

Destroy Mustard

by

T. E. Stoa, Agronomist
Experiment Station .

One of the worst of the annual weeds, and one which is increasing fast in many of our grain fields, is the common mustard. Like other weeds, mustard competes aggressively with crop plants for available moisture, fertility and sunlight. As a result, maximum crop yields can not be realized and the cost of harvesting, threshing and handling of the crop is increased.

To control any weed successfully one must know its habits, the characteristics of the plant, its seed and how it spreads. When, and how, can the plant be most easily destroyed? Does the ripe seed germinate readily, or does it have a long dormancy period? What soil temperatures are most favorable for germination? Does the seed have a seed coat that resists the absorption of water?

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EXTENSION SERVICE

NORTH DAKOTA AGRICULTURAL COLLEGE
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COOPERATING
Fargo, North Dakota

Annual Weeds Reproduce Only by Seed

Annual weeds can reproduce and spread only by producing new seed. Successful control depends on preventing seed production and reseeding. Mustard starts early in the spring, produces seed abundantly, ripens early and the seed shatters readily, increasing the infestation of fields greatly in the following years.

Getting rid of mustard in a field is more difficult than cleaning up wild oats or other common annual weeds. Keeping mustard out, therefore, is usually easier and less costly than getting rid of it, after the soil has become heavily infested with the seed. Mustard seed may be introduced with other seeds when sowing, through applications of manure carrying viable seeds, or seeds may be carried in from other fields by strong winds, or flood waters. When scattered plants first appear they should be rogued out so no new seed can be produced. One strong, vigorous mustard plant may produce as many as 2,500 seeds. The seed ripens early and shatters readily before the grain crop is ready for harvest. Because mustard seeds have seed coats that resist water absorption, they may live in the soil, without sprouting or rotting, for many years.

Tillage and Cropping

Handle infested fields to promote as prompt germination of the seed as possible, and to destroy the plants before new seed is set. Mustard seeds will sprout under relatively low soil temperatures. Early shallow spring tillage to break the crust, cover the seed and hasten warming up of the soil, is recommended to promote early germination.

After plants have started, deeper cultivation to destroy these and to bring near the surface unsprouted seeds, is advisable. Where there is a heavy infestation, the land preferably should be treated as fallow the balance of the season. This permits further cultivation and destruction of plants which start, because mustard seeds will continue to sprout throughout the summer and fall, if rains are favorable.

Tillage in late summer and fall should preferably be shallow, with no attempt to bring unsprouted seeds up near the surface. The intent of late season tillage should be to clean up the top soil for next year's seed bed.

Mustard seeds which germinate in the fall on fallow fields or early fall plowing, producing young plants, should be destroyed that fall. These young plants will sometimes live over winter, continuing to grow early in the spring. They are much easier to destroy in the fall than in the spring when temperatures and surface soil moisture are more favorable to their recovery.

Usually such a fallow field may be sown to wheat or other small grains next year, sowing early and after only a shallow cultivation. There is a strong likelihood, however, that some live seeds still remain in the soil, even after a full fallow season, and control measures will have to be continued in later years.

For fields of light infestation a combination delayed seeding and extra spring cultivation, to destroy early starting plants, may be satisfactory and give most practical results. Intertilled crops like corn, sorghum, soybeans, or potatoes, if suited to your section of the state, and which give opportunity for cultivation, would fit best into such a program. Sometimes late sown flax, or later sown millet, proso or buckwheat, can be used to good advantage, furnishing opportunity for some income from the land, as well as some weed control.

Sowing Down to Grass or Alfalfa

Seeding a badly infested field to a perennial grass or alfalfa, leaving it down for a period of years with the expectation of having the seeds rot, is usually only partially successful. Some seeds will rot, some will germinate and fail later because of the competition from the grass or legume. However, since mustard seeds generally have a hard protective seed coat which resists the penetration of water, they can remain in the soil and retain their viability for many years.

When the grass or alfalfa seeding method is used it may be advisable to follow the sod with a period of fallow after the hay crop is taken off in June or early July, or, if plowed up later, to follow with an intertilled crop which will permit the destruction of any mustard which may come on.

