

Chemical Control of Common Weeds on Golf Courses

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Weeds like the poor we always have with us! The fundamental reaction to weeds is to pull them! If there are not too many of these *out-of-place plants* we can do this, otherwise we have to resort to other means. The eradication of weeds in lawns and golf courses is exceedingly difficult. For one thing the plow and the harrow, so important in the eradication and control of weeds in our agricultural lands, must be left behind. "Discourage the weeds by encouraging the grass" is the basic law of the greenkeeper. During these war times, the successful control of weeds of our greens becomes even more difficult; laborers, fertilizers and many chemicals so necessary for weed killing are not with us as they were before Pearl Harbor; many greenkeepers along with the chemicals have gone to war. Naturally we will get along as best we can;

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weeds of some greens will be given a furlough. At any rate we should not allow our weeds to increase their area of infestation or to produce seed. We should bear in mind that when the war is over, there is bound to be a greater use of our golf links than before the war.

Many of our greens now have a good turf. By proper watering and regular mowing, the grass can be kept in a thrifty condition. If the turf is mowed too closely, the vigor of the grass is reduced and the invasion of weeds encouraged. Cutting blue grass to a length of two inches is better from the weed restriction standpoint than a shorter length. It is also obvious that when an old lawn or an old green is heavily infested with dandelions or quack grass, it is best to spade up the area to a depth of 12-18 inches and rake out the roots of the unwanted plants. The ground will no doubt contain many weed seeds and these seeds should be encouraged to germinate before final seeding is made.

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Seeding should be made preferably in August and only pure seed should be used. Many spots infested with weeds need not be disturbed but may be treated with suitable chemical compounds. No weeds should be allowed to go to seed. Some concern should also be given to fence rows and adjoining property.

Weeds fall into two classes: Annuals and perennials. The annuals complete their cycle, seed to seed in one season. They may be separated into two divisions:

1. Annual grasses: Crab grass.
2. Mat-forming weeds: Chickweed, knotweed, spotted spurge, speedwell.

The perennials may also be placed in two groups:

1. Grasses: Quack
2. Rosette forming: Dandelion, plantain, self-heal, ground ivy.

Grau according to Robinson Craft and Raynor in their book, *Weed Control*, McGraw-Hill Co., New York, 1942, has listed the worst weeds of the golf course in order of their descending importance:

Putting green	Fairway	Rough
Crab grass	Dandelion	Dandelion
Chickweeds	Crabgrass	Thistles
Dandelion	Plantains	Plantains
Plantain	Chickweed	Ragweed
White clover	Rumex sp.	Rumex sp.

Crabgrass, dandelion, plantains and chickweeds are the most common. In the rough one may find any number of weeds of various genera, even poison ivy and buck brush.

The most economical and logical method for the eradication of weeds in lawns and turfs is hand weeding, provided of course the area is not too large and provided, too, that labor can be obtained. When the soil is moist and the weeds young, they are easily extracted from their footing. The job at best is tedious and continuous. Where such perennials as the dandelion are present it may be just as well to dig them out as to use some other method. It was not so long ago that this method of digging dandelions was about the only effective method of control. If the weeds got too thick the ground was plowed, reseeded and fertilized. "Learn to like them and to live with them" was a motto adopted by the less ambitious human being. We are glad that there were a few experimenters around.

A comparatively new arsenic compound, milarsenite, has come forward. It is a combination of sodium arsenite and milorganite, both made by the Milwaukee Sewerage Commission. Here you have the arsenic to kill the weeds and the milorganite to fertilize the grass. It is often applied at the rate of approximately 300 lbs. per acre. The Rhode Island Station has obtained good results from its use. The action is one of food depletion. The early growth of annuals is stopped by one

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Fairways have been generally neglected. Turf improvement should start at the first opportunity. Most fairways are badly in need of fertilizer, many require lime, and on some a weed eradication program should accompany or precede fertilization.

