A New Species of *Pineus* (Homoptera: Adelgidae) on *Abies*

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A New Species of *Pineus* (Homoptera: Adelgidae) on *Abies*[1]

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Abstract *Canad. Ent.* 96: 522-528 (1964)

A new anholocyclic species from the coastal region of western North America on *Abies amabilis* (Dougl.) Forbes and *A. grandis* (Dougl.) Lindl. is described. This is the first species of *Pineus* found on true firs.

Johnson (1959) recorded a species of *Pineus* on *Abies amabilis* (Dougl.) Forbes from western Washington, U.S.A. He described the habits, form, and wax secretions of the first-instar nymph so that it could be distinguished from *Adelges* (*Chermes*) *piceae* (Ratz.), and pointed out that it was the first member of the genus known to infest true firs.

[1]Contribution No. 954, Forest Entomology and Pathology Branch, Department of Forestry, Ottawa, Canada.

In August, 1961, we received samples of bark of *Abies amabilis*, collected at Kitimat, B.C., from A. K. D. Jardine, Forest Entomology and Pathology Laboratory, Victoria, B.C. These were infested by a species of *Pineus* which proved to be identical with material from Washington previously supplied by Dr. Johnson. Further samples were collected by D. H. Ruppell from Squamish, B.C.

Examination of stages present in these collections disclosed no evidence of alate forms, and the collectors could find no galls on spruce (*Picea*) attributable to this species. This suggests that it is monomorphic and monocyclic. It possesses all the morphological characters typical of *Pineus* (Annand 1928). The pore structure distinguishes it from previously described species.

***Pineus abietinus*, new species**

AESTIVOPROGREDIENS

FIRST INSTAR (Fig. 1).—Body 0.34 mm. by 0.21 mm. (10 specimens), light reddish-brown. Antennae about 0.085 mm. long; three-segmented with sensory area near distal end of third segment; third segment longer than first and second combined. Six dorsal plates on the head with the two posterior, marginal plates containing ocelli only; two large plates on prothorax; small, lightly sclerotized plates on mesothorax, metathorax and first seven abdominal segments. Pores circular with thin sclerotized margins; occurring singly or discontiguously in groups; smaller than ocelli; largest about 0.007 mm. in diameter; often indistinct on abdomen. The variation in the distribution of pores on the dorsum of four first-instar larvae is shown in Table I.

ADULT (Fig. 2).—Body 0.61 mm. by 0.55 mm. (8 specimens), thorax dark, abdomen light reddish-brown. Antennae about 0.025 mm. long, knob-like. Average number of pores at base of each antenna 2.4 (range 0-4). Cephalothoracic plate with a median suture, and sutures delineating the plates bearing ocelli. Most pores on cephalothoracic plate as large as or slightly larger than an ocellus, the largest being about 0.013 mm. in diameter. Relatively small plates on remainder of dorsum with pores slightly smaller caudad. Numbers of pores at the base of each sub-coxa of the first, second and third pair of legs averaged 3.5(0-7), 4.0(1-8), and 2.0(0-5) respectively. A pair of spiracles on each of mesothoracic and metathoracic segments and second to fifth abdominal segments inclusive.

The species is best distinguished by the size, structure and discontiguous grouping of pores. The averages and ranges of numbers of pores on the dorsum of ten adults follow:

				Abdominal Segments						
	Cephalothorax	Mesothorax	Metathorax	1	2	3	4	5	6	7
Average	54.5	25.5	19.0	10.4	6.4	5.1	4.5	3.4	3.3	2.9
Range	47-61	16-33	8-31	3-20	1-11	1-8	2-7	1-6	1-6	1-8

Numbers of pores on the dorsum vary considerably between right and left sides of an individual and between individuals, with variation least on cephalothoracic plate. The variation in the distribution of pores on the dorsum of four adult females is shown in Table II.

HIEMOPROGREDIENS

FIRST INSTAR.—Not identified, but probably similar to aestivoprogrediens, as in other species of the genus.

TABLE I

The distribution of pores on the dorsal area of four first-instar aestivoprogredientes, *Pineus abietinus* n. sp.

