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Old and New Weed Management Practices in Alfalfa

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Once forages are established, they are seldom treated with herbicides. This is in sharp contrast to row crops like corn and soybeans where 90% of the acreage receives an herbicide. How should we view the fact that herbicides are not widely used in forages? What will be the trends for weed management in the seeding year? Today's forage producers are placing significant emphasis on forage quality. What implication do these have for how we manage weeds in forages in the future? Will the limited use of herbicides in established forages increase significantly? Let's first review the weed management options in the seeding phase, and then the established stand phase of a forage production system.

Seeding year

The use of companion crops (oats or barley) has given and continues to provide generally good weed suppression in forage legumes. Thus relatively few companion-cropped acres have been treated and this probably explains why so few herbicides have been developed for use in this area. Current herbicide alternative, in companion seedings include the long-standing (though risky in terms of legume injury) option of MCPA, and more recently, Buctril (bromoxynil). Few new chemicals are being developed for use in companion seeded legumes.

A new alternative for alfalfa establishment is the use of Poast (sethoxydim) to kill the companion crop 4 to 6 weeks after seeding. This may be considered when the risk of serious soil erosion in sloping fields (or alfalfa injury from sand particles blown by the wind in light textured soils) makes solo seeding unwise. After the companion crop has served the purposes of protecting the soil or crop, it can be killed by a timely Poast application. This approach maximizes the production of legume in the seeding year and assumes that the companion crop is not needed for neither silage, grain nor straw. Naturally this method will not become the predominant way of seeding legumes, but does offer an interesting alternative for certain situations.

Direct (solo) seeding to establish alfalfa continues to grow in popularity. In Wisconsin, approximately 15 to 20% of the new seedings are done as solo seedings. In these situations, herbicides are often used to suppress annual weeds. The future will see greater fine tuning of herbicide selection in solo seedings to more closely match the herbicide with the weed problem.
Long standing preplant incorporated options include Balan (benzin) and Eptam (EPTC), which are applied as preventative weed control measures. New preplant and preemergence herbicides may be developed, but current attention seems to be on postemergence applications.

Poast and Buctril are newly registered postemergence alternatives which greatly enhance our options over the older postemergence compounds 2,4-DB. Both 2,4-DB and Buctril control many annual broadleaf species and Poast gives excellent postemergence control of annual grasses. These alternatives allow growers to practice the IPM principle of "treat as needed". In some cases, the weed pressure will be light and no herbicide will be needed. In other fields, either broadleaf or grass weeds will predominate and a single herbicide will provide adequate control. When both types of weeds appear in significant quantities, a sequential application or tank mix of two postemergence herbicides will be necessary to assure stand establishment and minimal impact of the weeds on forage quality.

This "wait and see" approach to weed management requires greater management skill and more time to monitor the crop and weeds than the preventative methods. Growers must accurately identify the weed species when they are in the seedling stage, as control will be inadequate if weeds are too tall when treated. This is most critical with 2,4-DB and Buctril, as they are only effective on weeds in the 2- to 4-leaf stage (usually 2 to 3 inches tall).

Unless the 2,4-DB label is modified, less will be used in the future. The currently labeled interval between application and harvest is 60 days for newly seeded forages. This interval is too long to allow the harvest of high quality alfalfa because the crop is usually well into the flowering stage 60 days after spraying. The future of Buctril use in alfalfa depends on how much alfalfa injury it causes. Current label restrictions require that the alfalfa have at least 4 trifoliate leaves when treated and that the high temperature on the day of application and for the following 3 days not exceed 70° F. This is often a very narrow window. Among these two variables, crop growth stage is the most important. Therefore, it would be less risky to treat 4-leaf alfalfa when temperatures exceed 70° F than to treat 3-leaf alfalfa when the temperatures are below this level.

In general, postemergence herbicide options challenge the weed management skills of our producers. To be successful, timely and routine field inspections must be done to accurately identify the weeds present, assess their density, and decide when to apply the proper herbicide. And Mother nature must cooperate with favorable weather during the relatively small window of opportunity to make the application before the weeds become too large to be controlled.

