OPERATIONAL AND SCIENTIFIC NOTES

NOTES ON THE CURRENT DISTRIBUTION OF *Aedes dorsalis* IN CENTRAL NEW YORK, 1969

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Medical entomologists have been interested in *Aedes dorsalis* (Meigen) ever since viruses of Western encephalitis (Hammon *et al.*, 1945) and California encephalitis (Reeves and Hammon, 1952) were isolated from wild caught females of this species.

The distribution of *Aedes dorsalis* in New York has been scattered, and it is considered rare in most of the State. Exclusive of Central New York it has been recorded by sparse collections in Albany, Niagara, Queens, and Rockland Counties (Barnes *et al.*, 1950).

Outside of the immediate Syracuse area it has been recorded in Central New York from Utica, Ithaca, and Baldwinsville. Most of the collections have been single, or at most, very limited numbers of the species.

An occasional *A. dorsalis* adult has been collected in the Syracuse area off and on since 1905. According to R. Means, larvae were collected by Jamnback in 1958 and in 1963 in the marshy southern border of Onondaga Lake. Salt deposits around this lake impart a salinity to some marshes in the area.

During 1968 and 1969, a series of light traps located at Syracuse, Baldwinsville, and Camillus, New York recorded significant numbers of *A. dorsalis*. The light trap at Camillus, New York collected 94 *A. dorsalis* during July 1968, and the light trap at the southern end of Onondaga Lake collected 59 specimens between July 22 and October 15. One specimen was collected in September at the Baldwinsville location. The relatively large numbers of adults in Camillus and Syracuse indicated a much more prolific breeding site than had thus far been located.

A small, but very prolific breeding site was found in the industrial complex near Solvay, New York during the summer of 1968. Later, on June 20, 1969, sites were found near Amboy, New York that were breeding large numbers (up to 200 per dip). These breeding sites, apparently ideal for this species, were shallow grass-lined pools bordering tailing ponds of the Solvay Process plant. The tailing ponds contain wastes that are high in salts, particularly NaCl and $CaCl_2$. Presumably leaching from these beds has contributed to the salinity of the adjacent pools. Total chlorides in these pools reached 85,000 mg/liter in September 1969, and the water had a pH of 7.2. (N.Y. State Health Dept. Laboratory, Syracuse Branch, September 1969). The high number of *A. dorsalis* breeding in the Solvay area was not reflected in light trap collections at Syracuse or Baldwinsville during 1969. The Camillus trap was not in operation during this season.

An aspirator collection of *Aedes dorsalis* on July 9, 1969 at Canton in St. Lawrence County, probably constitutes a new distribution record in New York. Since the single individual was collected, 4 specimens have shown up in light trap collections at Canton, New York, near the St. Lawrence Seaway, during the months of July and August 1969. The breeding site of this northern group of *Aedes dorsalis* has not, at the time of writing, been located.

The distribution of *Aedes dorsalis* in Central New York and its fecundity in preferred habitats, coupled with the discovery of its possible importance as a vector remind us that any mosquito distribution record may be significant in the light of new knowledge.

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ECOLOGICAL CONSIDERATIONS OF THE COHABITATION OF PITCHER PLANTS BY *Wyeomyia smithii* AND *Metriocnemus knabi*

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In late July, 1969, a clump of the pitcher plant, *Sarracenia purpurea* L. with six open pitchers was given to me by Dr. L. Martens of this department. This pitcher plant was of interest because in addition to containing the mosquito *Wyeomyia smithii* (Coq.) it also contained specimens of the midge *Metriocnemus knabi* Coquillett. Like *W. smithii* this midge is confined to pitcher plants during the larval portion of its life cycle (Johannsen, 1937).

A leaf of a pitcher plant may be considered as a microcosm or minature community. The presence of two species so similar in their niche requirements, namely, detritus feeders in pitcher plant leaves, confined together in a small circumscribed space with a finite amount of common food, raises serious problems for the ecologist. The traditional view of competition embodied in Gause's Rule or the competitive exclusion principle leaves no doubt concerning the problem. Put in its baldest terms it simply states that two species requiring the same resources cannot coexist (Pimentel *et al.*, 1965). Some contemporary definitions of the niche permit competition, for example Margalef (1968) defines the niche in such a way that two species utilizing the same resource would have the same niche if there is a non-negative feedback loop between them resulting from the parallel negative feedbacks of each species with the resource. No matter how defined, the essential question here is in what way is there niche segregation between the midge and the mosquito to permit mutual survival in a common circumscribed space with a finite food supply utilized by both. A similar question was asked of two higher Diptera by Pimentel *et al.* (1965).

Since both of these species are obligate inhabitants of pitcher plants and both are detritus feeders, they both can be said to be utilizing the same resource. It appears to be the differential utilization of this resource which provides the niche segregation permitting cohabitation. Larvae of *W. smithii* depend to a large extent on filter feeding in their utilization of the detritus for food by passing water across their mouth by the vibration of the brushes. *M. knabi* on the other hand crawls over and among the plant fragments and other debris and feeds on adhering particles by chewing movements of the mandibles. We might consider the food particles in the pitchers' water as going through different stages of ecological succession with *M. knabi* utilizing the early stages of succession, namely, the large particles and their adherents, and *W. smithii* using the later successional stages where the material is further broken down by bacterial action and plant enzymes to smaller particle size. Although they are using the same food resource, at any given moment they are using portions of the resource which are of different ecological age. This sufficiently segregates their requirements so that their niches can be said to have a sufficient but essential area of non-overlap.

Another aspect of considering the pitcher as a dynamic community is that of species diversity. Of course, in the usual case *W. smithii* is the sole species in the community. In this case the diversity of species is obviously minimal. The diversity per individual (Brillouin, 1960; Pielou, 1966) expressed as $H = \frac{1}{N}\log_2\frac{N!}{N_1!\,N_2!\ldots N_s!}$, where there are N_i individuals in s species and $\Sigma N_i = N$, will be zero since $N_1 = N$ and the $\log_2$ of 1 is zero. Therefore the addition of *M. knabi* to this dynamic system of necessity results in increased species diversity irrespective of the relative abundance of either species. Such an increase in diversity suggests a more mature system, one with greater complexity and stability. Of more interest it suggests a more efficient system where the limited resources of the pitcher plant microcosm are more efficiently exploited than they would be if *W. smithii* were the sole inhabitant.

The cohabitation of this limited ecosystem by these two species throws some interesting light on two problem areas which are of extreme interest to today's ecology.

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A CONTAINER FOR USE IN FIELD STUDIES OF SOME PATHOGENS AND PARASITES OF MOSQUITOES [1]

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More than once we have wanted to know whether a pathogen was active in a particular pond, especially when its mosquito hosts were absent or only a few were present. Also, we have wondered whether some mosquito species might be adequate hosts of a particular pathogen though they seldom or never occurred naturally in a given infected pond. Additionally, we have been interested in obtaining large numbers of larvae infected with specific pathogens when naturally infected populations were low or absent.

[1] In cooperation with McNeese State College, Lake Charles, Louisiana 70601.