

PSYCHE.

ON THE SPECIES OF NEMOBIUS KNOWN TO OCCUR IN INDIANA.

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Among the Gryllidae occurring in the Northern-Central States the members of the genus *Nemobius* rank first in number of individuals. From August first to mid-November they swarm by thousands on every grass plot and piece of waste ground, whether in open sunny fields or the dense shade of the forest. Even the tangled masses of sphagnum mosses and other semi-aquatic growth of fen and marsh furnish shelter and food to certain species which, in the ages of the past, have become adapted to a life of such surroundings.

But while the individuals are so plentiful, their size is so small that heretofore they have received but little attention from the average collector. Moreover, so similar in general appearance are they that very close observation by the student is necessary to separate the species one from another. As a consequence but 18 have hitherto been described from the whole of North America, while but three have been accredited to the States north of Florida and east of the Rocky Mountains. McNeill* listed but one from Illinois, and I, in a former paper, but three (one of which is but a short winged form) from

Indiana.* Bruner † mentions three, two without names, from Kansas, while Scudder, in the most recent paper on the group ‡ accredits three, viz: *N. fasciatus*, *N. cubensis* and *N. carolinus* to the Central and Eastern States.

Within the past five years many specimens have been collected in different parts of Indiana. A careful study of these reveals the presence of at least six species and one well marked variety, three of which are herewith described for the first time. There is little doubt but that the right kind of investigation will show the presence of as many or more in almost any State east of the Rocky Mountains. Those known to occur in Indiana are as follows:

1. *N. fasciatus* De Geer.

This, the long-winged form of our most common species, has been taken by me only in the vicinity of electric lights. The wings of both sexes extend much beyond the tips of hind femora, those of the ♀ reaching to or beyond the tip of ovipositor, while the tegmina

* Psyche, VI, 1891, 6.

* "The Gryllidae of Indiana," in Proc. Ind. Acad. Sci., 1891, pp. 134-136.

† Publ. Neb. Acad. Sci., III, 1893, 32.

‡ Journ. N. Y. Ent. Soc., IV, 1896, pp. 99-117.

reach to the end of the abdomen. During hundreds of days spent in field collecting not a single specimen of *fasciatus* has been seen. Many, however, have been taken from the walks and streets of Indianapolis, Fort Wayne and other cities and towns in the northern part of the State, but none, as yet, in the southern half, not even in Terre Haute, where I resided for seven years. Where the insect breeds, and feeds by day is to me unknown. At times, as in the first week of August, 1899, swarms composed of myriads have appeared about the lights of some of the cities. The newspapers the next day had a column or more devoted to the insects but nothing, except wild guesses, as to whence they came.

1a. *N. fasciatus vittatus* Harris.

This is the form which abounds everywhere throughout the State. It varies in color from a dusky brown to a rusty black. When of the latter hue the stripes on the head, to which it owes its varietal name, are very dim or wholly invisible. In size it is larger than any other, except the long-winged *fasciatus*. The largest specimens in my collection have come from the borders of swamps. The tegmina of the ♀ cover a little more than half the abdomen and their cross veinlets are coarser and much more prominent than in the next species. Those of the ♂ cover three-fourths of the abdomen. The ovipositor is about one eighth longer than the hind femora.

No intermediate short winged forms

connecting *fasciatus* with *vittatus* have been seen by me, nor have any been recorded to my knowledge. The two are, however, regarded as dimorphic forms of the same species by the leading authorities, Saussure and Scudder. In Indiana *vittatus* begins to reach maturity about July 20. Living specimens have been seen as late as December 1st. Although present in vast numbers, but little is known of its life habits. It appears to be omnivorous, feeding upon carrion, cow dung and grasses with equal avidity. Though small in size the aggregate damage which it causes to grass and kindred plants in the course of a single season must be great, and there is little doubt but that it, as well as the other species of the genus, should be classed among those insects highly destructive to forage plants.*

2. *N. maculatus* sp. nov.

Size medium; head rather prominent, dark luteous or castaneous, more or less dotted with piceous, especially on forehead and cheeks; eyes rather large, prominent. Antennae dull luteous, the basal third lighter; maxillary palpi luteous, the apical half of terminal joint piceous. Pronotum broader than long, faintly tapering anteriorly; the dorsal field castaneous with numerous dark points; the front margin and lateral field sparingly beset with stiff black bristles. A piceous stripe starts back of the eye and covers the upper two-thirds of lateral field of both pronotum and tegmina. The latter with a yellowish vein separating the dorsal and lat-

* For other accounts of the destruction wrought by the species of *Nemobius* see Rathvon, U. S. Agr. Report, 1862, p. 380, and Osborne, Bull. 23, U. S. Div. Ent. p. 59.

eral fields, more prominent in the ♂. The dorsal field testaceous, sometimes with piceous dots; in ♀ covering one-third of abdomen, in ♂ two thirds; wings absent. Legs and dorsal surface of abdomen testaceous sprinkled with fuscous which on dorsal surface of hind femora is sometimes in cross-bars. Ovipositor almost straight, equalling in length or very slightly shorter than hind femora; the apical blades rather long, tapering evenly to a fine point; above, evenly and sharply serrulate. Length of body 8 mm.; of hind femora, 6.5 mm.; of ovipositor, 6.5 mm.; of pronotum, 2.5 mm.; of tegmina, ♀ 2.8 mm., ♂ 4 mm. Width of pronotum, 3 mm. 1 ♂, 9 ♀'s.

