

## LEAD POISONING OF WATERFOWL

by Theodore H. Atkinson, Belmont

Every year an estimated 45 million waterfowl die from all causes during migration. Slightly less than half of this total is harvested by hunters. Of those which die from other causes, an estimated two million are needless victims of a disease induced by man, lead poisoning.

The cause of this disease is the estimated 3000 tons of spent lead bird shot which annually falls into waterfowl feeding areas where it settles into the mud and is ingested by waterfowl as food or gravel. When waterfowl ingest lead shot, the action of the gizzard grinds the shot into small particles. These are dissolved by gastric juices into lead salts which enter the blood stream with lethal effects. Hard food, such as corn, requires the gizzard to work harder and longer, putting a greater concentration of lead into the system in a given time span. Thus, ironically, the feeding of corn to starving waterfowl in winter may save them from starvation only to kill them through lead poisoning.

Waterfowl suffering from lead poisoning show varying degrees of emaciation, reduced activity with reluctance to fly, lowered food intake, wing droop, bile staining of the vent area, a tendency to seek isolation and cover, the inability to walk or stand, and internal disorders that a trained diagnostician can detect.

The direct effects of lead poisoning can kill birds outright, but insidious secondary effects may endanger an entire waterfowl population. Lead poisoning puts great stress on waterfowl, suppressing the immune response and allowing other diseases to overcome the birds' natural defense mechanisms. As a result, for example, avian cholera present in a few carriers, can spread more readily throughout an entire flock producing further die-offs and an increased number of carriers among the surviving waterfowl.

The ultimate effects of lead poisoning on a waterfowl population may be catastrophically epidemic. In one incident, 6000 Whistling Swans were lost to lead poisoning on the Mallowuskie National Wildlife Refuge in eastern North Carolina. On another occasion, 2500 Snow Geese died of avian cholera spread through a population affected by lead poisoning.

There is a common impression that lead shot disappears into the soft-bottom marshes and cannot be reached by waterfowl. However, die-offs caused by lead poisoning have occurred in deep mud marshes a number of years after they have been closed to hunting. This has been confirmed in wildlife refuges and other areas where the U.S. Fish and Wildlife Service examines waterfowl found dead to determine the cause of death. Additional evidence comes from examination of gizzards of waterfowl killed by hunters.

In one study based upon examination of 35,411 gizzards of hunter-killed birds, 6.7% contained lead shot with significant variations among species and locations. For example, less than 2% of Buffleheads, Green-winged Teal, mergansers, Wood Ducks, Northern Shovelers, and Gadwalls contained shot. But in Canvasbacks, Lesser Scaup, Redheads, and Ring-necked Ducks the incidence of ingested pellets ranged from 12%

to 14%. In the state of Massachusetts, 7.2% of the 1369 gizzards examined contained lead shot. Yet at some specific locations, spent shot is producing a much higher incidence of shot in gizzards. This may approach 100% in some species populations at these locations. The greatest danger of lead poisoning of waterfowl occurs after the hunting season, when the lead shot lies near the surface of the marsh mud before settling into its depths. Because hunters are drawn to the areas where the largest number of waterfowl are normally found, prime feeding areas tend to receive the greatest concentration of shot. During the hunting season the pressure of human activity keeps the birds moving and prevents normal feeding in the areas being hunted. Following the hunting season, the birds resume their normal feeding habits in the now lead-concentrated prime feeding areas.

Spring drought may aggravate the danger of a lead-poisoning epidemic. During spring droughts, waterfowl concentrate on limited marsh areas. These areas tend to be the deepest parts of the marsh and often the same prime feeding areas which contain major deposits of lead shot. As a result, many more waterfowl are lost to lead poisoning during spring seasons when drought conditions occur. Such spring losses are particularly significant if drought conditions prevail over a large area since they further reduce the population at a time when its reproductive potential is already curtailed by poor habitat conditions.

Although concern about lead poisoning focuses upon waterfowl (Anatidae), some other aquatic birds have been examined for the incidence of ingested lead pellets. Most of the information concerns Soras, in which the incidence of lead shot in the gizzards examined ranged from 1.8% to 13.1%, depending on where the birds were collected. Lead shot has also been found in gizzards of King, Clapper, and Virginia rails, Common Gallinules, and American Coots.

