AGRICULTURE

Pesty Plant Routed By Simple Chemicals

➤ HONEY MESQUITE, one of the most destructive plant pests invading livestock grazing lands in the Southwest, can be curbed by tiny pellets of the chemical fenuron, scientists of the Agricultural Research Service, U.S. Department of Agriculture, have found.

A bag, a spoon and a horse are all the scientists need to apply the pellets to eradicate the weed that seriously threatens valuable grassland in New Mexico, Texas, Arizona, Oklahoma and California.

About a level teaspoon will control a plant one foot in diameter, the scientists found. The pellets must be applied just before the rainy season to be effective.

The troublesome bush has been taking over the grassland by robbing precious moisture from the semi-desert soil. Once the grass cover is reduced, spring winds blow sand into dunes around the plants. Rabbits and rodents help spread the weed by making their homes in the bushes and carrying seeds into adjacent grasslands.

Grass cannot be merely reseeded in these areas because the arid soil has high surface temperatures and poor moisture conditions. Thus, it is important to eradicate the honey mesquite early before it destroys the grass cover.

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GENERAL SCIENCE

Dr. Salk to Continue Immunization Studies

➤ FOR THE FIRST TIME since Dr. Jonas Salk became director of the Salk Institute for Biological Studies in the La Jolla section of San Diego, Calif., he has settled down to work in his own laboratory.

Dr. Salk told SCIENCE SERVICE that he expects to "work on some of the difficult problems that have not been solved."

One of these problems that strikes young persons between the ages of 20 and 40 is multiple sclerosis, the cause of which is still unknown. Another is muscular dystrophy; again, cause unknown.

"I hope to work on the immunization problem," Dr. Salk said in an interview following a lecture in Washington, D.C., at a National Foundation-March of Dimes meeting. "This applies to a number of diseases, as much as basic science does."

The meeting was directed toward volunteers of the National Foundation who will carry to the public the important message that the mystery of birth defects can be solved when doctors and scientists work together.

Dr. Salk and his co-workers now have a staff of 120. One-fourth of these workers are Ph.D.'s and M.D.'s. The others are technologists and staff members who back up the work of the scientists.

Best known for his work on polio and influenza vaccines, Dr. Salk has long had the support of the National Foundation, originally known as the National Foundation for Infantile Paralysis.

Dr. Salk once dropped out of medical school. Although he returned to earn his M.D. degree, it was not until after he had received several research fellowships. He did not have the temperament of the practicing physician but he understands research that is needed for the practitioner to make a success of his treatments.

It was while he was at the University of Pittsburgh that the scientist realized his dream of perfecting the polio virus. He also worked at the University of Michigan and in other colleges.

Dr. Salk told the volunteers listening to his talk on purposes of the Salk Institute that he did not expect them to repeat the scientific explanations of birth defects that he was trying to explain. All he asked was that they not think of basic science as unrelated to humans.

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PLANT PHYSIOLOGY

Key to Photosynthesis Found in Ferredoxin

➤ THE KEY TO THE PROCESS of photosynthesis, by which green plants turn sunlight into the food essential for all life on earth, lies in a chemical called ferredoxin.

Photosynthesis is the most important process on earth, not only because it sustains all life by providing food for plants and animals, including man, but because it continuously replenishes the atmosphere with oxygen.

The essence of photosynthesis is the capture of solar radiation that is converted by chloroplasts into chemical energy, which is then used to create chemical products, mainly carbohydrates. Chloroplasts are microscopic particles containing the chlorophyll pigments of green plants.

Ferredoxin is an iron-containing protein found in chloroplasts. The chemical reduction of ferredoxin is the key reaction caused by light in photosynthesis, Dr. Daniel I. Arnon of the University of California reported.

Both reduced ferredoxin and ATP, short for adenosine triphosphate, are needed for photosynthetic cells to form carbohydrates from carbon dioxide and sunlight. Ferredoxin has been found in every species of photosynthetic bacteria so far examined, Dr. Arnon reported in Science 149:1460, 1965.

The process by which solar energy is converted and stored in the early products of photosynthesis formed prior to carbohydrates is known as photophosphorylation. In one type, known as cyclic photophosphorylation, the sole product of the conversion of radiant energy into chemical energy is ATP, known to be the universal energy currency for all living organisms.

Another type is known as noncyclic photophosphorylation. It yields, in addition to ATP, oxygen and the powerful ferredoxin. ATP and reduced ferredoxin together are the first products formed during photosynthesis which are used to power the synthesis of carbohydrates and other organic compounds.

