

FRUSTRATION IN THE FIELD: A GROWER'S PERSPECTIVE ON DODDER CONTROL

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A variety of experiences has been acquired battling dodder where infestations have ranged from slight to moderately heavy. Strategies have been developed to cope with the variability of this problem and have been modified with the recent availability of dinitroaniline preemergence herbicides. Suggestions to cope with varying extents of infestations are given.

BACKGROUND

Our ranch is located in one of the prime dodder infestation areas of the state—the high desert area of Los Angeles County. On this property, alfalfa has been the primary crop farmed since 1919. As a result, we provide all the factors contributing to a high degree of infestation (discussed by Reference 1): 1) climate favorable to growth and reproduction of dodder; 2) long stand life of at least seven years; 3) few alternative crops; and 4) potential large soil reserves of dodder seed at a long-established ranch.

Some growers in our area remember dodder appearing somewhere from 1947 into the early 1950's. Observation was first made in the seed production fields and later in the hay fields. Three species of dodder are most troublesome in California. Largeseed dodder (*Cuscuta indecora*) is the species most often present in the high desert and the only species we have encountered. Today, dodder is widespread, infesting about 90 - 95 percent of fields in the high desert (Ref. 1). Some of the native plants in the desert surrounding the ranch now support dodder.

The cropping program at the ranch is not the best in minimizing dodder growth. The border-strip method of irrigation is used in which a field is divided into 40-foot-wide beds separated by a border. Irrigation is accomplished by flooding these beds. Reference 2 observed that dodder is less of a problem under sprinkler irrigation than where irrigation is by flooding. Where flood irrigation is practiced, dodder infestations are worst where the stems are longest, next to borders. For these reasons, we change the direction of cut next to our borders at every cutting. In this way, the longer hay next to a border alternates with each cutting. A stand of alfalfa is allowed to remain in production for over seven years. When the field is finally taken out in the fall, a grain crop is planted in the winter. Alfalfa is again planted the following fall.

As a result of this history as well as other factors, we have fields with almost no dodder and fields with moderately heavy infestation. We even have fields with no dodder at one end and heavy dodder at the other. Therefore, a strategy to deal with all these variations must be established without the grower becoming too frustrated.

WHY DODDER IS SUCH A PROBLEM

The main reasons dodder is so difficult to control and eradicate can be summarized:

1. Rapid Growth. Under the proper conditions, dodder growth is extremely rapid. Reference 1 indicates rates up to 3 inches per day
2. Prolific Seed Producer. In our area, small white flowers started appearing about the middle of June and each flower is capable of yielding up to 4 seeds (Ref. 6). Anyone who has ever seen the tremendous number of flowers on a dodder plant can therefore be impressed with the great seed producing capability of dodder.

3. Low Germination. Many researchers feel that considerably less than 10 percent of the viable seed reserves of dodder in the soil germinate each year. The seeds that do not germinate each year may remain viable in the soil for many years. I have heard and read estimates ranging from 10 to 60 years. These greater times probably refer to storage under a laboratory setting and not under field conditions. As a result, a grower may battle dodder year after year with no apparent progress. If dodder had at least a 90 percent germination like alfalfa or a grain seed, the fields could be rid of this weed in a year or two! We need to know more about the germination and emergence of dodder seed under field conditions over the years.

TREATMENT METHODS

General

The primary control strategy since the early days of 1950 (Ref. 3) has been to find the infestations while they are still small and destroy them before they have set seed. The most important consideration in dodder control is often stated (Refs. 4 and 5): "Prevention is the most effective and least expensive method of dodder control." Unfortunately, most growers entering the hay business or leasing and developing fields about which they have no direct experience usually do not fully comprehend the extent of the dodder threat. Often, several years pass before they are fully aware of the problem.

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Spot Treatments

The extent of control using spot treatments depends how well the applicator can see the dodder and is conscientious about his task. In our area, five alfalfa cuttings are taken each year. Spot treatments are made between cuttings just after the bales have been removed from the field. In this way, less damage is inflicted on the growing stand. In the spring after first cutting, the recently emerged dodder is practically impossible to see. After our last or fifth cutting, the nighttime temperatures are so cold that the the dodder has appeared to "dry up" and is also difficult to see. Hence, unless a dodder patch is rather large after the fifth cutting, we only attempt to spot treat after the second, third, and fourth cuttings.

Seeing the dodder patch is often difficult. The color will range from bright orange, to white or brown depending on several factors. Visibility can be increased if the applicator faces the sun in the early mornings or late afternoon. We have found that even the most conscientious applicator may miss up to 10 to 20 percent of the dodder in a bed.

Although some small patches still occur, the average size of the dodder infestation increases with increasing cutting. Perhaps this results because the swather may remove most of the attached dodder, making the remaining dodder difficult to see after that cutting. As a result, spot treatment may be missed. As the season progresses, the missed dodder has an opportunity to extend its area.

