

FOOD PLANT AND HABITAT NOTES ON SOME NORTH AMERICAN SPECIES OF PHLEPSIUS.

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A systematic treatment of the North American species of *Phlepsius* by Prof. Osborn and Dr. Lathrop appeared rather recently.* This is an excellent paper for the separation and identification of our North American species. Probably in an attempt to abbreviate the paper, food plant notes and ecologic data were omitted. The present treatment is undertaken in order to give some notes on personal observations in the field and to show some of the interesting diversities in habitats of the members of this genus.

Probably one of the most interesting groups of the genus and one which is apparently quite distinct in coloration and food habits from the other species, contains the so-called "banded" species of *Phlepsius*. This group includes those forms which are definitely marked by cross bands of darker brown coloration giving the insects the general appearance of markings of alternating light and dark brownish transverse bands. In all cases where food plants have been definitely determined for these species they have been found feeding upon some species of pine. *Phlepsius tigrinus* and *Ph. franconianus* occur together, frequently being found on the same tree or limb. Mr. Knull has collected both species from White Pine, *Pinus strobus*, in the Allegheny Mountains of Pennsylvania. The writer has also secured them from this food plant in Pennsylvania and in Ohio has taken them abundantly on *Pinus rigida* and *P. virginiana*. In Ohio *Ph. tullahomi* has frequently been taken with them also. In a previous paper† the writer pointed out that this species was not a tree inhabitant and that it occurred on *Andropogon*. This statement was made in error, as more recent investigation has shown that minute seedlings of *Pinus virginiana* and *rigida* were growing in what seemed to be a pure *Andropogon virginicus* association. The seedlings were only a few inches in height and completely hidden by the clumps of *Andropogon*. Although most abundant on these

*Ann. Ent. Soc. Amer. Vol. 16, p. 310, 1923.

†Conn. Geol. and Nat. Hist. Surv. Bull. 34, p. 130, 1923.

small succulent pines, they also occur and have recently been taken in nymphal and adult stages from older trees.

The same mistake was made at first regarding the food plant of *Ph. palustris*. Seemingly it was swept from a heavy sedge, *Juncus megacephalus*, but close observation revealed in that case also small seedlings of *Pinus palustris* and it was afterwards taken from larger pines where no sedges occurred. This species is by far the largest and most robust of the banded group. *Ph. slossoni* and *Ph. lippulus* are both southern species and live on pine. Food plant records to date, however, show them to be confined to different species of pine. *Ph. slossoni* has been taken only from *Pinus caribea* and *Ph. lippulus* only from *Pinus palustris*. Further observations may show a wider range of food plants for each of these species. *Ph. strobi* receives its name from the white pine on which it lives. This species has long been confused with a species of *Eutettix*, feeding on *Chenopodium*, which error has recently been pointed out by Prof. Osborn. *Ph. granticus* is also reported by Lowry as occurring on pine in New Hampshire.

A number of species of the genus also occur on the floor of the pine woods. In Florida several species live in this habitat, some of which are found farther north. *Ph. floridanus* and *Ph. attractus* occur on the fine short grasses of the pine forest floor in well drained areas. *Ph. nudus* and *Ph. tubus* occur on similar small grasses in open pine woodland. *Ph. pulchripennis* is found for the most part under pine woodland conditions, but on herbaceous growth and where the soil is apparently more moist. In addition it occurs on grasses bordering the everglade areas and was taken from grasses in open portions of the everglade hammocks. In these three habitats the conditions under which it occurs are similar. *Ph. distinctus*, another grass species of the open pine woods, was found only where the growth was very luxuriant and the woods sufficiently open to favor a heavy growth of the herbaceous layer and to present the appearance of a savannah. The food plant could not be determined.

Present records would indicate that very few species are known to live on trees or shrubs other than pine. *Ph. tinctorius*, probably an imported species, is known only from the New York, Newark, N. J., area, where it occurs on *Aralia spinosa*. *Ph. marmor*, known at present only from Manitoba, is reported from *Juniperus horizontalis*.

