

AN INDIANA INSECT SURVEY.

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The scientific and economic value of a survey of the insect fauna of Indiana and the need of such a survey has been emphasized to the writer for several years, so much so, in fact, that plans were drawn up three or four years ago, the initial steps being taken before I became connected with Purdue University. These plans, made before learning of the Biological Survey Committee of this Academy, seem to be appropriate at the present time and will, I believe, fit in conveniently with the plans of this committee.

Briefly, the object of such a survey would be to explore, exploit, record, map, collect and study the insect fauna of Indiana; to determine the occurrence and range of all insects of the state and to study their relation to plants, animals, human welfare, etc. Such a survey would include a study of the relation of insects to changing conditions, that is, swamp areas being reclaimed by drainage, peat bogs, sand areas, and the like, being put under cultivation for the first time, etc. It would also include studies of the small lake areas, caves, and similar places. In this connection it is planned to build up a working collection of insects representative of the state and of surrounding states and in time it is hoped that collections of insects, illustrating systematic, economic, biologic and ecologic groups, can be prepared for distribution to high schools and other public institutions.

No very definite method of procedure has been formulated. Indiana is very fortunate in having had a number of the country's best entomologists. Thomas Say, the father of American entomology, described and studied many species from Indiana during his residence at New Harmony, 1826 to 1834. One of the country's best known economic entomologists, Francis Marian Webster, carried on his early work in Indiana. The lasting influence of Webster's work on the agriculture of the state has been impressed upon the writer and more than one farmer of the older group has told me of the work which Webster did on his particular farm. More recent is the work of W. S. Blatchley and E. B. Williamson, both systematists without a peer. Blatchley's monumental works on the Classification of Coleoptera and Orthoptera are recognized standards as are also Williamson's equally classical Odonata studies. Besides Blatchley and Williamson, Indiana has other entomologists, nationally recognized as authorities in their groups, including H. F. Dietz and H. C. Kinsey, authorities on the Coccidae and Cynipidae, respectively, H. E. Enders and E. J. Kohl who have specialized on the biting lice (Mallophaga), W. H. Larrimer on the Jassidae, H. J. Painter on the Orthoptera, and the writer has studied the Scarabaeidae and Aphididae.

Necessarily an insect survey of this nature requires a division of work and it was planned to appoint honorary curators for the different groups or orders, to serve without pay, who would co-operate in col-

lecting, determining, monographing and in other ways assist in the plans. Where possible, residents of Indiana would be responsible for the work, but in some groups it would be necessary to look to others for co-operation in the systematic studies. Probably the Myriopoda and Arachnida should be included in the insect survey plans since they are usually treated with the insects and by entomologists.

Probably three card indexes should be maintained, as follows:

I. Index of the previous references in literature, arranged systematically.

II. Index of the collection records, (a) the insect index arranged systematically and (b) a host index referring to the species in the insect index (a); arranged alphabetically.

III. Index based on the economic, biologic, and ecologic records and arranged systematically.

All three indexes are in use by the writer at the present time and many records have been accumulated.

The uses and values of an insect survey for Indiana are innumerable but a few might be noted at this time.

Aside from the purely scientific value of such a survey and collection, this work will be of direct use in handling economic problems and in this connection we will enumerate as follows:

1. Prevents errors and facilitates accurate identification. We will not be safe from serious errors in our work with economic insects until we know far more of our insect fauna than we know now.

2. We will be able to define with considerable accuracy the "Life Zones". Thus the Insect Survey work will show the regions where watch must be kept or measures applied and will avoid waste of attention and effort in regions where the problem is not of importance.

3. In the case of sudden outbreaks of insects not previously known to be destructive, our Insect Survey will furnish data to enable immediate action and will furnish a basis upon which to proceed with our studies and for information to the public.

4. Insects are continually changing habits and where a previous knowledge of the insect has been available it has proven of greatest value in such cases. A few examples are: The strawberry root worm attacking strawberry plants but doing very little damage has, in the past few years, become one of the worst pests of roses in greenhouses; certain snout beetles of the genus *Lixus* which have heretofore been known to attack only wild dock are becoming a pest of corn in the swamp areas now being drained in Greene County; the greenhouse leaf roller was once only known to attack weeds but now is a common pest of celery and other garden vegetables as well as numerous greenhouse crops; the rose leaf-roller was little known when it attacked wild cherry but now it is a pest of rose; the quince curculio attacked only haws before the advent of the quince; a common tree hopper until recently was to be found only on wild plants but now it is generally common on several important ornamentals; and a host of other examples could be cited and additional ones are certain to come to us every year.

5. Biology teachers draw on the insects as an inexhaustible source for their classwork and the survey will undoubtedly become a valuable asset to the teaching of biology in the state. The educational value of a survey, such as planned, is beyond estimation.

A survey as planned is a gradual development but a start has been made and it is hoped this paper will stimulate the organization of an insect survey for Indiana. The insect collection at Purdue University is essentially a collection purchased from T. B. Ashton of Kansas some thirty years ago and is especially rich in Coleoptera, containing many rare and new species. The collection is being transferred from old wooden boxes to up-to-date Schmitt boxes and the various groups are being submitted to specialists for correct classification as rapidly as possible. The card indexes previously mentioned have already been started. The entomologists of the state have co-operated in furnishing specimens and data. An exceptionally fine set of Odonata has been placed in the collection by E. B. Williamson, many specimens of Coleoptera and Hemiptera have been furnished by Doctor Blatchley, a series of Crambidae have been donated by Geo. G. Ainslie of the U. S. Entomological Laboratory, Knoxville, Tenn., specimens of Jassidae by W. H. Larrimer, a valuable collection of Coccidae by Harry F. Dietz and the writer has included his own collection of Scarabaeidae and several thousand slides of Aphididae.

Thus a start at least has been made towards studying the insect fauna of Indiana and we wish to take this opportunity to urge all members of the Academy interested in the work to offer suggestions and to co-operate in making the Indiana Insect Survey the best in the United States.

Purdue University.

