SOME NORTH AMERICAN SYRPHIDAE.

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PIPIZA FEMORALIS Loew, Centur., VI, 38.

THE species of the genus *Pipiza* as a whole, are quite difficult to determine. Dr. Williston's table, in his Synopsis of North American Syrphidae, would divide them readily into two groups—those with the “abdomen uniformly black,” and those “with a basal interrupted yellow fascia.” The type of *P. femoralis* Loew, consisting of a single specimen from Illinois, is characterized by having on the second segment, two large quadrate markings, very narrowly interrupted and forming a broad fascia across the middle. On the other hand, these abdominal markings vary in size until they become obsolete or entirely wanting, in which case we have the *P. albipilosa* Williston.

A large series collected by the writer in the vicinity of Philadelphia, Pa. (the locality for the two types of *albipilosa*), shows that a large percentage have traces of, or quite prominent yellow markings on the second segment. The species was common at Arcola, Montgomery Co., Pa., April 27, 1894; later it was taken at Edge Hill, Pa., May 3, 1896; it was also collected by Mr. C. T. Greene at Lehigh Gap, Pa., July 1, 1903. Recently I have received from Mr. Germain Beaulieu, four specimens collected in Montreal, Canada, May 10 to 20, 1906, which show all gradations in the abdominal markings from the typical *femoralis*, to the more strongly marked specimens associated with *albipilosa*. Specimens of an intermediate character have also been received from Mr. S. A. Shaw, Hampton, N. H., May 17, 1904, and through Dr. W. E. Britton, collected by Mr. H. L. Viereck, at New Haven, Conn., May 7, 1905, and by Rev. H. W. Winkley at Branford, Conn., May 25, 1905. Mr. G. Chagnon, also collected it at Rigaud, Canada, May 28, 1899. I have collected the typical *albipilosa* at Auburndale, Mass., May 26, 1905.

There seems to be no structural character to separate the two; the dark tibial bands vary considerably in extent, being as a rule less prominent in the typical *femoralis*; the slight clouding on the middle of the wing is also variable; the whitish pile is noticeably longer on the male than on the female. Among the twenty specimens before me seven are females; four of these would be considered typical *femoralis* and three intermediate. Of the males four are typical *albipilosa* while eight are intermediate in character. The specimens vary from 7 to 9 mm. in length.

They have the habit of hovering in the air, in the woods, along the paths and roadways.

Pipiza radicum Walsh and Riley, is not related to this species, as is shown by Mr. D. W. Coquillett (Proc. Washington Entom. Soc., VI, p. 200, 1904).

PIPIZA FESTIVA Meigen.

P. festiva Meig. Syst. Besch., III, p. 243, 1822; Williston, Syn. N. Amer. Syrphidae, p. 27, 1886.

Two female specimens which agree with the description of this species, were taken by the writer at the cascades on the road to Mt. Greylock, near North Adams, Mass., June 14, 1906. Comparing these with the specimen in the Museum of Comparative Zoology, from "Canada," referred to by Osten Sacken in his Catalogue as "*Pipiza festiva* Meigen (or a species closely allied to it)" proves them to be the same. There is also a specimen from Hallowell, Me., in the Harris collection, Boston Society of Natural History bearing the MS. name of "*binotata*."

That it is a variable species is shown by Schiner in his Fauna Austriaca I, p. 262, where he considers the *P. ornata*, *lunata* and *artemis* only variations. In general appearance it resembles *P. femoralis* but is readily distinguished by the dark smoky brown of the outer half of the wing; it is also a little larger, measuring about 10 mm., while *femoralis* averages about 8 mm. The locality "Canada" being questioned by Dr. Williston probably accounts for its omission by Prof. Aldrich from his Catalogue. The species has recently been recorded from Roca, Nebr., by Mr. Paul R. Jones (Jour. N. Y. Entom. Soc. XV, p. 89, 1907).

PIPIZA QUADRIMACULATA Panzer.

Syrphus quadrimaculatus Panz., Fauna Germ., LXXXVI, p. 19, 1803.

Pipiza quadrimaculata Meigen, Syst. Besch. III, p. 249, 1822; Schiner, Fauna Austr., I, p. 262, 1862.

