

## NUISANCE MOSQUITOES IN TWO WISCONSIN PARKS; OCCURRENCE AND CORRELATION BETWEEN BITING AND LIGHT TRAP CATCHES

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**INTRODUCTION.** Increased amounts of leisure time and more disposable income is reflected in more extensive use of outdoor recreation sites. Simultaneously, demands for effective nuisance pest control has increased. This study identifies nuisance mosquito populations in two separate outdoor recreation sites and determines the feasibility of using light traps as monitoring devices to guide control programs.

Light traps have been used for years to collect mosquitoes. They are also used by some abatement districts to monitor populations. This device can be reliable if the nuisance mosquitoes are attracted to light. Some investigators have reported that light trap samples do not represent the true heterogeneous mosquito populations that occur in nature, (Huffaker and Back, 1943; Thompson and Dicke, 1965). Stabler (1945) reported nearly equal percentage of some mosquitos attracted to human bait and light traps. Therefore, before light traps can be recommended for use in a specific situation it is necessary to know the predominant nuisance mosquito population and whether there is a significant correlation between the biting catches and light trap samples.

Each park selected has a serious mosquito problem nearly every year. The location and topography of each is such that different species would be anticipated, although no study has been made in these areas.

Point Beach State Forest is located 5 miles northeast of Two Rivers, Wisconsin. This area is relatively low, with sand dunes

along the shore of Lake Michigan. The sand dunes give way inward to forested ridges alternating with sandy sloughs paralleling the shoreline. The sloughs between the ridges vary from 25 to 90 feet in width. The area is underlain with limestone. Ground water enters the sloughs by seepage from swamps at higher elevations away from the shorelines (Wiedman). Precipitation supplements this water at certain times of the year. The forest is composed predominantly of white pine (*Pinus strobus*), hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*) and birch (*Betula papyrifera* and *B. lutea*). Some white cedar (*Thuja occidentalis*) occurs in moist areas. Camp sites are located in the wooded areas near the shore of Lake Michigan. Mosquito breeding occurs in the sloughs and numerous temporary woodland pools.

Wyalusing State Park is located at the confluence of the Wisconsin and Mississippi Rivers. The crest of the park is thickly covered with mixed hardwoods and rises 350 feet above the Mississippi and Wisconsin Rivers. Camp sites are located in the wooded areas above the flood plain area. Mosquito breeding sites are in the numerous temporary pools of the wooded area and the flood plain area along the shores of the rivers.

**MATERIALS AND METHODS.** Light traps were located in wooded areas comparable to camping areas. Traps used were the modified New Jersey type consisting of a square box with a screen funnel under a 40 watt lightbulb leading to a cyanide jar. An 8-inch electric fan at the base of the trap assisted in drawing mosquitos attracted to the light into the cyanide killing jar. Traps were run one night each week for a 3-year period beginning in June and ending in September. No effort was

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made to synchronize the light trap operation with weather conditions; however, traps were not run on rainy, cold or foggy nights when low catches could be anticipated. Light trap samples ranged from 0 to 750 mosquitos.

Biting catches were made on a human subject. Mosquitoes feeding or attempting to feed were collected with an aspirator over a 10-minute period. Sample sizes ranged from 4 to 30 mosquitos. One light trap was operated at Wyalusing State Park in 1966, 1967 and 1968. One trap was also operated at Point Beach State Forest in 1966, but in 1967 and 1968 two light traps were used. Species identification were determined by a key in Barr 1955, "Mosquitos of Minnesota."

It is recognized that the *communis* and *stimulans* group within *Aedes* are each composed of a number of species difficult or frequently impossible to separate, especially if some of the scales are rubbed off the mesonotum. Therefore in this study, each group is considered as a single species.

RESULTS. Point Beach State Forest biting and light trap catches are summarized in Table 1. Biting catches for the 3 years

park. However, biting catches indicated that the species was not a real nuisance.

The biting and light trap catches made at Wyalusing State Park are summarized in Table 2. In 1966 *Aedes vexans* was the dominant biting species (35.7 percent), followed by *Aedes communis* (30.3 percent) and *Aedes trivittatus* (24.7 percent). In 1967 *Aedes communis* was dominant (56.5 percent), followed by *Aedes trivittatus* (24.7 percent) and *Aedes vexans* (19.6 percent). In 1968 *Aedes communis* was again dominant (66.0 percent), followed by *Aedes vexans* (28.6 percent). *Aedes trivittatus* populations were low (5.3 percent) compared to the previous years.

