Weeds in Flax

chemical control of grasses and broad-leafed weeds in Imperial County

John E. Swift

Control of weeds in flax may be accomplished by crop rotation, by cultural practices, and by chemical weed control.

The use of chemicals to control weeds in flax should be utilized only when cultural or rotation practices fail to give control. The recommendations given here are tentative and are based on results obtained in the Imperial Valley. Their application to other flax growing areas may not be practical.

Grasses which present a problem in growing flax are usually wild oats and canary grass. Control of these grasses is a difficult problem, but a degree of success has been obtained. There is yet much to be learned about the application of weed killers which sometimes cause excessive injury to flax.

From the results obtained in 1947 and 1948 the best recommendation for the use of oil to control grass in flax is as follows:

Material per acre—Shell Weed Killer No. 11,* 80 gallons.

Equipment—Ground sprayer.

Time—When flax is 1½" to 5" tall and after a majority of the grass has germinated but before it forms clusters and reaches a height of seven inches.

Pressure—200 to 300 pounds per square inch.

Precautions—Do not spray in evening when there is no air movement or when there is frost or excessive dew on the plants.

Spraying as early as possible is important for the best results. The control of grasses over seven inches tall or in large clusters is usually ineffective. Heavy flax over five inches in height forms a protective shield over the small grass plants and does not allow enough oil to contact them to give an effective kill. Excessive injury of the flax results in the evening when the air is very calm and there is no wind.

The yields in 1948 from a series of sprayed and unsprayed paired plots were as follows:

	Sprayed plots	Unsprayed plots
Average yield per acre (bu.)	34.1	20.3
Average dockage (%)	8.1	15.8

For the two years of 1947 and 1948 control measures with oil sprays have cost $16 to $18 an acre. Results of spraying have been variable and no guarantee can be made that spray application will always bring about a big increase in yield.

Broad-Leaved Weeds

Broadleaf weeds that usually present a problem in growing flax are pigweed, lambsquarter, redweed, sunflower, wild beets, hubam clover, sour clover and malva. Control of the broadleaf weeds has been obtained by the use of selective herbicides but much more experimental work is needed on such problems as time, amounts and methods of application.

As the selective sprays are more effective on small weeds, it is desirable to spray before the weeds reach a height of four inches. This is not always possible and it has been found that quite effective control can be obtained on some of the larger weeds by spraying as soon as possible after irrigation.

The recommendation for spraying to control broadleaf weeds is as follows:

Ground Application

Material per acre—1¼ gals. Sinox Selective,* or equivalent amount of Dow Selective,* two to three pounds sulphate of ammonia, used only with the Sinox concentrate, 124 gallons of water.

Pressure—100 to 125 pounds.

Time—Soon after irrigation and when weeds are 4" or less in height.

Airplane Application

Material per acre—1½ to 1¾ gals. Sinox Selective,* or an equivalent amount of Dow Selective,* 2 pounds sulphate of ammonia, used only with the Sinox concentrate, 15 gals. of water.

Time—Five to six days after irrigation and when weeds are 4" or less in height.

Further work is needed to study time and rates of application in an effort to lower the cost of spraying. At present the cost is from $7 to $8 an acre.

Preharvest Spraying

Large broadleaf weeds such as pigweed, lambsquarter, redweed, sunflower, and hubam clover often seriously hinder harvesting operations. These weeds slow up harvesting and the green weed seeds often cause heating when the flaxseed is in storage. Preharvest spraying kills or

* To simplify explanations it is sometimes necessary to use trade names of products. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