Specimen No.	1						2						3						4					
	Left			Right			Left			Right			Left			Right			Left			Right		
	*Ma	*Pl	*Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma
Head	8	1	1	1	1	6	7	2	1	1	2	7	9	2	1	2	2	4	8		2	2	2	9
Prothorax	3		1	1		3	5		2	2		6	6		2	2		6	4					5
Mesothorax	4	1	3	3	2	4	3		2	3		4	4		2	2	1	5	4		2	1	2	4
Metathorax	3	2	3	2	2	3	2	1	1	1		1	2	1	1	1	1	3	2	1	1	1	1	3
Abdomen 1			2	2	2		2		1	2	1	2	2	1	1	1	1	2		1	1	1	1	2
2	1	1	1	1		2	2			1	1	1	1	1	1	1	1	2	1	1	1	1	1	2
3	2		1	1		1	2	1	1	1	1	1	2		1	1	1	2	1			1		1
4	2	1	1			1	2		1	1	1	2	1		1	1		2	2					2
5	1					1					1	1	1					3	2					2
6	1					1							1					3	1					1
7	1					1							1						1					1
8																								
9																								

*Ma = marginal row; Pl = pleural row; Me = mesial row

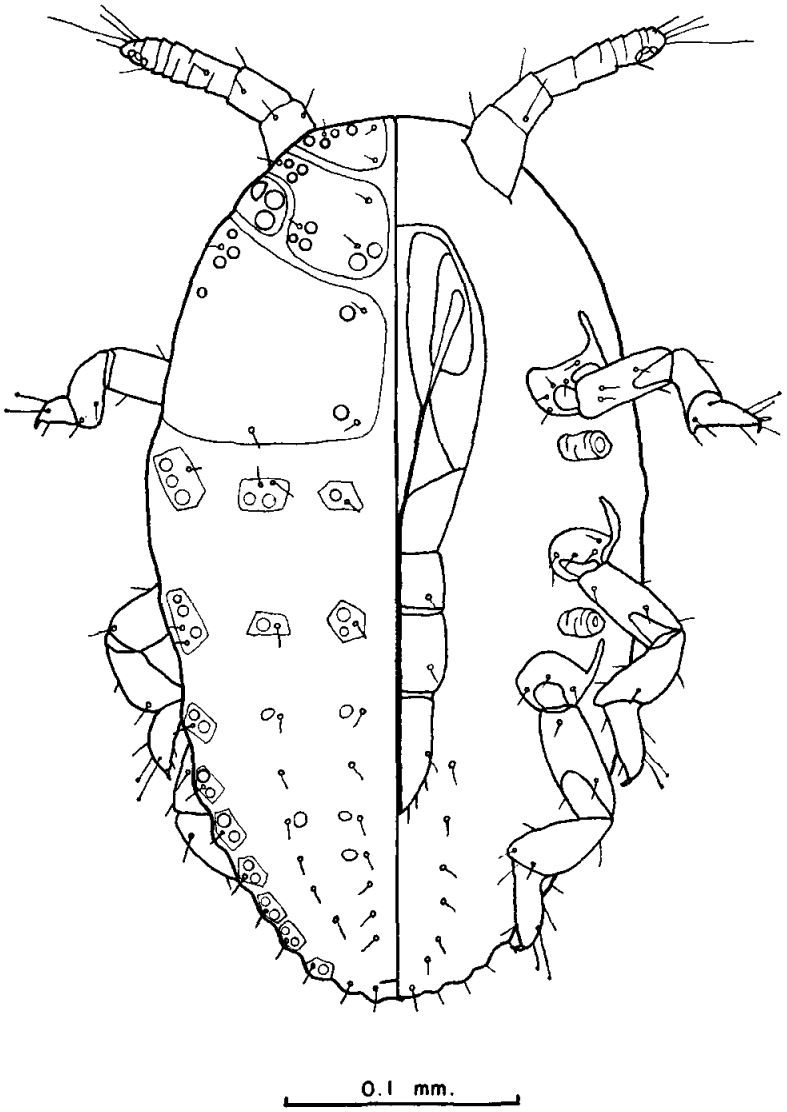

Fig. 1. *Pineus abietinus,* new species. First-instar larva, aestivoprogrediens.

