



Cattle Producer's Handbook

Range and Pasture Section

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Ranch Biosecurity as a Weed Control Measure

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Weeds have been a plague to cattle producers in the United States for generations. On some agricultural operations, weeds have reduced the quality and productivity of pasture, crop, or rangeland by competing with desirable plants for water, nutrients, and light. On others, weeds have caused injury to livestock through reduced forage availability or through slower growth, abnormalities, or death caused by toxic/poisonous plants. On still others, weeds have resulted in less efficient use of resources, such as land, water, money, and employees. In short, weeds often have a direct impact on ranch efficiency, productivity, and profitability.

To minimize the impact of weeds, agricultural producers focus substantial resources (i.e., time and money) on weed control. One estimate is that U.S. farmers and ranchers spend over \$12 billion each year to control weeds (Pimentel et al. 2000; Monaco et al. 2002; Babbitt 1998). Despite these efforts, noxious and invasive weeds continue to spread at alarming rates—anywhere from 11 to 17 percent per year, depending on species (Table 1). This trend indicates that both the number of acres impacted by weeds and the cost associated with weed control will probably continue to grow into the future.

Table 1. Area infested and average annual spread rates of several noxious and invasive weeds in the U.S.

| Weed species | Area infested (million acres) | Avg. annual spread rate (%) |
|-----------------------------|---|---------------------------------------|
| Canada thistle | 12.7 | 11 |
| Downy brome (or cheatgrass) | 56.5 | 14 |
| Leafy spurge | 4.6 | 14 |
| Medusahead | 2.4 | 12 |
| Musk thistle | 7.6 | 17 |
| Spotted knapweed | 6.9 | 17 |
| Yellow starthistle | 14.8 | 15 |

Source: Duncan and Clark 2005.

Why Weed Prevention?

To manage weeds, ranchers generally adhere to one of two general approaches. The most common—yet least effective—is to make control of a new weed a priority only after it has spread across much of the ranch and started to impact ranch operations and profitability. Unfortunately, by then the weed has become so well established (i.e., large amounts of weed seed in the soil and extensive root system) that it will probably be around for many years, if not a lifetime.

The other approach is to take steps to prevent new weeds from ever becoming a problem. The medical adage, “an ounce of prevention is worth a pound of cure,” is applicable to weed management. That is, a few dollars spent on prevention can be worth thousands (and sometimes millions) of dollars of cure. Though often overlooked, prevention should be the foundation of the weed control program on every agricultural operation. It is, by far, the most important ranch activity that can save time and money in weed control.

Where Do New Weeds Come From?

Before we can discuss weed invasion, we first need to understand the basics of weed biology—specifically, where new weeds come from and how they move around. Most of the noxious and invasive weeds in the U.S. are not native to this country. They come from Europe, Asia, Africa, and other places around the world. When they arrive in the U.S., either on purpose or accidentally, many are able to gain a foothold and begin to spread.

New populations of weeds are usually established through seed, although some species of weeds can reproduce from roots, bulbs, cut branches, and other plant parts. Weeds are prolific seed producers and their

Table 2. Production and survival of weed seed.

| Weed species | Seed produced per plant | Length of seed survival in soil |
|----------------------|-------------------------|---------------------------------|
| | (number) | (years) |
| Canada thistle | 700 | 10 |
| Common lambsquarters | 72,000 | 39 |
| Common mullein | 223,000 | 39 |
| Dandelion | 15,000 | 6 |
| Green foxtail | 34,000 | 39 |
| Prickly lettuce | 28,000 | 9 |
| Redroot pigweed | 117,000 | 10 |

Source: Radosevich et al. 1997.

seed has the potential to lay dormant in the soil for many years (Table 2). For example, a single common mullein plant—a weed that is commonly found along waterways, in pastures, meadows, fence rows, and waste areas—can produce around 250,000 seeds per year and these seeds can remain viable in the soil for nearly 40 years (Radosevich et al. 1997).

Other weeds rely on creeping roots as their primary mechanism of spread. A single Canada thistle plant can spread to become a patch 10 to 20 feet in diameter in only one year. Root fragments can also generate new plants. In a study at Purdue University, a one foot long section of Canada thistle root was planted in a large, soil-filled wooden box and allowed to grow. After one

year, the box was disassembled and that small root fragment had generated 450 feet of root, 150 feet of underground stems, and 70 aboveground stems (Ross and Lembi 1999).

Weeds can arrive at a ranch by several different means:

Contaminated Products

Throughout the early history of the U.S., farms and ranches were largely self-sufficient or relied on neighbors to meet their needs. Recent advances in transportation, technology, and communication have resulted in the specialization of most agricultural producers. Today's ranchers no longer produce everything needed to sustain their operations and must purchase goods from all over the U.S. and sometimes other countries. Weeds can arrive at ranch locations with nearly any product that comes from the outside. Products that are sometimes contaminated with weed seed include hay, straw, feed grain, and fill material (Fig. 1). Even seed for planting crops, pasture, or rangeland can contain weed seed.

