Psylla* species.

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