

natural sciences

LEAD POISONING

Spent shot kills fowl

Buckshot that never finds its mark nevertheless kills hundreds of thousands of waterfowl each year. Spent shot in lakes and marshes are eaten by waterfowl as if they were seeds or grit. The birds die of lead poisoning.

William H. Stickel of the U.S. Bureau of Sport Fisheries and Wildlife Research Center at Laurel, Md., estimates that two or three percent of the American waterfowl population is lost to lead poisoning annually.

Mallards are the main victims, but many kinds of ducks, geese and swans are also poisoned, Stickel says.

Lead affects the nervous system and causes death in weeks after the shot are eaten. The birds become weak and thin; coordination becomes poor and voices may change. The poisoning also causes reduced motility and a great reduction in food consumption. Death occurs in part through starvation.

In the end, Stickel says, soft iron substitutes for lead in making shots may be an answer to the problem.

PESTICIDES

Enzymes as detoxifiers

Enzymes, catalysts that aid in biochemical processes, are being explored for clues to the growing problems of pesticide toxicity.

Dr. Robert M. Hollingworth, insect toxicologist at Purdue University, is directing research exploring the operation of enzymes in organophosphorous compounds common to many persistent pesticides. He hopes to determine factors governing their poisonous effects and to discover the metabolic processes that break down the poisonous substances.

It is the reaction of the pesticide molecules with enzymes that determines, in part, whether a substance will be toxic for a specific insect or organism, Dr. Hollingworth says.

The Purdue researcher also is seeking ways toward changing the chemical structure of pesticides to alter their toxicity in specific situations.

An attempt by the Interior Department to develop a catalyst that will cause DDT pesticide to lose its toxicity is showing some success (SN: 1/3, p. 8).

SILVICULTURE

Mistletoe woes

Mistletoe at Christmas arouses a great deal of sentiment, but it means a costly, year-long problem to Oregon's foresters.

Among the three dozen genera of the family, the dwarf mistletoe *Arceuthodium*, has cost up to \$100 million in retarded forest productivity in Oregon and other western states, a scourge rated higher than all other tree diseases combined. Furthermore, the mistletoe parasites are increasing unchecked, says Dr. Lewis F. Roth, professor of botany at Oregon State University.

In contrast to the leafy *Phoradendron*, the popular Christmas mistletoe, the dwarf sends out leafless jointed shoots, deep sinkers into the tree, and long strands throughout the inner bark.

Hosts in Oregon for the dwarf mistletoe are usually the native white and black oak, a tree generally of little commercial value. Some of the ornamental oaks have been hard hit, however. Varieties of the dwarf mistletoe attack lodgepole pines in eastern Oregon, Douglas fir in the south, hemlock and ponderosa pine throughout the state and other varieties of economically important trees.

There is no known control, says Roth. The dwarfs have very limited or no photosynthetic capacity and are entirely dependent on the host tree for all food as well as minerals and water.

SILVICULTURE

Help for Indian forest lands

A Forestry Service Center to help Indians develop productive capacities of their commercial forest lands has been established at Littleton, Colo., under the Central Office of the Department of the Interior's Bureau of Indian Affairs.

The center will coordinate forest management inventories and plans, evaluate the cost effectiveness of intensive management efforts and conduct special studies required for the protection and management of Indian-owned forest lands.

The Bureau's move toward more intensive forest management is in keeping with President Nixon's call to increase forest productivity to help meet critical housing needs.

RECLAMATION

Restoring rangeland

Drought-ridden rangelands damaged further by overgrazing and brush invasion may be restored to productivity with a new regrassing method.

Cattlemen faced with lack of forage for cattle, and conservationists fearing inroads of wind erosion and water loss, may welcome work achieved by Agricultural Research scientist C. H. Herbel of the United States Department of Agriculture.

By establishing grass seedlings, using a mulch of uprooted range brush to conserve moisture and reduce soil temperatures, Herbel hopes to restore upwards of 80 million acres in the Southwest lacking adequate grass range.

Good stands of grass ranges often fail to withstand the hot, dry periods during the summer growing season. Excessively high temperatures of soil surfaces cause rapid evaporation of available moisture. Rainfall is often erratic, is poorly distributed and occurs at a damaging intensity, Herbel observes.

His experiments show that black gamma, sideoats gamma, various lovegrasses and fourwing saltbrush will grow well despite the severe conditions, provided a mulch is used to lower surface temperatures and retain moisture at critical growing periods.

Once established and well managed, Herbel says, the grasses will flourish. Land now requiring 600 acres or more to support a single range animal will increase in forage capability up to ten times over with the new cover, he says.