On June 8, 1898, I collected a number of specimens referable to this European species on the flowers of the Labrador tea (*Ledum latifolium*) near Ricketts, "North Mt." Pa., alt. about 2300 ft. The same species was collected on Mt. Greylock, Mass., June 15, 1906, at an elevation of 3535 ft. The specimens agree so closely with the description of this species, that there seems to be no doubt of their identity. The head, thorax and abdomen are a very dark bluish black, shining, with short thin hair; antennae brown; second and third segments of the abdomen, each marked

with two yellow spots, those on the third being usually much smaller. Legs black, the knees and tarsi brownish, wings tinged with dark brown. Length 6–7 mm.

In the abdominal markings there is considerable variation. Among the eleven specimens collected the spots on the third segment show all gradations, from equal in size those on the second segment, to being obsolete and in one specimen wanting. The males have the most prominent markings.

PIPIZA AUSTRALIS n. sp.

Pipiza pulchella Johnson, Proc. acad. nat. sci. 1895, p. 329 (*non* Williston) ♂ ♀. Head, thorax and abdomen black or a very dark blue-black, shining, covered with a sparse whitish pile. Antennae brownish black, length of the third joint between four and five times its width, under side toward the base more or less reddish. Legs bluish black, tips of all the femora, basal half of the front and middle tibiae, the metatarsi and two following joints of the tarsi yellow; basal half of the posterior metatarsi and the two last joints of all the tarsi black. Wings dark brown, somewhat lighter towards the base, last section of the fourth longitudinal vein angulated in the middle. Length 6 mm.

Five specimens, St. Augustine, Florida, March 15, 1891. The length of the third antennal joint and venation induced me from the description, to refer it to *P. pulchella* in my paper on the Diptera of Florida. Since that time I have collected a number of the true *pulchella* and the distinctness of the two is very apparent. Its longer third antennal joint, dark brown wings and very dark blue-black body are the principal distinguishing features.

The genus is characteristic of the transition and boreal zones, this being the only species recorded from the lower austral.

CHRYSTOXUM VENTRICOSUM Loew, Centur., V, 44, 1864.

Owing to a mistake in the habitat, there seems to be considerable confusion regarding this species. The two types are marked "W. T.," the original description gives "Washington." Osten Sacken, Catalogue, 1878, gives "Distr. Columbia," as does Dr. Williston in his Synopsis of the Syrphidae, p. 15 "District of Columbia (Lw.), Canada." The original description also calls for an inverted Y and not a V shaped marking on the fifth segment. It might be referred to either, it is really a very broad Y with a short stem. The scutellum of the types shows faintly the dark translucent disc so characteristic of all the species and cannot be called entirely yellow,

as Loew's description ("scutellum totum flavum") would indicate. When you try to make eastern species fit the description of *C. ventricosum* you have "troubles of your own." The *ventricosum* of the New Jersey list should therefore be *C. derivatum* Walk. I have seen no specimens of *ventricosum* from east of New Mexico and Colorado. It is certainly very close to the *C. arcuatum* Latr. of Europe.

CHRYSOTOXUM PUBESCENS Loew, Wien. Ent. Monatschr., IV, 84, 1860.

The types of this species are both from "Ill." Specimens agreeing in every respect with the types are frequently taken throughout the eastern United States from Maine to Virginia. The inverted V and Y which has been used in describing the markings on the fifth abdominal segment, is apt to lead to some confusion in separating the closely related species *C. pubescens* and *C. laterale*; the former calls for an inverted V, the latter an inverted Y. This distinction however is not as clear as it seems, as it varies in the two sexes, being usually more V shaped in the ♂ and Y shaped in the ♀. This variation has also been pointed out by Mr. C. H. Tyler Townsend (Trans. Amer. Entom. Soc., XXII, 35, 1895). The type (♂) of *C. laterale*, from "Nebr." is readily distinguished by having the third, fourth and fifth segments broadly, laterally margined with yellow. A specimen (♀) from the same state shows a very slight indication of the margin being interrupted. A similar specimen from New Jersey, I have also referred to *C. laterale*. In the twelve specimens before me there is an indication that *laterale* may possibly prove to be only an extreme variation of *pubescens*.

CHRYSOTOXUM DERIVATUM Walker, List III, 542, 1849.

