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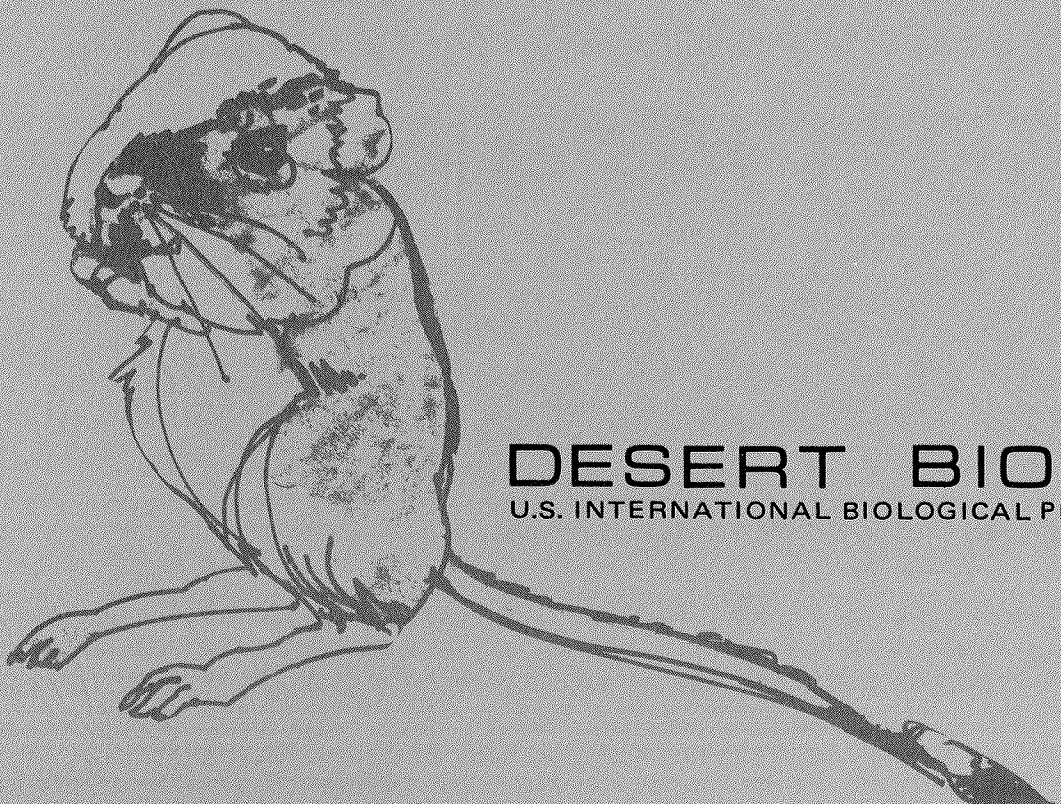


RESEARCH MEMORANDUM

RM 73-33

DEMOGRAPHIC AND BIOENERGETIC STUDIES OF  
CUTWORMS IN CURLEW VALLEY

W. J. Hanson, Project Leader  
and G. F. Knowlton



DESERT BIOME  
U.S. INTERNATIONAL BIOLOGICAL PROGRAM

1972 PROGRESS REPORT  
DEMOGRAPHIC AND BIOENERGETIC STUDIES OF CUTWORMS IN  
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Report Volume 3

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## A B S T R A C T

A survey of all stages of the cutworms of Curlew Valley was carried out in 1972. While the bulk of the material remains unidentified, many species were evident. The most abundant species taken as larvae on the study area were several unidentified species of *Euxoa*, in addition to *Feltia ducens*, and *Pseudorthosia variabilis*. Numbers recovered at random sample plots were too low to make an estimate of overall abundance in the area. Attempts were made to establish laboratory colonies of two of the more common species for future demographic and bioenergetic studies. Larval rearings have thus far proved successful on a diet of alfalfa leaves and on an artificial diet.

