

# FARGO'S MUNICIPAL INSECT AND RODENT CONTROL PROGRAM<sup>1</sup>

C. L. BRADLEY

*City of Fargo Health Department, Fargo*

This subject will be discussed under three main topics; (a) mosquito and fly control, (b) rodent control, and (c) sanitary land-fill as it relates to rodent control.

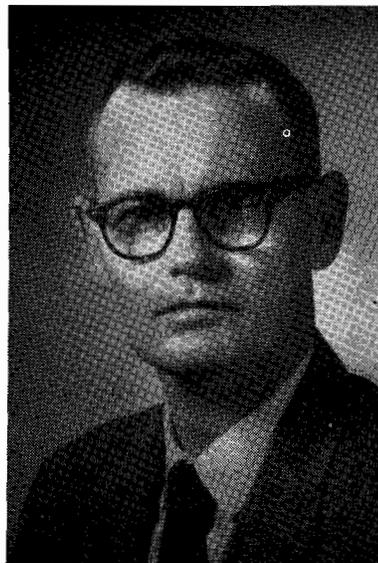
## MOSQUITO AND FLY CONTROL

There appears to be a distinct public health aspect to the problem of mosquito control in the State of North Dakota as a whole, in addition to the readily admitted nuisance problem that is involved. To begin with, there are approximately thirty-eight species of mosquitos, representing nine genera in North Dakota. Of these, *Aedes vexans* and *Aedes dorsalis* are the two dominant species; *Aedes* of the floodwater type seem to be the most prevalent in the Fargo area; *Culex tarsalis* is the third most numerous species. The latter has been found to be naturally infected with both the St. Louis and Western types of encephalitis.

North Dakota, one of the smallest states from a population standpoint in the Missouri River Basin, according to records from the Virus Investigations Unit of the Communicable Disease Center, for the period 1930-1948, led all the states in the basin in the number of cases of human encephalitis for that period. The total number of cases for the nineteen year period was, 1,586, the second highest in the country; the State of Missouri was first with 2184 cases. In 1941 there were 134 deaths in North Dakota due to encephalitis, a fatality rate of 12 per cent.

In 1950 mosquito control operations in the City of Fargo were begun on May 31 and involved the use of a Todd-Tifa fog generating ground unit. Fogging operations were carried on between the hours of 8:00 P. M. to 12:00 midnight each day, provided atmospheric conditions were favorable, using a 5 per cent DDT solution combined with No. 2 fuel oil. The city was divided into sections and one section was completed at a time.

A New Jersey Light Trap was set up to collect the mosquitos that were attracted to the light. This proved valuable as a means of indicating the efficiency of the local control operations. Identification of the various species was made through the cooperation and facilities of the Department of Entomology, North Dakota Agricultural College, (NDAC).



Mr. Bradley was educated at the University of Minnesota and the North Dakota Agricultural College. After Military Service during World War II, he served as Sanitarian in the Bismark Health Department and, later, the Fargo City Health Department. In 1949 he became associated with the Manchester Biscuit Company as Plant Sanitarian and Safety Director. In 1950 he returned to the Fargo City Health Department as Head of the Division of Sanitation.

In June of 1950 Fargo was plagued by a concerted attack of canker worms, and an invasion of small black flies called "no-seeums" added to the problem. In an attempt to remedy the situation, arrangements were made to have the city sprayed by air. Spraying operations began on Wednesday, June 14 at 6:00 P.M. and were completed the following day. The area covered was 1,260 acres in the city and approximately one-eighth of a mile beyond its borders. A mixture of 25 per cent DDT emulsifiable concentrate to three parts of water (by volume) was used. The planes were calibrated to apply the DDT at the rate of one pound per acre. The city parks were also covered in the operation. This cost the city \$1.00 per acre for spraying. The chemicals cost \$1,380. Total cost of the operation was \$3,000 or eight cents per capita. The project, financed from the city's "contingent fund" was considered highly successful.

