W 1285

WEED CONTROL STRATEGIES TO MAXIMIZE COOL-SEASON PASTURE PRODUCTIVITY

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Weeds in pastures reduce forage yield and quality, consequently compromising animal performance by restricting intake and presenting potential toxicity issues. The occurrence of weeds can be a result of poor pasture establishment, overgrazing, neglect in restoring soil fertility, frequent use of fire and the increasing uncertainties of climate patterns in recent years. Combined, these factors negatively impact the forage stand density and create a favorable environment for the proliferation of weed populations in pastures. Weed control is required for optimizing forage yield and ensuring the well-being of grazing animals.

Weeds can be used as an indication of pasture health. To draw a parallel, consider a scenario where an individual visits a doctor due to feeling unwell and is diagnosed with high blood pressure. While a prescription medication might be recommended for immediate relief, the doctor also emphasizes the importance of lifestyle changes, including regular exercise, a healthier diet and stress management, for sustained improvement.

Translating this analogy to pasture management, chemical control may offer an immediate solution, analogous to a prescribed medicine, which addresses the immediate problem. However, cultural control methods, such as avoiding overgrazing and maintaining optimal soil fertility levels, parallels lifestyle changes. These cultural practices enhance the resilience of forage stand while mitigating the conditions favoring weed germination. The synergy of chemical and cultural control methods not only minimizes weed populations temporally but also establishes a foundation for long-term resilience, reducing the need for extensive herbicide use in the future.

Cool-season weeds typically first germinate in the fall, carry on their development into the spring and typically bloom in late spring as their life cycle ends. Given that spring is the peak yielding period for tall fescue (*Lolium arundinaceum*) (Schreb). and other cool-season forages such as orchardgrass (*Dactylis glomerata L.*) and timothy (*Phleum pratense L.*), scouting fields is imperative during this time. Understanding weed growth and development and prioritizing scouting will improve the decision-making process (Table 1).

IDENTIFYING THE PROBLEM

First, it is essential to identify the cause of the problem to select the right tools for effective management. Second, understanding the physiology and growth habit (annual, biannual, or perennial) of each weed species is critical since these factors will impact the specific control strategy selected. Controlling weeds before bloom is crucial, but it can be challenging as some of them are hard to differentiate. Fortunately, there are now various web-based and mobile-friendly apps like PictureThis® and iNaturalist® to assist with fast and accurate weed identification. Capturing clear pictures and consulting your county Extension agent ensures accurate guidance before defining a weed control program, which can include preventive, cultural, mechanical and chemical methods.

Table 1. Cool-season Forages Activity Calendar

Activity	Winter			Spring			Summer	
	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.
Scouting for cool-season weeds	B	B	B	B	M			
Controlling cool-season weeds		B	B	B	M	M		
Scouting for warm-season weeds					P	B	B	M
Controlling warm-season weeds						B	B	M
Nitrogen fertilizing			P	B	P			
P and K fertilization	P	P	P	P	M	M		

M = Marginal month; P = Possible Month; B = Best Month

PREVENTIVE AND CULTURAL CONTROL

Thoughtful preventive and cultural control practices can prevent weed development and enhance the competitiveness of the desirable forage. Key practices include cleaning machinery, quarantining animals from weed-infested areas, using high-quality seed and preparing seedbeds with the right fertility levels and soil pH. These practices prolong stand life, improve forage quality and increase forage yield by increasing the competitiveness of forages against the weeds, which is vital for the economic viability of cool-season forage systems.

Before applying fertilizer to pastures, it is essential to conduct a soil test to determine specific nutrient needs, especially nitrogen, phosphorus, potash and lime recommendations. For cool season forages, a soil pH between 6 to 7 is crucial. This pH range optimizes nutrient availability for plants, ensuring most essential nutrients are readily accessible in the soil for optimal pasture productivity (Israel & Rhodes, 2015a).

Avoid overgrazing or cutting hay below 3 or 4 inches, which will negatively affect plant recovery while subsequently reducing leaf area and ground coverage. This opens opportunities for weed germination, particularly towards the end of the growing season. Allowing plants adequate time to recover contributes to stand vigor, minimizes space for weeds and promotes a healthier overall pasture.

