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THE OUTLOOK FOR VERTEBRATE PEST CONTROL

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ABSTRACT: Because of the increased concern for the environment and the public's positive action toward preservation of all forms of plant and animal life, future control methods for pest animals will require a greater degree of specificity than in the past. Vertebrate pest control does not face a very promising future unless the independent and cooperative effort of both industry and government is expanded. The time has passed when one could use a chemical simply because it was a good poison or repellent. Now, especially when food or feed crops are involved, it is necessary to know a lot more about a chemical than just its effect on the target species. Our knowledge now must include: (1) chemical and physical properties, including chemical structure, (2) micro-analytical methods for detecting or measuring the chemical, (3) degradation rates and resultant by-products, (4) oral and dermal toxicity (acute and chronic) to target and non-target animals, (5) efficacy as toxicant or repellent, (6) phytotoxicity, (7) pharmacology, and (8) secondary hazards.

At present there is need for more chemists and pharmacologists in the field of vertebrate pest control research. Due to the comparatively small market for chemicals used in vertebrate pest control most chemical companies are reluctant to spend the large sums necessary for their development. Also, a potential source of personnel for increasing this type of research is available at many state universities and experiment stations. Support from these institutions should be encouraged.

Six years ago at the Second Vertebrate Pest Conference, it was stated appropriately that in controlling pests in agricultural crops one must consider residues; phytotoxicity; accumulations of the pesticide in the soil; effect on beneficial species of insects and mites; the effect on wildlife species; hazards to humans, pets and livestock; and the problem of environmental contamination. A lot has happened since that conference; for example, the earth's gravity has been overcome and men have been transported to the moon and back. Of equal importance, in the last decade, the public finally began to show a real concern about the things man does and can do to his environment. Along with this public awareness of fish and wildlife values, both economic and esthetic, has been increased. As stated by Baldwin (1964), "There is a growing concern, coupled with positive action for the preservation of all forms of plant and animal life." The report of the Secretary's Commission on Pesticides and Their Relation to Environmental Health, more commonly referred to as the Mrak report, demands that all control programs be critically reviewed. Congressman Henry S. Reuss, the Chairman of the subcommittee on Conservation and Natural Resources has summarized the situation as follows: "Too many people -- particularly too many affluent people -- cause air and water pollution, make noise, emit harmful chemicals, crowd open spaces, cause traffic congestion and otherwise reduce the quality of life in our predominately urban society." When we couple this statement with the fact that the human population in the United States is increasing at the rate of 3 million per year we can begin to appreciate the magnitude of the problem.

In dealing with vertebrate pest problems we must be increasingly concerned with the effect these programs may have on the environment. I do not wish to imply that these responsibilities have been ignored in the past, but they must be of major concern in the future. More research is needed to increase our basic understanding of animal and plant ecology. We need more information on the life history, habitat requirements, and interrelationships with other animals and on specific or behavioral characteristics which may provide the key to specific control. It is important that we do not devote all of our efforts to chemical controls but that we give due consideration to ecological approaches in the solution of vertebrate pest problems. Just last week a conference on the Ecological Control of Animals by Habitat Management was sponsored by the Tall Timbers Research Station in Tallahassee. The purpose of the conference was to explore the role of habitat management in regulating pest animal populations. Also, the National Science Foundation has recently selected four universities to share in a research training program on non-chemical means of controlling pests. One of the universities, North Carolina State, will emphasize natural means of controlling mammals and birds. The other cooperating universities are the University of California, the University of Oregon and Cornell University.

During the past decade only a few new vertebrate pest control chemicals have been developed or introduced into the market. These include Avitrol, Gophacide, Ornitrol, Phostoxin, Starlicide, R-55 Rodent Repellent and BioMet 12 Rodent Repellent. Although the numbers are

few, they do represent some significant developments. Avitrol is a fright-producing chemical which causes certain species of birds to fly erratically and produce alarm or distress calls, thereby frightening away the rest of the flock. Ornitrol is the first chemosterilant to be used in managing populations of feral pigeons. Although these chemicals represent a new approach to control much remains to be learned about their use. Avitrol, at present, is not registered for use on food or feed crops. It is hoped that before the next corn growing season a temporary tolerance will be established so that additional field tests may be made. Ornitrol is registered only for use on pigeons; future work may lead to the development of other uses.

One reason for the apparent delay in developing new chemicals is the vast amount of information that is needed to support a request for registration. This is particularly the case if the chemical is to be applied to a food or feed crop. In addition to the usual amount of information on the efficacy of the material, it is necessary to know (1) the chemical and physical properties, including structure, (2) a micro-analytical method, (3) degradation rates and the by-products, (4) oral and dermal toxicity (acute and chronic) to target and non-target animals, (5) phytotoxicity, (6)pharmacological action, and (7) secondary hazards. The precise requirements for registration may well be illustrated by citing Avitrol. Although only .1362 to .4086 grams of the chemical on a cracked corn bait is uniformly applied to an acre of standing corn (milk, dough or dent stage) it must be demonstrated that harmful residues do not exist in the plant or the grain. Much of this basic information can only be obtained by a team of experienced chemists.

For some reason the development of chemicals for vertebrate pest control has not progressed as rapidly as have insecticides or herbicides. Presumably this is influenced by the limited, potential market. Unfortunately the potential market for vertebrate pest control chemicals is not fully known. If we consider damage by mammals and birds to agriculture, forestry, stored foods and structures plus the damage by birds to aircraft the total would undoubtedly approach one-half billion dollars annually. This does not include the health or esthetic aspects. Another indication of the size of the damage problem is the response to letters sent to 37 Agricultural Experiment Station directors, primarily in corn producing states. Replies were received from 32 states; 18 indicated that bird damage to corn was an important problem and 16 indicated a willingness to cooperate in a research project to alleviate the damage. Many other examples of the extent of damage have been reported but more factual information is needed to adequately support an expanded program.

In order to speed up the development of new chemicals and control studies there is need for better coordination of effort between the chemical companies, the federal government and the states. Also, a budget more in keeping with the size of the problem is necessary. As keynote speaker at the First Vertebrate Pest Control Conference, Mr. W. C. Jacobsen, former director of the California Department of Agriculture and long time worker and counselor on pest control problems, made a statement which summarizes the situation now as well as it did 8 years ago: "Truly, hundreds of dollars have been spent where thousands of dollars are needed. The field is large enough so that more of the better equipped educational and research institutions can and should embrace it. All efforts in this direction will yield the best results if there is adequate correlation."

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