

BUFFALO GNATS (SIMULIDÆ) IN INDIANA AND ILLINOIS. By F. M. WEBSTER.

In his "Guide to the Study of Insects," p. 391, and again in his "Our Common Insects," p. 73, Dr. A. S. Packard acknowledges the receipt of examples of a buffalo gnat from Prof. J. T. Cox, State Geologist of Indiana.

In this notice it is not stated whether the examples were taken in Indiana, or in Illinois, where the author accuses the insect of causing the death of horses on the prairies.

The late Dr. E. R. Boardman, of Stark County, Illinois, wrote me some years ago of the former occurrence of these gnats in his State, as follows: "I spent the summer of 1843 here on Spoon River. The settlers used to watch for the appearance of the buffalo gnats every year, and they usually came from the 10th to the 20th of May, from the Winnebago Swamp. That year it was about the 12th or 15th of May, when we were planting corn, that a neighbor rode up and told us to look to our stock, as the gnats were coming. In less than an hour the cattle and horses came tearing in off the prairie, the former bellowing with pain, the latter kicking and throwing themselves on the ground, and rolling to rid themselves of their tormentors. The gnats did not usually remain more than four or five days at the longest, and often not over twenty-four hours, when a wind would carry them off.

"When they used to come in such numbers, I have known them to run stock from here, thirty or forty miles down the Henderson River, and when the stock were recovered they would be so used up by running as to be almost useless. The deer used to leave the swamps about the time the gnats appeared, and take shelter along Spoon River, often coming in droves, and when hard pushed would take to the water.

"The gnats came more like a swarm of bees than anything else I can compare them to. I never saw them at Pawpaw, DeKalb county, nor do I recollect of seeing or hearing of their occurrence here, for the last thirty years—since the swamp has been drained and pastured."

The following, from a letter received several years ago from Mr. John Marten, at that time residing in Decatur, Illinois, will give additional information as to the distribution of *Simulium* in Illinois, and also add a valuable hint as to remedial measures for the relief of stricken animals.

"I have found the buffalo gnat in Edwards county, Illinois. In the spring of 1883 or 1884, I do not now remember which, two, and possibly more, horses were killed in that county. During both seasons the gnat was found there. Farmers from Richland and Lawrence counties, north of Edwards,

complained of the pest. My observations were too limited to say more than these general things.

“My father-in-law, before his death, told me that in former years the gnats had been very troublesome in Edwards county, and that whenever he had been called upon to treat cattle or horses they always recovered. He condemned, roundly, the notion that the bites of the gnats were necessarily fatal, saying that cures could easily be made by such treatment as would cause copious urination. He used nitrates and kindred remedies. He was a practicing physician and thoroughly acquainted with his profession.

JOHN MARTEN.”

Owing to the obscurity regarding the locality from which Prof. Cox obtained his specimens, it was not until the year 1886 that we had any exact information as to the occurrence of the buffalo gnat in Indiana; our attention being called to the fact by Prof. S. B. Boyd, of Washington, Davies county, who informed us that these insects occurred along White River in considerable numbers. With a view of gaining further information respecting this matter, we addressed a letter to Hon. Samuel Hargrove, of Union, Pike county, from whom we received a reply, not only corroborating Prof. Boyd, but stating the fact of their occurrence along the Patoka River, also.

On the 10th of November, 1886, we started on a trip to Pike county and vicinity, by way of Seymour, Jackson county, where we were informed by Mr. J. A. Peters, an extensive farmer of the bottom lands, that no gnats occurred in that vicinity, but about Bloomfield and Worthington, in Greene county, they often annoyed stock greatly. From Seymour we went to Washington, Davies county, where we again met Mr. Boyd, and learned from him that these gnats infested the bottom lands along the entire western, and also a portion of the southern, borders of that county.

In White county we examined a portion of the Patoka River, a small stream whose winding course is nearly due west, emptying its waters into the Wabash River a short distance below the mouth of the White. The bottoms are wide, and the bed is of clay, the current in low water, as it was at that time, is rather sluggish, but in high water it is quite swift and covers the bottoms, which are often cultivated, but fully as often timbered and grown up with brush. The stream also has more or less drift-wood, stumps, and other debris in it, but we found no place where this caused any perceptible increase of the current. We examined such of this drift-wood as we could disengage, but could find no trace of the buffalo gnat in any stage of development.

We learned from people residing along this stream, that in 1882 the gnats occurred as far up as Jasper, Dubois county, and several mules and horses, in the vicinity of Bovine, Pike county, died from the effects of being bitten by gnats. Usually, however, the insects did not occur in that vicinity in any considerable numbers.

At Hazleton, on White River, in Gibson county, Dr. P. H. Curtner informed me that gnats had appeared, with more or less regularity, every season for the last seventeen years, being very much more abundant in seasons of high water during spring time. Localities between Hazleton and the Wabash River were especially noted for the great numbers of gnats occurring there. Dr. Curtner's facts are of especial value, as he has had several years' experience with buffalo gnats in Louisiana, during the war, having been connected with a battery of Federal artillery.

A quite significant fact was noticed, in that wherever the insects were reported as being the most abundant, the stream was very tortuous, thereby presenting many narrow points of bottom-land, more or less covered with trees and underbrush, across which the water flows whenever the stream is very much swollen. Lumbermen, who are much on the river, say that where the bottoms have been cleared, gnats are not usually abundant.

