nations. From each dish half the agar was removed by cutting out blocks; the space was then filled with liquid soil extract and antibiotics as for PA. To promote oogonium production boiled hemp seeds were placed in the agar, but a few hyphal tip cultures remained sterile and their antheridia could not be observed.

The frequency of falcate antheridia varied in the same order in all isolates. They were most frequent in the liquid PA medium and least frequent in the solid WA medium (Table I). On WA the prevailing type was clavate with a moderately long or short stalk and a crooked, conspicuously swollen end. This was true for all Ontario isolates. Sideris'

TABLE I

Environmental influence on antheridial morphology in cultures of *Pythium irregulare*

No.	Isolate Origin	% Distribution of Antheridial Types[a]					
		Falcate	Interm.	Clavate	Falcate	Interm.	Clavate
		On a solid medium (WA)			In liquid in medium (PA)		
7583/1	Ontario	2	3	95	79	19	2
7583/2	Ontario	8	14	78	83	16	1
7695	Ontario	0	8	92	68	26	6
7864C/1	Ontario	1	2	97	56	32	12
7864C/2	Ontario	0	2	98	50	32	18
8458	Ontario	0	2	98	62	27	11
8589/1	Ontario	0	2	98	69	21	10
8591/1	Ontario	0	1	99	68	26	6
8591/2	Ontario.	0	4	96	69	24	7
6044	Australia[b]	4	4	82	72	20	8
7188	Kentucky[c]	1	13	86	58	27	15

(a) in 50 to 260 antheridia observed in each culture.
(b) typical of a large number of Australian isolates studied earlier.
(c) identified as *P. polymorphon* by Sideris.

P. polymorphon also formed similar, predominantly clavate, swollen antheridia (140 out of 162) on WA. In liquid PA cultures the prevailing type was falcate with a long sturdy stalk, without a crook, and with little or no swelling of the antheridium proper. These antheridia, including their stalks, sometimes had a length of 140 mu. Many antheridia had intermediate shapes. The differences between the sizes of oogonia, the occurrences of spines, and sizes of sporangia were inconsistent and small in all isolates. The dominance of falcate antheridia in liquid was observed in hundreds of irrigated cultures (unpublished data on *Pythium* in Ontario soils). When these cultures were transferred in solid WA, all formed predominantly clavate swollen antheridia. Chi-square tests showed that effects of the medium on the antheridial types (Table I) were highly significant ($p=0.01$). Study on the falcate antheridia, considered as the unique and most characteristic feature of *Pythium polymorphon,* lead to the conclusion that *P. polymorphon* should be considered as a synonym with the common species usually referred to as *P. irregulare*. However, it has been suggested in the literature that the latter is not distinguishable from *P. debaryanum* Hesse. If this view is accepted, *P. polymorphon* would become a synonym of *P. debaryanum*.—O. Vaartaja.

BRITISH COLUMBIA

Defoliation of Western Hemlock by an Undescribed Species of Epinotia.—A dark gray moth, with a ⅜-inch wing spread, identified by T. N. Freeman, Entomology Research Institute, as a new species of *Epinotia,* recently attracted attention as a potential forest pest. Defoliation of mature and overmature western hemlock by the larvae of this moth was reported in mid-May 1965 near Holberg, Vancouver Island. The total area of infestation exceeded 83,000 acres, including 17,400 acres of moderate and 18,240 acres of heavy defoliation. Ocular estimates of defoliation of trees in heavily defoliated areas showed up to 80% loss of both new and old foliage with heaviest losses in the lower crown of dominant trees, in the lower and mid-crown of co-dominant trees, and in the upper or entire crown of intermediate and suppressed trees. Reproduction in the region was lightly infested. A few needles on amabilis fir were also damaged.

Most of the feeding damage occurred during March and April. On mature hemlock trees, it consisted of one or more round perforations, about 1 mm in diameter, on the underside of needles near the apex, sometimes extending a short distance into the needle. The feeding, although light, affected many needles and was sufficient to allow desiccation and subsequent loss of foliage. Similar partial mining resulted in severe defoliation in several areas on Vancouver Island in 1963. The feeding habit of the insect on reproduction differed from that observed on mature trees in that the needles were completely mined. Because most of each needle was consumed, loss of foliage was light.

