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**PRELIMINARY INSECTICIDE TESTS AGAINST THE DOUGLAS-FIR
NEEDLE MIDGES, *Contarinia* spp., LARKIN, B.C., 1962¹**

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Introduction

Periodically, Douglas-fir trees in portions of the southern interior of British Columbia are severely infested with needle midges, *Contarinia* spp. Needles attacked by larvae of these tiny gall midges become distorted and discoloured, and dehisce. Even light infestations can degrade the market value of Christmas trees or mar the appearance of shade trees. Recently the Christmas tree industry, which in 1961 grossed approximately two million dollars in British Columbia, has become concerned over midge damage; also, home owners have requested advice on use of insecticides to protect Douglas-fir shade trees.

Life histories and bionomics of the Douglas-fir needle midges of British Columbia were investigated by S. F. Condrashoff (1962a, 1962b). The adults emerge from the ground in May as the Douglas-fir buds are opening, and eggs are deposited on the new needles. Shortly after hatching, the maggots enter the new needles and feed there until October, when they drop to overwinter in the ground. The life history studies indicated that insecticides directed at emerging adults or at newly hatched larvae should be most effective for control.

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Methods and Results

The test was carried out at Larkin, B.C. Five trees from five to seven feet high were used for each treatment and another five were left unsprayed as checks. Insecticides were applied with a hand sprayer until the run-off point was reached. Thiodan and DDT emulsions and a lindane suspension were the insecticides tested. One imperial gallon of water was added to each of the following quantities of commercial concentrates to obtain the finished formulations:

- 3 fl. oz. Thiodan emulsifiable concentrate containing 2 lb. technical Thiodan per imperial gallon
- 2 fl. oz. DDT emulsifiable concentrate containing 2.5 lb. technical DDT per imperial gallon
- 3 teaspoons of 25% lindane wettable powder

The concentrations of the finished sprays were: Thiodan—0.375%; DDT—0.312%; and lindane—0.12%.

The midges were first observed in flight on May 14, and the sprays were applied during the morning of May 16. At the time of spraying, most of the buds on the majority of test trees had opened; none on one of the check trees had opened. This variation is common in a natural stand of Douglas-fir.

Immediately after spraying, five open buds were picked at random from each check and each test tree. Three to eleven eggs were present on each bud, and two of the fifty buds contained larvae.

Late in the morning of May 17 the trees were examined for the presence of adults. Myriads were present about the four "check" trees with open buds, while none was seen among the foliage of the check tree with unopened buds. None to five adults were observed in flight among individual sprayed trees.

On May 21, five open buds from each treatment were examined. Table 1 shows the average number of eggs and larvae per bud.

TABLE 1.—Average Number of *Contarinia* Eggs and Larvae per Bud on Five Opened Buds from each Treatment Five Days after Spraying.

Treatment (May 16, 1962)	Eggs	Larvae	
Check	18.0	5	
Lindane	5.5	4.0	} most larvae dead
Thiodan	2.7	1.5	
DDT	1.5	0.2	

The results shown in Table 1 indicate that more eggs were deposited on the unsprayed trees than on the sprayed trees during the period May 17 to 21. Presumably adults were killed or repelled by the insecticides.

Final effectiveness of the sprays was assessed during the last week of August, 1962, when damaged needles were easily recognized. Percentage infestation was determined from ten terminal twigs picked at random at about breast height from each tree (Table 2).

TABLE 2.—Percentage Infestation of Current Year's Douglas-fir Needles by *Contarinia* spp., Larkin, B.C., August, 1962.

Treatment (May 16, 1962)	Average	Range
Check	17.5	*10-28
Lindane	12.7	4-25
DDT	4.0	3-6
Thiodan	2.0	0.1-5

* Check tree with unopened buds at the time of spraying.

The control achieved with DDT or Thiodan as indicated in Table 2 would be adequate for the Christmas tree industry; the colour and growth of the current year's foliage was better than on the lindane-treated or the untreated trees. It should be noted that lindane was applied at about one third the rate of DDT and Thiodan which is in general line with usage of these chemicals against some pests of ornamentals. The check tree with the lowest infestation (10%) had no open buds at the time of treatment. This suggests that much of the adult flight was over by the time buds on this tree had opened.

Summary

At Larkin, B.C., in 1962, Thiodan and DDT applied with a hand sprayer at the time of bud opening gave satisfactory control of the Douglas-fir needle midges. At the concentration used, lindane did not give adequate protection. The concentrations of the finished sprays were Thiodan 0.375%; DDT 0.312%; and lindane 0.12%.

References

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