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LANTHUS ALBISTYLUS (HAGEN), A NEW RECORD
FOR MICHIGAN, WITH ECOLOGICAL NOTES ON
THE SPECIES (ODONATA: GOMPHINAE)*

JUSTIN W. LEONARD

ALTHOUGH the dainty gomphine *Lanthus albistylus* (Hagen) has been recorded from many of the northeastern and north central states and from eastern Canada,¹ rather extensive collecting failed to reveal its presence in Michigan until 1936, when I secured an adult male and an almost fully grown nymph. It is believed that a few notes on the collecting site may be of value because of its ecological distinctness.

Both specimens were taken from Kinne Creek, Lake County, Michigan. For many years this stream has been entirely owned and controlled by a private club whose members have used it only for trout fishing. As a result of this type of usage, the stream in the vicinity of the section from which the specimens were taken retains a more natural character than do neighboring waters, most of which have been variously affected by human activities.

Kinne Creek originates as the outlet of a small, shallow, weedy lake, from which it flows approximately three miles to

* Contribution from the Institute for Fisheries Research, Michigan Department of Conservation and University of Michigan.

¹ Maine, New Hampshire, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Indiana, Kentucky, Tennessee, and Missouri, and in Canada from Ontario, New Brunswick, and Nova Scotia.

empty into the Pere Marquette River. Throughout the greater part of its course it has eroded a rather narrow, steep-sided valley, which for approximately the first mile is clothed with a mixed second-growth forest of oak, pine, and hemlock. The other part of the valley supports good plantings of white and Norway pine, with the immediate stream side shaded by dense growths of white cedar, alder, willow, birch, and hemlock. At its source the stream is about ten feet wide, its waters flowing sluggishly over a bottom of shifting sand. After a few hundred yards the character is altered as increasing amounts of gravel appear in the bottom and the flow becomes rapid. In this part are small springs which drain into the stream, and below, the springs are so numerous as to form a chain of seepages almost continuous to the mouth. This results in a very soft shore line which supports heavy growths of watercress (*Roripa nasturtium*), white water crowfoot (*Ranunculus aquatilis*), and water weed (*Anacharis canadensis*). Near the source little vegetation occurs in the stream proper. As spring water supplies increase, however, sparse clumps of white water crowfoot appear in sufficient numbers to bind and secure small bars of shifting sand. Downstream, the vegetation increases in the channel and is augmented by dense marginal beds of *Chara* and *Anacharis*. Throughout its course the stream contains many fallen trees, waterlogged stumps, and timbers.

A water analysis conducted on Kinne Creek at 6:15 A.M., August 19, 1936, near the spot where the nymph was taken, yielded the figures in Table I.

TABLE I
ANALYSIS OF WATER IN WHICH NYMPH OF *LANTHUS ALBISTYLUS*
(HAGEN) WAS TAKEN

Air temperature	64.5° F.
Water temperature	57.5° F.
Free carbon dioxide	7.0 p.p.m.
Methyl-orange alkalinity	112.0 p.p.m.
Phenolphthalein alkalinity	0.0
Dissolved oxygen	7.5 p.p.m.
pH	7.8

The pH value indicates definite alkalinity, and the figure

obtained from the methyl-orange test for bicarbonates demonstrates that the stream is of the "hard water" type.

On the afternoon of July 27, 1936, a single adult male of *Lanthus albistylus* (Hagen) was taken as it rested on an abandoned concrete screen support which had at one time served to check downstream migration of warm-water fishes from the lake. For a few minutes prior to capture, the insect was observed to make short, rapid flights, returning almost at once to its original resting place. Its behavior seemed more libelluline than gomphine, and at a distance it was mistaken for a *Leucorrhinia* strayed from the lake. Viewed more closely, the yellow compound eyes and abdominal appendages were discerned, and the insect's identity rightly conjectured. A careful search of more than a mile of stream failed to reveal any more adults.

