

The

FLORIDA ENTOMOLOGIST

Official Organ of The Florida Entomological Society,
Gainesville, Florida.

VOL. XX

NOVEMBER, 1937

No. 3

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Issued once every three months. Free to all members of the Society.

Subscription price to non-members is \$1.00 per year in advance; 35 cents per copy.

THE INSECT DEPREDATORS OF PURSLANE

(*Portulaca oleracea* L.)

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INTRODUCTION

It is only within relatively recent years that workers have begun to turn their attention to a study of the part played by weeds in the economy of our noxious insects. The need for such information is greatly increased by our knowledge of the role of insects and weeds in the dissemination of the various maladies of cultivated plants. Thus, Lindford (71) has shown that *Emilia flammæ* Cassin, a weed common in pineapple fields of Hawaii, is the "reservoir" for the serious disease of pineapples known as Yellow-Spot, and that the onion thrips (*Thrips tabaci* Lind.) transmits this malady from *Emilia* to pineapples. Drake, Harris, and Tate (26) proved that aphids, commonly feeding on purslane and other weeds in the onion fields of Iowa, often in their wanderings from plant to plant stop to imbibe the juices of the onion and by so doing may become the vectors of that peculiar disturbance, Yellow Dwarf of onions. Their studies show that it would be impossible for these aphids to live and complete their development on the onion; yet they are the sole natural vectors of Yellow Dwarf.

Not only is the relation between insects and weeds important in the spread of plant diseases; this relation is equally important to cultivated crops in many other ways. This is brought about in part by common weeds serving as favorite hosts, thereby

harboring insects and promoting undesirable insect populations. So efficient are weeds in this respect that their insect depredators, because of a diminishing food supply, often shift their attacks to adjoining cultivated crops and there do untold damage. There are countless examples which will illustrate the intricacy of this relationship between insects, weeds, and crop plants. Davidson (21) gives a very striking example of certain aphid species which, in their annual cycle, will migrate in the autumn from a group of numerous, unrelated, herbaceous, summer host-plants to a few, closely related woody-stemmed winter hosts. In the spring they migrate back to their summer hosts.

In grassy and weedy gardens, where cutworms are wont to lay their eggs, considerable damage is done to cultivated plants. The cutworms migrate to the cultivated plants when their natural food supply is exhausted.

Forbes (44) has shown that the corn-root aphid is dependent in the early spring upon such weeds as purslane, ragweed, fox-tail, smartweed and crab grass before corn is planted. Decker (23) found that along the margins of fields, cultivated crops like corn, during certain seasons, are attacked by the common stalk borer, *Papaipema nebris* Guenee, after the larvae have begun their development on grasses or weeds.

To encourage the increase of insects in the interest of weed control would at first appear to be contrary to the general principles of pest suppression; but there are some records of such which are both interesting and convincing. For example, the Russian thistle is usually present in great abundance in Canada in many sections where clean farming is not practiced. However, this noxious weed does not cause undue alarm because the growers have learned that the sugar beet webworm, *Loxostege sticticalis* Guenee, will check its spread. The sugar beet webworm will also feed upon cultivated plants and many weeds, including purslane, when Russian thistle is not present.

Again the use of insects in combating weeds finds a classic example in Australia. Here the cactus is an important plant introduction. Within recent years it has become established in New South Wales and Queensland, spreading over sixty millions of acres and causing great alarm by forming impenetrable thickets over thousands of square miles of territory. Certain insects which feed upon the cactus in Mexico and South America have now been introduced into Australia for the express purpose of controlling this dangerous weed. Latest

published reports show that almost unbelievable results in reclaiming this land have been obtained from the use of these insects.

Metcalf and Flint (84) cite the work of Glick, who in an unpublished manuscript records that a species of sawfly eliminated purslane from a ten-acre field of onions, although neighboring fields were much troubled with this weed. On numerous occasions the author observed the purslane sphinx, *Celerio lineata* Fab., feeding on the foliage and stems of purslane, keeping it from seeding. According to Hyslop (63) *Centorhynchus marginatus* Payk., was introduced accidentally into this country. It feeds upon the seeds of the noxious dandelion, *Taraxicum officinale* Web., often destroying one-quarter of the seed. Marcovitch (77) reported that milk vetch (*Astragalus canadensis* L.), a very common weed of Minnesota, is kept from becoming a weed of the first rank by its insect enemies. The agromyzid fly which feeds upon lantana and keeps it from seeding in Queensland was introduced into Hawaii by Koebele for the purpose of controlling the spread of this plant.

Weeds at times may be thought of as being beneficial in that they harbor numbers of parasites which develop upon their insect depredators. These parasites are often of great value in destroying many other insects which might become very destructive to crop plants. In the writer's experiments several white-lined sphinx moth larvae were taken from purslane in the field and caged. Later they pupated but the adults never emerged, for they had been parasitized by certain hymenopterous forms. Two of the pupae were dug up and examined. They contained well-developed parasitic larvae. This illustration has been given to show the relationship between weed feeders and the parasites in their control. The control of plant-feeding insects by other insects is very complicated. It has been found that many parasites increase to such a degree as to prevent any appreciable damage.

From what has been said above it may be seen that a study of the relationships between insects and weeds may often be of great importance. In this paper the author has confined himself to a study of the insects which feed upon the herbaceous weed, *Portulaca oleracea* L., or common purslane. Much use was made of the literature on the subject in order to compile as complete as possible a list of those insects feeding on it.

THE PLANT (*Portulaca oleracea* L.)

The species *Portulaca oleracea* L., is a common plant of India—its natural home. It occurs over Europe and North America, being especially abundant in gardens. Records show that purslane was carried westward from Asia to Europe, and for centuries it was used as a salad and pot herb. This plant was observed in Massachusetts as early as 1693. Since then its spread has been very rapid. This rapidity of spread is due in a large measure, one writer has said, to the carelessness of the early Pennsylvania Germans, who were very fond of it as a vegetable.

Purslane is a procumbent annual, with mostly alternate, oblong-cuneate leaves about one-half inch long. The flowers are yellow, sessile and axillary. The seeds are black.

Some authorities have called purslane a "Cosmopolitan Weed" because of its wide distribution. It is not uncommon here in the United States to find it in cultivated grounds around dwellings and also in waste places.

Purslane has some direct economic value. Knight (69) says that the juice from its leaves will relieve swelling and pain inflicted by the hairs from the body of the white-marked tussock-moth larva. It is also of value as food for hogs, a purpose to which quantities are devoted. The seeds are used in medicine.

SUMMARY AND LITERATURE

A careful and comprehensive search of the literature has failed to disclose any previous lists dealing specifically with insects feeding on purslane. However, there are many isolated records in various text books, taxonomical works, catalogues, and host-plant indices. It has been the problem of the writer to gather these, to supplement them with his own field observations and rearing records, and to organize and present the whole in a detailed and usable list. All told, eighty-three species, distributed in their Arthropodan orders, are recorded in this paper.

INDEX TO THE FLORIDA ENTOMOLOGIST

An index to volumes 1 to 19 inclusive of the Florida Entomologist is now in preparation. This index contains a table of contents arranged by volumes and an index of the insects by specific and varietal names. This index is to be sold at 75c a copy. Orders should be sent to J. W. Wilson, Business Manager, Lakeland, Florida. Subsequent volumes will have an index in the last number of each volume.