

Pointers on How and Why of 2, 4-D USE

By **FRANKLIN D. JONES**

Manager, Horticultural Dept., American Chemical Paint Company

OUR BASIC KNOWLEDGE of plant hormones and what they do arose out of some bio-chemical work in the University of Utrecht in Holland simultaneously with work at the California Institute of Technology in 1934.

Most scientists familiar with the subject believe that the naturally occurring plant hormone is indole acetic acid. This chemical can be made synthetically also, but chemicals with similar structure have been made which do not occur naturally, which are stronger and more stable, and are used therefore in agriculture, such as naphthalene acetic acid and naphthyl acetamide which are used in stopping premature drop of apples.

Several groups of organic acids have been found to be very effective plant killers, and some of these are plant hormones. About a third of the known plant hormones are also weedkillers. 2,4-D or 2,4-dichlorophenoxyacetic acid and its derivatives are both plant hormones and excellent weedkillers. This particular chemical is one of the best, most available and cheapest in the group, and the research and the publicity on the new type of weedkiller has therefore centered on 2,4-D. 2,4-D kills plants by destroying their starch and sugar, and because in some way it also interferes with the plants' ability to make any more starch and sugar. Because of its plant hormone properties, it travels the more readily throughout the plant.

In applying 2,4-D to plants,—and by the way, a weed is only a plant that persists in growing where it is not wanted,—it can be applied as a clear solution or as an emulsion. The clear aqueous solution such as the sodium, ammonium, and other

soluble forms, does not wet all plants alike. We all know that some leaves are waxy, some are hairy, and some wet very readily. The trouble with the clear solution is that a wetting agent must be added in just enough a quantity to leave a film of liquid on the leaf, but not so good a wetting agent that the film is too thin.

Why Emulsion of 2,4-D

On the other hand, the emulsion form deposits globules of oil on the leaf which makes a film that wets the leaves more uniformly and thoroughly than a water solution, thus giving a much more uniform effect to overcome the variations in species and in the age of the leaf.

Making up a formula does not involve merely the addition of a wetting agent to 2,4-D. The carrier which is apparently only a filler frequently turns out to have a vital effect on the way the formula as a whole wets the leaf and which can even improve the effectiveness of the weedkiller. For example, the oil must be of a certain viscosity and its chemical nature has a bearing on the effectiveness. The properties of the dry fillers such as talc have a bearing on the effectiveness of the dry dust applications of 2,4-D.

The application of nitrogen to plants stimulates succulent, vegetative growth so that it is not surprising that nitrogen fertilization sensitizes the average plant to the effect of 2,4-D. Hawk weed, for example, that has been recently fertilized, withers and dies within a week after 2,4-D treatment, while unfertilized hawk weed takes 3 to 4 weeks to die. Most of the bent grass I have seen injured with 2,4-D had been fertilized with nitrogen just before treatment with 2,4-D.

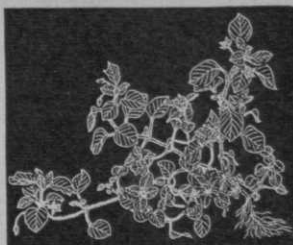
SIX FUNCTIONS PERFORMED BY PLANT HORMONES

1. Initiate roots.
2. Control stem growth.
3. Control upward movement of moisture and nutrients.
4. Assist in pollination or fruit set.
5. Control abscission of leaves, flowers, and fruits.
6. Control relative growth of branches or "apical dominance."



Broad Leaf Plantain

not very sensitive in the fall. Should be sprayed in late spring and summer.



Chick Weed

grows best in cool weather of spring and fall and is most easily killed then. Requires effective wetting by 2,4-D formula.



Knotweed

should be sprayed in the spring. Nitrogen treatment will frequently sensitize this plant in mid-summer when it would be too dormant for 2,4-D penetration.

Tips on Treating

1. Use coarse spray nozzle as large droplets are three times as effective as a mist spray. Fan-type nozzles are preferable.
2. Use low pressures—75 to 100 pounds—to cut down and reduce misting.
3. Use half the recommended strength when spraying bent. To test local conditions, always use 2,4-D on a small section of your bent turf before using it on the large scale.
4. Keep spray away from desirable plants. 2,4-D kills most vegetables, flowers, and deciduous shrubs, also small evergreens.
5. Follow up complete sprays with knapsack sprayer three weeks afterward to get missed spots.
6. Don't use 2,4-D until two or three weeks after nitrogen feeding on turf.

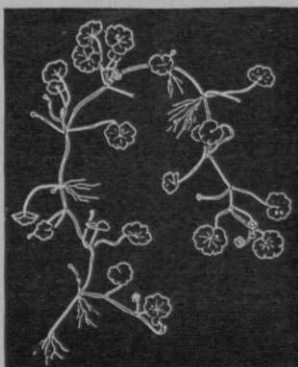
Dandelion

can be killed any time when growing actively until two weeks before frost.