Light trap catches at Wyalusing, on the other hand, indicated that *Aedes vexans* was predominant in 1966 and 1967 (79.4 percent and 78.8 percent). However, in 1968 *Aedes communis* was predominant (58.6 percent) followed by *Aedes vexans* (33.2 percent). Catches of *Aedes trivittatus* in light traps were consistently low during the 3-year period. However, biting catches in 1966 and 1967 indicated a population high enough to be considered a nuisance.

TABLE 1.—Percentage compositions of light trap and biting catches at Point Beach State Forest.

Biting Catches	1966	1967	1968	Avg. for 3 Yrs.
<i>Aedes communis</i> (De Geer)	12.2	13.7	33.6	20.2
<i>Aedes vexans</i> (Meigen)	1.1	.3	9.2	4.5
<i>Aedes trivittatus</i> (Coquillett)	0	0	.6	.2
<i>Aedes stimulans</i> (Walker)	76.5	83.6	53.0	69.9
Misc. & unidentified	10.0	.4	3.4	4.7
Light Trap				
<i>Aedes communis</i> (De Geer)	3.29	10.4	18.6	13.1
<i>Aedes vexans</i> (Meigen)	3.4	69.2	53.6	49.4
<i>Aedes trivittatus</i> (Coquillett)	0	.1	.4	.1
<i>Aedes stimulans</i> (Walker)	22.4	8.4	19.1	16.2
Misc. & unidentified	70.8	11.6	8.1	20.8

indicated that *Aedes stimulans* was the predominant nuisance species (69.9 percent) followed by *Aedes communis* (20.2 percent). In 1968 the percentage of *Aedes communis* was greater than in the two previous years. Light trap catches, on the other hand, indicated that *Aedes vexans* was quite common (49.4 percent) in the

To facilitate analysis, biting and light trap catches were grouped into bi-monthly periods for each location. The data were processed and analyzed by computer. All possible correlations were calculated between biting and light trap catches. While an occasional significant "r" (correlation coefficient) value was obtained between

TABLE 2.—Percentage compositions of light trap and biting catches at Wyalusing State Park.

Biting Catches	1966	1967	1968	Avg. for 3 Yrs.
<i>Aedes communis</i> (De Geer)	30.3	56.5	66.0	56.5
<i>Aedes vexans</i> (Meigen)	35.7	19.6	28.6	26.5
<i>Aedes trivittatus</i> (Coquillett)	24.7	24.7	5.3	14.6
<i>Aedes stimulans</i> (Walker)	3.5	0	0	0.6
Misc. & unidentified	10.0	0	0	1.8
Light Trap				
<i>Aedes communis</i> (De Geer)	13.3	8.6	58.6	20.1
<i>Aedes vexans</i> (Meigen)	79.4	78.8	33.2	71.9
<i>Aedes trivittatus</i> (Coquillett)	3.1	2.5	2.3	2.9
<i>Aedes stimulans</i> (Walker)	.87	0	0	.6
Misc. & unidentified	3.2	9.9	5.7	4.2

biting and light trap, there was not a consistent pattern of significant correlations between biting and light trap collections for species, bi-monthly periods, years, or locations.

**SUMMARY AND CONCLUSIONS.** It would be desirable to use a light trap to measure or monitor nuisance mosquito populations as a guideline in planning a control program in parks. However, the data presented indicate that in a situation such as Point Beach State Forest and Wyalusing State Park this is not feasible. There was no consistent pattern or relationship between those mosquitos which are the nuisance in the parks and those caught in light traps.

The major nuisance mosquito species at Point Beach State Forest are *Aedes stimulans*, followed by *Aedes communis*. *Aedes vexans* is present in the area as indicated by light trap sampling, although it does not appear to be a nuisance as indicated by biting catches.

Wyalusing State Park was distinctly different from Point Beach State Forest with reference to dominant nuisance mosquito species, which were different each year. The nuisance mosquito species at Wyalusing State Park are *Aedes commu-*

*nis*, followed by *Aedes vexans*, and *Aedes trivittatus*. Populations of the latter species in 1968 were low compared to 1966 and 1967.

Correlation coefficients ( $r$  value) between light trap catches and biting catches indicated no consistent pattern which might be useful in planning a control program.

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