Not only is some problem encountered visualizing each dodder infestation, the extent of each spot is difficult to see. Small stems may reach out beyond the central portion and can be very hard to see. As a result, we apply spot treatments at least two feet further than we can see any dodder stems.

Some specific spot treatments that have been used are listed below. A

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spread out over the infested area. Therefore, soil moving on infested fields should be done intelligently with regard to the consequences.

c. Cultural - The reserve of dodder seed in the soil can be very effectively reduced by planting a non-host crop such as sorghum, milo, corn, rice, beans, cotton, etc. which are irrigated during most of the dodder germination period of the summer. The purpose is to germinate as many seeds as possible which will soon die because no suitable host will be present. Naturally, such fields should be kept clean of weeds that may serve as hosts, such as field bindweed, Russian thistle, london rocket, prickly lettuce, lambs quarters, annual sowthistle, fillaree, etc. Several fields on our ranch are almost clear of dodder after having been planted in a permanent pasture for approximately eight years.

2. Postemergence

Naturally, any of the spot treatment methods described earlier can be expanded on a larger scale to treat the entire field. However, we have had the best experience with flaming or burning the entire field. In this approach, a 500-gallon propane tank on a trailer is equipped with a 20-foot wide boom with burners attached. The rig is towed through the field using a tractor. Reference 1 gives an estimate of the costs involved. Two passes are made: the first at a low speed to wilt the alfalfa and the second at a higher speed to set the wilted plant material on fire. We wait as long as possible between the first and second passes to allow the material to wilt. However, the second burn should be done before regrowth appears. In our situation, time between burns is 1 to 3 days. The procedure is only done after first or second cutting because a later application will most likely kill many beneficial insects. In the past, we have had severe problems with alfalfa caterpillar if field burning was done after later cuttings. Such an approach must be used after most of the dodder has germinated in the spring. This year, for example, Reference 6 indicates that 78 percent of the dodder in our area had germinated before June. When such an approach becomes necessary, we try to cut the field on rather dry ground so that the resultant burn will be as efficient as possible. We recognize that our ranch is located in a geographical area that allows us to mass or field burn fairly efficiently. This approach will be much less effective in areas of higher humidity and rainfall.

OUR DODDER CONTROL STRATEGY

Given several methods of spot and field treatment, all with severe shortcomings, the problem of organizing them into an effective control program should be discussed.

Old Strategy

1. If a field has been planted in alfalfa for at least one year, we will know from the previous year's experience if mass burning will be required. If burning is needed, we will burn after first cutting even if dodder is not noticeable at this time. Water will be taken off the field 10 - 14 days before cutting so it will become reasonably dry. In this way, mass burning will be more efficient and thorough.

2. On the other hand, if the alfalfa planting is starting its first summer or from the previous year we expect to be able to control the dodder by spot treatment, we will walk each bed after the second cutting and count the number of dodder infestations per acre. One difficulty in spot treating dodder is that an applicator often does not know the degree of infestation until he enters the field. If the dodder spots number 40 per acre or greater, we usually mass burn immediately. If not this many infestations are present, we will spot treat. The number of spot treatments per acre will tell us the amount of manpower and equipment needed to spot treat a field. Five years ago, we employed two men on almost a full time basis to

treat dodder. Two years ago, this effort was reduced to one man part time.

New Strategy

1. With the advent of Treflan, our dodder control strategy is significantly altered. We will apply this material in the spring slightly before the dodder emerges (March 1 - 15).
2. Any spot treatment that is necessary afterwards can usually be done by one man per field so counting dodder infestation is not mandatory. Using Treflan as a preemergent, the labor requirement for spot burning has been reduced to less than one man, quarter time.
1. Learn when the dodder first emerges in the spring in your area and time the first application of Treflan accordingly.
2. Also be aware of the distribution of dodder emergence in your locale and time subsequent Treflan treatments accordingly. Perhaps only one treatment will be necessary if most of the germination occurs over a two to three month period.
3. Use a spot treatment method of your choice to destroy any dodder infestations that escape the Treflan treatments.

DEVELOPING YOUR OWN STRATEGY

GROWER NEEDS FOR FUTURE RESEARCH

These topics for research will be very important in developing better dodder control programs.

Biology

1. Additional research needs to be done to determine when dodder first emerges from the soil in the spring. Can this period be correlated with temperature or degree-days data?
2. Research needs to continue to learn of the distribution of dodder emergence over the entire season.
3. During the growth of the dodder plant, how much time is required to produce viable seeds?
4. To what extent do spot treatments (such as flaming, Dinoseb, etc.) affect dodder seed remaining on the plant?
5. How long will dodder seeds remain viable and potentially able to germinate in a field? We are primarily interested in Large-seed dodder (*Cuscuta indecora*).

Control

1. When is the optimum time to apply preemergence herbicide?
2. With Dinoseb being unavailable for use, what other non-selective contact herbicide can be used?
3. Can a selective herbicide for dodder after it has attached to alfalfa be developed?
4. What is the best strategy for "clean up" of a field infested with dodder? How many years will be needed to accomplish this task?

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