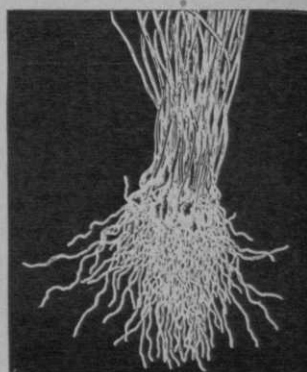
Lawn Pennywort

readily killed when warm enough for active growth.



Wild Garlic

this, like chickweed, is a cool weather plant and should be sprayed when about six inches high in spring or fall.



Destruction of established weeds with 2,4-D requires that the plants be in an active state of growth so that the weed-killer will go readily throughout the plant. Dormant weeds are not affected by 2,4-D to any extent because there is little movement within the plant in dormancy. Consequently, the 2,4-D application should be made when the soil temperature is high enough for activity within the plant as a whole so as to get movement all through the roots. It is wise to wait 2 weeks after nitrogen feeding before spraying bluegrass, and 3 weeks before spraying bent.

2,4-D does not appear to leave a residue in the soil under average spring, summer, and fall conditions where there is adequate soil moisture. However, this means that the weeds should be allowed to die (3 to 4 weeks) before re-seeding is done.

Questions Seed Killing

Some publicity has been recently given to treating soil with 2,4-D to kill weed seeds. This is a dangerous procedure, and I do not think it should be done except in a very limited experimental basis until more is known about soil treatment. Treatment of the growing weeds is one thing, but treatment of the soil is a totally different proposition.

Poison ivy along the fences is a problem at some golf courses. The leaves are quite waxy and results have been very erratic with the clear solutions of 2,4-D, and the emulsion type of 2,4-D application is more desirable on this weed. The plants should be allowed to leaf out thoroughly before any kind of a kill can be expected, and repeated spot sprays are usually necessary for the tougher plants.

Clean Out After 2,4-D

It is important to clean out the spray tanks and equipment before fungicides are used in the sprayers. The small amount of 2,4-D that might remain if it were not cleaned out will step up the plant injury level of the fungicide. Soda ash in hot water and soap solution, or TSP solutions will clean out the solution types of 2,4-D, while emulsifiable oil or emulsified kerosene will wash out any of the 2,4-D oil emulsion residue that might be left.

Penna Plan Calls for Semi-Annual Reconditioning of Clubs

★ Charley Penna, pro at Beverly CC (Chicago district) has a club cleaning service that's being studied by Chicago district pros as something to adopt when it becomes possible to get equipment and competent shop boys. It's a service that Penna's members have talked about so

word of it is getting around the district.

The ordinary service of cleaning clubs after each round and making minor repairs without the member having to request them is expertly done at Beverly because Charley early in his golf shop work was trained by Tommy Armour to pay careful attention to this part of the job. Charley extended his education in this work by employment in golf manufacturing plants during the winter. Consequently Penna has trained his own staff, headed by Wilfred Chase, also an Armour graduate, to do competent and conscientious work in return for the members' payment of club servicing and storage charges.

But where Charley carries the service beyond the customary extent is in two careful overhauls of clubs and bags each year; one before the season starts and another in mid-season.

The big job is on the woods. The first step is to remove the damaged finish with a sanding cone attachment on his buffing motor. Then he restrains the club in its original color. Then three coats of lacquer are applied. The new finish is baked in by heat-treating lights. In a golf shop the sort of a baking oven used in a first class golf club manufacturing establishment is out of the question, but the lights do the job.

The face of the club is refinished and touched up.

The shafts are polished and Lexol is applied to the grips to renew the tackiness. If caps on tips of shafts are damaged Penna replaces them. The whipping, or plastic shields, are checked and put in good shape.

This job takes about 4 days.

On the irons the shafts are polished, the grips are given a Lexol treatment and general check-up is made to see that every detail of the club can pass inspection.

Bags are saddle-soaped and if sewing or other minor repairs are needed Charley sees that arrangements are made to have that work handled.

Some might think that such a complete overhauling puts the clubs and bags in such good shape that purchasing interest in new equipment is discouraged. But it works out exactly the other way. Members are reminded to take pride in equipment instead of being content with the old stuff. Consequently the service has been a factor in getting Beverly members eager to buy the latest and best whenever Charley can get it for them.

The best grade of materials are used in Penna's overhauling work. The staining and laquering is done under a ventilated hood in one corner of his shop. Members seeing this work in progress are made aware that they are getting unusual returns on their payments of club cleaning charges.