One ingenious manager had a difficult problem two years ago with a beetle that was boring into the greens and causing havoc with putters. He discovered that the insect "praying mantis" ate the beetles and just about any other insect pest that crossed its path. This spring he purchased several mantis egg cases and put them near the greens where the beetles were especially thick. Two weeks after the eggs hatched, the beetle problem was cleared up.

For more information about this interesting and effective aspect of insect control contact: Ecological Insect Service, 15075 W. California Ave., Kerman, Calif. 93630 or Eastern Biological Control, R.D. #5, Box 379, Jackson, N.J. 08527.

Visual or aesthetic pollution is as pressing a problem as any other type of pollution. But the golf course has the distinct advantage of being a beautiful place for recreation that still preserves many of the natural environmental features of the area.

The Torrey Pines Municipal Golf Course, La Jolla, Calif., home of the Andy Williams Classic, is a good example of this. The course (along with an adjoining 877-acre state reserve) offers golfers and visitors a chance to see the only stand of Torrey Pines (*pinus Torreyana)* on the mainland of the United States. These gnarled, bent and twisted trees reflect their proximity to the sea. There are 2,000 full grown trees in the area. TPMGC manager Dick Mayer told GOLFDOM that the course takes special pride in its trees and uses only sprays that will not harm the valuable pines which make the course one of the most beautiful in the country. Mayer also noted that this year Torrey Pines is going to have a match tournament to raise money to help preserve these unique trees.

Another difficulty that is becoming more acute every year is noise pollution. Many of the new courses in Southern California are being located away from streets and highways where automobile noise abounds.

This is the case at La Costa CC, host of the Tournament of Champions and the American Airlines Astrojet Classic. It has a 7,200-yard course that extends from the well-equipped pro shop east toward the mountains. All the residential housing units are placed so that traffic streets do not run near the greens. Eddie Susalla, executive director and professional at La Costa, thinks that the designs of the future in golf courses will completely eliminate the automobile from anywhere around the course.

Susalla mentioned another special ecological problem at La Costa—the intrusion of salt water on the course from the nearby Pacific Ocean. Susalla designed a system which put tile under the affected areas, thus allowing fresh water to run on the course instead. This is a good example of what can be done with ecological thinking.

An ecological dilemma that faces many clubs in arid Southern California and in other parts of the country as well, is the lack of rainfall. Ted Nyergers, manager of the Whispering Palms GC in Rancho Santa Fe, finds this to be his number one problem. Building lakes and small ponds that blend in with the scenery is a good way to deal with this water problem. These small ponds not only add beauty and recreational possibilities to the course but are also sources of inexpensive water for irrigation to the greens.

Garbage and what to do with it is an ecological concern common to everyone. As waste proliferates each year, it becomes increasingly difficult to find space for the accumulation. Because Southern California does not allow incineration because of air pollution, it's an especially difficult problem there.

One club is toying with the idea of collecting its clippings and other refuse into a pile for decomposition. The finished product is then sold and recycled as compost for fertilizing farms and gardens. Although this idea is a new one, several towns are currently doing it and are making a profit plus getting rid of the waste. The club can also cut down on its fertilizer bill by utilizing its own products.

We have had a rather brief look at some aspects of the ecological picture and how it might apply to golf course management. The golf course is a good example of how man might blend his recreational facilities with his environment and still preserve the delicate ecological balance of nature. □

WILL THE INSECTS TAKE OVER?

By Fred V. Grau

What is the future of turfgrass without the traditional control insecticides? Alternative natural controls presently are being explored, which will help the superintendent reconcile the problems of turf care and pollution

INCREASED pressure to curtail the uses of certain insecticides will continue to be exerted by both governmental agencies and the public. However, denial of a favorite insecticide does not mean that, overnight, insects will destroy turfgrass areas. Effective control programs have reduced populations to a point where minor depredations can be tolerated. What then lies ahead? Will there be safe biodegradable agents that will keep insect populations at tolerable levels?

One problem with chemical insecticides is that with time, insects develop resistance. Another serious disadvantage is the unavoidable destruction of beneficial insects which associate with the "bad guys."

Turfgrasses that are resistant to insect attack have not yet been announced. In fact, there is virtually no work in this direction. In 1942 the first variety of wheat resistant to the Hesian fly was introduced. In time this one variety loses its resistance. Then another resistant variety (out of 22) is planted and the problem is postponed for another 10 years.

