

TUBERCULOSIS IN MICHIGAN DEER PARKS— PUBLIC HEALTH SIGNIFICANCE¹

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Human infection with bovine tuberculosis is today a medical rarity in the United States. This has not always been true. Fifty years ago a certain proportion of all human tuberculosis was a result of infection with *Mycobacterium bovis*, the tubercle bacillus having cattle its primary host. Human infection with this organism resulted mainly from ingestion of tuberculosis contaminated dairy products and from contact with tuberculous cattle. Bone and joint tuberculosis was a common characteristic of this type of the disease and the resultant tuberculous hunchback was not an uncommon sight.

There was ample opportunity for the human population to contract bovine tuberculosis as it was estimated in the early 1900's that about 5% of all cattle in the United States were tuberculous and that its prevalence was doubling every 15 years (1). Further, in 1918 alone, nearly 50,000 tuberculous cattle carcasses were condemned as unfit for human consumption.

In 1917 the U. S. Department of Agriculture inaugurated a bovine tuberculosis eradication program that incorporated an intradermal tuberculin test and the slaughter of reactors to this test. This program is credited with reducing the incidence of tuberculosis in the U. S. cattle population from 5% in 1917 to 0.08% in 1965. In 1965 in the USA only 61 cattle carcasses were condemned due to tuberculosis on regular kill (i.e. other than reactors or suspects).

The ultimate goal of this program as indicated by its title is the complete elimination of bovine tuberculosis from the cattle population of the United States. This requires the elimination of the organism responsible for bovine tuberculosis not only from all cattle but also from all other living reservoirs of infection.

TUBERCULOSIS IN DEER PARKS

In the fall of 1962 a veterinary practitioner reported to the Michigan Department of Agriculture that he had diagnosed tuberculosis in a deer from a captive deer herd that had died after a chronic illness. The herd from which this animal came was composed of two deer species originally exotic to the United States

but many generations of which had been raised in U. S. zoos and deer parks. This herd was a major feature of a privately owned roadside park that attracted large numbers of tourists during its short summer season. The Michigan and U. S. Departments of Agriculture were interested in this finding due to its possible threat to the cattle tuberculosis eradication program. Deer, however, are not included in the definition of livestock in the Michigan Department of Agriculture regulations and no investigation could be made without the cooperation of the owner. The owner in this case gave full cooperation and a testing program was undertaken which included intradermal tuberculin testing of deer, monkeys, llamas, aoudads, reindeer, and donkeys resident at this park (2).

Nearly one third of over 200 deer tested were positive to the tuberculin test. No evidence of tuberculosis was found in any of the other species present. A concerted effort was made to eliminate the tuberculosis infection from the deer herd by conducting a series of tuberculin tests on the herd and removing all of the test reactors. Nearly half of these reactors were observed on post mortem examination to have tubercles in the lungs and many more had lesions of tuberculosis in other parts of the body.

Samples from many of these animals were examined by the Michigan State University Tuberculosis Research Project, and the causative organism was found to be *Mycobacterium bovis*. After conducting a number of tuberculin tests and slaughtering more than 70 reactors, chemoprophylaxis of the remainder of the herd was attempted. The herd was treated daily for two six-month periods with the drug isoniazid (I.N.H.). Periodic tuberculin testing since initiating chemoprophylaxis reveals that the disease has been successfully controlled and possibly eliminated from this herd.

Concern with this disease does not rest entirely with the Department of Agriculture's Animal Health Division. Conservation Department personnel should be concerned as all deer are quite susceptible to this form of tuberculosis. If this disease should become established in native deer herds, now free of this disease, serious losses could occur. Adverse climatic conditions, nutritional deficiencies, and the yarding or herding of deer in the northern states during the winter months creates an ideal environment for the

¹This article is based on a slide presentation before the 22nd Annual Conference on Environmental Sanitation at Gull Lake, Michigan, March 1966.

spread of this disease should it be introduced. Once established in native deer, it would become a perennial disease problem.