Our Turf Service Bureau and Soil Testing Laboratory are available to those desiring assistance in formulating an effective and economical green or fairway fertilization program.

SOME Milorganite is available for use on golf course turf. If you can't get all you need, please remember MILORGANITE is still in war service—for building turf on airfields and for increasing food production.

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application; with dandelions, buckhorn and broad-leaved plantain it is usually necessary to have two spring applications and two fall applications. Milarsenite is used principally on fairways. Light infestations of crabgrass were killed by 200-300 lbs. per acre of milarsenite. Where the crabgrass was heavy enough to cause smothering an application of 400-600 lbs. was necessary.

Sinox, a newly introduced dye stuff, manufactured by the Standard Agricultural Chemical Company, Hoboken, N. J., originally came from France where it was developed in 1933. Sinox, (sodium dinitro-orthocresylate) is extremely toxic and at the same time selective in its action. The material is in some ways similar to picric acid which has been used for a long time as a killing and fixing agent by plant morphologists. Dinitro-orthocresylate is yellow in color and as a dye is known as Victoria yellow. In order to overcome the low solubility property, the material is treated with sodium hydroxide giving the corresponding salt, sodium dinitro-orthocresylate, readily soluble in water at the concentration used in weed control. The commercial preparation is a dense suspension of fine crystals forming a paste 30 per cent sodium dinitro-orthocresylate and 70 per cent water. It is made from

products derived from the distillation of coal. The dry product is inflammable and is one of a number of compounds used as explosives. It is non-corrosive and relatively non-poisonous as compared with arsenicals. It is toxic if taken internally in large doses. Used as a spray it is not inflammable and not hazardous on dry vegetation.

It has been found that the addition of an acid salt such as ammonium sulfate or sodium bisulfate to the Sinox will greatly enhance its effectiveness, making it possible to have the dosage rate reduced. Optimum results are usually obtained when such herbicides are sprayed on weeds in their seedling stage. A one gallon container holds approximately 10 pounds; a common recommendation is to dilute to 100 gallons with water and spray this over an acre of ground. Eight pounds per acre will control black nightshade in peas. Before we go any further it may be well to take an inventory and see what we can do to control our turf weeds.

Crab Grass

(1) Hand weeding; (2) Sodium chlorate (Atlacide)—one pound in 10 gallons of water applied when crab grass is young, two leaf stage—100 sq. ft.; (3) Sodium arsenite—1 oz. in 10 gallons water—1000 sq. ft.; (4) Lawn Sinox 10 gallons of a

GRASS SEED

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2 per cent solution made by mixing 1.8 pints Sinox in 10 gallons water—1000 sq. ft.; (5) Milarsenite, 5-7 lbs. per 1000 sq. ft.

Dandelion

(1) Iron sulfate—1½ lbs. per gal. water—1 gal. will cover about 40 sq. yds. of turf—several applications; (2) Lawn Sinox—1.8 dilution—in blue grass 1/10 lb.—ammonium sulfate can be added as activator—3 applications; (3) Kerosene (White) in September 2 qts. per 100 sq. ft.; (4) Meo 181.—Same rate and same time as with kerosene.

Plantain

(1) Sodium chlorate (Atlacide); (2) Sinox; (3) Milarsenite.

Chickweed

(1) Sinox; (2) Milarsenite.

White clover

Milarsenite.

Rumex species

Dig.

Perennial weeds

(1) *European bindweed (Creeping Jennie)* a. Sodium chlorate: Make holes 18 inches deep, 18 inches apart; place in each hole, 1 level teaspoonful sodium chlorate; fill holes immediately with good soil.

b. Tetrachlorethane: Make holes as under sodium chlorate; place in each hole 2 ounces tetrachlorethane through long

stemmed funnel or employ special probe.

(2) *Canada thistle*

Spray with sodium chlorate or Atlacide about the 20th of June; do not cut plants before spraying. Make second spraying in September.

(3) *Poison ivy*

Spray with ammonium sulfamate (Am-mate).