The herbicide Pursuit (imazethapyr) may become another alternative for postemergence-weed management in newly-seeded alfalfa. It has given very good broadleaf and grass control when applied early postemergence to alfalfa and may be registered for the 1993 season. In 1991 it received approval for use in alfalfa grown for seed only, and the manufacturer has requested label approval for alfalfa used as forage.
We are noting an increase in late summer seedings of alfalfa in Wisconsin. Growers who harvest early season vegetables (peas or sweet corn) or winter wheat find this a convenient and usually successful time to seed alfalfa. Summer seedings will probably increase in the years ahead. Weed problems in late July and early August are minimal, so no preplant herbicide is used. However, winter annual weeds are well adapted to summer seedings. For example, shepherd’s purse and pennycress often appear in summer seeded alfalfa. In fields seeded after winter cereals, volunteer grain can be a serious competitor with the legume. Moldboard plowing usually eliminates this problem, but chisel-plowed or disked fields may create ideal germination and growth conditions for the cereal. A timely application of Poast is essential to kill winter wheat because it will continue growing the next spring if left untreated.

Established stands

The way we grew forages prior to the 1950s apparently gave excellent weed control as a direct, but perhaps unrecognized, result of the infrequent cutting of the crop and the common practice of seeding forage grasses with the legume. This system either did not allow weeds to become established or gave forages the ability to out compete the less desirable species. When the legume component declined to low levels, fields were rotated to other crops and thus serious buildup of weeds was avoided. The rotation to other crops is still the most common management system for weedy forages, though a few growers plant continuous alfalfa. In addition to disease and autotoxic concerns, continuous alfalfa enhances the encroachment of weeds.

New species may occur in established alfalfa stands, but species shifts probably develop more slowly than in grain crops. We have seen a gradual increase in dandelions in Wisconsin’s forages over the last 25 years. Continued use of crop rotations will help prevent such weed species shifts.

Most weeds in established stands are perennials such as yellow rocket, quackgrass, white cockle and hoary alyssum. Sencor or Lexone (metribuzin), Velpar (hexazinone) and Poast are herbicide alternatives in established stands. The decision to treat or not needs to be based on the weeds present and their density, and the alfalfa density (a minimum of 5 alfalfa plants/sq. ft. is necessary to justify treatment). Producers should anticipate two harvest seasons after a single application to recover more than their investment costs.

On occasion, annual weeds can also infest established forage stands. During the summer months, yellow foxtail is commonly observed in older stands. Herbicide application for these problems is appropriate when the alfalfa stand is adequate to assure reasonable yields in future harvests.

Weeds affect forage quality but our understanding of these interactions is inadequate. More research is needed to quantify the impact of weeds on forage uptake and utility by various
animal species and in different phases of their growth and/or milk cycle. Another unanswered question is whether weeds have similar effects in forages harvested as silage and hay.

I have observed that the presence of both common dandelion and potato leaf hoppers in alfalfa in late summer thins the stand during the winter. This did not occur when only leaf hoppers had stressed the legume. This, and other observations, led me to propose the "two stress theory". By this I mean that alfalfa will tolerate a single stress (either environmental or a grower mismanagement practice) but in most cases, two, or perhaps three, stresses reduce the survival of the crop. This may be why some growers harvest alfalfa in early fall (when we discourage them from doing so in order that the crop can accumulate sufficient root reserves to survive the winter) with no apparent negative consequence to the crop. If untimely harvest is the only stress present, the crop may come through the winter in relatively good shape. But if the potassium level is low, if weeds are present, if soil moisture levels are low, if leaf hoppers are abundant, if diseases are prevalent, etc., the crop may pay the price in the form of stand decline.

Producers must remain profitable to survive. The relatively high cost of herbicide treatments in forages undoubtedly limits their more widespread use. Growers often perceive that the cost of treatment exceeds the returns. This highlights a need for research to pinpoint the importance of weeds on all aspects of forage cropping systems: yield, quality, palatability, longevity, drying time, nitrogen credits, host of pests, weed seed reservoirs, etc. A better view of how weeds interact on these factors is essential to avoid treating when not necessary and to also be able to reap the benefits of treating when expected returns clearly exceed the investment.