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IN SCIENC

PSYCHOLOGY

Pope's Visit May Be Step To Universal Symbols

➤ POPE PAUL'S DECISION to put visually and dramatically the grandeur of his office to the service of peace raises a question as to what impact his visit will actually have on the feelings of people in the United States and other countries.

Any influence the Pope might have on world peace is impossible to measure. However, the eminent psychologist and writer, Dr. Gordon W. Allport of Harvard University, said he thinks the Pope's visit may be one step toward developing universal symbols for mankind.

"Mankind needs a mouthpiece," he remarked. "I don't say Pope Paul is it, but who is there?" At present, "mankind" is an undeveloped concept, he said. There are no good symbols for it. United Nations Secretary General U Thant could be a symbol, but he is necessarily too involved in administration, the psychologist observed.

Dr. Allport also noted that recent ecumenical moves under both John XXIII and Paul VI have instilled a more friendly feeling in Protestants for the Catholic Church. This, plus the "attention value" of his historic first visit, reinforces the Pope as a possible spokesman for mankind.

A different opinion was expressed by political scientist Dr. Donald Stokes at Michigan University's Survey Research Center.

An expert in public opinion, Dr. Stokes thinks that if there is any psychological effect, the chief beneficiary will be the United Nations.

Dr. Stokes interprets Pope Paul's visit as support for the UN as well as for peace. Impact would probably be toward improving the UN's image, he said.

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GENERAL SCIENCE

Dr. Frederick Seitz Receives High Award

➤ DR. FREDERICK SEITZ, president of the National Academy of Sciences, Washington, D.C., has been named recipient of the 1965 Franklin Medal, highest honor of the Franklin Institute, Philadelphia.

The medal citation reads: "For his contributions to the understanding of the structure and properties of solid materials, for his extensive and clear exposition of the new theory of the solid state and its applications, and for his service as a leader of science in national and international affairs."

Founded in 1914, the Franklin Medal is awarded annually to scientists who, in the opinion of the Institute, have done most to advance physical science or its applications. It has been given to such famous scientists as Thomas A. Edison, Guglielmo Marconi, Niels Bohr, Albert Einstein and Enrico Fermi.

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E FIELDS

CONSERVATION

Food Value of Tidal Waters Emphasized

➤ FISH, CRABS, oysters and other protein-rich creatures along the coastal areas of the world will form a vital source of food for the increased population of the future, if man and his wastes do not destroy them all.

Estuaries rank among the most naturally fertile areas for finfish and shellfish, said John S. Gottschalk, director of the Bureau of Sport Fisheries and Wildlife of the U.S. Department of the Interior. Yet these are the places now being destroyed as man pours his waste products into the rivers and seas, fills up the marshes, and cuts off and diverts the waters, he told the National Audubon Society convention in Boston.

Many valuable creatures are being drastically threatened, he said, including oysters, shrimp and other shellfish, as well as finfish, waterfowl and other birds and animals.

Twenty-three states are custodians of the coasts. These states are watching the tragic destruction of the wetlands and waterlife so necessary for our future well-being.

Mr. Gottschalk believes that education, research, legislation and coordination must be enlisted in order to preserve the coastal wetlands and estuaries.

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PSYCHOLOGY

Attention in Infancy May Halt Retardation

➤ THE MOST PERVASIVE CAUSE of mental retardation is not heredity but lack of attention during infancy.

Seventy-five percent of all mental retardation is caused by sensory deprivation resulting from little human attention, Dr. Reginald S. Lourie reported to a three-day seminar on mental retardation at Children's Hospital in Washington, D.C. Dr. Lourie, director of psychiatry at the hospital and a psychiatry professor at George Washington University, has been active in the Government's Head Start program, designed to aid culturally disadvantaged youngsters.

That sensory deprivation can result in retarded minds has long been known. However, the wide incidence of the cause came to light only after the late President John F. Kennedy boosted research in this field, Dr. Lourie said.

Sensory deprivation in this context is not blindness or deafness. It refers to the apathetic reactions of a child who receives too little tender, loving care, particularly from his mother. His senses are fine, but his drive to understand the world has been stunted. Doctors believe the infant mind simply does not develop enough brain cells if it is left alone to organize sensations by itself.

Retardation in such cases is as permanent as a hereditary insufficiency, so far as scientists are able to tell.

