

Effectiveness of two models of light traps in sampling low level mosquito populations

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Light traps of various designs have been used for many years as a means of collecting nocturnal and crepuscular insects. Traps designed specifically to sample populations of mosquitoes have been developed. The New Jersey trap (Headlee, 1945) provides large catches, but the bulk of the trap and its battery present problems of portability. The CDC miniature trap (Means, 1979) is smaller, more portable and generally more usable in situations in which sampling sites are accessible only on foot.

Two CDC miniature traps produced by the Hausherr's Machine Works in Tom's River, New Jersey have been used since the summer of 1985 to sample populations of non-anthropophilic species. (Butts, 1985) The traps consist of a cylindrical plexiglass housing for the light and fan mechanism and 4 size D dry cells. An aluminum rain shield is attached above this unit with diameter equal to that of the lower portion of the white nylon organdy net collecting bag. The collecting bag has an upper cylindrical portion which fits around the bottom of the fan/light unit and which opens directly into the larger, expanded cylindrical collecting bag.

In the summer of 2001, two CDC miniature traps of a different design were obtained from the John W. Hock Company of Gainesville, Florida. The fan/light unit appeared to be identical to the trap described above but has a battery pack that may be suspended separately from the mechanics unit. A black plastic rain shield covers the unit and a conical collecting bag of black nylon organdy is suspended from the bottom. Sampling with these traps at Greenwoods and at the Thayer Farm indicated considerable differences in collecting efficiency between the Hausherr's and Hock designs. (Butts, 2001 2001a)

The apparent slightly larger than expected catch at the large pond southeast of the Zachow farm buildings (Butts, 2001) suggested that a comparison of traps efficiency should be conducted.

MATERIALS AND METHODS

Four sites along the west side of the upper (north) end of the Zachow Farm Beaver Pond were established. Steel "Shepherd's hooks" designed for suspension of potted plants, bird feeders etc., were placed at intervals of approximately forty m, about twenty m from the edge of the water in an open area with herbaceous ground cover. Sites were numbered from south to north.

Light traps were suspended at a height of about 1.5 meters above ground level with positions of the two types of traps altered with each repetition of sampling. No effort was made to differentiate between each of the two traps of each design. Sampling

was done on six dates starting on July 1 and ending on September 16. Trap placement is recorded in Table 1.

Table 1. Trap placement for sampling series. Sites numbered sequentially from southernmost position.

| <u>Date</u> | <u>Trap Type</u> | <u>Position</u> |
|-------------|------------------|-----------------|
| July 1 | Hausherr | 1 & 3 |
| | Hock | 2 & 4 |
| July 9 | Hausherr | 2 & 4 |
| | Hock | 1 & 3 |
| Aug. 21 | Hausherr | 1 & 4 |
| | Hock | 2 & 3k |
| Aug. 26 | Hausherr | 3 & 4 |
| | Hock | 1 & 2 |
| Sept. 9 | Hausherr | 1 & 2 |
| | Hock | 3 & 4 |
| Sept. 16 | Hausherr | 1 & 4 |
| | Hock | 2 & 3 |

Table 2. Mosquitoes collected in light traps. Number of individuals per site noted parenthetically.

| <u>Date</u> | <u>Site</u> | <u>Trap</u> | <u>Species</u> | |
|-------------|-------------|-------------|---|------|
| July 1 | 1 | Hausherr | <i>Coquillettidia perturbans</i> (Walker) | (20) |
| | | | <i>Culex restuans</i> (Theobald) | (3) |
| | 3 | Hausherr | <i>Coquillettidia perturbans</i> (Walker) | (2) |
| | | | <i>Coquillettidia perturbans</i> (Walker) | (12) |
| July 9 | 1 | Hock | <i>Coquillettidia perturbans</i> (Walker) | (5) |
| | | | <i>Coquillettidia perturbans</i> (Walker) | (1) |
| | 4 | Hausherr | <i>Coquillettidia perturbans</i> (Walker) | (1) |
| | | | <i>Coquillettidia perturbans</i> (Walker) | (11) |
| | | | <i>Anopheles quadrimaculatus</i> (Say) | (1) |
| Aug. 21 | 1 | Hausherr | <i>Coquillettidia perturbans</i> (Walker) | (5) |
| | | | <i>Culiseta morsitans</i> (Theobald) | (2) |
| Aug. 26 | 3 | Hausherr | <i>Coquillettidia perturbans</i> (Walker) | (7) |
| | | | <i>Coquillettidia perturbans</i> (Walker) | (2) |

RESULTS AND DISCUSSION

Mosquitoes collected in light traps are listed in Table 2, and were predominately caught in Hausherr traps. A total of 64 mosquitoes (58 *Coquillettidia perturbans* (Walker), 3 *Culex restuans*(Theobald) 2 *Culiseta morsitans* (Theobald) and 1 *Anopheles quadrimaculatus* (Say)) were collected versus a total of 8 (all *C. perturbans*) in Hock traps. Four species are represented in the catch in Hausherr traps (although one clearly dominates) versus only a single species in Hock traps.

A factor that must be considered is the relationship among trap sites, since the total of specimens collected at site one is equivalent to the total collected at the remaining sites. This would not appear to greatly influence the difference in collecting effectiveness of the two types of traps.

One obvious difference in the traps is the total visibility (at least to human visual receptors). The white collecting bag and reflective aluminum rain shield make the Hausherr traps more readily seen under low ambient light. Whether or not this is noted by mosquitoes is unknown.

The apparent differences shown in this study may not be a factor (and may not occur) under conditions in which such traps are most commonly utilized. They are routinely used to determine population levels in relation to mosquito abatement activities where total population size is larger by orders of magnitude relative to those found locally. The largest total catch of 26 individuals on July pales in comparison to collections of several hundred per trap, numbers that are not uncommon when populations of salt marsh species are sampled. This study may be criticized on the basis of small sample size as it might affect statistical significance. However, in situations in which presence versus absence of given species is a matter of concern, it would appear that the design of the Hausherr trap makes it a better choice as a survey device.

REFERENCES CITED

- Butts, W.L. 1985. Mosquito Studies. *In* 18th Ann. Rpt. SUNY Oneonta Biol. Fld. Sta. SUNY Oneonta.
- Butts, W.L. 2001. Mosquito Studies – Greenwoods Conservancy. *In* 34th Ann. Rpt. SUNY Oneonta Biol. Fld. Sta. SUNY Oneonta.
- Butts, W.L. 2001a. Mosquito Studies – Thayer Farm. *In* 34th Ann. Rpt. SUNY Oneonta Biol. Fld. Sta. SUNY Oneonta.
- Headlee, T.J. 1945. The mosquitoes of New Jersey and their control. New Brunswick, NJ. Rutgers Univ. Press. 326p.
- Means, R.G. 1979. Mosquitoes of New York, Part I. Bull.430a State Science Services, NY State Museum., Albany. 219p