

THE SEPARATION OF MOSQUITO CATCHES FROM THE NEW JERSEY LIGHT TRAP

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In the course of the Pennsylvania Mosquito Survey for 1947 (a part of the Ecological Insect Survey of Pennsylvania) methods of separating and counting of mosquitoes from New Jersey light trap catches came under critical scrutiny. In the county mosquito control commission investigated, a method of separating was used which the writers believe is more or less like that used in most similar organizations.

In the particular case under discussion, the person originally handling separation alone was not a professional entomologist, but was a semi-skilled worker with long experience in the job of segregating mosquitoes from the matrix of other insect bodies in the catch. The method used was as follows: the trap collection was spread as thinly as possible over a light colored blotter. The mosquitoes (females only) were then picked out, usually using the naked eye and forceps, and segregated for identification to species by another worker. One catch from a commission trap at the end of June filled approximately seven cubic inches of space when loosely packed. A routine twenty minutes' "spread-out" sorting yielded 13 female mosquitoes.

The junior author, wishing to separate the males, took the residue, after supposed removal of all females, to the Survey Labo-

ratory at State College. Sorting by the spread-out method, he was surprised to find, besides the sought-for males, 32 additional females. The residue was turned over to Dr. S. W. Frost, the Director of the Survey, for subjection to his "breakdown" method.

In this method, the total light trap catch is broken down into some 30 or 40 categories—to orders, families, and in a few cases, to species—all done in the first separation by pigeon-holing each category into small receptacles. The separators are skilled or semi-skilled and all have had biological training. Low magnification is used constantly. The larger insects are carefully examined to make sure that no smaller insect may be hidden in folds of wings or legs. With care exercised, this method yields 100 per cent of any category of insects but the very smallest; mosquitoes are not small when compared to some of the *Cecidomyiidae* and other tiny insects.

To shorten this part of the report, then: the breakdown method applied to the catch in question yielded still another 43 female mosquitoes. Nine of the 43 proved to be unidentifiable because without legs, wings or abdomens, but the breakdown picked out even these fragments.

With this information, the senior author selected another large county commission

TABLE I.

	No. of Females	% of Total
1. Spread-out sort by county commission	13	14.8
2. Spread-out sort by State Survey	32	36.3
3. Breakdown sort by State Survey	43	48.9
Total	88	100.0

catch and had the county separator go over it in the routine manner using the spread-out method. He then took the residue and went over it himself, using the spread-out method but exercising special care. The results of the two sorts were as follows, given in approximate percentages:

mosquito control commission. The breakdown method of Dr. S. W. Frost was found to be the most efficient method of sorting, yielding 100 per cent of a given category such as mosquitoes, but the method proved impractical for the sorting of only the one category with a small

TABLE 2.

	<i>% of Total</i>
1. First sort in routine spread-out manner by separator	34
2. Second sort in routine spread-out manner by senior author	50

In a third extremely careful spread-out sort, the senior author believes that he found the remaining 16 per cent of female mosquitoes. The improvement in the first sort by the separator from 14.8 per cent in Table 1 to 34 per cent in Table 2 was probably due to more careful sorting after the special request of the senior author for separation and perhaps also to a difference in the size and composition of the total catch.

In view of the above findings, the county commission instituted new procedures in separation of the catch. The breakdown method was out of the question due to the uneconomical use of time and labor in searching for only one category of insects. Under the new system two men went through the catch in turn, each using the spread-out method with low magnification when necessary and exercising greater care in sorting. A random sample of the residue from such a double spread-out search was again submitted to examination by the breakdown method at State College. Results are as follows:

labor force and a large number of catches. As a compromise, closely supervised double spread-out counts by two different separators counting consecutively was checked and found to yield very good results when performed under low magnification.

The New Jersey Light Trap has the reputation of being a tool of a high degree of standardization. The present writers believe, however, that the methods of counting and sorting employed by various agencies investigating mosquito populations have been woefully non-standard. The following factors are the principal ones affecting full accuracy in separation of female mosquitoes from the non-culicid insect matrix:

1. Composition and size of catch.
2. Perceptual abilities, interest, and alertness of the separator.
3. Differences in methods and tools employed.

This crude study is not intended to set standards of separation methods, but to

TABLE 3.

	<i>No. of Females</i>	<i>% of Total</i>
1. Double spread-out sorting at county commission	183	97.3
2. Breakdown sorting of residue from 1 above	5	2.7
<i>Totals</i>	188	100.0

CONCLUSIONS

The spread-out method of separating New Jersey Light Trap female mosquito catches from the matrix of non-culicid insects was found to be extremely inefficient and productive of misleading counts as practiced by at least one county

focus attention upon the methods now in use. Actually, any method or system may be used which yields the ideal 100 per cent of female mosquitoes, or which yields differences from that percentage small enough so that the composition of the mosquito population may be accurately determined.