

## *The Economic Status of the Fulgoridae.*

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The insects of the family of Fulgoridae have not been recognized as of very special importance from the economic standpoint, particularly in the northern part of the United States and some notes concerning their relation to various crops may be appropriate.

There is, I believe, no single species that has been dealt with extensively as an injurious pest and the only one that has been described with special mention of its destructiveness to any important crop in America, is the corn Fulgorid, *Dicranotropis maidis*, which was described by Ashmead as destructive to corn in Florida. This record was made a number of years ago, and since there have been but two records of its occurring in particularly destructive numbers. I have also examples collected in Florida, and showing the various stages of the insect in such numbers that no doubt it might be considered of economic importance.

In the northern states, aside from the occasional attacks of the Pruinose fulgorid, *Ormenis pruinosa* Say, and the *Ormenis septentrionalis*, there have been described by Fitch certain species of *Cixius* and *Lamenia* which occurred upon various plants in such numbers as to be reckoned among the list of injurious species. But most of these forms, however, have been looked upon as objects of curiosity, interesting to the entomologist, but not of such importance to the agriculturist as to warrant any exhaustive economic study. It may be admitted that none of them are to be ranked alongside of such noted species as the Chinch Bug, the Hessian Fly, or the Codling Moth as species that have a prime importance from the economic standpoint. There are, however, as I shall hope to show, a considerable number of species that have a wide distribution, and occur in such numbers from year to year as

to constitute an important factor in the success of raising certain kinds of crops.

Among those which I rank in this connection for the northern part of the United States, are a number of minute species which occur in grass land and which attack the various kinds of grasses in very much the same manner as do the Jassidae.

While seldom occurring in such numbers as certain species of Jassids, some of the species at certain times may be found in numbers almost equalling some of the most destructive of the Jassids.

To mention a few of these species, the *Liburnia campestris* of Van Duzee has a distribution covering all of the northern United States, southern Canada and extending to the Mississippi, at least, to the southward. It occurs in large numbers, especially in favorable localities in pasture lands, and there can be no question that it must constitute an important drain upon the productiveness of the crop. Van Duzee says in connection with his description of the species, speaking for Buffalo:

"Here this pretty little species abounds in dry pastures, especially where the grass is thin and parched during the heat of summer."

It might be inferred from this mention that the presence of these insects in pastures might count as a factor in the dry and parched condition of the grasses where they occurred. In Ohio it is one of the most abundant species and its life history has been worked out in detail by Mr. Otto H. Swezey and will, I trust, be ready for publication in the near future.

The *Liburnia luteola* Van Duzee is another abundant species, but its distribution so far as present records show, is not so general as for the preceding species. In Ohio it is one of the most abundant forms, and since it occurs in blue grass, it must be looked upon as a destructive species. In the genus *Stenocranus*, the species *dorsalis* and *lautus* are among the most common, but their attacks so far as present observations go, are made particularly upon the sedges and hence they are not to be counted as particularly injurious.

*Stobera tricarniata* Say is a widely distributed spe-

cies occurring probably all over the country and often taken in considerable numbers in grass land. Its habits have not been recorded in detail, but it will certainly come in for attention when the members of the family are worked economically. Several species of *Pissonotus* and *Phyllodinus* are also found in sufficient frequency to merit more thorough study. Possibly these attacks are limited to grasses or sedges of little economic value, and hence unimportant, but they certainly should be given careful study to make certain of their economic position.

The genus *Otiocerus* includes some of the most beautiful and delicate Fulgorids, if not of all insects and their occurrence on oaks, hickory, walnut and other trees and shrubs, render them of importance from the economic standpoint.

*Bruchomorpha* includes some quite grotesque forms which occasionally are found in considerable abundance in pasture land. Their habits have not been traced closely enough to say with certainty as to the limits of their food supply, but it may be considered safe to presume that the larger part of their attack is upon valuable forage grasses, and hence, to the extent of their abundance, injurious. The most common species appear to be *dorsata* and *oculata*, but several others have been described. *Aphelomena simplex*, a related form is fairly common in Iowa, Dakota, Ohio and doubtless quite generally distributed over the Mississippi valley.

*Scolops* includes a number of species that are very grotesque in the elongation of the head and *sulcipes*, which is distributed over the country from New England to the Pacific coast, is of such common occurrence in lowland pastures that it unquestionably may be counted an economic factor, though by itself alone, perhaps not of sufficient weight to merit particular investigation.

It should be noted, however, that we have in these groups a large number of species each of which occurs constantly from year to year, occasionally in large numbers and their aggregate influence is too important to be ignored.

In the subfamily *Cixiinae*, almost nothing has been

learned as to the economic relations and while a few species like *Cixius stigmatus* and *Oliarus 5-lineatus* and *humilis* are often abundant and very familiar in the mature forms, scarcely anything has been learned of their early stages.

The references to pines, oaks, etc. by Fitch referring simply to the adult forms has little bearing on the economic status since their greatest ability for destruction exists during the larval stages. Indeed these host plants are in all probability simply accidental, the insect alighting and feeding in the mature form on any species of plant that may be convenient to their breeding grounds.

The discovery the past summer of a species of *Myndus* which in the larval stages lives upon the roots of various plants may serve possibly as a clue to the habits of other members of the subfamily. This species, which I have called *Myndus radialis*,<sup>1</sup> was found in May on the roots of grasses, nettle and *Impatiens* in the low ground of an old river bed.

It occurred only in one locality and in a rather limited space were found considerable numbers; in fact, almost every clump of grass or patch of nettle was found to support some of these insects. They evidently passed all of their larval stages underground as the adults were found in the cavities or in the roots protected by the overlying rubbish or dead leaves and at least for some time after maturing, seemed quite inclined to remain underground. Those which were reared in confinement usually concealed themselves beneath lumps of earth. While the extent to which this insect has been found so far does not warrant the conclusion that it has a particularly important economic position, it indicates that we have to deal in this family with the possibility of subterranean species and the extent to which these may be destructive it is difficult to determine except by careful observation over considerable territory. The gradual drain upon plants from the sucking of the sap from the roots may not show particularly above ground except when it becomes so great as to cause distinct withering or dying of the

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<sup>1</sup>Ohio Naturalist, Vol. IV, p. 42.

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plant. Nevertheless, the drain would interfere with the  
normal growth and in any forage which is of value the  
the action of any subterranean species may be taken into  
account.

Recently the importance of the insects of this family  
has been emphasized by the destructiveness of the Cane  
Leaf-hopper in Hawaii, which has been causing so exten-  
sive injury that the matter has been taken up as a special  
problem by the Hawaiian government. Mr. Koebele, the  
Hawaiian entomologist, was commissioned to come east  
for the express purpose of securing specimens of the  
Fulgorid parasites, some species of which have been noted  
by Mr. Swezey in the vicinity of Columbus. I understand  
from Mr. Koebele that the insect has devastated an  
extensive area, occurring in a strip of country some ten  
miles wide by thirty miles long and causing such serious  
damage that the sugar crop for the past year or two has  
been very greatly lessened. A pamphlet by Dr. Perkins  
relating to this species was published during the early  
part of the summer and this indicates extended ravages  
over a considerable territory.

As an indication of the extent to which these Ful-  
gorids are parasitized it may be mentioned that Mr.  
Koebele, as a result of several weeks of persistent collect-  
ing, secured and shipped to Hawaii about three thousand  
parasites, most of them apparently of the form known as  
*Gonatipes*. He also discovered several forms of parasites,  
not hitherto recorded and these will doubtless be fully dis-  
cussed in his reports of the work. It will be a matter of  
considerable interest to learn what success this parasite  
may have if it is successfully established in Hawaii, since  
the insect upon which it is hoped to establish it is of a  
different species and even of a different genus from the one  
affected here.

It is worthy of note that the species of Fulgorids  
which are parasitized in this region are ordinarily kept  
within certain limits and it is quite possible that the  
occurrence of these native parasites may play a constant  
role in this connection, although the per cent of the indi-  
viduals which support parasites seems to be quite small.