## INTRODUCTION

Many species of cutworms occur in the Great Basin, and the large genus Euxoa, which includes many of the cutworm species, perhaps has reached its greatest development in number of species in that region (Hardwick, 1970). During some years high infestations of larvae have been observed to nearly denude large areas of desert rangeland and, as most species have a rather wide host range (Crumb, 1929), the great impact on the desert ecosystem by these insects seems obvious. However, most species have been studied very little, especially those not occurring in areas of cultivation, and demographic and bioenergetic studies of the dominant species should provide valuable information in assessing this impact.

## OBJECTIVES

The objectives for 1972 were to determine the species of cutworms present in Curlew Valley, to determine their population density based upon larvae recovered from the soil, and to establish laboratory colonies of the dominant species for future demographic and bioenergetic studies.

## METHODS

Surveys were begun in March and continued until November at several sites in Curlew Valley, but with concentrated efforts at the northern validation site, 5 miles northwest of Holbrook, Idaho. Litter samples were processed in Berlese funnels, and soil was carefully examined for the immature stages. Sifting soil through a one-fourth inch mesh screen was at first attempted in recovering larvae but proved too time-consuming and laborious, and the soil was thereafter examined by hand. For the collecting of adults, a Malaise trap was maintained on the study area from March to October and the insects removed at least weekly. Light-trapping was carried out also at least weekly from June to September. During late summer and fall moths were collected from flowers, especially those of Chrysothamnus spp.

Random sampling was begun in a designated area near the north validation site

but, as too few cutworms were recovered for an adequate estimation of overall abundance, this was not continued. The sample plots consisted of one cubic foot of soil. Thereafter searches for larvae were concentrated around the bases of various species of plants to obtain as many larvae as possible and to get an indication of preferred host plants. All immature stages recovered were returned to the laboratory for rearing to the adult stage.

Adults from which laboratory colonies were begun were collected at night and placed in oviposition cages containing soil, a method modified from that of Jacobson and Blakeley (1957). Efforts were made to obtain the same species as those recovered as larvae. Eggs which did not hatch in a few weeks were exposed to a two-month cold period (Berube, 1957). As soon as the larvae appeared they were placed in petri dishes, in which alfalfa leaves or various other food, such as lettuce, bean leaves and wheat sprouts, were provided. An artificial diet, described by Patana (1969) was begun for some of the larvae.

## RESULTS

Samples of litter processed in March, April and May contained several Noctuidae larvae, primarily early instars, while no larvae were recovered from the soil, which at that time was quite moist. By late June the litter had dried and contained no larvae, while larvae were then being recovered from the soil. The larvae were found to be deeper as the soil dried, and were most abundant around the bases of certain plants, especially *Lupinus caudatus* Kell. From a total of 137 larvae recovered alive from the soil, 79 emerged as adults. Several species of *Euxoa* appeared to be represented, along with *Feltia ducens* Walker and *Pseudorthosia variabilis* Grote. Twelve of those which did not emerge were parasitized (four by Braconidae, five by Ichneumonidae, one by Chalcidoidea, and two by Tachinidae).

Preliminary identification of the adults collected at the study area indicates a large number of species present. However, much of the material has not been identified. Those which were most abundant were *Euxoa auxiliaris* Grote, *Euxoa declarata* Walker, *Euxoa obeliscoides* Guenee, *Euxoa ridingsiana* Grote, *Feltia ducens* Walker, *Feltia venerabilis* Grote, *Pseudorthosia variabilis* Grote, *Sidemia devastator* Brace and *Spodoptera praefica* Grote. Some of these may have come in from nearby cultivated farms, and therefore only those which were reared from recovered larvae would give the

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true picture of the species occurring in the desert habitat.

It is not known if the small number of larvae recovered from the soil during random sampling presents a true picture of their abundance, or if the method used was adequate. There was no evidence of excessive plant damage due to cutworm activity. On the basis of previous work on the life history of various species, feeding is usually completed in late spring, and a period of arrested development during a prepupal stage lasts through the hot summer months. This coincides with the findings of the present study, as nearly all of the larvae recovered after late June were in a prepupal state and within an earthen case. By early August all had pupated and began to emerge 2 weeks later. Eggs collected from confined adults embryonated in a few weeks. At this time those of two species hatched and the remainder entered diapause.

The rearing of larvae on alfalfa leaves and on the artificial diet is proceeding satisfactorily.

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