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DISEASE RELATIONSHIP OF DOMESTIC STOCK AND WILDLIFE

By Dr. J. E. Shillinger

Division of Wildlife Research, Bureau of Biological Survey

From the time that western civilization established itself on the North American continent until very recent years, little thought was given to the diseases, or other forms of loss, in game. In the process of bringing civilization and the incidental domestic arts and trades to the United States it appears to have been the policy to establish domestic farm stock on the land just as abundantly as the carrying capacity of land would tolerate. And judged by the low quality of many of our present farm animals, it is evident that in many cases the land was, and is now, overstocked and undermanaged. In traveling over this country one is impressed by the lack of uniformity, imperfect physical development, and poor state of nutrition of much of the domestic livestock. It would appear that the wild animals unhindered by fencing and other restraint such as controlled mating, feed selection, and enforced habitat in contaminated or polluted environment, have a better chance for perfect growth and complete development to a size and proportion normal for those species.

While all of the factors mentioned produce a definitely deleterious result on the welfare of animal life, that of contaminated or polluted environment is by no means the least. The stunting action of disease on the growth of the young is too well known to admit of controversy. The impairment of function of vital organs due to minute cellular changes resulting from sub-acute or chronic infections prevents normal growth. Through centuries of enforced survival in densely congested pastures, pens, and stables, a certain degree of acquired resistance to many diseases has been built up in farm stock. If it were not so, very few barnyard animals would ever survive the conditions generally seen in our agricultural districts. Manure heaps, quantities of partly spoiled feed, and decaying masses of vegetation and refuse have come to be regarded as a natural part of the barnyard scene.

Those who have attempted to raise or maintain wild species under these conditions have learned that it can not be done. Attempts which have been made to keep large numbers of wildlife in concentrated areas regularly show a very heavy loss. These losses are made much more pronounced by the close association of domestic stock with the wild forms. The minute infectious organisms, as well as the larger parasites, frequently attack similar types of domestic and wild animals.
OLD WORLD INTRODUCTIONS

It is conceivable that with the introduction of domestic species from Europe into North America in the 16th and 17th centuries they were exposed to certain new disease organisms, especially the larger parasites, to which they were not accustomed. Proof of this may be found in the presence of certain parasites in cattle and sheep in this country that are unknown among those animals in the Old World, but they are present among our native deer and other wild ruminants. Similar situations exist also in the carnivorous groups and among birds. If, however, any serious losses occurred in domestic animals as a result of the acquisition of parasites or diseases from wildlife during the early period of their association in this country, it has not been recorded.

Based on these facts, it would appear that the domestic species through their enforced survival in highly contaminated environment for thousands of years are not very susceptible to injury from a few more parasites from wild animal sources. In the present generation those parasites that are essentially American are no more injurious to farm animals than are those of world wide distribution. Therefore, it may be stated that there is no well-grounded evidence to show that the proximity of wild game to domestic stock is a serious menace to the latter.

FUR AND GAME FARM LOSSES

When the picture is viewed from the other position an entirely different situation is apparent. Those who have experimented with maintaining wild animals in close association with domestic farm stock have usually had extensive losses among the former. This situation maintains throughout the various groups of wild animals, none being immune to the ravages of some serious disease common to the domestic stock of similar types.

Fur animal producers have had more disastrous losses from canine distemper among their silver foxes than is regularly observed by dog owners. Many fox ranchers have learned by costly experience that a rather mild case of distemper in a dog may wreak havoc when the infection is transmitted to a herd of silver foxes.

Quail and grouse raised under controlled conditions on game farms frequently die in great numbers from poultry diseases to which the domestic birds have acquired a high degree of tolerance. For this reason the most modern method of propagating upland game birds is to raise them by mechanical methods of incubation and brooding in order to be sure they are not exposed to infections from chickens used as foster mothers. Blackhead, coccidiosis, avian tuberculosis, avian diphtheria, and parasitism caused both by worm and insect infesta-
tions, are common diseases of upland game birds raised in captivity which are readily communicated to them from farmyard fowls.

Artificial heating methods of hatching and hovering young game birds are by no means a sure control of disease problems on game farms, but the chances of disease are materially reduced by eliminating domestic poultry from the disease-causing possibilities.

Wild Game Diseases

Among the ruminant big game animals the situation is even more evident. The serious losses from necrotic stomatitis encountered among wild ruminants are well known. The causative organism may be found in many locations outside the host animals, but the accumulations of damp decaying waste products contaminated with animal feces are common sources from which the disease spreads. Since the germs survive for long periods in suitable environment, the premises which have been used by cattle or sheep may remain infective for big game for a long time after the removal of domestic stock.

Those who were connected with wildlife conservation activities on the west coast in 1924 may well remember the consternation wrought by the spread of foot-and-mouth disease from cattle to deer in the Stanislaus National Forest. In this spectacular outbreak it was necessary to kill over 22,000 deer in order to control the infection. Of those removed, it was observed that somewhat more than 10 per cent of them exhibited lesions of the disease at the time. While the methods of slaughter and removal of the carcasses from the forest was the only possible means for eliminating this dreaded disease from the country, it is hoped we will never again be faced with a similar experience.