The type of this species is from "St. Martins Fall, Albany River, Hudson Bay." We should therefore expect specimens from the same faunal area to be more typical than those from more southern localities. A specimen from Grand Lake, Newfoundland, collected by Mr. Owen Bryant agrees more closely with the description than any other; between this specimen however and a series from N. H., Mass., N. J., and Penna, it seems to be impossible to draw a line notwithstanding minor discrepancies. The Newfoundland specimen is about 9 mm. in length (Walker's description calls for $3\frac{1}{2}$ lines), the basal two-thirds of all the femora are blackish and the markings on the fifth segment can be described as "three large yellow spots." All of these characters are however extremely variable; the eight specimens which I refer to this species vary from 9 to 11 mm.; the specimen selected by Loew from the English River, Can., as representing this species, has the basal half of the femora

black, while the two arcuate yellow spots on the fifth segment are narrowly connected with the central triangle. Two specimens from Mass. have only the basal third of the front and middle femora blackish, the basal half of the posterior femora being brownish; in one the brown forms a conspicuous middle band. A specimen from Franconia, N. H., collected by Mrs. A. T. Slosson has the posterior femora only slightly tinged with red towards the base; a similar specimen was collected at Folsom, Pa. Three specimens from Riverton, N. J., show only a slight basal tinge of brown on the front and middle femora.

CHRYSOTOXUM FASCIOLATUM Meigen. Syst. Besch., III, 171, 1822.

In 1905 I received from Mr. H. H. Newcomb a large *Chrysotoxum* (♀), which he collected at Gold Rock (Rainy R. District), Ontario, July 21. While collecting on the summit of Mt. Greylock, Mass., July 15, 1906, alt. 3535 ft., I obtained after much difficulty, owing to their rapid flight and habit of poisoning in the air just out of reach of the net, a ♂ of the same species. Later I received from Mr. E. F. Hitchings two specimens collected at Hancock, Me., in June. That it was a species new to our fauna was readily apparent, but its determination was another matter; a new *Chrysotoxum* is not an inspiring thing, under existing conditions, and you feel like putting off the evil day.

An inspection of the Loew collection at the Museum of Comparative Zoology, through the kindness of Mr. Henshaw, revealed two specimens of this species, one marked "Mass.," the other "Can." and labeled "*fasciolatum?*". Lately I have received a specimen of this European species from Dr. F. Hermann, and find no character to separate the American specimens. Why was it not included by Loew and Osten Sacken in the Americana fauna? We can only account for it in this way,—Loew was describing only the new species. Osten Sacken may have overlooked it, or perhaps seeing the name questioned, thought it best to have its capture verified.

It is a conspicuous species measuring from 13–15 mm. in length, and readily distinguished by the wide black band extending entirely across the scutellum, leaving only a narrow basal and apical margin of yellow. None of the interrupted abdominal bands extend to the lateral margin, although in one specimen and in the one from Europe it is narrowly connected with the yellow at the posterior angle; the marking on the fifth segments might be described as a broad inverted Y. Basal half of the front and middle femora black, of the posterior femora brown.

MIXOGASTER BREVIVENTRIS Kahl.

M. breviventris Kahl, Kansas Univ. Quart., VI, p. 137, 1897.

A male and female of this interesting species were collected by Mr. Erich Daecke, at Lucaston, N. J., August 27, 1905. The type, a female, was described from Lawrence, Kans. The male differs but little from the female except that the fourth segment is nearly twice the length of the third, the posterior border on both being greatly dilated towards the lateral margins; the fifth segment and hypopygium (in the specimen before me) seem to be injured or forced within the abdomen, so that they cannot be accurately described.

TRICHOGRAMMA PRETIOSA RILEY: SEASONAL HISTORY.

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THE paper here presented for publication is one of a series on this insect based on observations and studies made during the Cotton Bollworm Investigations in Texas in 1904, by the U. S. Department of Agriculture. The observations were made in the laboratory at Paris, latitude 33°, 45' north and the host of the parasite was *Heliothis obsoleta* Fabricius, unless otherwise stated in the text. In their report on the bollworm, Quaintance and Brues (1905) have already given the substance of much that is to follow, but I believe the observations of enough importance to justify elaboration, an impossibility in connection with an economic report of that kind.

NUMBER OF GENERATIONS.

The species under consideration is a remarkable example of an hymenopterous insect having multiple generations, and to this fact may be largely attributed its efficiency as a parasite. From the beginning to the end of the breeding season of 1904, it was under constant observation, and in the laboratory many successive generations were bred, so that actual records were obtained for fifteen consecutive cycles from the latter part of May to the first week in November. In addition to this direct evidence, there was also obtained much supplementary data, which warrants a positive statement to the effect that there were at least eighteen distinct generations of the little egg-parasite in the vicinity of Paris in 1904. The records show that the parasites began to appear about May 3rd, corresponding to the first noticeable