3-1948

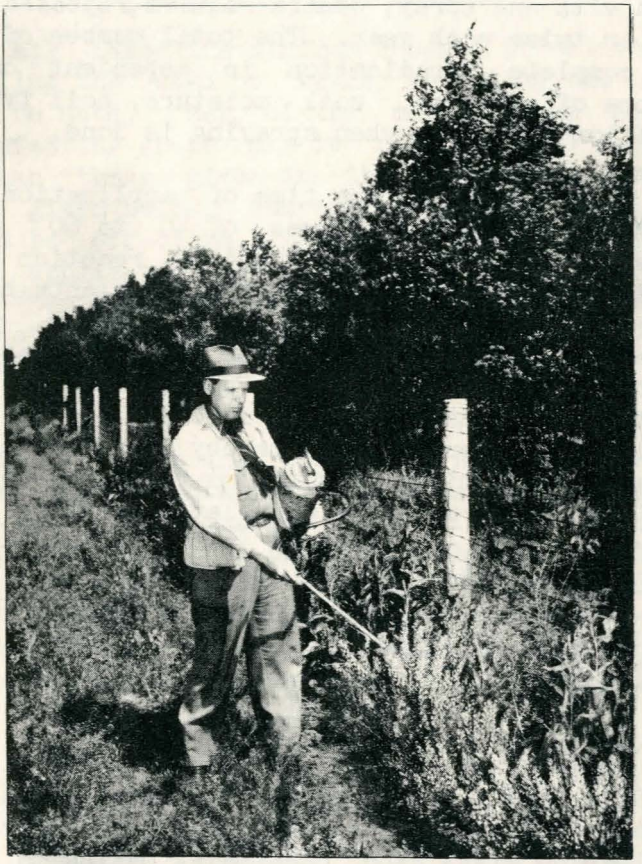
EC179 Chemical Weed Control in Nebraska

Noel S. Hanson

March
1948

E. C.
179

Chemical Weed Control In Nebraska



Cooperative Extens[illegible] Home Economics
University of Nebraska College of Agriculture, and the United States
Department of Agriculture cooperating, H. G. Gould, Acting Director,

CHEMICAL WEED CONTROL IN NEBRASKA

Noel S. Hanson, Glenn Viehmeyer, and J. D. Furrer 1/

Most species of broad-leaved annual weeds show some susceptibility to 2,4-D, especially in the early stages of growth. With the exception of a few species, adequate control of the broad-leaved weeds can be accomplished with timely sprays of 2,4-D. Several of the broad-leaved perennials can be eliminated with one spray. Others require repeated sprays once or twice each year. The total number of sprays for complete eradication is dependent on many factors of species, soil moisture, soil type, and condition of growth when spraying is done.

Temperature at the time of application is important. Low temperatures of 40 to 60 degrees Fahrenheit slow up the speed of reaction to the point where recovery of the treated plants has been observed. Too high temperatures of 80 degrees Fahrenheit and above may cause too rapid action on the top growth which will not permit adequate translocation of the chemical into the roots of the deeply-rooted perennials, thereby reducing the kill. Inasmuch as optimum conditions for treatment with 2,4-D continue only for a relatively short time in the spring for annuals, and in the spring and occasionally in the fall for perennials, it is of utmost importance that the treatments be timely and be applied when the plants are in optimum growing condition.

Types of 2,4-D

Because of the relatively low solubility of 2,4-D in water, the commercial formulations on the market at present include the 2,4-D in chemical combination with other chemicals making a water

1/ Assistant Agronomist, Nebraska Experiment Station, Assistant in Horticulture, North Platte Substation, and Extension Weed Specialist, College of Agriculture, respectively.

soluble or emulsifiable product. Three different types of commercial formulations are readily available. These include (1) the esters of butyl, ethyl, isopropyl, or methyl alcohol in emulsifiable oils, (2) di- or tri- ethanolamine salts of 2,4-D, and (3) both anhydrous and monohydrate sodium salts of 2,4-D.

