Five Systemic Insecticides Used Against Douglas-fir Cone Insects.—In previous tests it was shown that the systemic insecticides phosphamidon and systox are capable of killing larvae of the midge, *Contarinia oregonensis* Foote, in Douglas-fir cones (Hedlin, A. F. Bi-Mon. Prog. Rept. 18(1): 3-4. 1962).

In 1963 experiments were continued using the systemic insecticides bidrin, dimethoate, and C-43064 in addition to phosphamidon and demeton (systox). The materials were applied as sprays with a 1-gal. pressure type garden sprayer at concentrations ranging from 0.5 to 4.25% active ingredient by weight. Treatments were made during the period from flower bud burst (about April 20) until cones became pendant (about May 20). Trees ranged in height from 20 to 40 ft. with most about 25 to 30 ft. Applications were made by climbing the tree with a ladder and thoroughly spraying the cone-bearing area. The portions of trees too high to spray were used as additional checks. In early September when cones had reached maturity a 20-cone sample was taken from each treated tree and examined for insects and seed loss. Similar samples from 15 untreated trees in the same area were examined. Seed loss was recorded for the following insects: cone moths (*Barbara colfaxiana* Kft. and *Dioryctria abietivorella* Grt.), gall midge (*Contarinia oregonensis*), seed chalcid (*Megastigmus spermotrophus* Wachtl.), and scale midge (*C. washingtonensis* Johnson).

The experiments showed that:

1. Bidrin gave better control of all insects than any of the other materials used. Applications on all trees treated over the period from April 22 to May 22 reduced seed loss considerably. Two trees sprayed on May 22 with 1.6% active ingredient suffered no seed loss to insects. The other materials gave no control when applied at earlier dates but concentrations of 4.25% of dimethoate on May 16 and phosphamidon and demeton on May 22 gave fair control. The seed losses caused by all insects were 1.6, 7.2 and 10.0%, respectively. C-43064 which was used in fewer tests at fairly low concentrations gave very little control. Fifteen check trees suffered an average seed loss of 65% (range 20 to 100%) to all insects.
2. Materials applied at concentrations which gave effective insect kill caused phytotoxicity in the following descending order (*a*) demeton, (*b*) bidrin, (*c*) phosphamidon, and (*d*) dimethoate. Phytotoxicity was indicated by (*a*) yellowing of current needles (light), (*b*) yellowing plus burned needle tips (medium), and (*c*) burned cone bracts and scales in addition to damage to current needles (severe).
3. Best results for all materials were obtained from applications made in late May when cones were at or near the pendant stage.
4. The untreated upper crowns served as good checks against the lower sprayed portions of the same trees. They experienced much greater seed loss than the treated portions.

The results indicate that bidrin may be the most effective of materials used from the standpoint of insect control. In considering both insect control and phytotoxicity, dimethoate is possibly superior. When applying the insecticides it is apparently necessary to treat the entire cone-bearing portion of the crown, and best results can probably be expected when cones are at or near the pendant stage. However before recommendations can be made regarding use of these materials, further information is required on the relative effectiveness of different concentrations of the better materials, on methods and time of application, and the possible deleterious effect on seed viability.—A. F. Hedlin.

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