

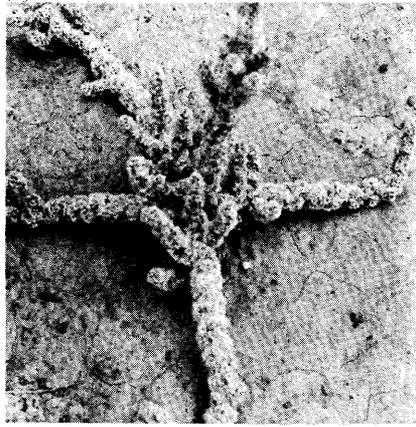
# MANAGEMENT NOTES

## Principles for Managing Ranges Infested with Halogeton

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Proper management of grazing lands often requires increasing the density of palatable forage species or reducing the density of weedy species, especially poisonous weeds. Grazing practices, reseeding, herbicides, and other techniques can be used to these ends. Usually, a successful technique rests on knowledge of the life cycle, ecological requirements, and physiological capabilities of the plant being manipulated. We must have such basic information about halogeton to manage grazing land in our cold desert region. This annual plant, poisonous to all classes of grazing animals, was introduced from the cold deserts of Asia. It has invaded more than 10 million acres of desert in the northwestern United States. It invades disturbed soils where native shrub cover is absent, thin, or low in vigor. Overgrazed sites, abandoned farmlands, highway and railroad rights-of-way, and trails made by domestic and game animals provide suitable habitats. Vigorous perennial vegetation prevents halogeton's invasion and can crowd it out on infested sites. Management practices should be designed to prevent halogeton's invasion by maintaining healthy vigorous stands of perennial forage plants, by reseeding with pe-



Large mature plant of halogeton in full bract stage, producing about 75 seeds on each inch of stem.

rennial forage plants, and preventing soil disturbance areas.

Halogeton, a prolific seed producer, typically produces about 75 seeds on each inch of stem. A large plant can have more than 1500 inches of stem. Halogeton can produce 200 to 400 lb/acre of seed. There are approximately 572 thousand seeds in each pound. The plant produces two types of seed, black seeds and brown seeds. Brown seeds constitute about one-third of the total production.

The black seeds germinate readily whenever sufficient moisture and heat are available. A few will germinate as soon as they are free from the bracts but a greater percentage will germinate following a short after-ripening period. Black seeds are viable for about 1 year in the field. The prolific production of black seed provides a means of rapid spread of the plant once it invades a suitable site. Production of black seed occurs from about the middle of August until

growth stops and the plant dries in late September. Plants which become established after August 15 produce black seed exclusively.

Halogeton produces brown seeds from about July 1 until mid-August, but both brown and black mature in late September. Brown seeds are viable but they do not germinate readily. Only a small percentage germinate each year and they persist in the soil for at least 10 years. Brown seeds provide a means of species survival during long periods of severe drought. This longevity profoundly affects management and control programs. These brown seeds assure the persistence of halogeton on any site where it has produced a seed crop. Control measures will fail unless this characteristic of the brown seed is recognized.

Reinvasion by plants originating from black seed is relatively simple to prevent. Prevention of seed production on a site for a single year should remove all viable black seed. But prevention of reinvasion by plants from the brown seed require a long-term vigorous follow-up program.

Halogeton is a serious problem on the cold desert because it possesses numerous qualities adapting it to life in this harsh, uncertain environment. Its anatomical structure permits very little water loss through its aerial parts. Where the lack of water limits or prevents the growth of most plants, it thrives. It germinates, grows, and prospers on soils too saline for any other desert plants. Not only does halo-

geton tolerate high salt concentrations, but it grows best when the sodium chloride concentration is at least 5800 ppm. Increased salt concentration does not, as with other plants, increase the halogeton's water requirements.

In early spring a dark "shadow" can be observed under the previous year's plants. This shadow is black alkali caused by high concentrations of sodium leached from the dead plants. Tests have demonstrated that halogeton leachate changes the soil properties and inhibits germination of seeds from other plants. Salts moved from the lower soil horizons to the surface change the environment, and halogeton appears to be one of the few plants that can tolerate the accumulated salts through all phases of growth.

Livestock losses to halogeton usually occur when hungry animals graze where other forage is scant or lacking. Losses occur

with animals being trailed through heavy infestations and to animals shipped into infested areas. Heavy losses have occurred when animals were penned in corrals containing dense stands of the weed. Proper herding can prevent many of these losses and research has shown that sheep fed pellets containing 5% dicalcium phosphate are protected against the poisonous oxalates in the weed. Other calcium sources were not effective and bonemeal appeared to make the animals more susceptible to the poison.

Herbicides can be one of the major tools for managing halogeton and other weed problems if used properly. Halogeton is susceptible to a number of herbicides. The cheapest treatment is 1 lb/A of 2,4-D (low volatile ester) applied during vegetative growth in 15 gal/acre of aqueous spray. After halogeton enters reproductive growth, about the first of July, the treatment be-

comes ineffective. The herbicide causes some injury to the native shrubs, however. When existing vegetation is injured, halogeton usually invades the soil left vacant by the injured plants. But this herbicide treatment can prevent the costly loss of a grass re-seeding on sites where rainfall is marginal. On these sites, halogeton can kill the young grass plants by removing soil moisture available to them. Once grass becomes established it can largely prevent the growth and spread of halogeton. Vigorous perennial plants provide the best control of halogeton.

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For more details see "Ecological and physiological factors influencing chemical control of *Halogeton glomeratus*," U.S. Department of Agriculture Technical Bulletin 1325, by Eugene H. Cronin, 1965. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 35¢.