

TECHNICAL NOTES

SAGEBRUSH INFESTED BY LEAF DEFOLIATING MOTH

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A native sagebrush defoliating insect (*Aroga websteri*, Clark) has infested vast areas in the sagebrush-grass (*Artemisia-Agropyron*) areas of eastern Oregon and adjacent states (Figure 1). Some small infestations of *Aroga* were noted in Malheur County, Oregon, in the summer of 1961. These infestations were observed closely in 1962 by county agent George Bain, the author, and others. It was estimated that approximately 10 to 15 thousand acres of sagebrush were killed in Malheur County in 1962, as a result of this infestation. Other small local infestations with some brush kill were also noted throughout eastern Oregon during 1962.

The infestation seemed to explode in the spring of 1963. It is conservatively estimated that over 12 million acres of sagebrush in Oregon alone were infested to some degree with this insect. While the *Aroga* is generally widespread, the degree of infestation and the effects of vary considerably. Old, stagnant stands of sagebrush seem to be most heavily damaged. Sagebrush growing along borrow pits, in swales, or in positions of more favorable moisture seem better able to resist infestation. It is a common sight to see vigorously growing sagebrush along the road and just across the fence literally miles of the shrubs black as a result of the *Aroga* activity.

It is difficult or impossible at this time to properly assay the damage to the sagebrush resulting from the *Aroga* infestation. Some sagebrush that was hit very heavily early in the spring of 1963 later made some regrowth. Other sagebrush did not. It is a moot question as to whether this fall regrowth will contribute

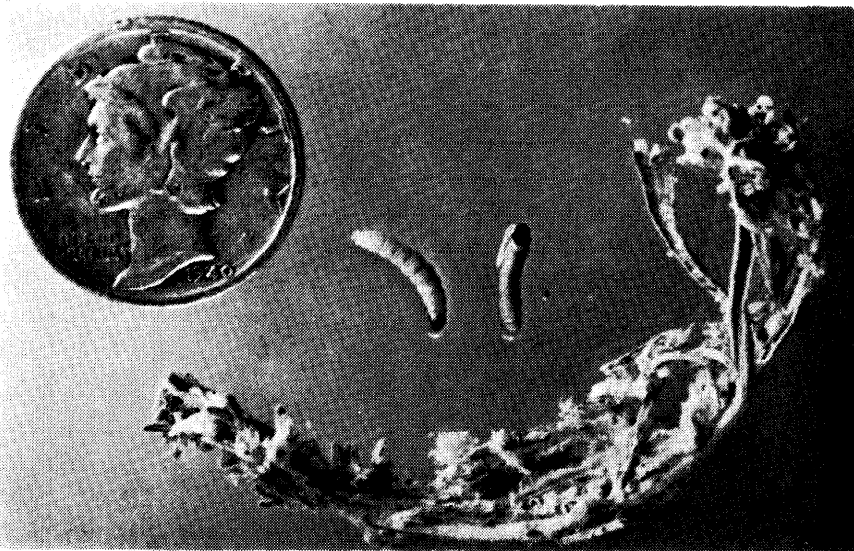


FIGURE 1. Larvae of *Aroga websteri*, Clark. (Photo by R. R. Kindschy, BLM, Vale, Oregon).

to the death of infected plants through a continued use of carbohydrate reserves.

Although some plants will be able to stage a comeback, final evaluation of the results of this year's infestation of *Aroga* will have to be postponed. However, it is probably reasonable to assume that there are thousands or hundreds of thousands of acres of sagebrush that will be dead as a result of defoliation.

There is some disagreement as to just which species of sagebrush are affected by *Aroga*. Positive identification of *Aroga* on big sagebrush (*A. tridentata*), low sage (*A. arbuscula*), black sage (*A. nova*), and silver sage (*A. cana*) has been made in Oregon. There are some reports that *Aroga* also has been found on bitterbrush (*Purshia tridentata*) and other valuable browse species. However, there are other insects with similar habits of the *Aroga* that have been found and identified on these other species and there may be a considerable amount of confusion. The author has not found *Aroga* on any plants except the sagebrush species.