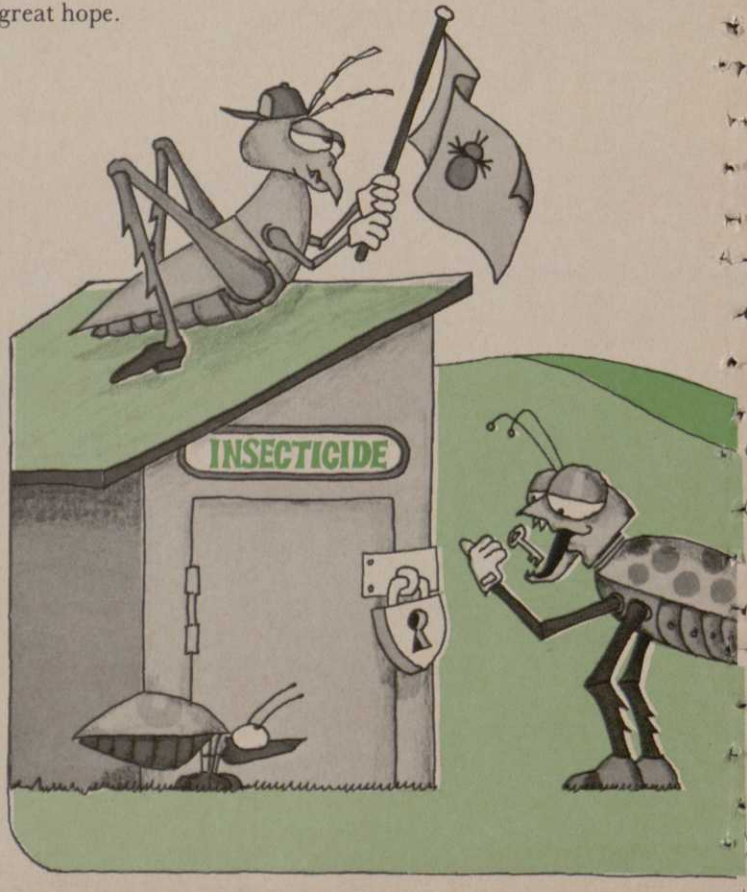
Other crop varieties, resistant to a number of insects, have been developed. They include alfalfa (weevil, aphid, leafhopper), barley (greenbug), corn (borer, earworm, rootworm) and wheat (cereal leaf beetle). This should give hope to researchers in turfgrass even though 10 to 15 years may be needed to breed resistance into a crop.

Natural enemies offer hope in long-lived crops such as turfgrass where the predator population builds up without interruption. One excellent example of this approach is the Milky Spore Disease of Japanese beetle grubs. It seems strange that a similar approach has not been made for other pests. So far over 700 insect enemies have been introduced, but less than 170 have become established. Problems of increasing enemy populations and effectively dispersing them continue to plague the industry.

The ladybug *(Rodolia Cardinalis)* has been reared and released successfully to control the cottony-cushion scale of citrus plants. Another promising effort is the mass rearing of the lacewing larvae for controlling the cotton bollworm.

It is as yet unknown that the parasite of the vector Dutch elm disease is becoming established, which hopefully will eliminate the widespread destruction of elms.

Several parasites of the spotted alfalfa aphid are controlling this pest. This, along with resistant varieties, offers great hope.



Bacterial toxins appear promising for large scale applications to crops. *Bacillus thuringiensis* was identified as an insect pathogen in 1927. Since 1950 when the toxin was isolated, 11 types from all over the world have been isolated. Several pharmaceutical companies are working to develop their own pathogenic strains. This toxin would act as a broad spectrum insecticide. Insects would be unable to develop resistance as easily as they do to conventional insecticides.

Insect viruses seem to be more promising than insect bacteria. Of some 250 viruses that are pathogenic to insects, about 10 are "nearly ready" for use. So far these viruses have shown no response in over 2,000 tests on animals. One trouble lies in mass producing the virus. Another is that of dispersing it in such a way that ultraviolet radiation will not kill it before it has a chance to kill the insect.

