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Preventing noxious weed invasion

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Thirty-two alien weed species infest over 6.5 million acres of rangeland in Montana and they are advancing at an alarming rate. Fifteen of those species are declared noxious by the state of Montana. The most serious weed is spotted knapweed which infests about 4.5 million acres (Figure 1). It has been estimated that spotted knapweed has increased at a rate of 27% per year since 1920 and has the potential to invade another 34 million acres in Montana alone (Figure 2).

Noxious weeds introduced into Montana during the 1950's, such as leafy spurge, whitetop, and diffuse knapweed are also spreading onto rangelands. Newly introduced noxious weeds, such as common crupina, rush skeletonweed, and Dyer's woad are encroaching into Montana from neighboring states. Yellow starthistle is spreading at a rate of about 25,000 acres per year in Washington and Idaho and is quickly advancing toward Montana. These noxious weeds have the ecological potential to invade nearly all of Montana's rangelands as well as many areas in other states.

The most effective method for managing noxious weeds is to prevent their invasion using a combination of methods aimed at limiting encroachment. Methods of preventing noxious weeds from spreading are:

- Limiting weed seed dispersal
- Containing neighboring weed infestations
- Minimizing soil disturbances
- Detecting and eradicating weed introductions early
- Establishing competitive grasses
- Properly managing grasses

Limiting weed seed dispersal

Noxious weed seeds are often carried along roadways in the undercarriage of vehicles. A Montana State University study showed that a vehicle driven several feet through a spotted knapweed infestation could pick up about 2,000 seeds. Only 10% of the weed seeds remained on the vehicle 10 miles from the infestation. Similarly, weed seeds are

dispersed by machinery. Limit noxious weed seed dispersal by refraining from driving vehicles and machinery through weed infested areas during the seeding period. Wash the undercarriage of vehicles after driving through an area infested with a seed producing noxious weed. Control emerging weeds in the wash-up area.

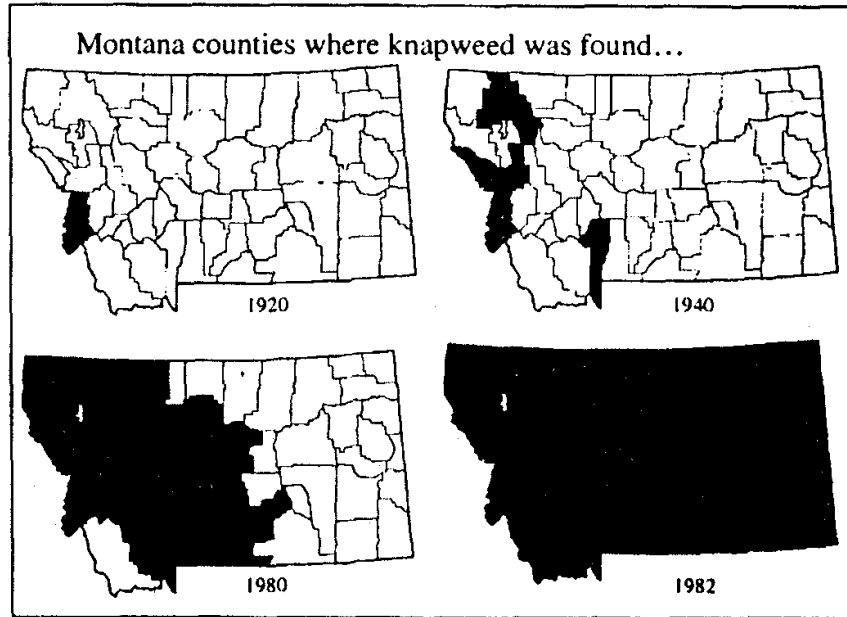


Fig. 1. Spotted knapweed was first reported in the western part of Montana in the 1920s. Since then it has spread to every county.

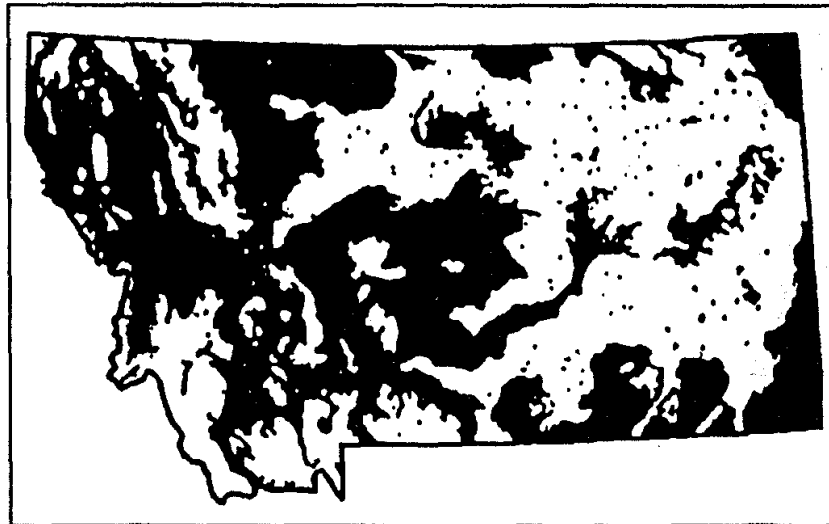


Fig. 2. Black areas are part of Montana where there is a high probability that spotted knapweed will grow (if it hasn't already), based upon the conditions found in 116 knapweed infestations.

