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DISEASE AS A FACTOR IN GAME FLUCTUATION

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For many years trappers, hunters, and game protectors have noted great fluctuations in the abundance of certain game and fur species. These are often so pronounced that in times of greatest scarcity predators that feed upon the depleted species likewise become seriously reduced in numbers. These periods of abundance and scarcity were noted by trappers in the early history of the country, as their catch of foxes, coyotes, wolves, and other carnivorous fur animals was largely dependent upon the abundance of game, especially grouse and hares, upon which the carnivores fed.

With the grouse and hare, the cycle from peak of abundance to greatest scarcity and back to maximum abundance averages about 10 years, but among some animals, as chipmunks and field mice, the cycle may be completed in 3 to 5 years. The shortage in the numbers of the game species discourages hunting, and the failure of sportsmen to purchase hunting licenses causes loss of revenue to State conservation departments.

Cooperative Study of Causes

These fluctuations in animal populations are more evident in the Northern States than in the Southern. For the past 10 years, therefore, the Section of Disease Control of the Bureau of Biological Survey, in cooperation with the Department of Bacteriology of the University of Minnesota and the Minnesota State Conservation Commission, has made a special study of the cycles of abundance and scarcity. Opinions have been advanced that the decrease in game populations is due to a shortage of food, to unfavorable weather in the breeding season, or to an overabundance of predators. More recent studies have revealed, however, that great reduction in numbers of game mammals and birds has occurred long after the end of the breeding period, during favorable seasons, or in the absence of an excessive number of predacious animals. This would indicate that these reductions are due to some unseen destructive agency that takes a large toll without exciting notice.

Sick or dead mammals and birds are difficult to find. The coloration of animals, which blends into the colors of the environment, offers little contrast to attract the eye. Furthermore, the tendency of sick animals to secrete themselves and to remain quiet also aids in their escaping observation. Dead animals are rapidly disposed of by scavenger mammals, birds, and insects, and in a short time no trace of the carcasses remains. Thus it may happen that a dense population may be almost wiped out by disease, and yet few evidences remain to attract the attention of the casual observer.

In connection with the cooperative studies now being conducted, efforts are made to collect for laboratory examination specified numbers of grouse and hares at regular intervals from representative areas, and to procure for study all grouse and hares found sick or dead. Several diseases that are fatal to these species have been recognized. It was demonstrated that the cottontail rabbits were wiped out by tularemia over a large area under investigation. The snowshoe hare and the grouse are more resistant to this infection, but the disease is also found in these as well as in other important species despite their greater natural immunity.

The immense numbers of ticks and other biting parasites that everywhere abound and are capable of transmitting infectious diseases furnish ample means for the spread of virulent organisms to almost every wild mammal and bird. It is not unusual to find several thousand ticks on a single specimen. For example, on a typical area in Minnesota in August 1935, the average infestation of ticks per snowshoe hare was 3,444, the numbers ranging from 388 to 8,564. With such massive parasitism by two-host ticks, the rapid spread of disease organisms is definitely assured. Furthermore, one must also take into account as possible carriers of disease the great number of biting flies and other insects that take their living from the blood of wild animals.

In addition to tularemia, other diseases that are known to be spread by contaminated or polluted environment have been discovered prevalent in game. Bird cholera and ulcerative enteritis have been observed in grouse, and paratyphoid has been found in hares. Several other fatal forms of disease, the cause of which is not yet known, have also been noted. One feature of the research investigations in progress is the examination of all abnormal conditions noted in the study specimens that may account for losses in wildlife.

The more or less sudden disappearance of certain species of game occurs regularly where there are dense populations. Where animals are abundant the possibilities for the spread of disease are greatest, as great concentrations increase the opportunity for infections to be carried by parasites or other means from one host to another. Likewise in dense populations pollution of the range reaches the maximum, and the consequent spread of parasites and disease may be exceedingly rapid.

Remedial Measures Suggested

From present information it is evident (1) that there is a disastrous decrease periodically in important game species; (2) that this diminution occurs regularly after times of greatest abundance and in places where the animals are concentrated; and (3) that dissemination of fatal diseases is facilitated among game when the populations are dense. It would seem necessary, therefore, to avoid the overpopulation of an area. By keeping the numbers uniformly below excessive abundance, it should be possible to keep the ravages of disease and other unfavorable factors at the minimum and to insure a sustained yield.

In order that landowners and sportsmen may get maximum returns from the game in any region, a regular annual supply must be kept available. On several experimental areas on which moderate hunting was continuously carried on when populations were increasing, it was found that there was regularly a greater supply of game in the lean years at the low period of the cycle than on ranges where no hunting had been done. Proper management of cyclic species that are either hunted, trapped, or otherwise pursued by man, should include complete protection during the years when their numbers are low. Investigations strongly indicate that if the high peaks of populations are prevented, the periods of extreme scarcity can be forestalled. To do this effectively, the hunting seasons in the various States should be adjusted each year to correspond with the rise and fall of the game supply as determined by field observations. Some States have arranged for this fairly satisfactorily, but others still adhere to more or less fixed hunting seasons designated months or years in advance. A flexible plan that can be adjusted to meet current conditions should lessen the radical fluctuations in the abundance of game and maintain a more uniform supply each season.