Like the Patoka, White River has rather a sluggish current. At Hazleton, the latter is estimated to flow at the rate of about six miles per hour in ordinary high water; during low water it is much less.

The following letter adds much to a knowledge of the distribution of buffalo gnats in southwestern Indiana:

"MARCO, IND., December 21st, 1886.

"MR. F. M. WEBSTER, DEAR SIR:—I am somewhat acquainted with buffalo gnats. I first find them on the head waters of a stream called River Deshee, and also on Wilson Creek, in the southern part of Harrison township, Knox county, southeast of Vincennes. They are not so much in the White River bottoms as they are in the low, marshy land adjoining said bottoms. I find them in said township, further north, in the vicinity of a low, sluggish creek, called Pond Creek. Where the high lands come near the river, I find none until I get above Edwardsport, at the mouth of Black Creek; but following that creek in Greene county, I find them abundant in low, wet land that makes and adjoins said creek, to-wit: Cain Drain, or Delaware Creek, a large marsh in Knox county, Carico Marsh, the Goose Pond, Bee Hunter Marsh, and Ladies' Creek Marshes, all in Greene county. In the bottoms, on the west side of White River, you will find plenty of them; but above Worthington they have never been known, so far as I have heard.

"The buffalo gnat in his natural state is about one-half as large as the common house fly. They make their appearance in early spring. A few days,—with the temperature from forty to fifty degrees—is apt to bring them. They cannot exercise when the temperature is 32°, but will come immediately upon the weather's getting warmer. Rain and wet weather will down him for awhile. His life varies as to the weather. One week of clear weather, with the temperature from 70 to 80 degrees, ends his existence. Generally they last from four to six weeks. They are very severe on all kinds of stock, and run the cattle and hogs, and drive them to the open ground, where the wind and hot sun has a tendency to drive the gnats down. They have been known to kill horses by blood sucking, and, when full of blood, are about as big as two house flies. They never attack a man.

"As a preventive, we use coal oil, rubbing it on the horse's head, neck, breast and flanks, as these are the parts generally attacked.

"Yours truly,

DR. R. A. J."

At least two species of *Simulium* occur in the Wabash River, near New Harmony, Posey county, in what is known as the Cut Off. This cut off has existed since before the country was settled, though, in an earlier day it was much narrower and used as a mill race, an oil painting by LeSuer, showing it as it appeared at an early day, is yet in possession of a son of Robert Dale Owen, residing at New Harmony. The channel has widened of late years, the bottom being rocky as of old, and at the lower extremity filled with rocks and bowlders, over and among which the water flows very swiftly. A number of head of stock were killed by gnats in this vicinity in 1884, and they were quite troublesome in the spring of 1890. On June 12th of the latter year I caught adults in the vicinity, belonging, without much doubt, to *Simulium pecuarum*, Riley, and feel quite sure that *S. meridionale*, Riley, also occurs there. From the number of pupa shells that, at the time of my visit, were attached to willows and branches of trees which had been inundated in spring, I judge that adults had been quite numerous, Larvæ were also found in the swifter flowing portions of the stream, but in limited numbers.

It appears somewhat strange that the only species of *Simulia* described by Thomas Say, for a long time a resident of New Harmony, should be accorded to Ohio, his specimens being from Ohio Falls, near Louisville, Kentucky. It would now appear almost impossible that they should not have inhabited the lower Wabash, while he was engaged in his entomological labors and within sight of the locality where they now occur. An almost parallel case is found in the chinch bug, which Say described in 1831 from

a single specimen "taken on the east shore of Virginia," while Prof. S. A. Forbes, in 16th Report of the State Entomologist of Illinois, p. 50, gives what seems to be incontrovertible proof that the insect was abundant in Illinois, within a few miles of New Harmony, as early as 1823. Therefore it does not seem improbable that *Simulia* may not have occurred in the Lower Wabash, and the Little Wabash, in Illinois, even before Say's residence at New Harmony, though, in attempting to secure proof of this I have been less fortunate than Prof. Forbes, as none of the oldest inhabitants about New Harmony can remember of the occurrence of buffalo gnats, except during recent years.

At the field meeting of the Academy, at Richmond, Indiana, May 12, 1892, we found another location for these insects, in Indiana, this being at Elkhorn Falls, situated five miles below the city. The larvæ, which appear to be different from any I have collected elsewhere, were found clinging to the rock and also to the algæ which overhangs the falls. No adults were found at the time, and but few pupæ.

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THE DEVELOPMENT OF THE VIVIPAROUS FISHES OF CALIFORNIA. BY CARL H. EIGENMANN.

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RECENT ADDITIONS TO THE ICHTHYOLOGICAL FAUNA OF CALIFORNIA. BY CARL H. EIGENMANN AND ROSA S. EIGENMANN. Published in part in Proc. U. S. Nat. Mus. for 1892 and in part in the Annals New York Acad. Sci. for 1892.

[ABSTRACT.]

We have prepared an enumeration of the fishes occurring on the Pacific coast of America, north of Cerros island, and to the depth of 150 fathoms. The explorations of the U. S. Fish Commission steamer *Albatross*, during the last three years, have added a large number of species to those previously known from this region, and our own explorations have added about as many new forms from San Diego alone as were discovered by the *Albatross* along the whole coast included in the present paper. These additions.