Plowing deep with the thought of burying the seeds so deep they are not likely to germinate, or be brought to the surface by later cultivation, rarely solves the problem satisfactorily. All seeds usually are not on the surface to be plowed down. More often they are scattered throughout the normal plowing depth. In plowing, the furrow slice is not so completely turned over that all seeds are buried to the full plowing depth, and so many live seeds may be turned up by cultivation the following year or several years later, ready to sprout and re-seed the field. This is especially true of seeds like mustard which have hard protective seed coats.

Destroying Weeds With Chemicals

Improvements which have been made in recent years in the development of selective herbicides give much encouragement to the use of chemicals in the form of sprays or dusts, as a means of destroying mustard and certain other types of weeds.

The dinitro sprays, such as Sinox and Dow Selective, have been used successfully for some time on broad-leaved weeds with considerable success in fields of grain.

The newer chemical 2,4-D, now being tested experimentally by many experiment stations and also being tried on many farms, offers promise of greater economy and convenience. It permits the use of a smaller volume of water per acre and less expensive spraying equipment. Much, however, is still to be learned about its use, when to spray, the rate to apply and especially as these are related to the effect on the crop.

When, and Rate to Apply

Mustard is one of the easiest plants to kill with these selective chemicals. Experience has shown that the dinitro sprays should be applied when the mustard plants are in the 3 to 5-leaf stage, the companion grain crop 4 to 8 inches tall and air temperature from 65 to 85 degrees. Later the mustard plants are less easily destroyed and the crop plants, being more advanced, may suffer some permanent injury.

To avoid crop injury, do not spray when plants are wet with dew or during periods of very high temperatures. For Sinox and Dow Selective, the rate to apply is the same - 1 gallon in 100 gallons of water, applied at the rate of 50 to 75 gallons of solution per acre in fields of wheat, oats, or barley, or 40 to 60 when spraying flax fields.

Results from tests to date indicate that 2,4-D should be used at the rate of $\frac{1}{4}$ to not exceeding $\frac{1}{2}$ pound of acid in 10 gallons per acre. This should be applied when the mustard is in the 3 to 5-leaf stage and before the grain crop reaches the jointing stage. Wheat, oats and barley apparently can be sprayed with less risk of injury than flax. If used on flax use from $\frac{1}{8}$ to $\frac{1}{4}$ pound of acid and apply when flax is from 2 to 6 inches tall.

The above rates are those which experiences to date have given most success. However, since a plant's reaction to the chemical may vary some with conditions for its growth, the results obtained will not always be equally good. In the case of the dinitro sprays, where the killing action of the chemical can be observed within a few hours, a preliminary test using slightly different rates and sprayer adjustments can be made. This makes it possible to determine which rate is the most effective for a given field, yet keeping within the desired margin of safety for the grain crop.

As experience is gained in the use of selective herbicides, and as these are being improved from year to year, it is probable that the use of these special chemicals, in connection with timely tillage and well planned cropping, will afford a more efficient and economical means of controlling mustard. (For more complete information on use of these herbicides see Extension Service Circulars A-108 (revised) and AE-23).

Precautions to Remember

When using selective chemicals to destroy weeds in grain fields you must remember that there is a risk to the crop. The chemical which can destroy a weed can, under certain conditions, also destroy or greatly injure crop plants. Some plants are destroyed more easily than others because of the size and texture of their leaves, insuring greater exposure to the chemical and more certain its entrance. A narrow leaf offers less exposure to the spray or dust, and a waxy surface affords less opportunity for the chemical to adhere to the leaf and gain entrance into the plant. An improper mixture or excessive dosage through careless applications of the spray or dust can lead to disappointing results.

When applying these selective herbicides to a field take care to avoid drift to other fields and crops which might be injured. This is especially true when 2,4-D is used. Alfalfa, sweet clover, potatoes, sugar beets, peas, soybeans, many garden crops and ornamentals are very susceptible to injury. Fields where wheat or other small grains are used as nurse crops for alfalfa, clover or other legume should NOT be treated with 2,4-D.

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