INFLUENCE OF TRAP SCREEN AGE ON COLLECTIONS OF TABANIDS IN MALAISE TRAPS[1]

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ABSTRACT. Since natural-color saran screen darkens with age, different age Malaise traps constructed of this screen were compared to determine if there was an effect on collection numbers due to aging. In addition, a trap constructed of black polypropylene screen and a saran screen trap painted with black enamel were included in this study. The data showed a significant decline in the numbers of tabanids collected associated with an increase in age. The black traps collected approximately 1/5 the numbers of tabanids collected in new traps. This decrease in numbers collected, which may be related to light intensity within the trap, should be considered when such traps are used in critical biological and ecological studies.

In previous studies (Roberts 1970, 1972) of the effect various trap designs and trap colors had on the numbers of tabanids collected, a Malaise trap constructed of natural-color saran screen was found to be the most efficient in respect to numbers collected. However aging, especially in the field, causes the pale straw color of natural saran to darken gradually over a 2- to 4-yr period to an orange-brownish color. Also, traps exposed to direct sunlight darken faster than those placed in shade. Screen retained in the laboratory also darkens with age but at a slower rate. Since gray- and green-colored traps were proved to trap fewer tabanids than the natural-color saran screen trap (Roberts 1970), a study was conducted to determine what effect the discoloration of the saran screen caused by aging, and also by extraneous dirt such as fungal growth, would have on collections. In addition, in view of the known attractancy of shiny black objects for tabanids, 2 black Malaise traps were included in the study to determine their efficiency in trapping tabanids.

MATERIALS AND METHODS. The Malaise traps used in the study were constructed according to the plans of Townes (1962). A new natural-colored saran screen trap was compared with natural saran screen traps that were 1 and 2 years old, with a 2-yr-old natural saran screen trap discolored by both age and by a black fungus that had grown in aphid honeydew droppings, with a 2-yr-old natural saran screen trap that was spray-painted with two coats of a shiny black enamel, and with a new trap constructed of a shiny black polypropylene screen.

The study was made May 31—June 10, 1972 in the Experimental Forest of the Delta Branch Experiment Station. The trap sites were 0.5 to 1.5 km apart and located on the road shoulders. Each trap was tested at each trap site by using a randomized Latin square design. Collections were started between 1:00 and 1:30 p.m. (DST) and terminated the following day between 10:00 and 10:30 a.m.

RESULTS AND DISCUSSION. A total of 18 species of Tabanidae were collected in the study. However, statistical analyses were made of only 5 of these species and on the total numbers of tabanids. All analyses were made on the transformation of the data to log $(X + 1)$. The collection data are presented in Table 1. The number of flies collected was taken as the measure of efficiency.

Statistical analyses divided the data into three significantly different groups. The most efficient traps were the new and 1-yr-old traps; the least efficient were the black traps. In view of the known attraction of black objects for tabanids (Hansens 1947, 1952; Bracken et al. 1962; Thorsteinson et al. 1965), the poor performance of the shiny black traps indicates that some factor had an opposing influence. The

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Table 1. Comparative numbers of tabanid species collected in 6 Malaise traps (total no. ♀ collected/trap).

Species	Trap type[a, b]					
	1	2	3	4	5	6
Tabanus						
fuscicostatus Hine	489a	293a	173b	181b	37c	53c
lineola F.	122a	102ab	93abc	84abc	65bc	61c
subsimilis Bellardi	313a	224ab	199ab	206ab	128bc	98c
wilsoni Pechuman	310a	293a	111b	127b	77b	113b
Chrysops						
flavidus Wiedemann	403a	508a	184b	156b	70c	35c
Total tabanids	1669a	1439a	790b	784b	391c	372c

[a] Trap types: 1—1-yr-old
2—New
3—2-yr-old (dirty)
4—2-yr-old
5—2-yr-old (painted black)
6—New (shiny black polypropylene screen)

[b] Numbers followed by same letter horizontally not significantly different at 5% level of confidence.

efficiency of both the 2-yr-old traps was approximately midway between that of the new and the black traps. The presence or absence of dirt on the 2-yr-old traps had no discernible influence.

The general conclusion drawn from this study is that the natural saran screen Malaise traps decrease in efficiency as the screen darkens from aging. This loss of efficiency will have to be considered when such traps are used in critical biological and ecological studies of Tabanidae. However, Table 1 shows some species were less affected by the color change than others.

Prior to the present study, the efficiency of the natural-color saran screen Malaise trap was thought to result from attractancy associated with the color of the saran screen. If this assumption is correct, then aging decreases the attraction. However, the low efficiency of the shiny black traps indicates a need to reconsider this assumption. One factor that could cause the decrease in trapping efficiency might be the decrease in light level within the aged trap, particularly in the top portion, a decrease that is particularly apparent in photographs of these traps made under the same set of field and exposure conditions. Thus, while the flies may be attracted to the traps, they may be influenced by the greater contrast in light intensity to fly back out through the trap opening rather than upwards into the collecting head. If this reaction does take place, the traps should probably be constructed to have a window effect in the upper portion of the trap (Catts 1970).

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