MECHANICAL CONTROL

Mechanical control methods range from hand pulling to mowing and even tillage. Mowing can reduce the impact of some broadleaf weeds, although it won't kill them. It also helps to reduce grass species weeds with upright growth such as Johnsongrass (*Sorghum halepense L. Pers.*), especially just before the seed head stage. Tillage is an option for weed control during pasture renovation, but caution is needed as it can spread weed species with rhizomes (e.g., Johnsongrass) and favor germination of any species present on the seedbank. In addition, it is not recommended for sloped areas. Selecting the appropriate mechanical control method depends on the target weed species and the overall goals of pasture management.

CHEMICAL CONTROL

Herbicides (chemical control) are an important tool for controlling weeds, but it's crucial to understand the life cycle of the target species before using them. Most herbicides used in pastures, like dicamba and 2,4-D, are synthetic plant hormones that cause uncontrolled cell growth and twisted stems, leading to plant death. Auxin herbicides (e.g., 2,4-D) can successfully control most broadleaf weeds in grass pastures. However, they can harm desirable forages such as clover species.

For herbicides to be effective, the plants need to be actively growing when you spray. Delaying herbicide application until weeds are in the bloom stage reduces effectiveness. At this point, weeds have stopped active growth and are focused on seed production. Most cool-season weeds will bloom in late April and May while warm-season weeds will bloom in late June through September.

Effectively managing broadleaf weeds in pastures through herbicide application requires a strategic approach. Start with thorough field scouting: December to early February for cool-season weeds and May to June for warm-season weeds. Don't delay spraying beyond March for cool-season weeds or late July for warm-season weeds to ensure optimal herbicide effectiveness. Sticking to this schedule allows you to target broadleaf weeds during their vulnerable stages, enhancing herbicide efficacy and ensuring successful weed control in pastures (Bates, 2010).

Chemical control can work well if the forage stand covers at least 60-70 percent of the ground. When spraying pastures, make sure that the equipment is properly calibrated and environmental conditions are optimal. For more information on spray calibration, see **UT Extension Publication W315 A Simple Method to Calibrate Sprayers**.

In the cooler months, the best time to spray is after three or more days with daytime temperatures above 60°F, as this is when cool-season weeds are actively growing (December to March). This helps the herbicide absorb and move throughout the plant (Israel & Rhodes, 2015b).

Other herbicides for broadleaf control such as aminopyralid + 2,4-D (e.g., GrazonNext HL®) and aminopyralid + florpyrauxifen-benzyl (e.g., Duracor®) are also options for controlling broadleaf weeds on pastures. In addition to the traditional spray method, some herbicides (concentrated solution) are sprayed on the dry fertilizer granules during the blending process, generating impregnated fertilizers. However, this method typically results in lower control compared to spraying. Consequently, it may still be considered a means for weed control to reduce application costs or if spraying equipment is unavailable.

When marketing hay, be aware of herbicides such as aminopyralid due to the residual effects. Treated hayfields may have commercialization restrictions that can be up to 18 months. Residual effects can extend to negatively impact clovers, leading to injury alongside broadleaf weeds. Always check the herbicide label for restrictions. For detailed information on appropriate herbicides and rates for pastures and hayfields, see **UT Extension Publication PB1580 Weed Control Manual for Tennessee**.

In summary, scouting fields early is critical for identifying weeds and applying control measures before they reach the bloom stage. Using a mix of control methods is more effective than relying on just one. Preventive and cultural practices not only improve forage quality and yield but also prevent weak forage stands. This reduces the bare ground area where weeds can grow, saving on herbicides, labor and fuel. A proactive and diversified approach to weed management leads to more cost-effective control, healthier pastures and a more productive pasture system.

EXTENSION PUBLICATION RESOURCES

UT Extension Publication W315 A Simple Method to Calibrate Sprayers – **tiny.utk.edu/w315**

UT Extension Publication PB1580 Weed Control Manual for Tennessee – **tiny.utk.edu/PB1580**

REFERENCES

Bates, G. (2010). Weed control in tall fescue pastures and hayfields. Ag Proud RSS.

Israel, T.D. and G.N. Rhodes Jr. 2015 (a). Buttercups. Pasture Weed Fact Sheet. UT Extension Publication W323. Knoxville, TN. 2 pp.

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