PUBLIC HEALTH IMPLICATIONS

Of major concern to everyone is the public health implication of the occurrence of tuberculosis in groups of animals to which the public has close contact. A feature of many of these deer parks is the freedom the public is allowed to mingle with, pet, and feed the deer. Adults and children hand-feed deer sufficiently hungry and tame to nuzzle those visitors who are slow at offering food. This close contact presents an ideal situation for the transmission of the tuberculosis organisms from the deer to humans. It was mentioned earlier that nearly 50% of the reactors had tubercles in the lungs. Many of these lung lesions were "open," that is, communicating with the air passageways. Therefore, the tuberculosis organisms would be present in the saliva of these deer and available for transmission to human hand and mouth. An ideal condition for aerosol-respiratory transmission of organisms is, also present.

The human population coming in contact with animals in similar parks is not small. Visitors to this one park in which tuberculous deer had been found numbered nearly 200,000 annually. There are about 30 parks in Michigan alone that have deer herds and there is an active exchange of animals between many of them, increasing the chances for spread of the disease. Before tuberculosis was discovered in this one herd, sales of many of its deer had been made to many other parks in Michigan and to parks in eight other states. Investigations have revealed that some of the deer herds in these parks had also become infected.

A major problem in controlling tuberculosis or any other disease in exotic species such as these deer, is the lack of health supervision. The Department of Agriculture in most states is limited to control of diseases in livestock, and deer generally are not included in the definition of livestock. The Department of Conservation in most states is generally limited to controlling the possession of species native to that state; so exotic species do not fall under their control. Local health departments do not act unless there is some indication of danger to public health. The insidious nature of tuberculosis prevents recognition of its presence except to those people closely connected with the herd and these people may have personal reasons for suppressing any evidence of trouble.

The machinery is already available within the Animal Health Division to conduct the tests necessary to establish the tuberculosis status of exhibition species with which there is a possible public or animal health hazard. It is neither advisable nor desirable to establish a compulsory testing program for all exotic animal species in parks and zoos. However, steps should be initiated to protect the gains made in tuberculosis control in both human and livestock populations by requiring tuberculin tests of those species with which the public is allowed to contact or which are allowed to contact domestic species of livestock.

REFERENCES

1. Amberson, J. B. 1966. A Retrospect of tuberculosis. *Am. Rev. Resp. Dis.* 93(3):343-351.
2. Towar, D. R., Scott, R. M., and Goyings, L. S. 1965. Tuberculosis in a Captive Deer Herd. *Am. Jour. Vet. Res.* 26(111):339-346.

SUMMER CONFERENCE ON "THE DEMANDS OF POLLUTION CONTROL LEGISLATION"

The Florham-Madison campus of Fairleigh Dickinson University announced today that it will hold its first Summer Conference on Control of Air and Water Pollution during August 22-26, 1966. The purpose of the conference is to review the effects of air and water pollution control legislation; the methods used to correct the problem—indicated, ideal and actual; the significance of the control measures; future trends; future requirements as seen in present and proposed legislation; local, state and federal laws; their impact on existing operations and their impact in generating new business and new profit opportunities.

This program comprises a week-long series of lectures by authorities in the fields of air and water pollution. Their lectures will cover the legislative, sociological, medical, technological and economic aspects of the problem of air and

water pollution. Case histories will be presented to show actual and proposed solutions.

One day will be devoted to technical presentations by representatives of manufacturers of pollution control equipment to review the capabilities of available equipment and technology to meet pollution control requirements.

It will be possible for those who cannot attend the entire conference to participate in one or more days of the program. Room and board accommodations are available at the campus.

Further information and application forms may be obtained by contacting Dr. Souren Z. Avedikian, Director, Summer Conference, "The Demands of Pollution Control Legislation," Chemistry Department, Fairleigh Dickinson University, 285 Madison Avenue, Madison, New Jersey 07940.