The great majority of the species are grass feeding and occur under varying conditions. In addition to those mentioned as occurring on the herbaceous growth of the pine woodland floor, several are abundant in the swamp and marsh. Two species especially are common in the Florida everglades. *Ph. planus* is abundant on *Panicum hemitomum*, the maiden cane, and *Ph. cottoni* occurs in the *cladium effusum*, sawgrass, association. *Ph. latifrons* also occurs in the everglade region on the moist prairies, but is found in more northern states as a meadow species.

Several different conditions are found in the fresh water swamps and marshes of the northern states. From field observations probably no species of *Phlepsiis* could be designated as a true swamp form. *Ph. solidaginus* would approach this condition quite closely, however, as it is common on the tall grasses of the fresh water marsh in a mixed association of *Carex-Phragmites*. *Ph. ramosus* has been taken from a similar habitat, but no specific data was obtained regarding the food plant. *Ph. fuscipennis* and *Ph. collitus* have been found very abundantly on short growths of *Juncus*, *Eleocharis obtusa* and *Scleria verticellata* at the margins of fresh water lagoons, where the small waves of the lagoon keep the sandy soil very moist and produce a very humid habitat. *Ph. nebulosus* has also been taken abundantly from the same plants, but where they were growing under different conditions. In this case the water had receded in the old lagoon basin so that a somewhat drier condition prevailed and the plants had formed a mat or turf.

At least two species are definitely associated with the bog habitat. Prof. Osborn has reported collecting *Ph. maculellus* on fine grasses in the bog association. *Ph. ramosus* also occurs in boggy areas and has been taken from clumps of grass growing in a mixed *Sphagnum-Tamarack* habitat.

A few species undoubtedly live most abundantly under heath conditions. *Ph. fulvidorsum*, although occurring in woodland areas, is found in greater abundance on one of the herbaceous plants in the heath association. It occurs in an association where *Smilax* sp., *Vagneria* and associated plants are found. *Ph. cumulatus* is another and more typical heath species, but is found under entirely different conditions from the preceding. It has been collected abundantly from mats of a pure association of *Arctostaphylos* (bearberry) which forms a portion of the herbaceous ground layer of plants in the northern conifer forests.

The character of the meadow may vary to a great degree. It may be a high, well drained area or a low moist meadow and as a consequence the type of plant and the humidity factor may vary decidedly. For this reason a larger number of species might be placed as meadow inhabitants. Several species are common in different types of meadows. In the northern states *irroratus*, *truncatus*, *collitus*, *decorus* and *tennessa* are found abundantly. The first three of these are very common. In the extremely northern states and Canada *Ph. apertus* is a common meadow species. *Ph. superbus* and *Ph. excultus* are abundant meadow species in certain localities, especially in the southern states.

Large areas of upland pasture and grazing land are covered with *Andropogon virginicus* as the principal species of grass. In this association *Ph. carolinus* and *Ph. cinereus* are found rather abundantly. *Ph. collinus* occurs in the same areas, but probably lives upon the small patches of *Aristida* which are constantly being invaded by the *Andropogon*. In some places it is also found on the washed areas where the *Aristida* is usually the pioneer plant to grow upon these denuded spots. *Ph. altus*, superficially resembling the former species, occurs on the short grasses of the western plains.

Open woodland areas of the deciduous forest, especially in mixed mesophytic forests where the humidity is rather high and there is a rich growth of herbaceous plants, furnish the proper habitats for several species. Of these might be mentioned *Ph. particolor*, which has been taken only in a very restricted habitat of this type, where short grasses together with *Luzula campestris*, *Sanicula canadensis*, *Viola blanda* and similar plants occur in a mixed hemlock-beech woodland. *Ph. incisus* occurs in the same habitat, but is found living under more varied woodland conditions. *Ph. decorus* and *Ph. fulvidorsum* may also occur under woodland conditions, but the relative degree of humidity may be much lower in the case of these latter species. *Ph. majestus*, also a woodland species, occurs on tall grasses growing in moist areas in rather dense shade where only a few herbaceous plants are found.

This data collected while observing field conditions of these insects in the Eastern U. S., shows a great diversity in food plants and types of habitats. If similar data could be brought together for the western species as well, it would probably show even a greater diversity of conditions, especially in the case of the mountain species and those of the arid southwest.