Using Grazing to Reduce Medusahead Infestations

Most of the studies on using grazing as a tool to reduce the abundance of medusahead on rangelands have been conducted in California. In California, medusahead emerges in late winter and remains green after other annual grasses have matured and senesced. In the Intermountain West, medusahead and many cool-season perennial plants emerge in mid-spring. Further, medusahead remains green after cheatgrass and bulbous bluegrass have matured. California studies may or may not be relevant to the Intermountain West, differences in growing season and availability of other forages growing with medusahead will affect diet selection of livestock.

Reduce Seed Production. The key objective of using grazing to control medusahead is to reduce number of seedheads and seeds it produces. Since most medusahead seeds persist in soil for less than two years, with few seeds surviving more than three years. The medusahead seed bank can be reduced quickly. Although grazing is unlikely to prevent all seed production, even a partial reduction in the number of seeds may help contain medusahead.

In California, high density, short duration, grazing in late April to early May reduced medusahead cover by 86% to 100% relative to ungrazed plots. Plants were grazed in the "boot" stage or stem elongation phase, just prior to flowering. This high intensity grazing did not cause persistent negative effects on the overall productivity of the grassland. It also increased broadleaf cover, native species richness and abundance, and plant diversity (DiTomaso et al. 2008).

Unfortunately, because the timing window for grazing medusahead is fairly narrow and animal stocking rates are high, sheep grazing is unlikely to be a practical solution for reducing most medusahead infestations. Furthermore, such high stocking densities will likely negatively impact on animal performance and health (DiTomaso et al. 2008; DiTomaso and Smith 2012).

Intensive grazing by livestock can lead to trampling which can also suppress the weed. For example, part of the reduction in medusahead reported by George and others (1989) is attributed to thatch depletion after two years of heavy grazing during winter and spring. Because thatch reduction allows competing species to increase, heavy grazing often results in increased forb cover and decreased grass cover (McDougald et al. 1991).

Maintain a Healthy Community of Perennial Forage. It's also imperative to maintain a healthy desirable perennial grasses and forbs while grazing. Proper grazing can help shift the competitive advantage to favor desired species. Grazing management can be an effective tool to reduce medusahead cover and seed production, as well as increase the cover of native forb species (DiTomaso et al. 2008; Griggs 2000; Reiner and Craig 2011). Montes-Sanchez (2017) found that when medusahead was 10% of the plant community, the amount of medusahead in sheep diets was also about 10%. Thus, sheep did not prefer nor avoid medusahead. Lusk et al. (1961) also found that sheep ate medusahead as a function of the percentage of medusahead in the stand on plots fertilized with nitrogen.

Regardless of management some sites are more susceptible to invasion than others, and even the best stewardship, including grazing management, may not prevent medusahead invasion. For example, on a sagebrush site with deep clay soil in northeastern California the level of medusahead infestation was similar regardless of whether the area was grazed or protected from grazing for over 30 years (Wagner et al. 2001).

Bovey et al. (1961) reported nitrogen fertilization increased utilization. For example, cattle and horses ate 90% of the medusahead on plots fertilized with 160 lbs nitrogen/acre, 40% on plots fertilized with 20 lbs nitrogen/acre, and almost none on control plots. Thus 10% of the plants developed viable seed. Nitrogen treatments resulted in some medusahead control but did not produce benefits commensurate with the cost.

When to graze. Although medusahead palatability to livestock is relatively low, sheep will graze medusahead in the vegetative stage. At high stocking rates sheep uniformly graze medusahead-infested grasslands in all vegetative stages.

In California, heavy grazing by sheep in late spring reduced medusahead stands in summer (Lusk et al. 1961; Turner 1968) whereas grazing in early spring (March) or fall (October to November), or both did not reduce medusahead cover (DiTomaso et al. 2008), and year-round grazing increased the frequency of medusahead (Harrison et al. 2003).

Brownsey (2017) found that defoliation at any phenological stage from boot to milk stage reduced medusahead seed production. Clipping medusahead after it flowered almost eliminated seed production. At flowering the crude protein content in medusahead declines and was only 8−11%. Thus, the nutritional content of medusahead is no longer adequate to meet nutritional requirements of livestock as medusahead transitions from emergence of awns to flowering. As a consequence, the window when livestock will graze medusahead is only 10 to 15 days when medusahead reproductive tillers are susceptible to grazing but could also support nutritional needs of cattle and sheep to prevent avoidance in diet selection.

References

Bovey, R.W., D. LeTourneau, and L.C. Erickson. 1961. The chemical composition of medusahead and downy brome. Weeds 9:307-311.

Brownsey, P, J.J. James, S.J. Barry, T.A. Becchetti, J.S. Davy, M.P. Doran, L.C. Forero, J.M. Harper, R.E. Larsen, S.R. Larson-Praplan, J. Zhang, and E.A. Laca. 2017. Using phenology to optimize timing of mowing and grazing treatments for medusahead (*Taeniatherum caput-medusae*). Rangeland Ecology and Management 70:210-218.

DiTomaso, J.M., G.B. Kyser, M.R. George, M.P. Doran, E.A. Laca. 2008. Control of medusahead (*Taeniatherum caput-medusae*) using timely sheep grazing. Invasive Plant Science Management 1:241-247.

DiTomaso J.M. and B. Smith. 2012. Linking ecological principles to tools and strategies in an EBIPM program. Rangelands 34:30-34.

George, M.R., R.S. Knight, P.B. Sands, and M.W. Demment. 1989. Intensive grazing increases beef production. California Agriculture 43:16-19.

Griggs, F.T. 2000. Vina Plains Preserve: eighteen years of adaptive management. Fremontia 27:48-51.

Harrison, S., B.D. Inouye, and H.D. Safford. 2003. Ecological heterogeneity in the effects of grazing and fire on grassland diversity. Conservation Biology 17:837-845.

Lusk, W.C., M.B. Jones, D.T. Torell, and C.M. McKell. 1961. Medusahead palatability. Journal of Range Management 14:248-251.

McDougald N.K., W.J. Clawson, J.W. Bartolome, and W.E. Frost. 1991. Estimating livestock grazing capacity on California annual rangeland. University of California Davis Range Science Report #29

Reiner, R. and A. Craig. 2011. Conservation easements in California blue oak woodlands: testing the assumption of livestock grazing as a compatible use. Natural Areas Journal 31:408-413

Turner, R.B. 1968. Vegetation changes of communities containing medusahead (*Taeniatherum asperum* (Sim.) Nevski) following herbicide, grazing, and mowing treatments. Ph.D. Dissertation. Oregon State University

Wagner, J.A., R.E. Delmas, and J.A. Young. 2001. 30 years of medusahead: return to Fly Blown-Flat. Rangelands 23:6-9.