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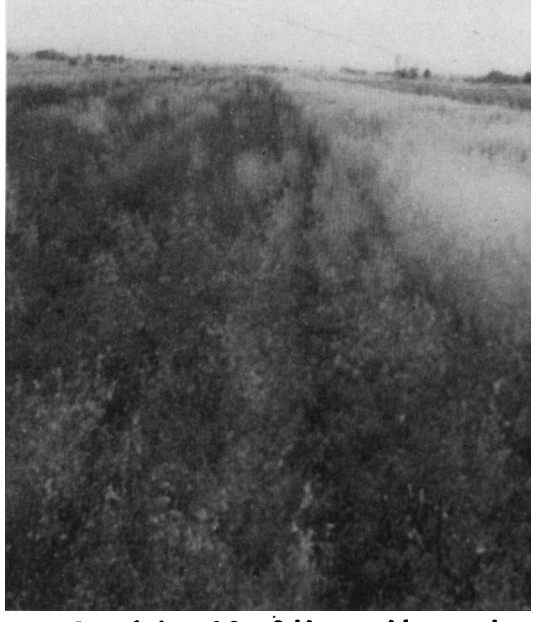
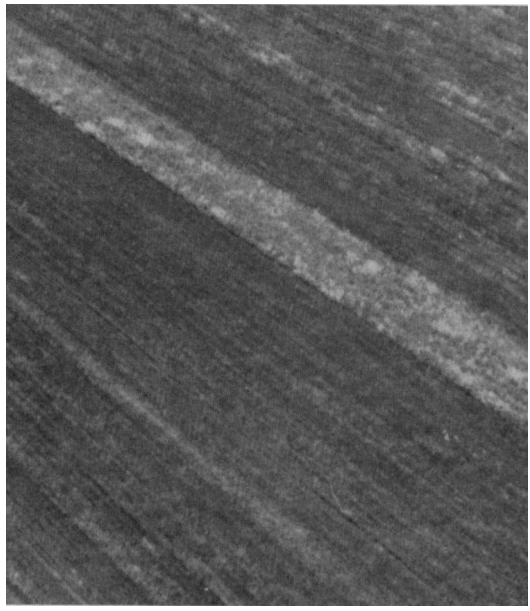


Ground view of flax field sprayed by ground rig *(left)* with 80 gals. per acre Shell No. 11 and unsprayed *(right)*.

Aerial view, same field. Unsprayed area appears as white strip.



Closeup, same field. *Left*, sprayed; *right*, unsprayed.

NEMATODES

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However, the parasites must be distinguished from other similar free-living species that are present in the soil.

Method of Spread

Root-lesion nematodes can be spread to new localities by the planting of infested seedlings. Since these nematodes are able to penetrate into the roots of many different plants it is possible that they may be carried in the roots of plants that are not actually injured by the infection. They may leave the roots of these plants and later infect susceptible roots if they become available. It is extremely desirable that plants intended for replanting in other localities be grown in soil that is free of root-lesion nematode infestation.

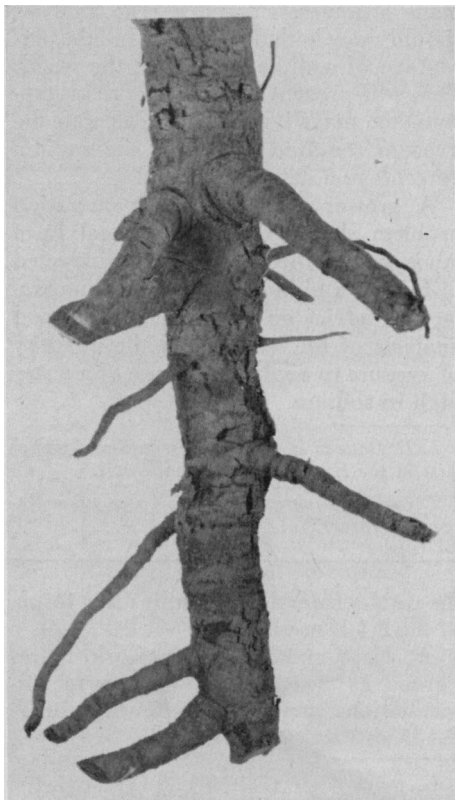
Irrigation water and the movement of soil during cultivation and other cultural practices undoubtedly play an important part in the spread of the nematodes within an infested planting.