There are chemicals that fall into the category of "attractants." One chemical will act as a food attractant. Methylbutanol attracts and kills male fruit flies. The first sex attractant (called a pheromone) was isolated from the female gipsy moth in 1960. More than 200 others have been discovered since then. Commercially available materials include attractants for 1) male pink bollworm, 2) cabbage looper and 3) fall army worm. Originally extracted from the females, they are now made synthetically. Concentration and timing of a spray can make or break the program. Too heavy a dose can repel the insect.

The juvenile hormone (ecdysone), which must be ingested, is very difficult to synthesize and, though extremely interesting, does not seem to offer too much hope for the future. Even so, one company has invested about $10 million over five years trying to produce a marketable hormone-like compound for insect control.

The technique of attracting male insects, then sterilizing them and releasing them to mate with females which then lay infertile eggs, has been highly successful in reducing the screw-worm fly in Florida and the Southwest. Each week 125 million sterile males are released along a 300-mile buffer zone along the United States-Mexican border. This sterile male technique is being broadened to include several economic crop pests. Costs of developing pest control vary but generally are far less than the economic damage suffered. The cost of the screw-worm program is reported to be one-fifteenth of the estimated annual damage to livestock and control costs before elimination.

Considering the broad range of techniques that have been successful on certain insects, control of turfgrass insects by similar methods is foreseeable. If the female cutworm moth and the female sod webworm moth laid only unfertilized eggs there would be no larvae to eat the grass roots. I am not enough of an entomologist to carry the analogy through, but hopefully there will be methods developed which will permit the growth of insect-free turf without the need for poisons that degrade the environment. □

Illustrated by Martin Trossman

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CONTRIBUTE TO SURVIVE

By Eliot C. Roberts Chairman, Plant and Soils Department, University of Rhode Island

Because of increasing urbanization, golf courses must begin to strengthen their positions in the public's mind by bettering the total community environment

The cool refreshing environment of the clubhouse is predicted as the golfer approaches through this inviting area of shade.

GOLF courses must improve the physical environment of their section of the city or they fail to fulfill an important function in the mind of the non-golfing public. Without public support, more and more courses will be squeezed out of existence by urban sprawl. Involvement in community ecology programs, therefore, will strengthen the position of the golf course and make it indispensable. Should the physical environment of a golf course start to deteriorate, the club is on its way out. The only reason to bring it back is if it cleans up pollution or replaces ineffective physical features.

Many golf courses are making significant contributions in the creation and maintenance of a desirable environment. All golf courses should be making efforts in these seven areas.

Green belt—City planning should devote space to the cultivation of vegetation that separates areas of high density population and provides privacy. Green belt areas provide fresh, clean air, relief from the noise and rush of the inner city, and space for people to regain their individuality and contemplate nature. Golf courses are the logical means to provide these facilities and should be used to enhance the city environment. Course officials, administrators and golfers should impress these facts upon their local community.

Wildlife conservation—Golf courses varying in size from 15 to 20 acres to 500 or more acres have great potential for wildlife conservation. Birds and small animals, which feed on insects in the soil and turf, and large animals that leave footprints on greens may at times be unwanted and even hazardous to golf course maintenance. However, with more planning, golf courses can play a larger role in wildlife conservation and accommodate more than just man on the golf course.

Soil, water and air pollution—Golf course superintendents should be active leaders in the anti-pollution movement in this country. They should combat water pollution on the golf course because algal bloom and aquatic weeds which develop from excess soil nutrients leaching into streams and ponds, are just as objectionable as solid waste pollutants. They should exercise great care in using pesticides to avoid damage to other vegetation or to wildlife on the golf course. The golf course staff has the capability for community leadership in the control of soil, water and air pollutants.

Noise abatement—Noise on the golf course should be

(Continued on page 46)

Survive

(Continued from page 45)

different from noise in the surrounding city. Street noises should be suppressed. Desirable golf course noises are created to some extent by landscape and ornamental plants which at the same time screen out objectionable noises.

Visual pollution—Little is accomplished by just cleaning up the mess throughout our countryside. These areas will only be relittered. Natural beauty must be recognized as desirable and respected by all concerned. Golf courses for years have made strides in this movement. They should take the lead in eliminating visual pollution and in creating a beautiful environment.

Real estate values—Golf courses can have a major influence on the preservation of real estate values. The golf course should set the standards for the surrounding area by maintaining a desirable environment. Residents will recognize the importance of golf course staff efforts. They will not be apathetic to the problems of maintaining this environment.