Along about the middle of July, the community began to indicate interest in a second aerial spraying. Fly control was advanced as the reason for this second

<sup>1</sup>Presented at the Fifth Congress of Sanitary Engineering at Lima, Peru, in March, 1956.

project. Although the fly population was not at a high level at the time, the populace apparently felt a plan of attack should be formulated in advance of the peak of the fly season. It was pointed out that the most important factors in fly control are satisfactory sanitation methods, and that if the public would follow proper methods of handling garbage and allied refuse, there would be no great fly problem. The City Commission, however, approved a second city-wide aerial spray, the funds for which were to be raised through a public "Tag Day." The local Chamber of Commerce, newspaper and radio stations contributed time and effort to the project while teams of volunteer women canvassed the city. Approximately \$3,000 was collected and the second aerial spraying of the city was begun on August 17 and completed on August 18.

In the subsequent seasons of 1951, 1952, 1953, and 1954, we continued ground fogging of the city proper and supplemented it by city-wide aerial spraying. Routine larvae checks made during these seasons indicated that a most satisfactory and nearly complete control of the areas treated had been obtained.

It was the feeling of the NDAC Entomology Department that perhaps enough emphasis had not been put on the control of the "flood water" or *Aedes* type of mosquito, therefore, during the 1954 and 1955 seasons, major attention was paid to temporary water areas. Special effort was made to obtain control by larviciding all breeding areas and by eliminating the mosquitos *before* they became adults. Aerial photos and ground surveys were made to provide data for preparation of detailed maps of Fargo and the surrounding territory. All permanent and semi-permanent water collections were recorded. A continuous survey of these localities was carried out from the middle of June until September first. Any areas found infested with larva at the rate of one or more per dipper were sprayed. Dieldrin and Aldrin were supplied by the NDAC for larviciding a total of eighty-five areas. Most of the tracts were treated by using a small compressed-air sprayer mounted on a jeep. This equipment was provided by the city. In the few instances where it was impracticable to handle the job with the ground rig, aerial larviciding was done.

In the 1955 aerial application, different parts of the city were sprayed with DDT at 0.5 lbs. per acre and at 0.25 pounds per acre. Certain areas were treated with Heptachlor at 0.1 pound per acre. It is quite conceivable, however, that since apparent satisfactory results were obtained with these experimental concentrations, a lower concentration of DDT might have been effective. Heptachlor could possibly be substituted for DDT. Additional work must be done, though,

before any actual changes in current procedures can be recommended.

In summarizing the mosquito control phase of the project there could be a tendency to give the entire credit for the rather spectacular success of that portion of the program to the aerial spraying operations. That, of course, would not be fair, nor would it be a true evaluation of the combined program because there are so many variable factors involved. It cannot be denied that the aerial spraying part of the local program was the most popular and had the greatest public support, yet the other phases, i.e., larviciding, ground spraying and fogging, all had an important part in the over-all result. In general, the larviciding appeared to be satisfactory, if the weather factor is considered. In other words, where the areas were treated, the larvae were killed; whereas, untreated areas apparently produced noticeable numbers of adult mosquitos. It is to be hoped, however, that the present program of primarily treating the temporary catch basins, rather than treating the standing water collections, will provide a mosquito control program that will permit effective control of the insects at their *source* and reduce the need for frequent city-wide destruction of adult insects.

The basic principles of sanitation are the corner stone to any insect control program. It is, therefore, mandatory to insure either adequate drainage or satisfactory sanitary conditions since the local topography favors the formation of and the retention of numerous pools of water capable of breeding large numbers of mosquito larvae. The large area involved renders satisfactory enforcement of adequate sanitary regulations most difficult.

Fly control in the City of Fargo, generally, has never posed much of a problem, at least during the last several years. This, perhaps, can be attributed in part to the fact that the local Health Department, through its Division of Sanitation, has been carrying on a rather concentrated campaign to eliminate the privy or "outdoor toilet" within the city limits as well as in the fringe areas surrounding the city. Also, in 1951, the City of Fargo adopted a modern refuse collection system by purchasing a fleet of trucks with packer type bodies and later converted its disposal method from the old city dump style to that of a sanitary landfill. Only kitchen garbage was collected by the city, but a twice-a-week pickup was made in residential areas during the summer months and once a week during the rest of the year with daily service being given to restaurants.