According to Henry,¹ *Aroga* has the following life cycle. The adult moth lays eggs in the late summer or early fall on small cracks in the bark of sagebrush or on the leaves. In approximately 2 weeks small larvae are hatched. These larvae mine into the leaves of the sagebrush plant and over-winter. In the spring when conditions become favorable for the larvae to work, they continue to mine the leaves (Figure 1). Leaves are cut off from the plant and pulled into little groups by webs from the larvae. The larvae then build cocoons within this small group of leaves and web (Figure 2). In the latter part of June or July the larvae go into the pupal stage. In approximately 2 weeks the adult moths emerge.

Since *Aroga* is a native insect, it would be expected that it has its own host of parasites. Entomologists at Oregon State University have reported that based on 75 samples, they find that parasitism upon the

¹Henry, John, M. S. Thesis, University of Idaho, 1960.

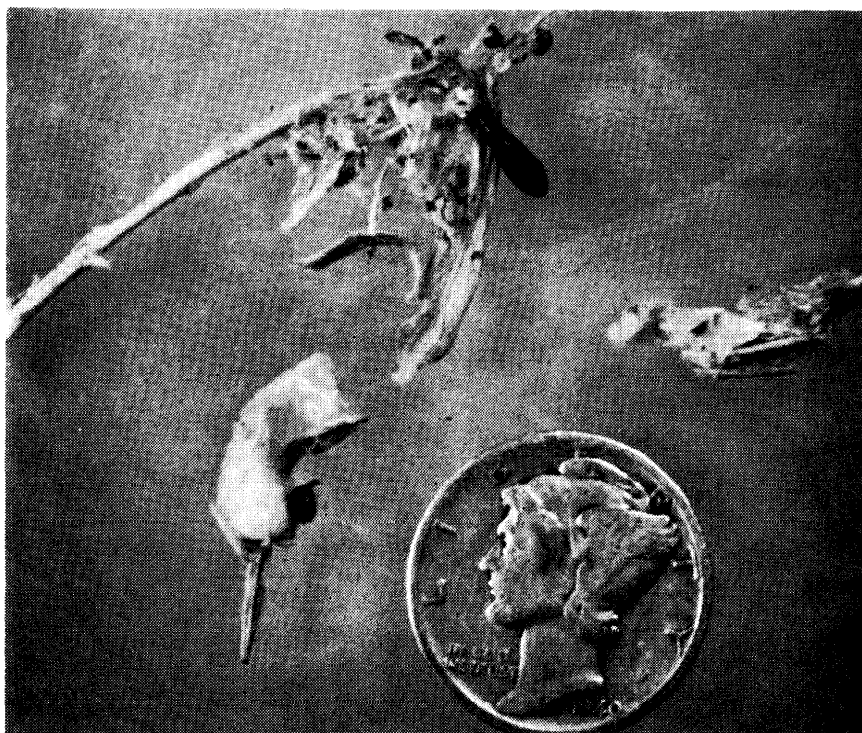


FIGURE 2. Pupa of *Aroga websteri*, Clark at top. Eggs enclosed in webbing at lower left. (Photo by R. R. Kindschy, BLM).

Aroga in some samples is approximately 50 to 70 percent. There appear to be two types of parasites; one works on the larva and the other works on the pupa. The effects of the parasites on the *Aroga* population for 1964 and subsequent years is unknown.

This widespread infestation of *Aroga* and subsequent damage to sagebrush has important ecological and range management implications. In areas of heavy sagebrush where desirable understory species are lacking, a heavy sagebrush kill may result in an increase of less desirable weeds.

Where there are sufficient understory grasses to take advantage of the removal of the sagebrush, nothing but good should come as a result of removal of sagebrush. Such areas should be managed to take maximum advantage of the sagebrush removal. However, on areas without sufficient desirable forage grasses as understory, the removal of the sagebrush may result in more serious range deterioration. Range seedings should be given major consideration where possible. The Bureau of Land Management has recognized the management and improvement implications of this

Aroga infestation. Private land operators are being advised to do so.

LATE-SPRING HERBAGE PRODUCTION ON SHORT-GRASS RANGELAND¹

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Herbage production on the short-grass plains varies from year to year. Thus it is difficult either to predict herbage production or to recommend stocking rates that are not detrimental, especially in drought years. The amount and time of precipitation, other climatic conditions, and grazing use have definite influences on the kinds and amounts of herbage produced.

Dahl (1963), found on a sandhills range in Colorado, that grass yields

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