OPERATIONAL AND SCIENTIFIC NOTES

EFFECTS OF CONTROLLED BURNING ON *AEDES TAENIORHYNCHUS* EGGS IN AN ABANDONED RICE IMPOUNDMENT IN SOUTH CAROLINA[1]

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ABSTRACT. Controlled burning reduced the number of viable eggs in an *Aedes* population. The effectiveness of the burn was related to the amount of rainfall, surface moisture and dry vegetation. A greater reduction in viable eggs occurred when the burn was close to the ground. Variable results were achieved if the surface was moist but there was a significant reduction in the number of viable eggs, due to a heavy amount of dry vegetation accompanied by low rainfall.

Various management practices have been established in abandoned rice field impoundments as part of a program to encourage the development of vegetation for attracting waterfowl and to provide a suitable environment for other wildlife (Clements and Rogers 1964, Springer 1964, Provost 1977, Carlson and Vigliano 1985). The practices attempt to produce a desired habitat and at the same time provide a measure of mosquito control. Two practices commonly employed are controlled flooding and burning. Although burning is a common practice for encouraging the growth of certain types of vegetation, the effect this practice has on the mosquito population has not been measured. This study was conducted to determine if burning was effective in reducing the number of viable eggs in a population of the salt marsh mosquito *Aedes taeniorhynchus* (Wiedemann).

The study site was an impounded 11.3-ha rice field 8 km north of McClellanville at the International Center for Public Health Research of the University of South Carolina. The study was carried out from May to July of 1986 and 1987 at sites selected by the highest concentration of egg laying by *Ae. taeniorhynchus*. The study in 1987 was carried out at a different site because of a reduction in the 1986 population due to extreme drought. Observation of the large population that emerged after flooding the impoundment, in addition to samples in the laboratory, revealed that only *Ae. taeniorhynchus* was using the impoundment for oviposition. In comparison with the 1987 site, the 1986 site had a smaller amount of dry vegetation, the rainfall was less than 1.5 cm and the elevation was higher, which resulted in better drainage and a much drier surface. All these factors led to a burn that was very close to the ground. The rainfall in 1987 was 10 cm, most of which had fallen on 2 separate days. The 1987 site was lower in elevation, which resulted in the retention of a much higher amount of surface moisture. The use of a moisture meter revealed that the subsoil of both the 1986 and 1987 sites was saturated.

Each site was staked off into 3 × 3 m plots. Six plots were burned the first year and 15 plots the second. Polyvinyl chloride (PVC) pipe was used to construct a 3 × 3 m device for taking samples. This square device was subdivided into 81, 30 × 30 cm squares by plastic coated wire. Sampling consisted of placing the device over each plot and randomly selecting 20 samples per plot. A 30-cm diam pan was used to collect each sample. Each sample was collected by forcing the rim of the pan into the soil to form a ring. The soil within this ring was removed to a depth of approximately 5 cm and placed in a bag. The bag was taken into the laboratory, placed in a pan and flooded; 24 h later, the larvae were recovered using a sieve, placed in a bowl and counted (Bradley and Travis 1942, Elmore and Fay 1958). The remaining soil was flooded again, allowed to stand for another 24 h and the procedure repeated. This was done so that any delayed hatch would be included in the count.

The larval count before and immediately after the burn was used in determining the effectiveness of the treatment. Of the 6 plots treated in 1986 (Table 1), 120 samples before burning yielded a total of 8,295 larvae, while 120 samples immediately after burning yielded a total of 31 larvae. The results from treating 15 plots (Table 2) during the summer of 1987 was not as dramatic and involved the use of statistical analysis

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Table 1. Effect of burning on the egg hatch of *Aedes taeniorhynchus* (1986).

Plot number	Before* burn count	After* burn count
1	2,433	10
2	1,930	4
3	1,390	5
4	1,014	1
5	781	7
6	747	4

* Each count represents 20 samples/plot.

Table 2. Effect of burning on the egg hatch of *Aedes taeniorhynchus* (1987).

Plot number	Before* burn count	After* burn count
1	776	72
2	3,560	899
3	909	146
4	1,257	340
5	2,418	289
6	241	17
7	312	87
8	3,982	1,625
9	2,412	598
10	1,118	88
11	1,783	87
12	4,520	1,597
13	5,225	1,338
14	114	64
15	241	17

* Each count represents 20 samples/plot.

to determine if burning was effective. A total of 300 samples taken before the burn yielded 28,868 larvae, while immediately following the burn there was a total of 7,264 larvae. An analysis of variance indicated ($P < 0.001$) that burning was effective in reducing the number of viable eggs. Although the amount of vegetation was not measured, it was observed that the heavier the vegetation, the greater the intensity of the fire. It is believed that this was one of the major factors which contributed to a reduction in the number of viable eggs.

Therefore, the effectiveness of a burn is directly related to amount of rainfall, surface moisture and dry vegetation. Although this study was not conducted in the winter months, this may be an effective time to burn due to the amount of dry vegetation, combined with a better chance of having an extended dry period.

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