There is no proof that the brain is actually underdeveloped because no one can study it directly, said Dr. Donald W. Delaney, assistant director for education at the Children's Hospital.

However, observation of children who have been deprived strongly indicates that their mental abilities are permanently damaged. Doctors point to the chimpanzee that could never learn well by sight because he had been closed in a dark room for a few months after he had been born. They believe this has relevance to human retardation.

Children most likely to be deprived come from very poor families, where the mother works all day and there is no father, Dr. Delaney said.

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OCEANOGRAPHY

'Sea Spider' Installed For Deep-Sea Research

See Front Cover

➤THE FIRST STABLE DEEP-SEA structure, nicknamed Sea Spider and seen on this week's front cover, has been installed in half-mile deep water off the coast of South Carolina.

Sea Spider, designed by Godfrey H. Savage of Woods Hole Oceanographic Institution, Woods Hole, Mass., is a saucer-shaped aluminum float, securely held to the ocean bottom by four long steel cables. Various instruments and buoyant hollow glass spheres are attached along the spider-leg cables and the saucer, which is placed 110 feet below the ocean surface to avoid buffeting by wind or waves.

A telemetering buoy at the sea surface transmits data collected from these instruments by radio to a nearby oceanographic vessel.

The structure, installed by engineers and scientists from Woods Hole, will give oceanographers their first virtually motionless reference point and instrument support in the deep ocean. It is far more stable and reliable than other sea measuring instruments, which are usually suspended or towed from surface vessels or are attached to buoys anchored by a single cable.

These traditional instrument bases are not very steady, Mr. Savage said. They sometimes swing around with a radius almost as great as the depth of water. During a period of 21 hours, oceanographers found that the Sea Spider buoy moved less than 10 feet in any direction.

The instruments, placed on Blake Plateau which is part of the U.S. continental shelf in the Atlantic Ocean, will record such measurements as ocean currents, temperature variations and underwater sounds.

As divers were installing and checking the equipment, they noticed large schools of fish attracted to the spherical buoy throughout the three-week test. Scientists believe the sphere might be modified for biological studies of the ecology and habits of fish in the deep ocean.

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PUBLIC HEALTH

Amount of Polonium 210 In Tobacco Differs

➤ NEW ZEALAND TOBACCO has less radioactive polonium than that grown in the United States, but Rhodesian tobacco has the highest amount of the radioelement.

Dr. L. P. Gregory of the National Radiation Laboratory, Department of Health, Christchurch, New Zealand, reported in Science 150:74, 1965, that tobacco manufacturers in his country are required to use a minimum of 30% New Zealand leaf in their overall production.

"In practice about 50% New Zealand leaf is used," Dr. Gregory said. Manufacturers are free to blend this as they wish, however, and they may make a brand of all New Zealand tobacco or all imported tobacco if they so desire.

The small amount of radioactive polonium in tobacco has caused some controversy over its effect on a smoker's lungs. For example, a mean of 0.15 picocurie per gram has been found in New Zealand tobacco, compared with 0.49 picocurie per gram in U.S. tobacco. South African tobacco has about the same polonium concentration as that in the United States.

Rhodesia, however, has much more radioactive polonium 210 in the leaf tobacco grown there.

The reason for the lower level of polonium radioactivity in New Zealand tobacco is not fully understood.

Dr. Gregory says the main tobacco-growing area is Nelson, which is at the northern end of the South Island, relatively near the coast.

The naturally occurring, alpha-emitting radioelement polonium 210 is found in plants generally, but its presence in tobacco is of special significance because of the possible effect on smokers' lungs.

"A possible explanation," he says, "is that much of the radon diffusing from the land's surface is dispersed over the sea. The resulting natural fallout of the lead 120 precursor of polonium 210 may well be significantly less over a country with a predominantly insular climate."

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AGRICULTURE

Low Birth Rate of Minks Blamed on Beef Gullets

➤ THE STRANGE MYSTERY of low birth rates, small litters and early deaths of young mink kittens has been solved.

Scientists are blaming the baby mink shortage on gullets of beef from slaughterhouse wastes fed to minks on mink farms. These carcass pieces contain enough natural beef thyroid hormones to upset the birth processes of the minks.

Physiologists at the Agricultural Research service, part of the U.S. Department of Agriculture, and scientists at the New York and Michigan Agricultural Experimental Stations cooperated in the research which led to this unusual finding.

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