Water

Water is the life-blood of every livestock operation but is of particular importance in the western U.S. where much of this resource originates off-site



Fig. 1. A Russian knapweed infestation along the border of an alfalfa field. Weeds often grow in or near hay fields where they can end up in a bale that is transported long distances. Seed produced on these plants allows weedspread to a new area.

(Fig. 2). Unfortunately, many weeds use water as a vehicle to move from one area to another. These weeds tend to grow and produce seed along the banks of rivers, streams, canals, and ditches. This seed falls into the water and is carried downstream where a new weed infestation is established. Some weeds, such as curly dock, even have seeds that are specially designed to float so they can more easily travel long distances across deep or shallow water.

Wind

Certain weeds, such as dandelion, Canada thistle, and milkweed, have developed ways of using wind to spread seed. These seeds are fitted with a white, fluffy pappus that serves as a parachute and makes wind dispersal possible. In fact, researchers in New York and Delaware found that a wind of only 11 mph can transport maretail seed between 45 and 90 miles from the source plant (Shields et al. 2006). Thus, under the right environmental conditions, it is easy to see how wind-dispersed seed can travel long distances while leaving a rancher with few options for prevention.

Animals and Humans

When animals consume weed-contaminated feed, seed from these weeds often finds its way into the digestive tract. In the days that follow, hundreds of viable seeds can pass through the animal—facilitating rapid weed spread if livestock are moved to a previously uninfested ranch or pasture. Other weed seed has thorns, spines, barbs, or bristles that can become attached to passers-by (humans, livestock, or wildlife). The seed of cocklebur contains many spines, each tipped with a tiny hook that grabs hold of clothing, shoelaces, animal hair, etc. Such an ingenious means of attachment has not gone unnoticed by industry, as cocklebur seed is reported to have served as the inspiration for Velcro®.

Equipment and Vehicles

Seed can also spread through contaminated equipment and vehicles. Puncturevine seed has stiff thorns that penetrate the rubber of tires and enable the seed to be transported to a new area. Other seeds do not have a special means of attachment but are often mixed with the mud or clumps of vegetation that adhere to vehicles or equipment used on the ranch. All of this material eventually falls to the ground where the seed can germinate.

What Can Be Done to Prevent Weeds?

Some specific tactics that can be used to prevent weed invasion on the ranch include:

1. Use hay, straw, cubes, feed grain, seed, and fill-material that are free of weed seed. “Certified Weed Free” products are becoming more common and provide some assurance that a new weed is not contained in the product that is purchased. Another option, especially if the source of the product is nearby, is for a rancher to inspect the field or area personally to see what weeds they may be buying.
2. Keep waterways free of weeds. Banks of rivers, streams, canals, and irrigation ditches can be monitored for the presence of weeds. When weeds are found along waterways, the number one goal should be to prevent seed production—an approach that will limit downstream spread.
3. Reduce the threat of wind-blown seed by monitoring ranch borders and controlling weeds that are wind-spread before they produce seed.
4. Train employees and visitors to clean themselves, their equipment, and animals when leaving weed-infested areas. Care should be taken to ensure that



Fig. 2. Weeds that grow and produce seed along waterways, such as irrigation canals, are often the source of new weed invasions downstream.

cleaning occurs in areas that are already infested with the weed.

5. Avoid driving through weed infestations. If it cannot be avoided, contaminated machines can be washed with water to remove weed seed before proceeding to an uninfested area.
6. Quarantine livestock that have grazed in weed infested areas. Research and experience have shown that weed seed can pass through the digestive tract of livestock and still germinate. Animals can be placed in a holding area with clean feed for at least 5 to 7 days to allow the seed to pass before moving them to a new area.
7. Maintain vigorous stands of desirable plants and eliminate unnecessary soil disturbance by vehicles, machinery, and livestock. Most weeds are opportunists that prefer to invade areas that have been disturbed, over-grazed, or managed improperly.

What If Prevention Fails?

Even with the best prevention program, some weeds will find a way to slip through the cracks. An early detection/rapid response program can help a ranch to catch and eliminate these new invaders. The idea is to find a new weed, whether it is a single plant or a small patch, early in the invasion process and immediately begin control measures—with the hope of eradication.

How can these new weeds be found? The best approach is for producers to become aware of what is growing on their ranches. High-traffic areas, such as roadways, waterways, feeding areas, and receiving areas, are the most likely sites for new weeds to appear and should be monitored carefully and

frequently. Awareness of weeds on neighbor's lands and on properties, both near and far, where business is conducted can provide an indication of weeds that have a good chance of appearing on the ranch.

If ranchers see a plant that they do not recognize, they should take a moment to determine its identity. This can be done using a good weed identification book or by collecting a sample of the plant and taking it to the local Extension office where identification help is available. It may turn out to be something harmless, like a native plant, but it could also be a new invasive weed that, if left unchecked, might become a plague to their livestock operation for years to come.

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