Tuberculosis is known to affect a wide range of mammals and birds when they are placed in close contact with infected subjects. Cases of wild game animals showing unmistakable lesions of the disease have been found in districts where a high percentage of the cattle and hogs were tuberculous. Game farmers accustomed to raising young pheasants under domestic chickens frequently experience heavy losses from avian tuberculosis contracted from the foster mothers. It has been noted that pheasants, otherwise very hardy birds, but in nature not regularly exposed to tuberculosis, are peculiarly susceptible to the ravages of this infection when they are maintained on a range with tuberculous poultry.

A disease similar to Malta fever in goats, and referred to as Bang’s disease, undulant fever, or contagious abortion, in cattle and hogs, has been diagnosed in herds of elk and buffalo which have been associated with domestic cattle. The extent of damage done by this disease in the game species mentioned cannot be stated, but in the
event animals are to be used for restocking depleted game areas or are to be introduced onto new ranges, they should be subjected to biological tests to make sure that non-infected animals are transferred. The plan of using only healthy animals as parent stock for restoring wildlife in depleted areas should be followed with reference to all conditions in order to restrict as far as possible the distribution of disease micro-organisms and the larger parasites.

To those who have lived in districts where rabies has been passed from dogs to wildlife, it is needless to elaborate on this unfortunate situation. These outbreaks of rabies were not given wide publicity as a matter of policy, but the damage done and the expense entailed in stamping out the infection were extensive. When rabies exists in the commonly recognized subject, the dog, regulatory measures may be developed to restrict widespread damage, but when it is passed from dogs to such wild species as coyotes and foxes the potential danger is multiplied many times. Since rabies is transmitted in nature by biting, the only reasonable means for eliminating the disease in the known infected areas is that of vigorous trapping and otherwise destroying all of the wild mammals in that district that are capable of inflicting wounds with their teeth. Such severe measures are called for because of the seriousness of rabies infection and the ease of its transmission to all forms of animal life, including man.

Perhaps the most serious conflict between domestic stock and game at present is the pollution of heavily grazed range land with the droppings of these animals containing disease-causing micro-organisms and parasitic worm eggs. A number of authentic cases are on record where big game mammals have thrived on a given area for generations, and have rapidly disappeared with the introduction of cattle and sheep on their range. As yet the few workers engaged in wildlife disease studies do not have complete information on the exact nature of some of the obscure causes of loss in big game mammals when associated with domestic stock. The results, however, in many instances are apparent.

Recently a well controlled experiment in propagating Rocky Mountain bighorn sheep in Alaska showed that the original specimens taken from the wild survived very well in the enclosures provided. When they were associated with domestic sheep for the purpose of raising some crossbreeds, the bighorns gradually died off. The crossbred lambs appeared to have a greater resistance than their purebred bighorn sheep parents, but in time they too died, while the domestic sheep parents survived and remained in good condition. The only evident explanation is that some infectious organism or parasite well tolerated by the domestic sheep accustomed to polluted environment was transferred to the wild animals with disastrous results.
It has been observed by Federal biologists that Rocky Mountain bighorns do not survive when domestic sheep are placed in competition with them. Ranges formerly occupied by large numbers of bighorns have become almost depleted of this species within a few years after the introduction of domestic sheep.

Numerous accounts tell of heavy losses of bighorns from sheep scab in the pioneer days of the sheep industry in the West. Merritt Cary in 1911, page 62, N. A. Fauna, No. 33, says, "A danger which threatens mountain sheep in Colorado as well as other western states is the introduction of scab from domestic sheep allowed to graze on the higher mountain slopes." In 1910 Edward Warren (in "The Mammals of Colorado," p. 238) states "C. F. Frey tells me they (mountain sheep) suffer much from scab in the West Elk Mountains and that a party told him in 1902 at one place near the head of Sapinero Creek 75 head were counted which had died of scab. Domestic sheep had run in that locality, and the wild sheep had doubtless contracted it from them."

On ranges of the Coconino National Forest where actinomycosis, or lump jaw, was prevalent among the mixed populations of cattle and antelope a few years ago, it was observed that losses among the latter were particularly heavy. This again, as in many types of infections, indicates a greater degree of susceptibility of wild species to common diseases of domestic stock.

Various internal parasites of identical species are common to both domestic and wild ruminants. In a great many instances such injurious parasitic worms as the liver fluke (Fasciola hepatica), stomach worms (Haemonchus contortus), and various species of lungworms, including Dictyocaulus viviparus, of world wide distribution, are common to big game mammals and domestic ruminants.

Care has been taken to mention those destructive diseases and parasites known to exist on other continents in order to show that their presence among stock here in America was not dependent upon our native wild fauna but were most probably introduced with cattle, sheep, and other stock from abroad.

Irrespective of the various specific diseases, bacterial and parasitic, which the author has enumerated, the gross picture as observed by expert and non-professional conservationists shows a definite conflict between the herds of domestic stock and wild game. It is regularly seen that with the introduction of flocks and herds of grazing animals the wild forms become proportionately scarcer corresponding to the numbers of domestic stock. It is conceivable that if we were to enforce this constant intermingling in considerable numbers that certain important wild game species may suffer complete extinction.