OPERATIONAL AND SCIENTIFIC NOTES

XEROX TRANSPARENCIES AS A TRAINING AID

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In order to promote better understanding of the expanding mosquito control program in Dutchess County, New York, an educational method was needed to present mosquito illustrations to laymen in such a manner as to attract and retain audience interest.

We have found that Xerox copies produced on transparencies manufactured by and available from Sepsco, Inc., 1940 Will Ross Court, Chamblee, Georgia 30005, do an excellent job of reproducing illustrations such as line drawings of adult and larval mosquitoes. These can easily be projected on a screen from an overhead projector. Comparisons of egg types and developmental forms can be emphasized by juxtaposition of separate transparencies as needed.

The 8½" by 11" transparencies are available at $9.95 per 25 sheets in four colors, yellow (Zelar Y, Stock No. 4765-417A), green (Zelar G, Stock No. 4774-417A), blue (Zelar B, Stock No. 4785-417A), and red (Zelar R, Stock No. 4795-417A). A clear transparency (Zelar, Stock No. 4755-417A) is also available and not only is less expensive at $8.95 per 25 sheets but produces the most distinct image. Yellow produces the second most satisfactory projection. The method of reproduction is merely to substitute the sheets of transparencies for the paper usually used in the Xerox copying process. The transparencies may be cleaned with a soft cloth and water. Although the print appears to be very durable, the plastic will not resist abrasion well and care must be used to avoid scratches which would tend to degrade the projected image.

A NOTE ON FOG APPLICATION

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For the past several years this office has suggested the use of diesel fuel oil No. 2 for foggers in back yards. The recommendation has apparently proved successful as there have been no return calls for further information. When making the recommendation, it has been the practice of this office to advise the questioner that if he is not satisfied with the performance of the diesel oil fog to call back and we will recommend another treatment, which however will be more expensive.

About a month ago a cattleman in the Sabine Pass area wanted information on anything that he could do to relieve the pressure of the mosquitoes on his herd. A fogging device was suggested using the exhaust system of a tractor which was available on the farm. Diesel fuel oil No. 2 was recommended as an economical possibility for control and as a substitute for the traditional smudge. Several days after the conference, I received a phone call from the gentleman advising me that the fog from the exhaust generator had provided protection for the herd and not only had it given relief from the mosquitoes but apparently had controlled the horn fly as well.

A similar series of events has taken place with a resident of Beaumont who owns some cattle in Vidor. Subsequent contacts from this gentleman indicate satisfaction with the diesel oil. In tests last summer the District achieved control for moderate distances with the straight diesel fog. The results were not satisfactory at distances that the District needs in treating residential areas. It is hoped that more cattlemen will try the diesel fog as a method of providing relief for cattle during heavy mosquito flights. Equipment is inexpensive, usually at hand, and the cost of the diesel oil is far less than the loss of even one calf.

SEX IDENTIFICATION OF LIVE MOSQUITO PUPAE IN THE LABORATORY [1]

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Techniques and methods for the accurate sexing of mosquito pupae have, at one time or another, been the concern of most researchers using mosquitoes as experimental animals. Two major bases upon which sexing techniques depend are size differential between sexes and morphological difference in the genital segments of male and female pupae.

In 1939, Cantrell found no mention, in the literature, of the obvious difference in size between the sexes. In experiments on the effects of overcrowding in *Aedes aegypti* (L.) he found not only a size reduction in both sexes but the reduction in the females was greater than in the males. Mosquitoes produced under crowded conditions

[1] This work was partially supported by Hatch project No. 253 Revised.

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still had size differences between the sexes although size ranges overlapped. He therefore concluded that sexing of pupae by size would depend on the maintenance of favorable uniform rearing conditions. In other species, e.g., *A triseriatus*, there was an overlap of size ranges and in *A. vexans*, very little difference in size at all.

Difference in size of sexes is also the basis for large scale separation operations. Fay and Morlan (1959) devised a machine for the separation of stages and sexes of mosquitoes. The apparatus ran with an error factor of 2 percent females in male fractions. It allowed for the separation of sexes at a rate of 3,000/hour. McCray (1961) went on to devise a machine with an error factor averaging 1.3 percent. Only 1 of 58 samples had an error factor exceeding 5 percent, due to initial mechanical difficulties. With this device specimens could be separated by sex at a rate of 30,000/5 minutes; 120 times faster than with the Fay and Morlan device. But, as with size sexing of small numbers of pupae, these separators depend on the continuous production of uniform size pupae with no overlap of sizes between sexes.

The second basis of separation is the morphological difference between male and female pupae. In work with 8 common species representing 5 genera, Moorefield (1951) sexed pupae by noting differences in the genital segment. These determinations were verified by separating and rearing pupae and sexing of the adult. Once the morphological differences are recognized, the sexing of pupae becomes comparatively simple. With practice, sex determinations can be made at a glance regardless of the angle at which the hypopygium is viewed. The difficulty in this technique is that partial immobilization of the pupa is necessary in order to view the genital structures.

Moorefield (1951) suggested a technique for manipulating and sexing pupae. This essentially involves the use of a medicine dropper with its tapered end cut off. The pupa is drawn in with a column of water. It eventually moves to either the lower or upper meniscus. While the pupa is at rest in the meniscus the pipette may be carefully manipulated and the pupa sexed. Very careful handling is required, since even slight jarring causes a movement of the pupa.

Gillett (1955) reported a 'dry' method in which pupae were placed on moist paper and immobilized enough to be sexed. Ingram (1954) reported that viable adults resulted from pupae reared under these conditions.

Another procedure found effective for sexing live pupae also involved the use of a blunt end medicine dropper. The pupa is drawn into the pipette with a minimum of water. As much water as possible is squeezed out. The pipette is then quickly tilted backwards towards the rubber tip and the pupa remains on the inner wall. The pipette can be easily and rapidly manipulated. The pupa is surrounded by a drop of water so that it is safe from desiccation. Yet, the movement of the pupa is curtailed enough so that sexing can be accomplished easily. The effectiveness and speed of this procedure is determined by the ability to recognize the hypopygium at any angle.

In summary, the above technique improves Moorefield's method by increasing the ease of manipulation of the pupa. As with other procedures based on differences of the genital segments, this method is limited by the number of pupae that can be processed per unit time.

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Stomoxys calcitrans (L.) BREEDING ALONG TVA RESERVOIR SHORELINES

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For a number of years the stable fly, *Stomoxys calcitrans* (L.), has plagued campers and fishermen in certain areas of Kentucky and Pickwick Reservoirs on the Tennessee River. The pain and discomfort caused by this biting fly have become so acute at times that groups of people have been forced to abandon camping and recreational facilities.

A 3-year study on the Kentucky Reservoir side of Land Between the Lakes has shown that large outbreaks there are associated with dead mayfly bodies, *Hexagenia bilineata* (Say), and reservoir water levels. Kentucky Reservoir water levels follow an established guide curve, but flood control operations occasionally require temporary deviations. In June 1966 when water level recession started, a moist windrow of fine flotage mixed with mayfly bodies was left undisturbed by the