Control

There is very little information available on the control of root-lesion nematodes. They cannot be controlled in the roots since the available nematicides are toxic to living plants. It is possible to treat planting sites with a nematicide prior to replanting. An area approximately six to eight feet in diameter should be treated at the dosage rate of about 400 pounds an acre preferably with a nematicide containing 1,3, dichloropropene. An interval of at least two weeks should be allowed between treatment and planting. It also is preferable to dig the planting hole two or three days prior to the actual planting. This allows the fumigant to escape from the soil more readily and is a safeguard against possible injury of the plant by the fumigant. Precautions should be taken to avoid introducing untreated soil into the treated area.

Fumigation of the soil enables the young seedling to get well established before it is again subjected to the attack of large numbers of nematodes. Fumigation does not kill all of the nematodes and it is possible that over a period of several years the population will again build up to a point where it will be injurious to the new tree or vine.

The most promising method of control appears to be in the development of resistant or immune rootstocks. The Division of Pomology at Davis is at the present time engaged in the testing of many rootstocks to determine which ones can be successfully grown in the presence of high populations of root-lesion nematodes.



Northern California black walnut root showing severe damage to young seedling root. The main root shows the external signs of the lesions.

Distribution and Host Plants

The distribution of root-lesion nematodes as it is known at the present time is indicated below. Undoubtedly intensive surveys would greatly increase the known distribution as well as the host plant list. Host plants, and the counties where they are found are: apple in Sonoma; apricot in Madera; avocado in Los Angeles; cherry in Riverside, San Joaquin, Yolo; Croft lily in Humboldt; fig in Merced, Riverside, Tulare; grape in Fresno, Madera, Tulare; guayule in Monterey; olive in Riverside, Tulare, Yolo; peach in Sacramento; plum, on apricot root. in Kern, and walnut, in Butte, Fresno, Kern, Orange, San Bernardino, San Joaquin, Santa Barbara, Santa Clara, Solano, Stanislaus, Tehama and Yolo.

M. W. Allen is Assistant Professor of Entomology and Assistant Nematologist in the Agricultural Experiment Station, Berkeley.

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FLAX

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burns back these weeds, dries both the weed seed and the flax, reducing the possibility of heating in storage and making it possible to harvest by direct combining. This spraying also eliminates the necessity for windrowing and prevents the loss in flaxseed which usually occurs by shattering due to windrowing. In addition to these benefits, it reduces the amount of dockage and allows fields to be harvested earlier than normal.

The most promising material used in tests in 1947 and 1948 is a highly fortified oil. This consists of two to three pints of a general contact weed killer used to fortify 10 to 15 gallons of general contact weed oil per acre. All applications are made by airplane and the heavier application is used where weeds are heavy and the lighter application where only moderate weed growth is present. Fields containing excessively large thick pigweed and lambsquarter can not be successfully killed back to allow combining. Redweed present only in moderate amounts and scattered can be effectively killed, but where the redweed is heavily clumped and forms a mass, only the tops will be burned and windrowing still will be necessary.

Precaution Necessary

Precaution is necessary in the use of this highly fortified oil since it is injurious to other crops such as alfalfa, citrus, ornamentals and truck crops. Care in application and a minimum of drift is essential.

In 1948 a single field was divided into two equal parts, one half received a preharvest spray and was combined direct; the other half was not sprayed but windrowed before threshing. The yields of the sprayed and unsprayed portions of the field were as follows:

	Preharvest sprayed (direct combined)	Unsprayed (windrowed)
Yield per acre (bu.)	35.9	27.5

The dockage in the sprayed portion of the field was only about half as much as that of the portion of the field which was not sprayed.

Preharvest spraying also speeds up harvesting as a field can be harvested three to six days after spraying.

Since the cost of preharvest spraying is $7 to $10 per acre, it is essential to be able to recognize weed conditions that will more than repay the cost of application. Where weeds are not numerous, preharvest spraying usually is not practical and where the weed growth is extremely heavy and consists of very large weeds, spraying is of little benefit and the desired results are not accomplished. It is the intermediate condition between light and excessively heavy weed growth that must be recognized in order to obtain all the benefits from preharvest spraying.

John E. Swift is Assistant Farm Advisor, Imperial County.