ADULT.—Similar to aestivoprogrediens but with approximately twice as many pores, 360 (6 hiemoprogredientes) to 160 (11 aestivoprogredientes).

TYPES

HOLOTYPE.—Adult female aestivoprogrediens, Kitimat, **British Columbia,** August 16, 1961 (A. K. D. Jardine). *Abies amabilis* (Dougl.) Forbes. No. 8183, in the Canadian National Collection of Insects, Ottawa, Ontario.

PARATYPES.—Two adult females and three first-instar aestivoprogredientes from same collection and with same data as holotype.

LIFE HISTORY

Johnson described the first instar as "continuously active". We also have found no evidence of dormancy. Although the number of instars was not

TABLE II

The distribution of pores on the dorsal area of four adult female aestivoprogredientes, *Pineus abietinus* n. sp.

Specimen No.	1						2						3						4					
	Left			Right			Left			Right			Left			Right			Left			Right		
	*Ma	*Pl	*Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma	Ma	Pl	Me	Me	Pl	Ma
Cephalothorax	15	3	4	6	1	21	18		10	7	2	19	22	1	5	5	1	23	20	5	5	3	2	21
Mesothorax	11	2	2	3	3	9	10	3	3	3	2	7	7	3	3	4	3	6	5	3	2	3	2	4
Metathorax	9	3	1	2	2	6	6	1	3		1	3	2	1	1	1	1	4	5	3	1	2	3	7
Abdomen 1	3	3		3	2	3	3	1		1		2	1			1		1	3	3		1	2	1
2	3	1		2	2	1		1	1		1		1						2	1	1	1	1	3
3	1	1	1	2	1	2	3	1	1			1	1					1	1					2
4	2			1	1	2	1	1				1						2	2	1		1	1	2
5	1				1	2	1	1					2					1	2					1
6	1				1	1	1						1					1	4					1
7	2					1						1	1						1					1
8																								
9																								