In the Fargo area, the house fly, *Musca domestica* L. generally becomes noticeable the later part of August and remains until the first killing frost comes about the middle of September. During this period, special

emphasis is put on this phase of environmental sanitation by the field sanitarian as he makes his inspections of the various establishments and areas under his jurisdiction. These "reconnaissance surveys" indicate whether or not supplementary work by the Todd-Tifa ground unit is needed and whether more stringent enforcement of existing sanitary regulations designed to reduce probable breeding places of the house fly would be necessitated.

#### RODENT CONTROL

There are three species of rats common to the North American continent. They are the "brown rat" or the Norway rat, *Rattus norvegicus*; the "roof rat" or Alexandrian rat, *Rattus rattus alexandrinus*, and the "black rat" or ship rat, *Rattus rattus rattus*. The City of Fargo is concerned only with the Norway variety, as the Alexandrine rat is a southern rodent and is seldom found as far north as North Dakota. The "ship rat" is obviously not indigenous to the landlocked "Great Plains Area."

The Fargo rat control program is divided into three phases. First, a campaign to build out and starve the rats is undertaken. Field sanitarians, upon inspection of buildings, give helpful information to the property owner or tenant in the art of building out rodents by eliminating all of the enclosed spaces such as openings in hollow walls, between floors and under foundations where rodents may live and breed.

Rodents may be starved out of an area of infestation simply by keeping food away from them. Therefore, city regulations require that garbage be stored in tightly covered metal containers kept at least 18 inches off the ground, that premises should be kept free from rubbish, and that feeding stations for birds be eliminated if the householder desires to keep rats from using his premises as a free lunch ground.

The second phase of the program involves the poisoning and the trapping of the rats. The bait that has been found most effective against rats in this community is oatmeal, dog food, horse meat or hamburger combined with rodenticides such as Fortified Red Squill and Warfarin.

#### SANITARY LAND-FILL

The third and last phase of a well-rounded rodent control program is the establishment of a satisfactory method of refuse disposal.

On October 5, 1954, the City of Fargo's intra-city Sanitary Landfill was put into operation. The landfill was located in the industrial area of the city, approximately two blocks from a residential district. It covered about three and a half acres of what was for-

merly waste land along a county drain. The land is owned by the City of Fargo and as a reclaimed section will be of considerably greater value to the city than it was previously as it can be used as a recreation area, parking lot or as a site for light industrial purposes.

In the Fargo operation, enough dirt was dug from the bottom of the area by an HD-9G crawler type tractor with a two-yard front end loader, to form sides for the trench or dikes and cover for the entire operation. Refuse was dumped at the bottom of a ramp or slope, then the material was compacted against the sloped section in layers. This placing and compacting operation was continued throughout the day as additional truck loads were dumped. At the end of the day, the daily accumulation of refuse was covered with a protective skin of dirt six inches thick. This prevented the cell from becoming a nuisance. A series of these cells were built up until the trench neared completion and was approximately one and a half feet from grade level. Then a final cover of dirt two feet thick was applied. The completed fill was then six inches above grade level. This additional six inches was to allow for future settling. Stock-piled cover material was protected from frost by a layer of leaves gathered from Street Department sweepings during the Fall.

It is felt that the Sanitary Landfill method of refuse disposal is a very satisfactory method in a northern climate and is a most effective tool in the rodent and insect control program for the City of Fargo. It gives the city a profound psychological advantage to point out that it has taken the lead in removing a focal point of vector infection, and in addition, has turned what used to be an insanitary, odorous, fly and rat breeding haven into a clean and eventually useful area of land. Since initiation of the Sanitary Landfill program, rats have proved a minor problem at the disposal area.

In conclusion, it would not be amiss to say again that if the corner stone of any insect or rodent control program is laid upon basic sanitation principles, such a program should prove successful in any location provided satisfactory enforcement of sanitary regulations can be obtained.

#### ACKNOWLEDGEMENT

The cooperation of the Department of Entomology, North Dakota Agricultural College, for their assistance in the insect control program was greatly appreciated.

#### REFERENCES

1. Post, R. L. and Kramer, M. C. Skeeter Troubles. N. Dak. Agr. Exp. Sta. Bi-monthly Bull. 14: (3) 101-104. 1952.
2. Post, R. L. and Munro, J. A. Mosquitos of North Dakota. N. Dak. Agr. Exp. Sta. Bi-monthly Bull. 11: (5). 173-183. 1949.