SUMMARY. Procedures are described which enable interpretation of data from light trap collections to indicate more accurately the actual species composition and comparative density of mosquitoes. On different nights each week vertical series of light traps and mechanical sweep nets were operated in a wooded area near a mosquito breeding pond during 2 mosquito breeding seasons in southwestern Georgia. Indices of the attractiveness of light traps for 27 species of mosquitoes were determined by dividing the numbers of mosquitoes of each species taken in the light traps by the numbers taken in the sweep nets.

References


A ROTARY INSECT-PREFERENCE TRAP

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One of the problems confronting the investigator who is studying certain aspects of the bionomics of flying insects with the aid of preference traps is that of eliminating the bias of position. A review of the literature revealed that most traps that had been described were limited in their use (Peterson, 1953). Several individual stationary traps or a single direction trap with several compartments may offer unequal attraction to insects because of unequal distances of the traps from the source of insects or because of wind direction, adjacent trees and rough terrain.

Investigations at this station had revealed that Culex quinquefasciatus fed readily on chickens and that it preferred chicken blood to that of all other domestic animals tested (Edgar, et al., 1949). In view of anticipated studies on relationship of this mosquito to transmission of certain poultry diseases, it was desirable to learn more about its habits. To facilitate the realization of this objective, some sort of apparatus was necessary. Thus, a rotary trap was designed and constructed for the purpose of studying host, color, light: intensity and other preferences of this and other mosquitoes. Described in this report are the trap and the uses for which it was designed. Data obtained, particularly concerning C. quinquefasciatus, with the aid of the trap will be the subject of another paper.

Description of the Trap. The trap proper is of sheet aluminum and from above appears hexagonal in shape, Figures 1 and 2.2 It has six wedge-shaped compartments with partitions of solid aluminum riveted to the top and bottom. Toward the back of each compartment is a plate holder that will support filters to regulate color or intensity of light. The front side of each compartment has a door in which a screen inlet is mounted. The maximum opening of the rectangular inlet is 1.5 x 8 inches, the aperture of which can be reduced in size and changed in shape as desired. The depth of each inlet is 11 inches and behind each inlet, space

2 Persons interested may obtain blueprints of the trap from the Department of Poultry Husbandry.
Fig. 1. Front view of one compartment of the six-compartment rotary inlet preference trap with chicken in animal cage directly behind inlet cone. A sample animal cage is on top of trap.

Fig. 2. View of underside of trap showing tripod base and driving mechanism.
is available for a wire animal cage with dropping pan, test panels, delivery of CO₂
or other test subjects. There is also a top
door to each compartment; thus the oper-
ator can introduce cages or other equip-
ment by either route.

The trap proper is mounted on an ad-
justable tripod base, which is removable
for ease in handling. The trap revolves
around a central pole to which is mounted
a stationary battery of six lights. The com-
partment, or turn-table portion, is elec-
trically driven and the driving mechanism
is designed to allow the trap to rotate at
several speeds by merely changing pulley
wheels.

Accessory items for the trap include
glass cells and filter frames that can be
placed in plate holders. Glass cells are
water tight, designed to hold solutions of
different colors and intensities. Designed,
but not tried, are panels that can be painted with repellents or attractents that
can be placed behind the inlet. A CO₂
drum can be placed on the top of the trap
with outlets to each of the compartments.

Prior to use, the trap was carefully
tested to detect compartment differences.
It was placed in the field under a canvas
canopy near mosquito breeding sites and
operated for several nights with white
light, but without bait. Compartments
rotated around the centrally illuminated
pole at the rate of one complete revolution
per 74 seconds. A comparison of the
numbers of winged insects that entered
each compartment revealed that there
were no compartment differences. Col-
lections included several species of mos-
quitos as well as a good many other in-
spects.

In a similar manner, the trap was
operated for several nights in a heated,
thermostatically controlled, mosquito-tight
room. Mosquito breeding containers,
which contained only stages of Culex
quinquefasciatus were located in the room
so that there was continuous emergence
of adults during the test. Again, daily
counts of male and female mosquitoes
entering each compartment revealed that
there was no difference between compart-
ments.

In another series of nine trial runs, the
trap was operated in the aforementioned
room with Leghorn hens that had been
carefully selected for similarity as baits.
One hen was placed in each of three ad-
jacent compartments for three successive
nights. They were randomized to new
compartments for each run. Since most
of the mosquitoes that entered were fe-
male and they took blood meals, counts
were based on mosquitoes that had fed.
In spite of possible differences between
similar hens in the different compart-
ments, the difference between the num-
bers that fed on different birds was not
significant. This was taken as another
indication that there was no difference
between compartments.

Possible Uses. Of the several uses, the
trap is suitable for making host-preference
determinations. As many as six different
animals can be placed in separate compart-
ments or several smaller animals in each
 compartment and the attraction to and/or
feeding on such animals by any winged,
blood-sucking insect can be compared.
Cage-size limits the size of animal that
can be compared, and a 20-pound animal
is about the limit of a single cage. The
trap can be operated in the field or in a
room where specific insects can be liber-
ered. In addition, the attraction of in-
sects to varied numbers of small animals
or plants of different breeds or varieties,
sexes, ages and sizes can be compared.
The cages and compartments are easily
cleaned between runs to eliminate odors.

By means of flat glass cells that hold
colored dyes or by colored filters, the at-
traction or repellence of different colors of
the spectra for winged-insects can be de-
termined. By using dyes in cells rather
than fixed filters, it is possible easily to
alter the concentration of contents in order
to study the effects of different light in-
RECONNAISSANCE OF MOUNTAIN MOSQUITOES IN THE
McKINLEY PARK REGION, ALASKA

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INTRODUCTION. Since World War II, rapid progress has been made toward a
checklist of Alaskan mosquitoes; yet knowledge of those of the alpine zone
which comprise nearly a hundred thousand square miles is still meager and scattered.
Published lists, general or local, for the forms actually breeding above timber
line are lacking and needed. Distribution data based on collections of biting
Aedes are considered unreliable, due to the uncertainties of identification and because
the provenience of winged insects collected on mountainsides is problematic.
It has proved difficult, if not impossible, to predict mosquito problems at high priority
mountain installations. Reliable data are not only scanty but their interpretation
is also complicated, since alpine conditions, habitats, and biota descend even to sea
level under the influence of glaciers. Altitude itself, like latitude and longitude,
may give no clue to local precipitation and terrain aspects including slope direction, exposure, valley width and air drainage, and local temperature inversions which greatly affect mountain climate. Fortunately, the distribution of trees may be used in Alaskan zoogeographical and ecological studies as a criterion indicating local weather, and woods per se are decisive in determining mosquito distribution. Thus it was shown by Frohne (1955a) for tundra mosquitoes that the same arctic tundra forms and but few others characterize subarctic tundra. Hence emphasis is placed on the timber line rather than on actual elevations in this mountain study. The present progress report of larval surveys in the McKinley Park region introduces investigations of Alaskan alpine mosquitoes.

In the most recent listing including Alaskan alpine mosquitoes, Jenkins (1948) reported six species of Aedes from elevations usually above timber line, viz.: