W1384

Targeted Control of Horsenettle, Cocklebur and Pigweeds in Cool-Season Pastures and Hayfields

Roger Furlan, Graduate Research Assistant, Department of Plant Sciences
Bruno Pedreira, Associate Professor, Director and Forage Specialist, Department of Plant Sciences
Hannah Wright-Smith, Assistant Professor and Weed Specialist, Department of Plant Sciences
Larry Steckel, Professor and Weed Specialist, Department of Plant Sciences

Weeds compete with forage crops for water, nutrients and sunlight, which lowers yield and quality and can limit animal performance. Some weeds are toxic, while others have such low feed value that they reduce intake and animal performance. Pastures are especially vulnerable when they are poorly established, grazed too heavily, lack fertility or face drought and heat. These stresses are more important during summer, when tall fescue goes dormant and weeds gain a competitive edge (Oakes & Hancock, 2020).

Herbicides are a useful tool for controlling weeds in pastures and hayfields, but they work best alongside good management. Soil testing, fertilization and proper grazing or haying keeps forage grasses healthy and competitive. This reduces weed pressure naturally and supports a healthier, more resilient forage system in the long run.

Many broadleaf weeds can be managed with auxin herbicides like 2,4-D and aminopyralid, which mimic plant hormones and cause rapid, fatal growth. These products don't control grasses but can damage forage legumes such as clovers, and some (like aminopyralid) leave long-lasting residues in the soil. Some herbicides act mainly through leaf absorption (e.g., 2,4-D, florpyrauxifen-benzyl), while others provide residual soil activity (e.g., aminopyralid, picloram) that prevent new weeds from emerging. Using apps like Pl@ntNet, PictureThis, iNaturalist or Google Lens, along with help from county Extension agents, ensures accurate weed identification before choosing the right control method.

For best results, spray weeds when they are less than 18 inches tall and before they bloom in early summer (June–July). Treating early results in better control of emerged weeds and reduces competition with forage crops. Selecting a product with a residual herbicide prevents new weeds from emerging, keeping pastures cleaner through summer and supporting a healthier tall fescue stand for fall grazing or the second hay harvest. Perennial weeds may be sprayed in early summer when new shoots are emerging and again in early fall prior to winter dormancy.

Table 1. Warm-Season Weed Control in Forage Systems

Activity	Spring			Summer			Fall
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Scouting for warm-season weeds	Not recommended	Marginal months	Best months	Best months	Best months	Best months	Marginal months
Controlling annual warm-season weeds	Not recommended	Not recommended	Marginal months	Best months	Best months	Marginal months	Marginal months
Controlling perennial warm-season weeds	Not recommended	Not recommended	Marginal months	Best months	Best months	Best months	Best months

Yellow = Marginal months, Green = Best months and Red = Not recommended.

In Tennessee, the three most common warm-season broadleaf weeds found in pastures and hayfields are horsenettle (*Solanum carolinense*), pigweeds (*Amaranthus spp.*) and common cocklebur (*Xanthium strumarium*). The following section provides detailed descriptions of each species to assist with identification, along with notes on their toxicity potential and recommended control practices.

It is important to note that some herbicides discussed in this publication are restricted for use in certain Tennessee counties and may carry grazing or haying restrictions. Always read and follow the herbicide label for specific use directions. While additional herbicide options are available in UT Extension publication PB1580 Weed Control Manual for Tennessee, this publication highlights those products that have shown the highest level of effectiveness and consistency in field performance.

Before making an application, ensure that spraying equipment is properly calibrated and that environmental conditions are suitable for treatment. Accurate calibration not only improves control but also reduces the risk of crop injury or off-target damage. For detailed guidance on sprayer calibration, see UT Extension publication W315 A Simple Method to Calibrate Sprayers.

Horsenettle (*Solanum carolinense L.*)



Figure 1: *Horsenettle plant and details of the thorns in the stem and leaf (Photos: Roger Furlan)*

Description: Horsenettle is a warm-season perennial that emerges in spring from seed or rhizomes. The leaves have hairy margins, are alternately arranged and measure 2.5–5 inches long and 1–3 inches wide, with lobed edges. Both the upper and lower leaf surfaces are hairy, and the midrib and petiole bear sharp prickles (Figure 1). Mature plants can reach up to 3 feet in height. Horsenettle produces green berries that gradually turn yellow (Figure 2).

Toxicity: The sharp prickles on horsenettle discourage animals from grazing and may cause livestock to avoid infested hay bales. If consumed, the prickles can cause mechanical injury to the mouth and esophagus. Although cases of poisoning are rare, horsenettle is considered toxic, as it contains the glycoalkaloid solanine. In general, unripe berries are more toxic than ripe berries, and the berries are more harmful than the leaves.

Control: Avoid feeding hay that contains horsenettle and regularly check feeding areas for early infestations. Do not move cattle directly from infested pastures to clean ones, as the seeds can survive passage through the digestive system. Mowing plants can help suppress growth and promote desirable forage, but it will not eliminate the weed.



Figure 2: *Horsenettle berries (Photo: Roger Furlan)*

Herbicide	Rate
DuraCor* (Aminopyralid + florpyrauxifen-benzyl)	12 fl oz/ac
Grazon PD3** (Picloram + 2,4-D)	1.25-2.5 pts/ac
GrazonNext HL* (Aminopyralid + 2,4-D)	1.2-1.5 pts/ac

*Always associate with 0.25% v/v Nonionic surfactant (1 qt./100 gal) of spray mix.
** For use only in approved TN counties.

Common Cocklebur (*Xanthium strumarium L.*)



Figure 3: *Cocklebur plant (Photo: Roger Furlan)*



Figure 4: *Cocklebur burs and leaf in detail (Photo: Roger Furlan)*

Description: Common cocklebur is a warm-season annual. Young plants have hairless, purple-tinged seed leaves. The first true leaves are slightly toothed and triangular to egg-shaped, while later leaves are toothed and hairy. Mature plants reach 1–4 feet in height, with green stems that are hairy and often flecked with purple or brown. Adult leaves are rough to the touch, ranging from oval to heart-shaped with wavy, lobed edges. The fruits are woody, spiny burs, approximately 1 inch long (Figure 4).

Toxicity: The first two leaves (cotyledons) are highly toxic to livestock due to carboxyatractyloside, a sulfated glycoside concentrated in the burs (Figure 4) and young plant tissues. Toxicity is highest during the cotyledon and two-leaf stages and usually disappears by the four-leaf stage. Although mature plants are non-toxic and provide fair nutritional value, they are coarse, and animals generally avoid grazing them (Burrows and Tyrl, 2006).

Control: Animals can carry the spiny burs from infested areas on their fur, spreading them to clean pastures.

Herbicide	Rate
2,4-D Amine*	1.5-2 pts/ac
DuraCor* (Aminopyralid + florpyrauxifen-benzyl)	12 fl oz/ac
Grazon PD3** (Picloram + 2,4-D)	1-2 pts/ac
GrazonNext HL* (Aminopyralid + 2,4-D)	1.2-1.5 pts/ac

*Always associate with 0.25% v/v Nonionic surfactant (1 qt./100 gal) of spray mix.
** For use only in approved TN counties.

Pigweeds (*Amaranthus spp.*)



Figure 5: *Palmer amaranth plant Photo: Roger Furlan)*



Figure 6: *Spiny amaranth thorns (Photo: Roger Furlan)*

Description: Pigweeds are warm-season annual plants with an erect growth habit. Palmer amaranth has diamond- to lance-shaped leaves with long petioles—often longer than the blade—with smooth, hairless surfaces, sometimes showing a faint white or V-shaped watermark (Figure 5). Spiny pigweed has sharp spines at leaf nodes and a rough texture (Figure 6).

Toxicity: Pigweeds contain oxalates and nitrates, which can be harmful to livestock. Soluble oxalates bind with calcium in the digestive tract, forming insoluble calcium oxalate, which can lead to kidney failure. Dried pigweed can contain up to 30 percent oxalate, and ruminants that consume large amounts, especially if they are not adapted to high oxalate levels, are at high risk of poisoning. Nitrates in pigweed are converted to nitrites in the rumen, which bind to red blood cells and reduce oxygen transport. This can result in labored breathing, weakness, incoordination, dark brown-colored blood, and in severe cases, death within hours.

Control: Avoid leaving bare soil exposed and do not feed hay that contains pigweed. Some pigweed populations have developed resistance to auxin herbicides, although this is mostly observed in row crop systems and is uncommon in forage systems. In areas where resistant populations occur, herbicide effectiveness may be reduced, so additional management strategies may be needed.

Herbicide	Rate
2,4-D Amine*	2 pts./ac
DuraCor* (Aminopyralid + florpyrauxifen-benzyl)	12 fl oz/ac
GrazonNext HL* (Aminopyralid + 2,4-D)	1.5-2.1 pts./ac

*Always associate with 0.25% v/v Nonionic surfactant (1 qt./100 gal) of spray mix.
** For use only in approved TN counties.



UTIA.TENNESSEE.EDU

Real. Life. Solutions.™

W1384 03/26 26-0145 Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and County governments cooperating. UT Extension provides equal opportunities in programs and employment.