PROBLEM ALFALFA WEEDS

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ABSTRACT

Field studies were established to evaluate the efficacy of herbicides and to develop effective control programs for both marsh parsley, also referred to as wild celery (*Ciclospermum leptophyllum)* and field dodder (*Cuscuta pentagona)* in alfalfa hay. Best control of marsh parsley was achieved with Velpar applied alone or in combination with Gramoxone followed by Eptam. Karmex in combination with Gromoxone provided fair control. Gramoxone alone and in combination with Zorial, Goal or Visor provided unacceptable control. Control/suppression of attached dodder was achieved with Pursuit alone and in combination with Prowl. The tank mix application of Pursuit and Prowl provided the best overall control with two sequential applications of Pursuit providing longer and better control than a single application.

Key Words: alfalfa, marsh parsley, dodder, velpar, karmex, gramoxone, goal, zorial, visor, pursuit, prowl

INTRODUCTION

A variety of different weed species including annuals and perennials, warm and cool season, grasses and broadleaves, parasitic and poisonous infest alfalfa hay grown throughout California. The type of weed infestation in any given situation, is usually associated with the alfalfa planting time (fall, winter or spring) and the previous cropping history. Any of these weeds left uncontrolled can seriously reduce yields or cause a complete loss of the stand, especially during the establishment year. If a loss of stand doesn't occur, infestations can weaken young alfalfa seedlings, retard growth and delay the first cutting. Weeds also reduce the quality and the value of alfalfa hay because many are less palatable and less nutritious than alfalfa. Foxtail, both *Setaria* and *Hordeum* sp. can cause ulcers in the mouths of livestock making the hay less palatable. Fiddleneck and yellow starthistle are poisonous, making hay unfit for livestock consumption. Others, like chickweed and annual blue grass, have a high moisture content creating harvest and curing difficulties. Two such problem weeds include marsh parsley, also referred to as wild celery, and dodder.

Marsh parsley or wild celery is a winter annual in the carrot family that has become a troublesome weed in some alfalfa hay production areas. Its seeds germinate from late fall into early summer. In an alfalfa production system the mature plant grows prostrate, not over a few inches high, but branches can also curve upward and reach a height of 2 feet. The flowers are white in a flat cluster or umbel borne on a single stalk. The plant has a pungent aroma and taste making it unpalatable to livestock, ultimately reducing the value of the hay.

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Dodder is a parasitic annual that lacks chlorophyll. Stems are yellowish, thread-like and twining with numerous clusters of compact white flowers. It derives it's moisture and nutrients by embedding sucker like structures (haustoria) into the stem of the alfalfa plant. Dodder seed is hard and can lay in the soil dormant for years before germination. Seeds germinate and emerge in late winter to early spring. Growth is rapid, forming dense mats, turning large areas of the field an orange color. Alfalfa growth is severely reduced and due to the high moisture content of the dodder plants drying and curing for baling becomes difficult.

PROCEDURES AND RESULTS

Marsh Parsley

This trial was conducted in a two-year-old alfalfa stand at Tracy, California. Sixteen treatments were compared that included herbicides with post and preemergence activity. Herbicide applications were made on December 9, 1998, to marsh parsley seedlings that had begun to germinate and reach the one- and two-leaf stage. Germination was first noted in November and continued through April. Plot size was 10 by 20 feet replicated four times in a randomized complete block design. The treatments were applied with a CO_2 backpack sprayer using 20 GPA volume at 35psi.

Evaluations were made periodically, from January through August, between harvest cycles (Table 1). The best control included Velpar, applied at 1.0 lb./A, maintaining 90% control through August. Velpar was also effective in controlling small, emerged plants. Other herbicides that provided good control, when combined with Gramoxone, were Kerb and Karmex. Control was 93% and 70% respectively. Gramoxone was very effective as a post emergence treatment; however, new germination when a soil residual herbicide was not used. Other herbicides used in the experiment showed limited or poor results and should not be considered as recommended practice.

