

RECORDS OF BLUEBERRY INSECTS IN INDIANA.<sup>1</sup>

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During a survey of the blueberry regions of northern Indiana in 1925, observations were recorded on the insects of the high-bush blueberry (*Vaccinium corymbosum* Linn.) and the low-bush blueberry (*V. pennsylvanicum* Lam.). In a continuation of the records in 1926, insects of the dry land blueberry (*V. vacillans* Kalm.) were included. The following counties were surveyed: Fulton, Allen, Noble, DeKalb, Steuben, Lagrange, Kosciusko, Elkhart, St. Joseph, Marshall, Pulaski, Starke, Jasper, Newton, Lake, Porter, and Laporte. While it is recognized that these notes do not include all local areas in which blueberries are found, it is hoped that, as preliminary records of prevalence and extent of injury, they may serve as a basis for future, more extensive investigation.

In blueberry regions along the Atlantic Coast, Coville<sup>2</sup> reported the high-bush blueberry (*V. corymbosum*) to be relatively free from insect injury. Records of species occurring on this plant in the field were not given. Woods<sup>3</sup> has reported the insects found on the low-bush blueberry (*V. pennsylvanicum*) and the dryland blueberry (*V. vacillans*) in Maine. In accordance with a former record,<sup>4</sup> extensive injury to the fruit of *V. pennsylvanicum* was attributed to the larva of the apple maggot (*Rhagoletis pomonella* Walsh). While the identity of the insect causing the injury was doubtful, due to variations in the size of larvae, the adult fly was recognized.

The method employed in obtaining records on the three species of blueberries included: field observation of insects present, types of injury and extent, and collections in case a field identification was found impossible. The number of areas surveyed in each county and the number in which the various insects were found is recorded in Table I.

In distribution the high-bush blueberry (*V. corymbosum*) was found only in very moist peat soils, sphagnum, and tamarack bogs in the lake region. The low-bush blueberry (*V. pennsylvanicum*) was found in the edge of swamps along with the high-bush (*V. corymbosum*) and also in moist, sandy oak woods. Apparently adapted to a wide range of soil conditions, this species is, however, restricted to soils covered by an upper layer of leaf mold or other natural means of controlling moisture.

<sup>1</sup> Contribution from the Department of Entomology and Horticulture, Purdue University Agricultural Experiment Station, Lafayette, Indiana.

<sup>2</sup> Coville, F. V. Experiments in blueberry culture, U. S. D. A. Bur. Plant Indust. Bull. 193. 1910.

<sup>3</sup> Woods, W. C. Blueberry insects in Maine. Maine Agr. Exp. Sta. Bul. 244. 1915.

<sup>4</sup> Woods, W. C. A note on *Rhagoletis pomonella* in blueberries. Jour. Econ. Entom. 7:398-400. 1914.

"Proc. Ind. Acad. Sci., vol. 37, 1927 (1928)."

The dryland blueberry (*V. vacillans*) was found only in sandy oak woods and open barren sections. While the cultivation of blueberries is not of commercial importance, the three species mentioned are native and generally adapted to the acid peat and sandy soils in the northern one-third of Indiana.

TABLE I. Total number of areas surveyed in each county and the number in which the insects were recorded.

| County           | Total Areas<br>Surveyed | Leaf<br>Beetle | Fruit<br>Worm | Stem<br>Gall | Leaf<br>Tier |
|------------------|-------------------------|----------------|---------------|--------------|--------------|
| Lake .....       | 4                       | 1              |               | 3            | 4            |
| Porter .....     | 6                       | 1              |               | 6            | 6            |
| Laporte .....    | 4                       | 1              |               | 4            | 4            |
| Newton .....     | 2                       |                |               | 2            | 2            |
| Jasper .....     | 5                       |                |               | 5            | 1            |
| Starke .....     | 2                       |                |               | 2            |              |
| Pulaski .....    | 1                       |                |               | 1            |              |
| St. Joseph ..... | 4                       |                | 4             | 4            |              |
| Elkhart .....    | 2                       |                | 2             | 2            |              |
| Kosciusko .....  | 5                       |                |               | 5            |              |
| Lagrange .....   | 5                       |                | 5             | 4            | 1            |
| Steuben .....    | 3                       |                |               | 3            |              |
| Dekalb .....     | 2                       |                |               | 2            |              |
| Fulton .....     | 2                       |                |               | 2            |              |
| Allen .....      | 3                       |                |               | 2            |              |
| Noble .....      | 5                       |                |               | 4            |              |
| Marshall .....   | 1                       |                |               | 1            |              |

**Leaf Beetle** (*Galerucella cavicollis* Lec.). Adult beetles were found on leaves of *V. corymbosum*. Considerable injury to plants isolated near the edge of swamps was found due to eating away of young growing tips of laterals. Near Shelby in Lake County and Valparaiso in Porter County many plants near the edge of swamps were partially defoliated. This species was readily distinguished from *Galerucella decora* Say, which was found in the same swamps on willow, by the much longer thorax and distinct reddish color. Recorded in only one additional location, near Pine Lake in Laporte County, it is apparently more prevalent in the region bordering Lake Michigan.