*Ma = marginal row; Pl = pleural row; Me = mesial row

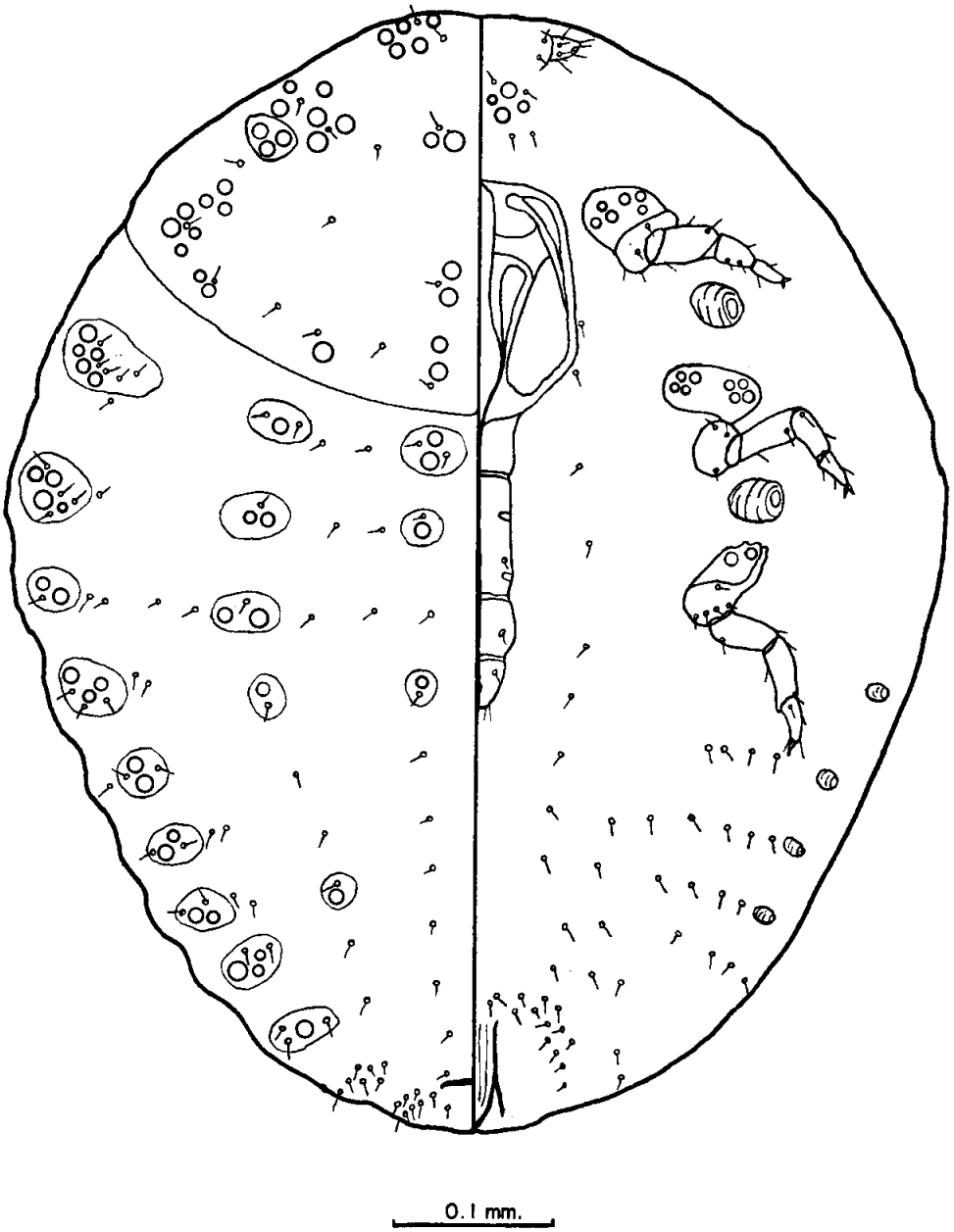

Fig. 2. *Pineus abietinus*, new species. Adult, aestivoprogrediens.

positively determined the sizes present suggested five. This indicates that the single form is probably of the progrediens type, as is the case with the exules of all other *Pineus* spp.

Deep snow prevented collections during the winter but it appears certain that overwintering takes place in the first instar, probably also in the second, and possibly in the third. In mid-August all instars of the aestivoprogredientes were present. Apparently oviposition by the aestivoprogredientes continued into

September. It is not known whether there are more than two generations per year, but this seems probable in the warmer parts of the insect's range.

All stages feed on the cortical parenchyma of the stem and branches where this is sufficiently close to the surface. The length of the stylets permits a penetration of approximately 1 mm. On the stems of older trees the insect will be found mostly in crevices between or under bark scales.

Distribution and Hosts

Collections at Kitimat and Squamish in British Columbia, and at Centralia and Curtis in Lewis County, Washington, suggest a distribution throughout the coastal region of Washington and at least the southern half of British Columbia. It has been found most frequently on amabilis fir, but Johnson (1959) also records it on grand fir, *Abies grandis* (Dougl.) Lindl., and has reared it on noble fir, *Abies procera* Rehd.

Discussion

The polymorphic ancestor from which this species presumably derived may still be extant in North America or elsewhere, but apparently it has not yet been found. It is possible that the monomorphic cycle is due to separation from its original primary host, as is the case with *Adelges piceae*.

The development of independent forms is common in the Adelgidae. Of the 12 species of *Pineus* in North America recognized by Annand (1928), only three are known to be holocyclic. Five are recorded only from the primary host (*Picea* spp.) and four only from the secondary host (*Pinus* spp.). In all cases, however, winged forms are known and the possibility of migration to an alternate host has not been ruled out, although most are thought to have lost this capacity. Recently Cumming (1962) has described an independent apterous form on spruce which appears to have derived from the polymorphic species, *Adelges cooleyi* (Gill.). Also two monomorphic, apterous species of *Pineus* have recently been found on spruce in Eastern Canada (Underwood, unpublished).

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