The liquid fertilizer "N-Phuric" (15-49) that contains a sulfuric acid base was evaluated following the first cutting of alfalfa in an attempt to find a post emergence burn down material with a shorter pre harvest interval than Gramoxone. The initial control of marsh parsley was 95% at the 20-GPA rate with 60% burn down of alfalfa. Many plants survived the initial burn and developed new growth from the base. It was apparent that well developed mature plants would be difficult to control using this method.

Summary

The conclusions to this study to suggest the following course of action for managing this weed:

1. Early fall plantings of alfalfa (September) are suggested to avoid parsley germination that begins in November.
2. In seedling stands effective control should be possible with Gramoxone and Kerb herbicides. Early timing is important for best control.
3. In established stands control of this weed should aggressively begin in the year when first noticed since it rapidly develops a large number of seeds.

4. Velpar should be the herbicide of choice in established alfalfa. Diuron is somewhat effective and can be tank mixed with Velpar to enhance control of parsley and other weeds. Kerb also shows activity and can be applied at a later time (between cuttings) if necessary.

5 Paraquat was the most effective herbicide post emergence and can be a good strategy to combine with soil active herbicides. Paraquat used alone during the last year of the stand will avoid plant-back problems.

Dodder

This trial was conducted in an alfalfa field planted in March 1999. Treatments were applied on June 17, 1999, and a sequential application was made on July 16, 1999 (Table 2). Both applications were made following a harvest and prior to irrigation. Plots were organized in a randomized complete block design with three replications. Each plot was ten by twenty-five feet in length. The spray volume used was 20 GPA for herbicides and 40 GPA with the N Phuric fertilizer solution. The treatments were applied with a CO_2 backpack sprayer and 11002 nozzles at 35psi. Different adjuvant solutions were compared with UN-32 liquid fertilizer. The dodder size ranged between six and fifteen inches in length at the first application, was well attached to alfalfa plants and beginning to flower. The dodder distribution varied in the trial; however, the population was heavy and ranged from 70% to 100% coverage throughout the plots.

Evaluations were made on July 13 and August 5, 26 and 49 days after treatment. Ratings were recorded on percent dodder control and measurements of dodder length in plot. Harvest data was taken on July 13 for yield and hay quality.

Summary (Table 3)

The best control of dodder at the 26 DAT evaluation was Pursuit at .094 rate, providing an average of 93% control. The reduced rates of .047 and .063 lbs./A were rated at 82% control. Raptor showed 86% at the .048 lb./A rate. Comparison treatments of N Phuric solution as a burn down was made combining Pursuit, Prowl and by itself. Significant foliage burn or 80% occurred five days after treatment in the N Phuric treatments; however, control of dodder was marginal and ranged between 43% and 75%. The treatment of Prowl alone showed some post emergence activity and suppression of dodder growth through the August 5 rating at 42%.

The delayed treatment of Pursuit made July 16 following second cutting to compare application timing gave similar control to that of earlier application at 97%.

The sequential application of Pursuit at the .047 lb./A rate sprayed after first and second harvest provided very good control of 92% by the August 5 evaluation.

The comparison of different adjuvants and UN-32 did not show any significant differences of control; however, previous Pursuit experiments have shown a positive influence on efficacy when oil concentrate adjuvants and ammonium sulfate or liquid nitrogen fertilizers were combined.

The results of this experiment clearly showed Pursuit herbicide having activity and providing 90% control/suppression for approximately thirty days after application of dodder that was attached to alfalfa. Evaluations (50 DAT) made following the second harvest, showed control had reduced to 80%.

Sufficient spray volume (20 GPA) and treatment timing to insure maximum coverage of dodder is extremely important for best results. It appeared that translocation of the herbicide through the dodder itself was limited and did not progress to the point of attachment. This was only an observation and should be further tested.

The two applications of Pursuit @ .047 lbs ai/A exhibited did how a longer and higher percent control than the single application. This may provide an option in situations were high dodder populations exist or an extended period of germination causes a later resurgence.

The tank mix combination of Pursuit with Prowl provided the best overall control of any treatment. This mixture of Pursuit/Prowl does offer improved post emergence activity on dodder with the addition of extended preemergence control. Together, the flexibility of these two herbicides can offer excellent control of dodder in seed alfalfa.