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Rat Control in the City of Rochester*

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Abstract:

Last fall the County of Monroe initiated a poisoning program to control rats in the inner parts of Rochester. There is good evidence to support the contention that without improvement in sanitation and structural rehabilitation of property poisoning will be temporarily effective but wasteful of money and effort in the long run. Techniques for the precise study of living animal populations are available and these supply the only truly objective information by which the Rochester rat control program may be evaluated. It is hoped that County officials appreciate this and will follow up their initial announcement of the program with a detailed progress report to the public.

1. Purpose of report.

On September 17, 1967, the Democrat and Chronicle printed an article announcing a "full scale attack against rats" throughout much of the central part of the city.

The problem is one of pest control and must be understood within the context of general population theory, practical problems of pest control, and experience gained in earlier attempts to control Norway Rats. A number of statements in the above-mentioned article indicated a failure to appreciate such considerations. For this reason the RCSI presents a preliminary report bearing on the Rochester rat control program.

2. Damage and danger from rats.

Rats in urban areas are undesirable for several reasons. They may serve as vectors for serious human diseases such as plague, murine typhus, salmonellosis, leptospirosis and trichinosis (1, 2). They cause structural damage to buildings. They consume large quantities of stored food products and damage other stored goods. Most people find them unpleasant for esthetic reasons.

U.S. urban areas greater than 500,000 people experience rat-bite at the rate of 10 per 100,000 people each year, though the incidence of secondary infection is quite low and the transmission of the more dreaded diseases is rare. While the direct public health hazard is not alarming it is true that human infants and invalid or unconscious adults have on occasion been killed by rats (1).

3. The control of rat populations.

No population of animals can increase indefinitely. In fact populations usually come quickly to a reasonably stable level imposed by: (1) shortages in food or cover, (2) predators or diseases, or (3) their own social behavior. Pest population control may be designed to achieve either complete eradication or an incomplete but drastic and persisting reduction in population size to a low and relatively harmless level. Eradication can be achieved in two ways. First, the means of subsistence (food, cover, water, etc.) may be decreased until the pest becomes locally extinct. Second, the pest individuals may be killed by poisoning in a defined area and all later immigration of the pest prevented. Lowering the means of subsistence is clearly the most effective method but killing of the pest directly is initially easier, more dramatic and hence the method of choice with most pest species.

Poisoning is being conducted in Rochester, and there is some hope that boarding, patching and other forms of rat-proofing will follow. Nothing is being done to prevent migration of rats from the untreated to the treated parts of the city. It is difficult to see how this could be accomplished. The wealthier parts of the city may harbor considerable rat populations in sewers due to the potential food supply introduced into sewers through sink-type garbage disposals. It is not known whether such food is really available to rats. In fact very little information on rat population sizes in urban areas is available. It is known that large populations may exist in rural areas around silos, corn cribs, chicken houses and other farm buildings. While rats do migrate a great deal, local urban migrations seem to be retarded either by the social structure of rat communities or the reluctance of rats to cross streets (3, 4).

Monroe County officials have chosen to use a zinc-phosphide poison-emetic. Animals capable of vomiting gain some protection from the emetic action of this preparation. Rats are not so protected. Other poison-emetics such as red squill have been used in the past. In response to an inquiry it was learned that the County Health Department will use zinc phosphide in sewers and one of the anti-coagulant poisons (presumably Alpha-Naphthyl Thio-Urea) around buildings. There has been some evidence of resistance to anti-coagulant poisons (Warfarin) developing in treated rat populations. Anti-coagulants kill rats by causing internal bleeding.

To be effective a poisoning procedure must cause the death rate of the rat population to exceed the birth rate. Otherwise the population will simply turn over more rapidly than it did prior to treatment, while it may remain about the same in absolute size. For various theoretical reasons it is even conceivable that a rat population might increase under poisoning; rat birth rates typically rise when poisoning campaigns are in progress. Serious objection to poisoning may arise because of the danger to pets and children who also might eat the poison.

An extensive urban rat control program was conducted as early as 1943 in Baltimore. With the aid of many residents rat poison was administered to 5, 574 city blocks. This included approximately 65% of the city. Rat proofing and

fumigation were also employed. Before treatment the rat population averaged 113 rats per block. Poisoning initially caused a rapid reduction to about 10 rats per block. In one year the population recovered to 55 rats per block, and yearly campaigns for three years held the population between 10 and 55 rats per block. When the cost caused abandonment of the program, the rat population returned to the 1943 level. Much detailed information on the Baltimore experience is available because a very ambitious study was made before, during and after treatment (3).

4. A balanced rat control program.

Long term reduction of rat populations can be achieved through measures which drastically reduce the food and hiding or nesting places. Techniques which reduce or eliminate the means of subsistence for rats have the advantage of being entirely safe, continuous in their effect, capable of producing eradication, and consistent with improved human living conditions. Rats in streets and houses are a symptom of the ills of the inner city and not now a significant cause of such ills. In this sense rats are an embarrassment; their abundance is an inverted reflection of the living conditions of their human companions.

A reasonable attack on rats begins with improving sanitation, enforcing building codes and leaving no garbage uncollected in the inner city. If this is done in fact, and not just on paper, the rat populations will probably dwindle. It might then make sense to extend the attack on rats by poisoning selected harborage, such as sewers. The Baltimore experience would indicate that poisoning without improved sanitation will ultimately be a waste of money and effort.

Our local governments might wish to consider rat control through a large-scale cooperative effort with inner city citizens' groups. This could include 1) educating the public in these areas on sanitation measures which eliminate rat food and harborage, 2) opening communication channels to government agencies involved with building code violations and garbage pick-up, and 3) advising and assisting tenants and home owners in rat-proofing dwellings. We have found a similar collaboration on the lead poisoning of inner city children to be extremely fruitful.

We are concerned about the news (the Democrat and Chronicle of June 18) that it will probably be necessary to "ditch" additional garbage collections and an intensified health education program in the inner city, due to lack of funds. There are, as we have indicated, serious doubts as to the effectiveness of the "search and destroy" program which is apparently all that will be financed here. We strongly concur with County Health Director Dr. Wendell R. Ames' statement that the real answer lies in effecting "physical and social changes aimed at halting the deterioration and improving the environment of inner city neighborhoods". One way by which these changes could be initiated at low cost is through cooperative efforts described above.

Finally, a comment about communication between officials and the general public is in order. It was appropriate and timely for County officials to announce the Rochester rat control program. In the near future, it will be even more appropriate for the public to be told, in precise terms, of the

impact of the control program on the number of living rats in treated and untreated parts of Rochester. It is essential that all judgments as to the effectiveness of the program be based on data showing changes in the size, the age and sex composition, and the fecundity of the live rat populations; not simply on counts of numbers of dead rats. The techniques for obtaining such data have been developed and published.

5. References.

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4. Calhoun, J. B. 1962. The Ecology and Sociology of the Norway Rat. Public Health Service Publication No. 1008. U. S. Dept. of Health, Education and Welfare.