**Fruit worm.** A small, uniformly white dipterous larva occurring singly in the berries of *V. vacillans* and *V. pennsylvanicum* in dry locations was found in St. Joseph, Elkhart, and Lagrange counties. The intact berries and stringy contents when infested indicated that it was probably the larva of the apple maggot (*Rhagoletis pomonella* Walsh) described by Woods in fruit of *V. pennsylvanicum* in Maine. Since adults were not reared, the identity of the insect was uncertain.

Dried fruits remaining on the plants of *V. vacillans* after normal ones had ripened and dropped were found to contain larvae of an insect other than the described fruit worm. Small masses of frass were observed in the calyx end, usually underneath the calyx lobes, which were curled inward upon drying. This was the larva of some small lepidopteran, apparently causing slight damage, since it was observed only late in the season.

**Stem-gall insect** (*Hemadas nubilipennis* Ashm.). Records of the occurrence of this insect on *V. corymbosum* and *V. pennsylvanicum* were obtained in all counties surveyed. The cause of the gall was first ascribed by Ashmead<sup>5</sup> to a new genus and species of cynipid, *Solenozopheria vaccinii*. The same insect is listed as causing the gall by Stebbins<sup>6</sup> and Thompson.<sup>7</sup> Rearing experiments carried out by Driggers<sup>8</sup> have established the cause of the gall to be a chalcidoid (*Hemadas nubilipennis*), while the previously described *Solenozopheria vaccinii*, along with two other chalcidoids, *Ormyrus vacciniicola* and *Eurytoma zolenzopheriae*, and a species of *Decatoma*, was probably a parasite or guest fly.

The reniform, pithy, polythalamus galls occurred on young wood produced during the current season. Injury consisted in a reduction of the fruiting surface for the following season, since fruit was borne only on wood produced during the previous growing season (fig. 1). Terminals were found containing galls more often than the more slowly growing laterals. This habit, together with the widespread occurrence of the insect, makes it a serious pest of both *V. corymbosum* and *V. pennsylvanicum* in Indiana.



Fig. 1—Galls of *Hemadas nubilipennis* on the high-bush blueberry (*Vaccinium corymbosum*). (Left). The reniform, pithy gall. Showing openings through which adult insects have emerged. (Right). Entire branch. Terminal and first lateral branch (A) killed by gall.

<sup>5</sup> Ashmead, W. H. Gall insects. Trans. Amer. Entom. Soc. 14:149. 1887.

<sup>6</sup> Stebbins, F. A. Gall insects of Springfield, Mass., and vicinity. Springfield Mus. Nat. Hist. Bul. 2. p. 46. 1909.

<sup>7</sup> Thompson, M. T. Catalogue of American Gall insects. Publ. R. I. Hospital Trust Co. p. 25. 1915.

<sup>8</sup> Driggers, B. F. Galls on the stems of cultivated blueberry (*Vaccinium corymbosum*) caused by a chalcidoid, *Hemadas nubilipennis* Ashm. Jour. New York Ento. Soc. 35:253-259. 1927.

**Leaf tier** (*Telphusa latifasciella* Cham.). Larvae from young leaf tips webbed together in May were collected in 1926. From two collections in Lake County on May 1 and one sent from Lagrange County on May 8, adult insects were obtained. Pupation had occurred before May 30 and first adult moths emerged before June 14, when rearing boxes were first opened.

This insect has been reported by Morse<sup>9</sup> on the "huckleberry" in New Jersey. It is not known, however, whether the true black huckleberry (*Gaylussacia baccata*) or one of the blueberry species was here referred to.

The larva of this gelechiid has been found only during May. Tying entire groups of very young leaves, which seldom make further growth, an appreciable amount of injury may result. Its distribution throughout the area is known to include Lake, Porter, Lagrange, Laporte, Newton, and Jasper counties.

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<sup>9</sup> Morse, S. R. Insects of New Jersey. Ann. Rept. N. J. State Museum, p. 555, 1909.