Wildlife and livestock disperse seeds two ways. First, animals ingest noxious weed seeds which can pass through the stomach unaffected, introducing seeds into new areas. Second, many weed seeds can become tangled in the hair coat of animals and fall to the ground when animals are moved to weed-free areas. Little can be done to limit weed seed dispersal by wildlife. Livestock should not graze weed infested areas during flowering and seeding, or be transported to a holding area for about 14 days after grazing weed infested areas before being moved to weed-free ranges. Sheep and goat grazing must be property timed and managed to prevent seed production.

Noxious weeds can be dispersed in feed. This can be a major problem where recreational horseback riding and hunting are permitted, but can be a problem for ranchers as well. Using only feed that is certified free of noxious weed seeds is one method of preventing the introduction of noxious weeds. Grinding and pelleting forage or grain will also reduce the chances of introducing noxious weeds.

Hikers, campers, and recreationists can spread noxious weed seeds on their clothing as they pick the flowers and discard the wilted parts along trails and recreational access sites. Once discarded these plants continue seed development. Clothing and camping equipment should be brushed and the discards placed into a hot fire before leaving an area. Prudence in limiting weed seed dispersal is critical for all recreationists.

Containing neighboring weed infestations

An integral part of any weed prevention program is to contain neighboring weed infestations. The most effective method of containment is to spray borders of the infested areas with an herbicide. Concentrate efforts on the advancing edge of the weed infestation. Containment programs typically require a long-term commitment to herbicide application because they are not designed to eliminate or reduce the infestation level, only to limit its spread. Roadways, railways, and waterways, where weed infestations often begin, should be under a constant prevention and containment program.

Minimizing soil disturbances

Areas of disturbed soil provide an optimal location for noxious weed establishment and subsequent invasion. Noxious weeds are alien to North America and have evolved under highly disturbed conditions. Noxious weeds have developed many characteristics, such as rapid growth rates, high seed production, and extended growing periods, which provide them an advantage over native North American plants in occupying disturbed soil. Minimizing soil disturbance by vehicles, machinery, wildlife, and livestock is central to preventing noxious weed establishment.

Detecting and eradicating weed introductions early

Preventing and controlling noxious weed encroachment depends on early detection. Survey the area, identify and remove any individual weed plants before they become well established. A survey plan should be developed for each management unit which includes inventory techniques (vehicle, horseback, motorcycle, foot), area surveyed, and survey time periods. At least three surveys should be conducted each year. A spring survey to detect weeds early enough to allow effective chemical control, the second survey in early

summer and the last survey in early fall. At each survey both new and old noxious weed introductions should be hand removed (individual plants) or sprayed with the appropriate herbicide. It is critical to prevent weed seed production. Once weeds have produced a flower, chemical applications generally do not prevent seed production, and hand removal is usually necessary. Hand-pulled plants should be burned. The weed infestation should be identified on a map, marked or flagged in the field, continually monitored, and controlled during subsequent surveys.

Establishing competitive grasses

Another method for preventing encroachment is to establish competitive desirable grasses in areas susceptible to invasion. Competitive grasses limit the establishment and growth of weed populations by using resources needed by weeds. Well-established grass stands are central to limiting weed encroachment along roadways. Specific establishment techniques depend upon the weed/grass complex and environmental characteristics of the site. In areas with a good residual (suppressed) perennial grass stand, chemical weed control (2,4-D, Banvel, Tordon 22K) may stimulate grass growth enough to allow site re-occupation. Severe weed infestations may require revegetation.

Properly managing grasses

On areas with a competitive grass stand, proper management insures that they remain strong and vigorous. In most cases, grasses require defoliation every two to four years to remove old stems which shade plants and hinder growth. Mowing, burning, and grazing are the primary methods for defoliating grasses. Grasses are generally mowed in the summer or fall. Burning is conducted in the fall or early spring before the grasses resume growth. Defoliation stimulates grass growth and enhances their competitive ability.

Proper livestock grazing can be an effective means to maintain competitive grass plants. A grazing management plan should include proper stocking rates to maintain a grass stand. Furthermore, the plan should include a grazing system which outlines the movement of livestock through out the year. Grazing systems should include altering the season of use, rotating livestock to allow plants to recover before being regrazed, and promoting litter accumulation. Grazing in this manner enhances the vigor and strength of the grasses which in turn limits weed germination and promotes early mortality of seedlings and rosettes. Any grazing management plan should include a monitoring program to determine the efficacy of the grazing system in protecting grasses and limiting weed invasion.

Summary

Montana and many rangeland areas are being invaded by noxious weeds. The most economical and ecologically sound method for managing noxious weeds is to prevent their invasion by using the following guidelines. Noxious weed dispersal must be limited, and neighboring weed infestations contained. Soil disturbances must be minimized. New weed introductions must be detected early and eradicated. Finally, proper grass establishment and management must be implemented.