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BRIEF NOTE

A COMPARISON OF CLEAR AND OPAQUE FUNNEL TRAPS FOR EMERGING INSECTS IN A SOUTHWESTERN OHIO POND[1]

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Funnel emergence traps have been used for many years for recording numbers and times of emergence of aquatic insects from ponds, lakes, streams and reservoirs. Older traps were made of various metals (Borutzky 1939a & b, 1955, Mundie 1956, 1957, Daniel 1972). Newer materials have become available and cheaper clear plastic traps have been utilized in recent years (Morgan 1971, McCauley 1976, Rosenberg et al. 1980, Sublette and Dendy 1959). Kimerle and Anderson (1967) compared submerged and floating clear and dark traps in the laboratory and in the field, and in both cases the clear traps yielded more insects. The current study compares the insect yields of paired clear and opaque funnel traps placed in a southwestern Ohio pond over a six-week period in the summer of 1981.

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METHODS AND MATERIALS

Two types of traps were utilized. The opaque traps were of the basic design of Mundie (1956) and were made of 0.6 mm stainless steel mesh and fitted with a handle to attach to the boat during servicing (Daniel 1965). These traps had an open end of .25 m^2 and were suspended from floats consisting of wooden 2×4s with styrofoam on each end and anchored to the bottom on each end. The clear traps were made from a template and plans supplied by Rosenberg et al. and were 0.1 m^2 at the open end and were constructed of cellulose acetate butyrate (fig. 1). They were suspended from small styrofoam floats.

The location of the study was a pond constructed on abandoned farm land, now a wildlife reserve owned by Miami University, two km east of Oxford, Ohio. One clear 0.1-m^2 trap was paired with one opaque 0.25 m^2 at stations one, two, three and four meters deep in the pond. The traps remained in position, just below the surface for the six-week period between 30 June and 9 August 1981. The traps were serviced daily by approaching each trap in a small rowboat and removing the collecting jar and covering it with a screened lid and placing a new jar in position. The clear traps were scrubbed periodically to remove collected periphyton. Collected insects were taken to the laboratory, counted and determinations made of the chironomids and ceratopogonids. Secchi disc readings were made daily.

RESULTS

The secchi disc readings were considerably higher early in the study period than later (fig. 2). A comparison of the clear traps and the opaque traps is shown by determining the mean number of insects from each depth for both traps during the early and late periods of the study. The early samples when secchi disc readings

FIGURE 1. Clear and opaque funnel insect emergence traps.

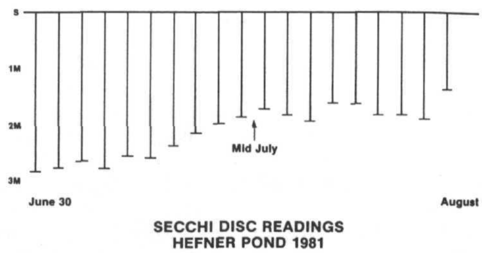

FIGURE 2. Secchi disc readings, Hefner Pond, 1981.

were higher and hence clearer water yielded more insects in the clear traps and the sampling summaries for the later summer period when lower secchi disc readings prevailed with less transparent water yielded more in the opaque traps (table 1).

An analysis of the numbers of insects in both the smaller clear traps and the larger opaque traps was done for both the early higher secchi disc period and the later lower secchi disc period of the summer. Mean numbers of insects trapped/m^2 and standard errors for each depth and time period are given in table 1. The data from the early part of the summer for the traps over three and four meters of water were not analyzed because of the high number of days in which no insects were caught. Differences in sample size were due to tipping of at least one of the traps due to wind action making the pair invalid for that date. If the paired *t*-test is utilized, the clear traps in the early summer period show a significantly higher catch at the .05 level than do the opaque traps. While the mean number of insects caught in the clear traps at one and two meters was higher in the late summer, the difference was not significant at the .05 level. The number of insects trapped in all traps was smaller in the deeper water in the later period. However, a greater number was caught in the larger opaque traps than in the smaller clear traps and the paired *t*-test indicated these differences to be significant at the .05 level. A further analysis using the nonparametric Wilcoxan Signed Rank test substantiated the results obtained by the *t*-test.

TABLE 1
Mean number of insects trapped per m^2 in clear and opaque traps at four depths.

	Depth of trap (m)	Valid days	Clear 0.1 m^2 traps Mean (Standard error)		Opaque 0.25 m^2 traps Mean (Standard error)		
Early							
Late June to mid July	1	15	42.7	(13.0)	5.1	(1.1)	*
High secchi	2	15	52.0	(9.4)	14.3	(2.6)	*
disc readings	3		Traps did not yield sufficient insects				
	4						
Late	1	12	34.2	(15.5)	21.0	(6.7)	
Mid July to 9 August	2	14	55.7	(9.6)	46.9	(13.6)	
Lower secchi	3	13	7.7	(3.6)	36.9	(10.6)	*
disc readings	4	13	3.9	(1.8)	13.2	(5.0)	*

*Significant difference if $P/2 < .05$

The early higher catches in the clear traps reinforces the conclusions of other workers with respect to the advantage of clear traps, but the loss of this advantage in the more murky water of late summer is indicated by our results. The advantage of the opaque traps at the deeper stations might be due to larger trap size or other unknown factors.

A list of the chironomid fauna removed from the traps during the study period follows: Chironomidae, Chironominae: *Lauterborniella varipennis, Dicrotendipes modestus, D. nervosus, Cryptochironomus ponderosus, Chironomus riparius, C. stigmaterus, C. attenuatus, Chaetolabis atroviridis, Einfeldia brunneipennis, Polypedilum halterale, P. trigonus.*

Tanytarsinae: *Tanytarsus flavellus, T. neoflavellus, T. viridiventris.*

Orthocladiinae: *Psectrocladius vernalis, P. simulans, Corynoneura taris, C. celeripes, C. scutellata, Eukiefferiella sordens, E.* sp. GP.

Tanypodinae: *Ablabesmyia illinoensis, Labrundinia pilosella, Pentaneura guttipennis, Larsia pallens, Procladius bellus, Tanypus concavus.*

Ceratopogonidae: *Bezzia glabra, B. varicolor.*

DISCUSSION

The data shown in table 1 indicate that during the early summer when secchi disc readings were higher the clear traps in shallower water yielded more insects per m^2 than the opaque traps, but during the later part of the study period when secchi disc readings were lower there appeared to be little difference in the yield between clear and opaque traps in the shallower water and a greater yield in the opaque traps in the deeper water. This substantiates the advantage of the clear traps in transparent waters, but further shows that in conditions of lowered transparency this advantage disappears.

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