Recommended Dosages of 2,4-D for Various Weed Infestations

In all cases the minimum dosage effective for controlling the weed or weeds infesting the crop should be used. Many of the more serious annual weeds infesting crops may be controlled by dosages lower than those given in the general recommendations given below. Where such lower dosages are known to be effective, their use will reduce both cost of application and danger of damage to the crop. (See Nebraska Extension Circular 172 for amounts of each commercial product to use. General recommendations as to amounts of 2,4-D products to use follow).

A. Weeds in Corn and Sorghum. Applications of 2,4-D to weeds in corn and sorghum should be made at the six-inch to laying-by stage of growth or after grain has reached the early dough stage. For the least serious effect on the crop, the spray should be applied from the side rather than over-the-top. Where the weeds are as tall as the corn, over-the-top spraying may be necessary.

1. Annual weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage.

a. 1/3 pound acid of the ester type. Use from 1 pint per acre of a 40 per cent ester to 3/4 pint per acre of a 46 per cent ester.

b. 2/3 pound acid of the amine or sodium salt types. Use $1\frac{1}{4}$ pints per acre of a 40 per cent amine salt or 4/5 pound of an 80 per cent monohydrate sodium salt.

c. Pre-emergence treatments. Treatment to the soil before the crop or weeds emerge appears promising, but is not recommended at this time because of insufficient information regarding the effect on the crop or organisms in the soil. Suggestions are made below for anyone wishing to try this method on his own initiative, but it must be understood that such suggestions do not constitute official recommendation by the Nebraska Experiment Station.

Suggested Pre-emergence Treatment: For those who wish to try soil treatments on their own farms in an attempt to prevent weeds from emerging, it is suggested that two dosages be tried separately. Apply 1 and 2 pounds 2,4-D acid per acre in 5 to 100 gallons water shortly before the crop emerges. Soil treatments will be from 3 to 6 times as costly as foliage sprays applied after the crop and weeds have emerged.

Caution: Some experiments and observations have shown more serious damage to crop plants from soil treatments on the lighter soil types with the least damage on the heavier soils.

2. Perennial weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage:

a. 2/3 pound acid of either type formulation. (Esters most effective on the more tolerant weeds). Apply this amount to the perennial weeds as a side spray shortly before laying by the crop.

b. $1\frac{1}{4}$ pounds acid per acre of either type formulation. Apply this amount to the perennial weeds as a side spray after the corn is in the early dough stage.

B. Weeds in Small Grains. Treatments of 2,4-D in winter wheat, rye, spring wheat, oats, or barley are recommended only where the infestations of weeds are so heavy that yield reductions from the weeds will exceed the possible damage from the treatment on the crop. Applications should be made in the spring either after the crop has reached the full tiller

stage and jointing begins, or after bloom. No treating should be done during the bloom stage. Airplane application is the most successful after the bloom stage because ground equipment causes severe mechanical damage at that time. Pre-emergence treatment to the soil is not recommended, and may cause severe damage.

1. Annual weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage:

a. 1/3 pound acid of the ester type. For general amount of commercial product see above.

b. 2/3 pound acid of the amine or sodium salt types.

2. Perennial weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage:

a. 1/3 pound acid of the ester type. Apply after full tiller and before heading.

b. 2/3 pound acid of the amine or sodium salt types. Apply after full tiller and before bloom.

c. 1¼ pounds acid of the amine or sodium salt types. Apply after bloom. Use the ester type on the more tolerant weeds.

C. Weeds in Perennial Grasses. The various perennial grasses are quite tolerant of even relatively high dosages of 2,4-D after the plants have become established, but are rather sensitive in the early seedling and young plant stages of growth. Applications of 2,4-D for weed control in the grasses should be applied after the grass plants have attained at least 3 to 5 inches growth the first season and at any time in following seasons except that on grasses to be used for seed production, no treatment should be applied after heading begins. Creeping bentgrass has proved to be somewhat sensitive to 2,4-D. The recommendations below include weed control in lawns.

1. Annual weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage:

a. 1/3 pound acid of the ester type. Apply as early as possible after annual weeds are fully emerged.

b. 2/3 pound acid of the amine or sodium salt types. Apply early.

c. Pre-emergence treatments are not recommended, but may be tried as suggested for corn and sorghum. Treatment should be applied before the weeds emerge in established grasses.