The life history of the insect is not completely known. Overwintering is believed to take place in the larval stage since larvae and pupae were found in silken cocoons distributed over twigs and foliage when biological studies commenced in May 1965. Adults emerged from mid-June to the end of July. Oviposition began in July and continued until mid-August. The eggs were laid on the upper surface just above the petiole of both fully formed new needles and old needles. Hatching was completed by September and the larvae entered needles of all ages, plugged the entrance hole with a silken mat, and proceeded to mine the needles. Larvae continued to mine inside the needles until the end of September when they had reached at least the fourth instar.

Studies will continue to determine how the insect overwinters and whether feeding similar to that observed in the spring of 1965 will reoccur. It is possible that spring feeding in 1965 was the result of limited feeding in the fall of 1964. If insect development during 1965 has been rapid enough, spring feeding may not occur in 1966.—S. F. Condrashoff and N. E. Alexander.

Larch Sawfly, *Pristiphora erichsonii* (Htg.), on Western Larch in British Columbia.—The larch sawfly was first observed in British Columbia, north of Fernie, in 1930. Since that time it has been found over much of the range of western larch, *Larix occidentalis* Nutt. The last outbreak occurred in the 1940's. It subsided by 1949 and populations remained low on western larch until 1963. Since 1963, sawfly numbers have increased rapidly, particularly in 1965 when moderate to severe defoliation was recorded over some 360 thousand acres of western larch in the Nelson Forest District and several thousand acres in the Kamloops Forest District.

An attempt to obtain a measure of the population trend of the sawfly was made by an assessment of random beating samples, through a comparison of ratios of new egg-bearing twigs (1965 growth) to old (1964 growth), and from 1 square-foot duff samples for cocoons.

Assessment of random tree beating samples taken from larch during the larval feeding period showed that the first collection of sawflies taken in the 1960's was in the eastern part of Nelson Forest District. The population apparently increased and expanded most rapidly in East Kamloops and most slowly in East Nelson. The greatest build up occurred in 1964-1965 in Central and West Nelson districts (Fig. 1).

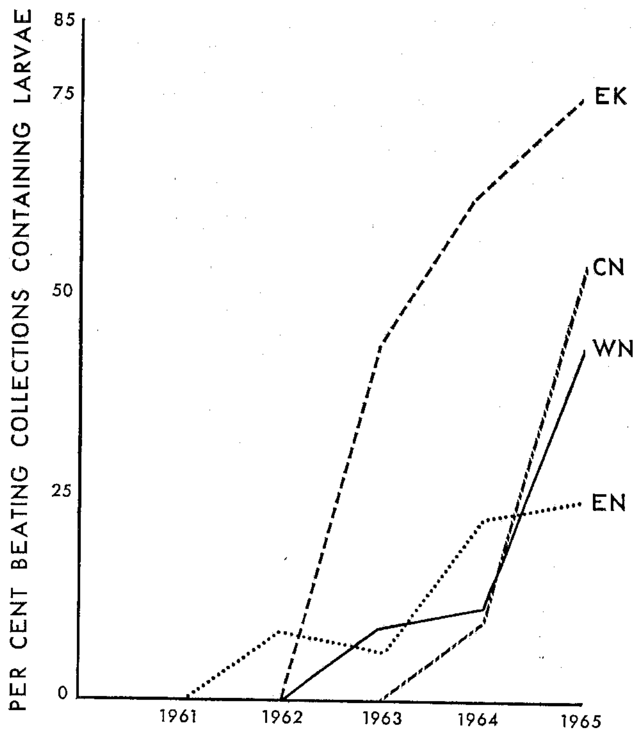

Fig. 1 Percentages of annual random beating samples from western larch, that contained larch sawfly larvae taken during larval feeding period, in East Kamloops and East, Central and West Nelson Forest Insect and Disease Survey districts, 1960 to 1965.

One larch tree was felled in September 1965 at each of four locations to obtain a ratio of new egg-bearing twigs to old. Results were as follows: Nelson, 879 new to 27 old; Salmo, 124 to 1; Beaverdell, 156 to 3; Paulson, 297 to 5. These samples more graphically show the explosive population increase in 1965.