N. maculatus is readily distinguished from *N. fasciatus vittatus*, by its average smaller size, shorter and straighter ovipositor, fewer hairs on head and pronotum and finer cross veinlets of ♀ tegmina. The serrulations of the ovipositor are sharper than in *vittatus*. The two also differ in color, the ground of *maculatus* being lighter and the piceous more generally sprinkled where in *vittatus* it is in lengthwise bars. *Maculatus* has been taken in small numbers only in Marion and Vigo counties. It is found in low open woods, usually in the vicinity of or beneath logs.

3. *N. palustris* sp. nov.

Size small; the body of ♂ especially short and broad. Head tumid; eyes large, but not prominent. Pronotum one third broader than long, the sides subequal, rather thickly beset with stiff black bristles, as is also the forehead and dorsal surface of the two front femora. Head, tegmina and body of most specimens, a uniform dark piceous; disk of pronotum piceous or fuscous sprinkled with piceous.

Antennae, legs and ovipositor fuscous. Maxillary palpi luteous except the apical joint which is wholly piceous. Tegmina of ♀ covering a little more than half the abdomen; those of ♂ hardly reaching its tip. Ovipositor almost a third shorter than hind femora, distinctly though feebly arcuate, the apical blades but little enlarged at the base, very finely serrulate with dull rasp-like teeth. Length of body of ♀, 6.5 mm.; of hind femora, 5 mm.; of ovipositor, 3.5 mm.

This handsome, little pitch brown Nemobiid has been found only among the tamarack swamps and cranberry bogs of the northern part of the State, where it finds a congenial home in the midst of the dense, damp sphagnum mosses. Sometimes they are so plentiful that a half dozen or more are seen in an area a foot square. Like the other members of the genus they are very active, when disturbed leaping vigorously, a few inches at a time, and finally seeking safety by burrowing in the masses of moss.

4. *N. carolinus* Scudder.

This prettily marked little species has been found to be rather common on the grass covered banks of streams and along the fence rows of open woods in Vigo, Putnam and Monroe counties. In general appearance it is a diminutive form of *N. maculatus* above described, but its small size and short arcuate ovipositor at once distinguish it. According to Scudder, *carolinus* ranges from New England to Nebraska and Texas.

5. *N. exiguus* sp. nov.

Size medium; body slender; head rather

large, but slightly tumid. Eyes small but prominent. Antennae, head, pronotum and femora testaceous. Maxillary palpi light yellow throughout or with the apical third of terminal joint infuscated. Tegmina of ♂ reaching tip of abdomen, testaceous with a narrow piceous bar on upper third of lateral field and with basal third of dorsal field usually more or less piceous. Tegmina of ♀ covering one half or more of abdomen, the dorsal field usually heavily shaded with piceous; wings absent in both sexes. Upper surface of abdomen piceous, lower surface testaceous or luteous. Ovipositor a third or more shorter than hind femora, distinctly arcuate, the apical blade not enlarged at the base, armed above with very small and rather dull teeth which are irregularly distant one from another. Length of body, 7.5 mm.; of hind femora, 6.3 mm.; of ovipositor, 3.5 mm.; of tegmina, ♂, 5 mm., ♀, 4 mm.

This is the "*N. exiguus* Scudder" of my paper on the "Gryllidae of Indiana" *loc. cit.* It appears, however, that Scudder had not described a species as *exiguus* but had merely mentioned a form of *N. fasciatus* under the name. Beutenmuller afterward* described *N. affinis* from New York, which he stated was the insect mentioned by me, but which, according to Scudder, † is *N. carolinus*.

Exiguus is longer and proportionately more slender than *carolinus*, though the tegmina of the male are broader. The pronotum and femora are not mottled or marked with fuscous as in that species. The serrations of ovipositor of *carolinus* are smaller, sharper and more evenly separated than in *exiguus*. The latter species occurs in all parts of the State and is fully one-half as common as *N. fasciatus vittatus*. Its habits, time of appearance and local habitat are also essentially the same. However, the smaller size, short ovipositor, yellowish maxillary palpi, and other differences in color, readily distinguish it from *vittatus*.

6. *N. cubensis*? Saussure.

Two ♂'s, distinct from those of any of the above species, were taken October 9th, 1893, from the sandy bed of the old canal north of Terre Haute, Indiana. They were sent to Mr. Scudder who reports them probably the short-winged form of *N. cubensis*. In life they were shining black with a bright yellow line separating the dorsal and lateral fields of the tegmina. No corresponding females have as yet been secured from Indiana, but Scudder records two as having been taken in Illinois.

* Bull. Am. Mus. Nat. Hist., VI, 1893, p. 250.

† *Loc. cit.* p. 107.



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