

Control of the Meadow Spittlebug on Forage Crops

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The meadow spittlebug, *Philaneus leucophthalmus* (L.), is a native insect and until the past decade was of little economic importance. Since 1940 it has increased in abundance and occurs in destructive numbers as far south as Virginia. Today it should be classed as one of the major forage crop pests in the states north of the Ohio River and east of the Mississippi. Increases in forage yields as great as one ton per acre have been reported when this insect was controlled.

The meadow spittlebug has one generation a year. The eggs are laid in old grain stubble in the hay fields in the late summer, usually September and October. In late April or early May, depending on the temperatures, the eggs begin to hatch and hatching occurs over a period of several weeks. The young nymphs are small and the amount of spittle produced is inconspicuous. In late May and Early June the nymphs are nearly full grown and the characteristic spittle masses are easily observed, each mass containing from one to 12 or more nymphs. By the middle of June the adults emerge from the spittle masses. These adults remain on the host plants for several weeks or until the forage crops are cut for hay, which causes them to disperse to adjoining crop areas. Adults can readily be observed on any growing crop during the summer months.

Injury is caused to plants by the nymphs sucking the plant juices from the stems and leaves, the excess liquid passing through the body and forming a frothy saliva-like mass which surrounds the nymph during its developmental period and from which the insect derives its name. Plant growth is stunted. In some plant a typical hormone-like effect is produced. In others internodal development is arrested producing a "bunchy" type of growth. This may be due to the injection of toxic salivary secretions into the plant tissues while feeding, as is the case of many related species of insects. It is suggested that the loss in forage is greater in dry weather than in seasons of abundant moisture, as the feeding of the nymphs draws off liquids from the plants faster than it can be replaced when the soil moisture is at a relatively low level. Populations as great as 300 nymphs per square foot have been observed.

Natural enemies are not numerous as the insect is protected from predators and parasites by the spittle mass surrounding the nymphs.

With the advent of DDT and other organic insecticides with a period of residual toxicity, control of this insect became feasible. However, complications caused by the danger of contamination by these insecticides of food products from animals feeding on treated forage, necessitates caution in recommendations for their use. Also the

presence of other injurious insects on forage crops which can be controlled by these insecticides should be taken into consideration in recommendations.

Experiments on the control of this insect were of three types; application of dilute dusts in early spring, the use of emulsifiable forms of insecticides in low gallonage applications, and the effects of various forms of insecticides on the adult insect in the summer.

In 1949, dilute dusts were applied to red clover near Wingate, Indiana, on May 4. The reductions in populations, as measured by the residual adult insects present in mid-June, indicated that benzene hexachloride, toxaphene and methoxychlor gave the best control. DDT, chlordane, and parathion gave highly significant reductions, but were not as effective as the other materials.

In 1950, thirteen emulsifiable forms of insecticides were applied to plots of mixed hay on the Agronomy Farm, near Lafayette, Indiana, on May 13, when spittle masses were numerous on the plants. Counts of the numbers of nymphs per square foot were made on June 6. Dieldrin, methoxychlor, benzene hexachloride, and lindane gave the best control. DDT and toxaphene were also effective. Chlordane, aldrin, Dilan, TDE (Rhothane), rotenone, Fluo-DDT (fluorine analog of DDT), and colloidal DDT were either ineffective or gave insufficient control to be of any value.

Since little is known of the injurious effects of the feeding of adult spittlebugs, the necessity for controlling them may be questionable. Also, it is doubtful if control of these insects to prevent oviposition will be of value. However, information has been obtained from experimental applications of various insecticides to clover in the summer, on the effects of these materials on the adult spittlebug populations.

In 1949, when adult populations averaged 16 spittlebugs per 10 sweeps of a 15-inch net, emulsions of methoxychlor and CS645A (one of the active ingredients in Dilan) gave the greatest reduction in the number of adults eight days after applications. Emulsions of DDT, benzene hexachloride, chlordane, toxaphene, TDE (Rhothane), Fluo-DDT (fluorine analog of DDT) and various mixtures of the above gave no practical control of the adults, although the DDT, benzene hexachloride, and mixtures containing combinations of methoxychlor, chlordane, benzene hexachloride, and DDT, reduced the populations of adults a significant amount.

The results of similar tests in 1950, when the average adult spittlebug population was the same as in 1949, (16 per 10 sweeps of a 15-inch net), emulsions of DDT, methoxychlor, lindane, TDE (Rhothane), and wettable parathion gave good reductions in the numbers of adults in the plots four days after application. Emulsions of chlordane, Fluo-DDT (fluorine analog of DDT), aldrin, Potosan, and Systox, and wettable EPN gave no practical control, although chlordane, Fluo-DDT, and aldrin reduced the populations a significant amount.