2. Perennial weeds. Apply the following amounts of 2,4-D in 5 to 100 gallons of water per acre, depending on density of foliage:

a. 1¼ pounds acid of either type. Apply to perennial weeds in established grasses before seed heads appear. Use the ester type for the more tolerant weeds.

b. Spray preceding the planting of perennial grass by two weeks to one month at 1¼ pounds acid per acre.

D. Weeds in Non-cropped Areas. Timely sprays with 2,4-D are valuable for the control of weeds along fence lines, irrigation and drainage ditches, waste areas, around storage yards and buildings, around arsenals, and along railroad and highway rights-of-way. Weed control should be accompanied with re-vegetation to perennial grasses. If this is not done, serious soil erosion and weed reinfestation may result. Two sprays applied each year would largely eliminate the weeds if applied (1) when the weeds are fully emerged but in a young stage of growth in the spring, and (2) under similar conditions of growth in midsummer or early fall. Cool season grasses should be planted in the areas either in the fall preceding the first spring spray, or the following fall after the second spray. Additional sprays should be applied as required for weed control.

1. Annual weeds. Apply 2/3 pound acid of either type of 2,4-D in 5 to 100 gallons of water per acre, when the weeds are young. The ester type may be used for the more tolerant weeds.

2. Perennial weeds. Apply $1\frac{1}{4}$ pounds acid of either type of 2,4-D in 5 to 100 gallons of water. The ester type may be used for the more tolerant weeds. Apply when weeds are fully emerged to full bloom, also on actively growing weeds in the fall after summer dormancy.

Caution: Poor results are common from treatments during summer dormancy.

Recommendations for the Dinitro Weed Killers

Because of the effectiveness of 2,4-D on annual weeds in crops tolerant of it, and also because of the greater desirability of handling 2,4-D, the use of dinitro compounds, which are yellow dyestuffs, has been somewhat reduced. Present uses of these contact herbicides are as follows: (These compounds should be used according to manufacturer's recommendations).

A. For the control of annual weeds in crops sensitive to 2,4-D such as flax, canning peas, field peas, and seedings of alfalfa. The ammonium salts of the dinitros are recommended for this purpose.

B. For the temporary destruction of weedy grasses in non-cropped areas. The concentrated compounds applied in oil or oil-water emulsions are recommended. Spots of the weedy grass nimblewill, Muhlenbergia schreberi, may also be controlled by this chemical. Infestations of downy bromegrass, Bromus tectorum, and hairy chess, Bromus commutatus, may be the most effectively eliminated from non-cropped areas by oil sprays of the concentrated dinitro compounds.

Sodium Chlorate for Perennials

Sodium chlorate and the proprietary chemical "Atlacide" may be used for the control and eradication of small infestations of such deeply-rooted perennials as bindweed, hoary cress, Canada thistle, leafy spurge, Russian knapweed, dogbane, bur ragweed, and tanweed. The latter five are moderately resistant to 2,4-D.

Sodium chlorate should be applied to the above species during September and October. Soil moisture conditions optimum for active growth of the weeds is optimum for good kills with this chemical. Remaining plants should be spot treated in the spring and at continuous intervals until the plants are gone. Rates from 4 to 6 pounds per square rod have been most effective.

Caution: Organic materials treated with sodium chlorate are inflammable.

Borax for Leafy Spurge Control

Agricultural mesh borax and a lesser refined form of borax called "Borascu" have value for the control and eradication of leafy spurge and for the eradication of dogbane. Dogbane usually grows in scattered patches on medium to highly productive soil where semi-permanent to permanent soil sterility from borax is highly undesirable. Many leafy spurge infestations appear on non-crop land where soil sterilization is not objectionable.

Since borax is a slow acting, long lasting chemical that does not easily decompose in the soil, it may be applied dry at any time during the growing season at the rate of 20 pounds per square rod. Surviving plants should be spot-treated at intervals until destroyed.

Extension Circular 179 replaces Agronomy Department Circular 88.