Secondary poisoning of species which feed on waterfowl also occurs. There are several records of lead poisoning of the endangered Bald Eagle. The source of such secondary poisoning is not ingested lead shot but lead salts in the devoured organs of the lead-poisoned waterfowl. Last year thirteen Bald Eagles were observed feeding on a goose die-off in southern Illinois. If a Bald Eagle consumes 15 to 20 lead-poisoned birds per day--not an uncommon occurrence at the site of an undisturbed die-off--lead salts in its system may quickly reach a lethal concentration.

What is being done to alleviate this problem? About five years ago, the U.S. Department of the Interior began a program to phase out the use of lead shot in waterfowl hunting by requiring the use of soft steel shot instead. At first this was done in selected areas along the Atlantic Flyway. Then it was expanded to include portions of the Mississippi Flyway. By the 1978-1979 hunting season, thirty-two states and parts of all four migratory waterfowl flyways were scheduled for such regulation. Unfortunately, expansion of steel-shot zones has been retarded by two problems. First, the shot manufacturers have been unable to produce enough steel shot to supply hunters on all the flyways. Secondly, there has been substantial hunter resistance to use of the new steel shot.

As a result of political pressure generated by this hunter resistance,

the Department of the Interior has been able to obtain passage of its budget only by agreeing not to enforce the steel-shot regulations in those states whose Fish and Wildlife Services do not concur with these regulations. The result for the 1979-80 hunting season was that 9 of the 32 states scheduled for such regulations did not approve their implementation in part or in total. In 1980 the same budgetary restriction was forced on the Department of the Interior with the same result in 12 of the 29 states scheduled for steel-shot regulations in 1980-81. However, some states not affected by the federal steel-shot regulations have instituted their own laws.

Hunters oppose the use of steel shot for several reasons. Some hunters believe that steel shot is ballistically inferior to lead shot and that its use will produce more waste kill of waterfowl from wounding than lead poisoning produces. The Fish and Wildlife Service has countered this belief with a study based upon use of steel shot in controlled harvesting of pen-raised Mallards and a study of the kill and wounding factors of both steel shot and lead shot on wild geese. Projections from these studies indicate that use of steel instead of lead would increase the annual number of birds downed but not retrieved by at most 377,000, which is much less than the two million killed annually by lead poisoning. Some hunters oppose the use of steel shot because it is markedly more expensive. Some are concerned that its use will damage their gun barrels. There does appear to be a potential for some choke expansion, but the Fish and Wildlife Service does not believe that the damage is sufficient to warrant withdrawal of the steel-shot regulations. Finally, some hunters do not believe that there is a significant lead-poisoning problem. The Fish and Wildlife Service has confirmed the extent of the problem with a great variety of evidence: studies of lead levels in the bones of hunter-harvested waterfowl; examination of approximately 100,000 gizzards for lead shot; tests for lead levels in blood samples drawn from live waterfowl; studies of the frequency of lead-poisoning deaths among waterfowl, and a survival study based on band returns from two groups of pintails, one group fed a quantity of lead shot and a control group fed none.

If the majority of hunters could be convinced that the true severity of the lead-poisoning problem justifies the use of steel shot in spite of some disadvantages, steel-shot regulations might become universal and massive lead poisoning of waterfowl might become only a memory. All who benefit from the welfare of waterfowl--hunters, professional wildlife personnel, naturalists, and birders--should support the achievement of this goal.



TOPICALS

BIRDS ON POSTAGE STAMPS  
from many countries. 25 different  
35¢. Free list. GEO. FORD, P.O.  
Box 5203 Gulfport, Fla. 33737.

*Our Specialty*

When In Concord Visit

NORTH COUNTRY OUTFITTERS

Outdoor Clothing • Hiking & Camping Equipment • Cross-Country Skis • USGS Maps



20 Years Of Helping With The Enjoyment Of New England Seasons

32 MAIN STREET (ROUTE 2A) CONCORD, MASS. 369-4186

Publication Available

Avian Abodes. "Homes for Birds," one of the Federal Government's most popular wildlife publications, has just been revised and reprinted by the U.S. Fish and Wildlife Service. The new version, an update of the 1969 edition, offers tips to bird enthusiasts on building and placing the various types and styles of houses for the most common species of American songbirds. Simple blueprints, complete with dimensions and instructions for the novice carpenter, are provided in the 22-page brochure. It also suggests ways to protect songbirds and their homes from natural predators during nesting season. "Homes for Birds" (Conservation Bulletin 14) is available for \$1.75 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.