

COLLECTING TABANIDÆ.

JAMES S. HINE.

The habits of flies belonging to the family *Tabanidæ*, commonly called horse-flies or gad-flies, furnish much material for study and observation. I take this opportunity to record some of the notes which I have taken in the last few years while endeavoring to collect and study the local species of the family. Although the eggs, larvæ and pupæ of many species have been studied, what I have to say in this paper pertains wholly to the adults. Members of the family are usually taken by every entomologist who does general collecting, but as a usual thing males are seldom taken; in fact this sex is so poorly represented in collections that no key has been published for identifying the males of our American species. The student must use the key to the females as far as possible and guess at the rest. In very many cases the male is not even described, so that sometimes, when the sexes are unlike, they can be associated only by observations in the field. By careful collecting and observation we have procured practically all of our local species in both sexes, and the derived benefit, satisfaction and enjoyment have paid us fully for our time and pains.

In the first place the mouthparts of the two sexes are different—the male lacks the mandibles which are present in the female. This makes it necessary for them to procure their food from different sources, the male obtains his from flowers, while the female lives by puncturing the skin and sucking the blood of warm-blooded vertebrates. Thus it is evident that during the time spent in procuring food the sexes cannot remain together. From an economic standpoint the female most concerns the student and she is often taken for study without an attempt being made to procure the male.

At this point I can say collect females around horses, cattle and other animals, and males on flowers; but this is not enough, for knowing the general habits of insects we are certain that there is a common ground where the two sexes may be found together. One finds this common ground in the vicinity of water, where their transformations take place and where their eggs are laid, also in various other places, which we shall take occasion to discuss as we proceed.

The females of all our local species of *Chrysops* with *Tabanus pumilus* and *nivosus* come buzzing around the collector in numbers, and at such times may be taken easily with a net. Other species of *Tabanus* come near enough that the sound of their wings is recognizable, but are so active that it is almost impossible to procure them.

During the time the female is ovipositing the male is often sitting near by on the foliage. At Georgesville, Ohio, June 4th, I observed *C. mœchus* ovipositing on foliage overhanging a mill-race; soon after specimens of the male sex were observed resting on the upper leaves of the same plant on which females were ovipositing. In a few minutes collecting, a dozen or more specimens of each of the sexes were procured. The only males of *C. indus* I have ever taken were procured at Columbus, on the border of a small pond, where the females were ovipositing.

The sexes of many species of *Tabanus* often alight on the bare ground of paths or roads that run through or along woods. At Cincinnati, June 10th, in company with Mr. Dury, we procured large numbers of the sexes of different species resting on some furrows that were plowed around a woods to prevent the spread of fire. We also took the same species resting in paths and roads that ran through the woods. Some of these same species were also taken from low-growing foliage in sunny places among the trees. At Medina, Ohio, males and females of *T. vivax* and *trimaculatus* were taken while resting in a road that ran through a dense woods.

One of the best places I have ever found to get the sexes of *Chrysops* and *Tabanus* is in the tall grass that skirts the marshes of Sandusky Bay. This grass is the *Phragmites* of botanists and grows to a great height by July 1st. On July 6th, at Black Channel, when the wind was high I went into a patch of this grass that was so dense that I could not use a net to advantage. Here I saw an abundance of flies and found that by approaching them very slowly I could readily pick the specimens off with my fingers. The male and female of *T. stygius*, *nivosus*, *C. æstuanus* and *flavidus* and the male of *T. affinis* and *bicolor* were taken in this way. I found that this same species of grass afforded excellent collecting wherever found, but most material was procured when the wind was high. On the same date and near the same place the male of *C. flavidus* was taken from the flowers of the common spatter-dock, and this and *æstuanus* were procured by sweeping in the adjacent low-growing herbage. R. C. Osburn informs me that he has had excellent success in collecting *Tabanids* from tall grass near water in his experience.

Tabanus sulcifrons Macq. is an abundant species in northern Ohio during the latter part of July and all of August. So common that by actual count twenty-eight specimens were taken from a cow in ten minutes, while a few that alighted on the animal during that time were not procured. August 1st of the present year I was at Hinckley, Medina County, and spent the day taking observations on this species. In the morning about nine o'clock I went to the border of a woods where I had often observed the species before. Here males and females were found

in abundance crawling over the trunks and foliage of trees, on the fence along the woods and flying about generally. One pair was observed in copulation on the fence, and I am of the opinion that the presence of so many flies in the locality at the time is explained on the ground that it was the general mating place of the sexes. On several occasions I have made observations which lead me to believe that the sexes of various species of the family copulate among foliage often high up in the trees. As Tabanids are not easily procured with a net from the surface of a rough rail, I tried the experiment of picking the specimens off with my fingers and found that it was surprisingly successful, if the movement toward them was made very slowly until just ready to touch them when the fingers were gripped quickly. Near a watering trough where a herd of cattle drank daily I found males in numbers resting on the ground where the turf had been tramped off. Along Rocky River I observed both sexes fly down to the water and dip several times in succession and then away to alight on a stone on the bank or disappear from sight altogether.

On July 29th I rode from Sandusky to Cleveland by boat. Although we were from two to five miles off shore all the time, males and females of *T. sulcifrons* often came on board and alighted on the canvas and rigging of the boat. From this it is evident that this species at least may fly for some distance over water.

We have taken *Goniops chrysocoma* on several occasions. It has a habit which is of value to the collector. At Hinckley, Medina County, I took several females and observed that they have the habit of stationing themselves on the upper side of a leaf, where by vibrating their wings rapidly and striking the upper surface of the leaf at each downward stroke, make a rattling noise which can be heard plainly several feet away. At Vinton last spring Mr. Morse and myself identified the characteristic sound of the species and were guided by it to procure specimens.

I have taken the male of *Pangonia rasa* on blossoms of sumac at Medina, Ohio, in August.