

Dawson and B. M. Boyns of the St. Ives Research Station, Bingley, England, tested the value of elemental sulfur on a heavy clay course at the Malone Golf Club near Belfast, and have reported on their work in the Journal of the Board of Greenkeeping Research.

In November, 1934, applications of flowers of sulfur were made on plots in a fairway at the rates of 3.5, 7, 14, and 28 pounds to 1,000 square feet. Examination of these plots in February, 1936, showed that conditions in the soil had been much improved, but that the 14-pound rate had slightly damaged the grass and the 28-pound rate had completely killed it.

Further areas of the fairway were treated at the 14-pound rate, and in the spring of 1938 a marked improvement was noted. Following the sulfur treatment, applications of sulfate of ammonia and calcined sulfate of iron were made. The result was an absence of weeds and worm casts on the treated areas.

The writers warned against the adoption on other soils of the rate of sulfur found suitable on this course. The proper rate of application probably varies on different soils. Too high a rate can do irreparable damage to the turf, due to the direct burn-

ing action or to the increased soil acidity. Sulfur should never be applied to light soils.

CHLOROPICRIN FOR CONTROL OF NUTGRASS

Nut grass, *Cyperus rotundus*, which is a sedge and not a true grass, is a serious weed in parts of the South. The control is difficult since hand weeding merely removes the leafy part, leaving the tubers on the underground stems to grow again. On a large scale it may be controlled by cultivating the soil every 3 weeks during the growing season for 2 years.

This is out of the question on small areas where intensive work must be carried on. G. H. Godfrey, of the Texas Agricultural Experiment Station, writing in Soil Science, has shown that on such small areas nutgrass may be eradicated in a few weeks by injections of chloropicrin. In his experiments the ground was spaded and the chloropicrin injected to a depth of 7 inches. In various trials, rates of approximately 9, 13 and 17 pounds to 1,000 square feet were used and the treated areas covered with glue-coated paper. In one trial no paper was used but the soil was wetted down about 2 inches and

the water renewed 3 times during the afternoon. Control was perfect at the heavier rates and practically so at the 9-pound rate, both when the area was covered with paper and when it was kept wet. When present in sufficient amount, the water prevented the escape of the gas.

While the cost of treatment would be too great on a large area, it seems quite practical for small areas. The cost is given as \$1.00 per 100 square feet for chloropicrin, plus a few cents for paper. The use of chloropicrin for killing weeds in soil and in compost has been described in the January, 1939, number of *TURF CULTURE*, pages 63-79.

CONTROL OF SOD WEBWORMS

There are several species of sod webworms, but they all have similar habits and cause the same kind of damage to turf. They are present in turf from early spring to late fall, but during periods of abundant rainfall the grass plants are not severely injured. In dry seasons, particularly in midsummer, severe injury may result from their feeding on the grass blades, and the grass may even be killed. In a Kentucky Agricultural Experiment Station Bulletin, H. H. Jewett has described three species of webworms common in Kentucky

bluegrass sod and has given an account of control experiments carried out during 1934, 1935, and 1937.

Preliminary trials were run with kerosene emulsion, barium carbonate, nicotine oleate, pyrethrum, arsenate of lead, beta dichloroethyl ether, Loro, Lethane Jr., Derris powder and a poison bait composed of cornmeal, Paris green and nitrobenzene. The kerosene emulsion, pyrethrum, and arsenate of lead were found to be the most efficient and were given more extensive trials during the three seasons, 1934, 1935, and 1937.

The kerosene emulsion was prepared from $\frac{1}{2}$ pound of hard soap, 1 gallon of water and 2 gallons of kerosene. One part of this emulsion was diluted with 10 parts of water and applied at the rate of 1 gallon to 10 square feet. When carefully prepared, this emulsion did not injure the grass except for a slight burn to the tips of newly clipped grass or grass bruised with trampling.

The arsenate of lead was applied in a spray prepared from 1 pound of arsenate of lead in 10 gallons of water at the rate of 1 quart to 10 square feet. This was the equivalent of applying arsenate of lead at the rate of 2.5 pounds to 1,000 square feet. It was recommended that soap or some other material should be