One should be on the lookout for weed immigrants. The puncture vine so common in California is new to most parts of Iowa. It has been found growing in the railroad yards at Hawarden, Iowa since 1933. Although an annual, the fruit carries prongs which when ripe penetrate automobile tires and make life miserable for man and beast in many ways. Diesel oil is at present the most satisfactory chemical to control it.

In general it would appear that it is possible to carry on our weed control program. Probably it would do no harm if our golfers became more weed minded than they are. If they saw a stray weed in the fairway they would pull it, place it in their golf bag and dispose of it when they came to the club house. Sodium chlorate may be difficult to obtain as such but there appears to be no restriction on Atlacide. It in itself is safer around buildings than sodium chlorate as it is not as much

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of a fire hazard as sodium chlorate. Tetrachlorethane may be obtained in limited amounts from E. I. DuPont de Nemours & Company, Wilmington, Delaware or Dow Chemical Company, Midland, Michigan.

Ammonium sulfamate (Ammate) recommended particularly for the eradication of poison ivy is manufactured by E. I. DuPont de Nemours. It is highly soluble in water, non-corrosive, non-inflammable and is not retained in the soil as long as sodium chlorate. It may be that we can use this new material to considerable advantage.

There may not be as many golf players this summer as last but all of us are agreed that as long as we have our golf courses, we should not permit them to become infested with weeds. It is much simpler to keep a good golf course in first class order than it is to make a clean course out of one which has become foul with weeds. "Prevention is better than cure"!

Proper Maintenance Needed by Dishwashing Machine

AT LEAST ONCE a week the dishwashing machine should be given a thorough cleaning and inspection. Dirt is likely to accumulate in small openings and on the less accessible inside surfaces of the washing equipment. Do you know which parts of your machine are easily disassembled to facilitate proper cleaning? Tubes and nozzles are removable in almost all types of machines.

Spray openings vary in area from .012 to .07 square inches. The smaller ones clog more easily. Stiff brushes work well for cleaning nozzles and tubes, but occasionally bristles break off and cause clogging in the manifold. This can be avoided by using a knife to push food particles from the spray tube slots into the tubes. Tubes can be cleared by flushing them with water or blowing them out with steam. Don't bang them.

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Dirt which interferes with dishwashing machine production is chiefly grease, but deposits of lime, alkali or calcium adhere more tenaciously and can do more lasting damage. Grease layers thicken quickly, imprison decaying food particles, and are friendly to germs, but grease is the type of dishwashing machine dirt that can be gotten rid of most readily.

Strong cleaning solutions should be used cautiously, if at all. Lye is popular for cleaning greasy machines, but it is corrosive and its cleaning action is deceptive: it may merely cut a channel through the grease without removing all of it, and it does not remove scale deposits. Diluted muriatic acid can do a more effective job, but it requires expert handling. There are detergents on the market which will effect removal of reasonable dirt accumulation safely. In the case of long-used machines, however, it may be advisable to employ more specialized services, available through manufacturers, to restore them to condition for a clean start. It is easier to keep a dishwashing machine clean than it is to remove soil from a dirty one.

Weekly inspection combines naturally with the cleaning job. Examine openings in the regular or automatic feeders. Watch for worn washers. Defective spray washers cause loss of pressure. Defective valve washers may necessitate replacement or reseating of the valves. Using wrong wrenches on valves rounds them off or wears them out.

Worn or broken parts should be repaired or replaced. Jagged edges on racks or metal parts are especially bad, as they catch and hold dirt particles, cause dish breakage, and frequently tear into the flesh of operators.

Make sure the pump is always well packed. To obtain new packing of the right type, it is advisable to order direct from the manufacturer of the machine.

Proper lubrication is an elementary requisite for trouble-free service from any machine, but it is often neglected. A few drops of oil should be put in the oil cups in the motor once a month, and grease cups should be kept filled with a good grade of grease. But don't put grease in oil cups, or oil in grease cups! Grease cups should be turned slightly every day,

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