Will Delayed Seeding Reduce Damage Caused by the Sweet Clover Weevil?*

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OBSERVATIONS by the North Dakota Agricultural Experiment Station during the past two years suggest that delayed seeding may be an important means of helping young sweet clover plants escape sweet clover weevil injury. This has been indicated under both experimental plot and extensive field conditions.

The sweet clover weevil, an insect pest of foreign origin, was first reported in North Dakota in 1941. Since then it has become generally distributed over the State and in many localities is responsible for serious damage. The adult weevil is a small grayish beetle. It feeds by cutting notches in the leaves of the sweet clover plants.

In early spring when the leaves begin to appear, the overwintered weevils are at times so abundant as to devour the leaves almost as fast as the plants can produce them. The young seedlings are the most severely affected and are often killed outright, because they do not have the ability of the older plants to offset the damage. Often the grower is at a loss to explain the failure of early seedings until the presence of the weevil is demonstrated..

Early in the spring there is the maximum population of overwintered weevils to begin feeding on what is then the minimum amount of sweet clover foliage available. The weevils are then most active in their search for sweet clover plantings for feed and places to lay their eggs. They distribute themselves by flight over the old plantings as well as the new seedings which are sufficiently advanced to attract them.

At Fargo this flight dispersal has been particularly in evidence during the last week of April and well into May. As the season advances the amount of sweet clover foliage becomes greater but flight activity and the number of weevils diminish.

The weevils lay their eggs at the base of the plants mostly during the latter part of May and early June. One weevil was observed to lay 19 eggs in the course of 24 hours. The incubation period of these eggs under laboratory conditions was 14 days. Soon after hatching the tiny grubs make their way to the rootlets and nodules of the plant and begin feeding. This feeding, however, is considered of slight importance in comparison to the damage which the adult weevils cause by feeding on the leaves. The grubs continue their feeding a few weeks, then transform to a brief resting stage, to emerge as adult weevils. Under local conditions this emergence begins during the last week of July and continues on into the second week of August.

In plantings made by Mr. T. E. Stoa, Department of Agronomy, the effect of late seeding in preventing weevil injury was strikingly dem-

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onstrated. The plantings included 15 varieties with each replicated in plots four times, sown for the purpose of determining if varieties differ in their tolerance to the weevil. Two were annual varieties; the other 13 were biennial. The plots sown on May 22 produced less than 5 percent of a normal stand of plants. While it is possible that wet weather and other factors may have contributed to the failure, it was evident that the weevils were largely responsible for the loss of the young plants. There was a heavy infestation of weevils which fed voraciously on the young seedlings as they appeared above ground.

On the following June 18 a similar series of plots was seeded, using the same source of seed, on an area adjoining the original plots. This seeding developed in a normal manner, except for slight feeding injury to the foliage, and produced fully a 90 percent normal stand of plants.

As further evidence of the difference in weevil activity in the two plantings, an examination made on July 15 showed an average of 5 grubs per plant of the May 22 seeding; while for the June 18 seeding the examination revealed an average of 1 grub to 30 plants. That is, the grubs were 150 times more numerous among the roots of the surviving plants of the May 22nd seeding than of the June 18th seeding. This in itself would indicate that fewer weevils invaded the later seeding, or that the season for egg-laying was about over, or both. It demonstrates rather clearly the relationship of the sweet clover weevil to its environment, in plant feeding and egg-laying, and shows how a knowledge of this may have an application to the protection of the plants.

How the difference in seeding dates may affect the sweet clover stand under field conditions was illustrated in a case called to the attention of the writer by Director H. L. Walster, during the past summer. The field was located about five miles from Fargo; it had been seeded to sweet clover along with a cereal nurse crop in the spring of 1944. Accompanied by Dr. F. Gray Butcher, Extension Entomologist, we looked over the field and discussed the situation with the owner. The most striking feature was the complete failure of the sweet clover to a distance of about ¾ of the way across the field. Upon inquiry the owner told us that the field had been seeded up to this point when wet weather halted operations and that it was two to three weeks before the balance of the field was seeded. In the later seeding a 35 to 40 percent stand of sweet clover plants developed. That the sweet clover was a complete failure in the early seeded portion of the field but was fairly successful in the later seeding, again indicated late seeding as an important factor in protecting the young plants in an area where the weevils abound. At the time of our visit to this field, which was late August, the typical notches in the leaves of the sweet clover plants gave evidence of a moderate sweet clover weevil infestation.

The difference in seeding dates of this field, while not representing as wide a spread of time, nor as late a date of seeding as for the experimental plots previously discussed, appear to be the only satisfactory explanation of the complete failure of the sweet clover stand in the early seeding and the fairly good stand in the delayed seeding.

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