environmental sciences

ECOLOGY

Snowbanks as ecosystems

Naturalists have long observed that alpine snowbanks in the summertime are often colored red or green. The color is imparted by algae that coexist in the snowbanks with other organisms in complex relationships.

The Institute of Arctic and Alpine Research at the University of Colorado is doing research in the front range of the Rocky Mountains 25 miles from Boulder, Colo., on the biological makeup of the snowbanks. Although the existence of the algae and their relationships with other organisms have been generally understood, work on protozoa, fungi and bacteria in snowbank communities was limited until the institute studies.

Protozoa populations bear a direct relationship to algae concentrations, the studies show, with the green algae common to areas below the timberline more productive of protozoa than the red algae found above the timberline. The green algae are apparently more edible for the protozoa than the red and orange algae, which are primarily hard spores.

The role of bacteria and fungi in the community is to decompose dead organisms and make available nutrients to them and other organisms. Dr. Robert Pollock of the University of North Dakota, a member of the research team, reported on the studies in the April SIERRA CLUB BULLETIN.

THERMAL EFFECTS

Checking the Connecticut River

Unless they are equipped with expensive cooling towers, both nuclear and fossil fuel power plants heat water that flows through their condensers and reenters the waterways from which the water first came. The consequent thermal effects have been a major cause for concern by environmentalists, who fear severe damage to life (SN: 2/28, p. 219).

But in the Connecticut River, at least, thermal effects from the Connecticut Yankee nuclear power station have had few damaging effects on life, according to preliminary results of study headed by Dr. Daniel Merriman of Yale University. The study reported in the May SCIENTIFIC AMERICAN began in 1965, two years before the plant actually went on the line. Although subtle ecological effects have possibly been missed in such a short-term study, there is no evidence of gross harm to life in the river, says Dr. Merriman.

ENTOMOLOGY

Dung beetle controls flies

A number of damaging parasites live in or breed on animal dung. A serious problem in the United States is the face fly, which breeds on cattle dung, then attacks the eyes of cattle. In Australia, the blood-sucking buffalo fly is damaging to the beef industry.

The Australians say they have found a unique biological solution to the problem. According to Dr. D. F. Waterhouse, chief of the Commonwealth Scientific and Industrial Research Organization's entomology division, introduction of the dung beetle—a harmless insect that lays its eggs in dung nests its larvae then eat—has had great success in reducing the amount of dung and parasites it would otherwise support. The buffalo fly is now under control in certain areas as a result of the program, reports Dr. Waterhouse.

There are a number of species and genuses of dung beetles, all members of the subfamily coprinae, and the Australians plan introduction of various species suitable for different regions. A well-known dung beetle is the famous scarab, and some species of dung beetles are beautiful insects with rainbow-hued metallic coloring.

Victor Adler, an entomologist with the U.S. Department of Agriculture, says that though various species of dung beetles are indigenous to the United States, no effort has been made there to use them as biological controls.

HYDROLOGY

Urban growth speeds runoff

When formerly porous areas of relatively open countryside are covered with pavement, homes and buildings characteristic of urban growth, the ability of the areas to absorb and hold water lessens dramatically.

The U.S. Geological Survey reports that in the past 30 years, water runoff into the ocean from western Long Island has tripled due to urban growth. The exact effects on groundwater supplies to 2.5 million Long Island residents is not yet known, but could be serious, reports G. E. Seaburn of the USGS's Mineola, L.I., office.

Construction of recharge basins, about 800 in Nassau County and 1,400 in Suffolk County, has saved about 10 percent of the precipitation that would otherwise be lost, says Seaburn. The basins are unlined underground sumps which collect rainwater from storm-sewer systems and allow it to percolate back into the groundwater supplies.

WEEDS

Resin against elodea

Elodea is a fresh-water weed that is choking Florida's inland waterways, slowing the flow of water and preventing passage of boats. The weed grows unattached and floating on the surface, but portions trail far beneath the surface.

Current techniques for removing elodea with chemicals such as copper sulfate, sulfuric acid and others also kill other plants and denude waterways. Treatment has to be repeated frequently.

Dr. Dean F. Martin of the University of South Florida chemistry department has discovered in the laboratory that a cation-exchange resin is effective against elodea through removal of metallic ions that are essential to its growth. Further experimentation is required before actual applications are attempted, but a possible approach would be to place the resin in a filtering dam where water enters the waterway. The metallic ions would thus be scavenged from the water before it enters the waterway.

Research has not identified which metallic ions are removed to prevent elodea growth, but Dr. Martin thinks they may be manganese or iron.