Recreational needs—Golf provides an important type of recreation for millions of people each year. In addition, it should place the golfer in an environment which features good competitive elements to maintain keen interest and concentration on the game. Golf should also bring out a feeling of optimism in the golfer by placing him where he is surrounded by the beauty and orderliness of nature.

A new concept involving the importance of ornamental plants in our environment is developing. Since frame of mind and state of feeling are influenced by our surroundings, every effort should be made to see that they contribute to man's improvement. Landscape and golf course architects may combine their talents to create the kind of golf courses that will revitalize men and women who use these facilities. In all our efforts to feed, clothe and house ourselves, we must never jeopardize the future by failing to satisfy man's hunger for natural beauty. □

Ecology-minded disposables come to golf courses

Once a novelty item, disposables today play an important part in the whole ecological picture, particularly in the area of pollution control. Now a company has come on the scene which not only offers disposables for golf courses but also specially designed, non-polluting disposal systems. Its products are designed to replace linens and apparel currently being used in golf clubhouses. The line has been developed by Dappatex Corp., a subsidiary of Levi Strauss & Company. It includes tablecloths, napkins, aprons for waitresses and caps, gloves, shoe covers and aprons for kitchen personnel as well as washcloths, bath and hand towels and a line of bedding, including pillows, pillowcases, blankets, bedspreads and sheets. Available for the individual golfer is a package containing four towels for washing golf balls, keeping hands dry and cleaning golf clubs.

These durable products are manufactured from nonwoven and other materials developed by Dappatex. They resist mildew, heat and fire, come in colors and can be scented. They also help reduce losses caused by mishandling, damage or theft.

Also available for clubs encountering refuse problems is a compactor, a pollution control device capable of compacting waste into a solid, easily-handled package. It reduces refuse volume by 400 per cent to 600 per cent or more, according to the company.

The compactor is offered in the automatic-loading 30K model at $7,000, the manual unload 25K at $5,000 to $6,000 and the smaller 5K at $3,000.

In addition to increasing consumer recreation programs, Dappatex is attempting to control environmental problems by developing methods for product re-cycling and self-destruction. □

Vermont takes the lead with tough anti-pollution bills

Vermont's contribution toward protecting the land was made in May, 1969, when the state passed the strongest, most innovative, environmental legislation in the country. The most important aspects of the new laws are these:

- Water pollution will cease to exist. If you dump anything into a Vermont stream you must prove you aren't polluting. In addition, every town must zone waterfront property to prevent potential polluting uses.
- Statewide land use planning and zoning will become a fact. Areas of the state will be zoned to prevent certain types of development and encourage others. It will also prevent what so often occurs when two abutting towns enact codes that permit a heavy industry zone in one town to bump into a residential section in another.
- All new developments and subdivisions must be licensed and approved by the state. This is the bill (H-417) that regulates the quality of sewerage and water systems and that creates the right of the public to protest effectively before work is begun.
- Any project planned for land above 2,500 feet will be subject to the rigorous scrutiny of H-417, irrespective of the project's size. According to Professor Hubert Vogelmann of the University of Vermont, this is the first time that the problems of total environment were taken into account when legislation was passed, and this opens the way for many new concepts of environmental legislation to be passed.

Other bills regulate incinerators and garbage dumps to prevent air pollution, control the appearance of mobile home parks, and permit the government, state or local, to buy farmland for future development while allowing the farmer to continue using it.

This is no way to groom an acre of turf grass!

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Its 5-ft.-wide reel has four alternating rows of vertical slicing and paddle blades. The intense air turbulence caused by the paddle blades blows the loose thatch and debris up and back into the hopper. For flail mowing, the reel converts easily to all mowing blades. It does a beautiful job of flail mowing "rough" grass areas.

Use the versatile Grounds Groomer year 'round for general turf maintenance. It's the only way to groom an acre of turf or more! For more information about this and other fine Ryan products, write for the Turf Equipment catalog.

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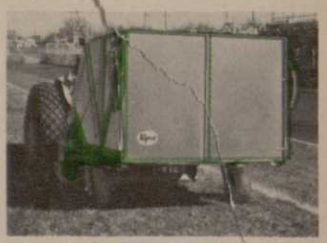

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