

SALT MARSH MOSQUITO CONTROL IN RELATION TO BEEF CATTLE PRODUCTION: A PRELIMINARY REPORT

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INTRODUCTION. Nearly 5 percent of the grazing area of the state of Texas is located in the low lying salt marsh land along the Gulf Coast. This area supports about 10 percent of the cattle population of the state for a portion of the year. This acreage is usable for cattle production only during the winter months due to the ravages of large numbers of mosquitoes developing there during the summer. Those cattlemen who attempt to use the land during the summer for grazing cattle find that their cattle are unthrifty due to reduced feeding time while fighting or attempting to evade the mosquitoes and due to loss of blood from their bites. Deaths of cattle from the concentrated attack of mosquitoes are a matter of record. Actual suffocation by inhalation of mosquitoes of both young and weak cattle has been observed.

An attempt is being made to determine the practicability of economic beef cattle production the year around in the salt

marsh area defined above. This attempt is in the form of an interdisciplinary study being conducted by personnel from the Brazoria County, Texas, Mosquito Control District; the Bioproducts Research Laboratory of the Dow Chemical Company; and the Gulf Coast Pasture-Beef Cattle Research Station, the Animal Science Department, the Wildlife Science Department, and the Entomology Department of the Texas Agricultural Experiment Station.

The study area is located in the southeastern part of Brazoria County, Texas, immediately west of West Bay and just inside of the intercoastal waterway. The test pastures range in elevation from 2 to 7 feet above mean sea level.

DEPARTMENTAL ACTIVITIES. The Bra-

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zoria County Mosquito Control District is contributing to the overall study by means of technical assistance, manpower, and equipment for personnel use as well as insecticide application. Personnel of the Control District have been and will continue making mosquito counts in the general area. In addition to these present activities of the Control District personnel, the project is strongly dependent upon their technical competence and background knowledge of mosquito activities of the area.

The Bioproducts Research Laboratory of the Dow Chemical Company has provided technical consultation and will provide chemicals to be used for mosquito control. These will be provided for the use of Control District personnel for the area control of mosquitoes on the pastures and for insecticidal treatment of the individual animals.

The Gulf Coast Pasture-Beef Cattle Research Station has provided the physical facilities for handling the cattle in the marshes. In addition, the station is furnishing the test cattle for the project and personnel for making a detailed soil and vegetative survey of the experimental area. The station, in conjunction with the Animal Science Department at Texas A&M, is providing personnel needed for management of the cattle and for obtaining production records on the cattle. These production records include periodic weights of the cows, periodic and weaning weight of calves, milk production of cows at selected periods, percentage of cows giving birth to and weaning calves, and health records of all test animals.

The Wildlife Science Department has been conducting species and populations studies on estuarine animals such as fish, shrimp and crabs and on waterfowl. In addition, a detailed study on the breeding, growth, population and distribution of rats in the salt marsh is underway. These rats will be used as prime indicator species of the effect the control of mosquitoes will have on terrestrial wildlife. Besides the direct effect of mosquitoes on wildlife,

observations will be made on the possible toxic effects on wildlife of the insecticides used to control the mosquitoes.

The Entomology Department has been engaged in the determination of the mosquito species present in the test area, the population levels of the various species, and the seasonal fluctuations of these species. These benchmark activities have centered around the use of Malaise traps for adult mosquitoes and water dip sampling for larval forms. To date, *eight* species of mosquitoes have been collected from the Malaise traps. These data, in terms of total female mosquito catch in two traps over a period of 9 months are shown in Table 1.

The two true salt-marsh mosquitoes,

TABLE 1.—Malaise trap collections of adult female mosquitoes in Brazoria County, Texas, during 1967-68.

Species	Percent of total
<i>Aedes sollicitans</i>	73.2
<i>Aedes taeniorhynchus</i>	14.5
<i>Psorophora confinnis</i>	3.5
<i>Anopheles crucians</i>	3.0
<i>Culex salinarius</i>	2.5
<i>Culiseta inornata</i>	1.5
<i>Anopheles quadrimaculatus</i>	1.5
<i>Psorophora ciliata</i>	0.2

Aedes sollicitans and *Aedes taeniorhynchus*, made up seven-eighths of the total catch and were present in the greatest numbers during the latter half of August and the first two weeks of September. Their numbers were practically negligible after November. The remaining species are more of academic interest than control concern. It is, however, worthy of note that *Anopheles quadrimaculatus* and *Culex salinarius* were first collected in September and *Culiseta inornata* not until the latter part of October. No *A. quadrimaculatus* were collected after the middle of December whereas *Culex salinarius* and *Culiseta inornata* were present all winter, albeit in very low numbers.

In addition to mosquito data, the same information has been recorded for all other

blood-sucking arthropods collected from the Malaise traps. Included have been numerous *Tabanus* spp. and *Chrysops* spp., the horn fly, *Haematobia irritans*, and the stable fly, *Stomoxys calcitrans*.

PLANNED FUTURE ACTIVITIES. Once the mosquito population reaches a level such that the test cattle appear to be irritated, insecticidal control measures will be put into effect. This will consist of spray applied to part of the cattle and part of the test area according to a preplanned pattern. At this time, counts will be made of mosquitoes on the test cattle. Numbers of other blood-sucking arthropods on the cattle will also be recorded. The presently employed insect population measurement techniques will be continued throughout the study.

Present wildlife studies will continue and new ones will be incorporated as need may dictate.

Water management by means of ditching to facilitate water movement is planned. This portion of the overall program will be carried out on additional pasture areas located adjacent to an inland bay. Observations will be made on the effectiveness of the drainage program in reducing mosquito populations, possible vegetative species alteration, and possible change in the chemical and physical properties of the soil.

We hope that the result of all of these activities will be an economically feasible means of mosquito management of the salt marsh to the advantage of beef cattle production.