On November 7, 1936, while engaged in studying the invertebrate bottom fauna of the stream in connection with a fish-production problem, I took a single *albistylus* nymph. The collecting station was located about three hundred yards below the point where the adult was captured in July, and differed from it in being less densely shaded, because of the presence, fifteen yards upstream, of a small road bridge, the construction of which had opened up the characteristic dense growth of streamside trees and shrubs. Here the stream width was about fifteen feet, the average depth six inches, and the current swift. The stream flowed over a bottom of fine gravel and sand which supported a sparse growth of white water crowfoot. The location received open shade from overhanging alders rooted in a large, swampy spring-seepage area on the left shore (Pl. I). At noon on this date the air temperature was 33 degrees Fahrenheit, and that of the water 43 degrees.

The nymph was taken in a square foot sample of the bottom with a net similar to that described by Surber (1937: 194-95). The associates of *albistylus* in this area are indicated by the list of organisms found in the sample (Table II).

The Michigan male is larger and more robust than any other example of this species in the collection of the University

TABLE II
FAUNA ASSOCIATED WITH NYMPH OF *LANTHUS ALBISTYLUS* (HAGEN)

ORGANISM	NUMBER OF SPECIES	NUMBER OF INDIVIDUALS
Platyhelminthes		
Planariidae	1	1
Annelida		
Lumbriculidae	1	1
Crustacea		
<i>Gammarus</i> sp.	1	1
Ephemeroptera		
<i>Baetis</i> sp. near <i>vagans</i>	1	1
<i>Paraleptophlebia mollis</i>	1	1
<i>Ephemerella</i> sp.	1	41
Odonata		
<i>Lanthus albistylus</i>	1	1
Plecoptera		
<i>Pteronarcys nobilis</i>	1	1
<i>Allocapnia torontoensis</i>	1	16
<i>Togoperla media</i>	1	1
Coleoptera		
Elmidae	1	36
Trichoptera		
<i>Hydropsyche</i> spp.	3	68
Diptera		
Tipulidae	3	6
Simuliidae		
<i>Simulium</i> spp.	2	49
Chironomidae	1	13
Rhagionidae		
<i>Atherix variegata</i>	1	1
Total	21	236

of Michigan Museum of Zoology. It also differs by preserving, in death as in life, compound eyes of a light canary-yellow color. Its size disparity is partially revealed in Table III.

The Michigan male exhibits a general robustness of structure far greater than that shown by any of the other specimens examined.

TABLE III
 DIMENSIONS OF MALE SPECIMENS OF *LANTHUS ALBISTYLUS* (HAGEN)
 FOUND IN VARIOUS LOCALITIES

LOCALITY	NUMBER OF SPECIMENS	LENGTH OF ABDOMEN LESS APPENDAGES IN MM.		LENGTH OF HIND WING IN MM.	
		Maximum	Average	Maximum	Average
Maine	3	26.0	25.5	20.0	20.0
Missouri	3	26.0	25.3	21.0	20.5
Kentucky	2	26.0	26.0	21.0	21.0
West Virginia	1	26.0	20.5
Oklahoma	1	26.5	21.5
Pennsylvania	3	27.0	26.3	20.5	20.2
Ontario	2	27.5	27.0	22.5	21.5
Michigan	1	28.0	23.0

A survey of the literature reveals a surprising paucity of published observations on the ecology of *albistylus*. Williamson (1905: 310) wrote that along the Rockcastle River, Livingston, Kentucky, it was "observed in the afternoon resting on boulders and pebbles about a wide, slow ripple." Walker (1906: 108) stated that in Ontario it was "locally common over rapids on the North Branch of the Muskoka River," and (1933: 112-13) he mentioned taking it in Nova Scotia, along "a small rapid forest stream with shallow riffles and intermittent pools. For a mile or so above the highway bridge it flows through dense woods but it is wide enough to admit the sunlight to a greater or less extent." Near St. Margarets, New Brunswick, he reported finding it along a similar but larger stream.

It is quite possible that in Michigan *albistylus* has as basic habitat requirements a combination of ample shade, copious spring-water supplies, and the particular bottom-type offered by Kinne Creek and duplicated in few other streams of the state, and that for this reason, being rare and local in distribution, it has hitherto escaped the attention of collectors.

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PLATE I

Kinne Creek, Lake County, Michigan. The two dark patches in the foreground are beds of *Ranunculus aquatilis*. The *albistylus* nymph was taken along the inner edge of the right-hand bed, in about six inches of swiftly flowing water.

LANTHUS ALBISTYLUS (HAGEN)

PLATE I



