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## GRASSHOPPERS FEEDING ON RED PINE TREES IN MICHIGAN (ORTHOPTERA: ACRIDIDAE)

J. E. McPherson<sup>1</sup> and Louis F. Wilson<sup>2</sup>

### INTRODUCTION

Very few North American grasshoppers are true feeders on conifers. The several species of the *punctulatus* species-group of the genus *Melanoplus*, as summarized and revised by Rehn (1946), have been reported as occurring on pine, juniper, and cedar, but few reports of actual feeding on conifers have appeared in the literature. Because of this paucity of information regarding the use of conifers as food for grasshoppers, we summarize here observations of several kinds of grasshoppers feeding on red pine (*Pinus resinosa* Aiton) in 1966 in Michigan.

### PREVIOUS REPORTS

Hebard (1935) observed grasshoppers of the *punctulatus* species-group, *Melanoplus splendidus* Hebard, feeding on both juniper and pinyon but showing a decided preference for juniper. Cantrall (1943) reports *Melanoplus punctulatus arboreus* Scudder (as *punctulatus punctulatus* (Scudder)) feeding on tamarack. Hubbell and Cantrall (1938) noted that, in the absence of any other food, caged specimens of *Appalachia arcana* Hubbell and Cantrall would accept pine needles. According to George (1953), ponderosa pines in shelter belts in the Great Plains states have been injured by undetermined species of grasshoppers. Ponderosa pines and other shelter belt trees, however, are not usually fed upon until after nearby grain fields are harvested (Wilson, 1961) or unless it is a very dry year (George, 1953).

No other records of North American grasshoppers feeding on conifers are known to us. In his comprehensive study and summary of food selection on Orthoptera Gangwere (1961) offers no new data, and in a review of food selection in Orthoptera, Mulkern (1967) does not touch the subject at all.

### OBSERVATIONS IN 1966

Numerous grasshoppers were observed chewing on the needles of red pine in Wexford County, Michigan, in July 1966. The pines constituted a windbreak separating a 5-acre oatfield and a young red pine plantation. Grasshoppers were quite common in the oatfield and on the lower

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branches of the windbreak trees, but scarce on the young plantation pines. Their abundance in 1966 in Wexford County was due to the especially dry summer there which favored population buildup. Walking in the oatfield along the windbreak raised 30-50 insects for every two steps. Specimens were collected from the pines and oats and identified as *Melanoplus bivittatus* (Say), *M. femurrubrum femurrubrum* (De Geer), *M. sanguinipes sanguinipes* (Fabricius), *Spharagemon collare* Scudder, and *Pseudopomala brachyptera* (Scudder). Both juveniles and adults were present. Only the three species of *Melanoplus* were actually seen feeding on the pines.

The new needles were preferred to the old ones on the windbreak pines. The grasshoppers' geonegative feeding position and perhaps their weight caused them to feed near the center of the needle. Needles were sheared off or broken over (Fig. 1) because the insects ate only a small portion of each needle. Why they did not consume more of each needle is not certain--perhaps the needles were unpalatable to them.

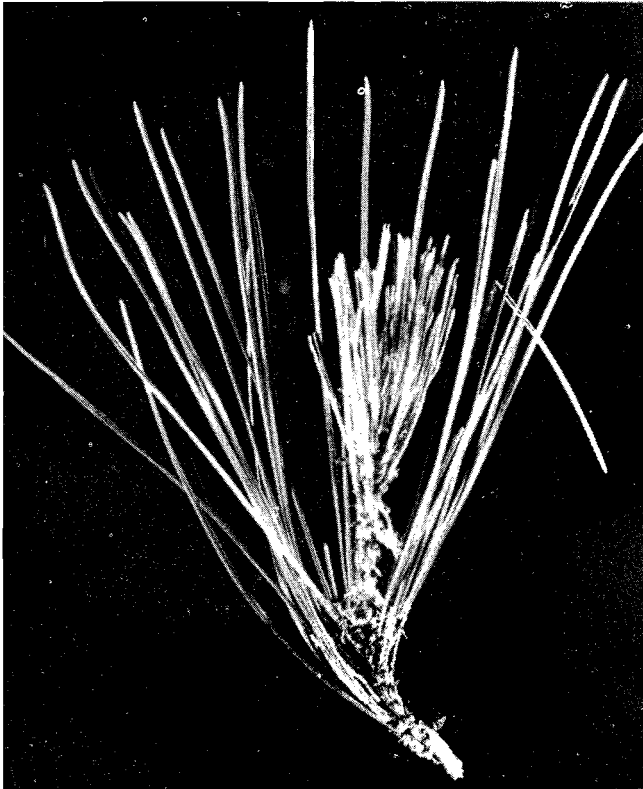


Fig. 1. Grasshopper feeding damage to red pine shoot, showing sheared-off new needles and a broken-over old needle.

## DISCUSSION

The species of *Melanoplus* collected in Wexford County are not members of the *punctulatus* species-group, so they probably are not true conifer feeders. More likely they fed on red pine because their normal food plants had been depleted. By mid-July the grasshoppers had nearly denuded 3 acres of oats near the windbreak. All oat leaves had been stripped off the plants, and most stems were chewed up or broken over. With their preferred food gone some grasshoppers moved to less devastated parts of the field but others moved onto the red pine. By the end of August a considerable amount of red pine foliage had been destroyed.

Fortunately, the windbreak trees suffered little permanent injury because they were about 25 feet tall and damage on them was confined to the lower 3 feet (five or six whorls) of foliage. Had these trees been seedlings less than 3 feet tall, they certainly would have suffered considerable injury. In the late 1940s the U.S. Forest Service had to suppress grasshoppers in newly established red pine plantations in Michigan where there was considerable grass in order to protect the seedlings from feeding damage; the records of the project are on file at the Supervisor's Office, U.S. Forest Service, Cadillac, Michigan. Although feeding situations such as the two cited here are not common in Michigan, they do point out the potential hazard of growing small grains and other grasses adjacent to young pines in years when grasshoppers are abundant and suppression measures are not utilized.

## ACKNOWLEDGMENT

We are indebted to I. J. Cantrall of the Museum of Zoology, University of Michigan, for identifying the grasshoppers, supplying references on grasshopper feeding, and giving helpful suggestions on the manuscript.

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Books intended for review should be sent to the Editor, Ronald S. Wilkinson, The Library, Michigan State University, E. Lansing, Michigan 48823.



### ERRATA (Vol. 1, No. 5, October 1967)

- Page 149, line 3: for "large size of *L. mactans* males . . . ." read "large size of *L. variolus* males . . . ."
- Page 173, line 10: for "1957" read "1967."