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The Medusahead Problem in Idaho¹

PAUL J. TORELL², LAMBERT C. ERICKSON³, and ROBERT H. HAAS⁴

INTRODUCTION

MEDUSAHEAD, *Elymus caput-medusae* L., is currently the worst range weed in Idaho. It has gained this distinction because of its rapid migration, its vigorous competitive nature, and its extremely low forage value. In the absence of effective control measures, the medusahead problem is becoming more acute each year. The threat that the weed poses to Idaho's livestock industry is sufficient to merit grave concern.

According to Abrams (1) medusahead is native to Europe. The same author points out that medusahead was first described by Linnaeus, in 1753. Thus, while the species is one of the earliest to be recorded by botanical science, it is a relatively recent introduction to the United States. Furbush (2) provides the earliest reference to medusahead in the United States by his account of a collection of the species made near Roseburg, Oregon, in 1887. St. John (9) noted another early collection of medusahead by G. R. Vasey near Steptoe, Washington, in 1901. The earliest authenticated specimen of medusahead in the University of Idaho Herbarium was collected in Owyhee County in 1946, by Ray J. Davis. However, ranchers in southwestern Idaho maintain that the weed was noticed in Gem County during the 1930 decade.

Although the origin of medusahead in Idaho is obscure, the species has demonstrated that it is capable of rapid migration. In 1952, Sharp and Tisdale⁵ referred to a weed survey that indicated there were at least 30,000 acres of medusahead in Idaho. In 1955, Hironaka et al. (3) estimated that Idaho's medusahead infestation amounted to 150,000 acres. In 1959, the Bureau of Land Management⁶ reported 700,000 acres of the weed in southwestern Idaho.

Idaho's largest medusahead infestation occurs in the southwestern part of the state (Figure 1). The recent survey by the Bureau of Land Management shows that the major portion of the infested area is in Gem, Payette, and Washington Counties. Smaller but

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⁵L. A. Sharp and E. W. Tisdale, Medusahead a problem on some Idaho ranges, Univ. of Idaho Forest, Wildlife and Range Expt. Sta. Res. note No. 3, May, 1952.

⁶Correspondence, Bureau of Land Management, State Office, Boise, Idaho, May, 1959.

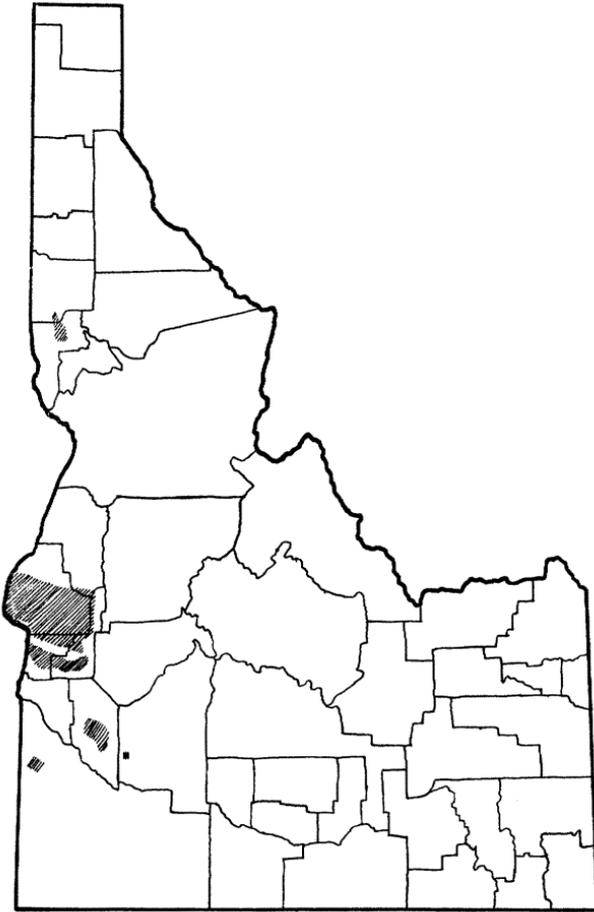


Figure 1. The medusahead infestation in Idaho as of May 1, 1959.

still dangerous stands exist in Ada, Adams, Elmore and Nez Perce Counties. Somewhat minor infestations are known in Boise, Canyon, Latah, and Owyhee Counties.

THE NATURE OF MEDUSAHEAD AS A WEED

Medusahead is typically a winter annual species. However, with proper vernalization it can also develop as a spring annual. Bovey⁷ found that sprouting seeds exposed to night temperatures of 35°F. for a period of 7 days produced plants which fruited normally. These results are supported by Major (4) who reported evidence of the necessity of a cold treatment for normal development and seed production.

The extremely aggressive and competitive characteristics of this weed were aptly described by Peck (7) who stated:

⁷R. W. Bovey, unpublished master's thesis, Univ. of Idaho Library. June, 1959.

“In southern Oregon, in the high hills east of Ashland, thousands of acres are covered, almost to the submergence of other forms of herbaceous vegetation, with a continuous mantle of *Elymus caput-medusae*, the Medusa-head grass.”

To a similar degree, many thousands of acres of the foot-hill ranges in southwestern Idaho are dominated by a medusahead stand so dense and vigorous that the other herbaceous vegetation has been almost submerged. Figures 2 and 3 illustrate a typical medusahead stand in this area. The weed has practically eliminated downy brome (cheatgrass), *Bromus tectorum* L., and it is providing intense competition to the few resident perennial grasses and forbs that remain.

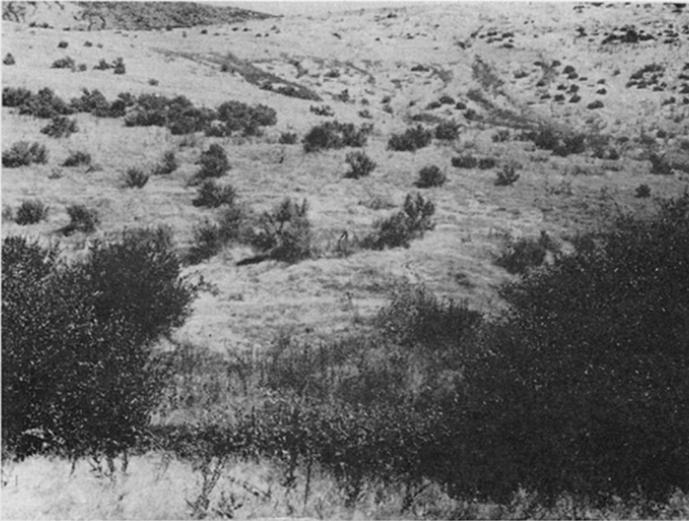


Figure 2. A typical stand of medusahead in southwestern Idaho. Some 700,000 acres are infested with the weed in this area.

Several inquiries have been received from ranchers concerning possible means of removing medusahead from established stands of desert wheatgrass, *Agropyron desertorum* (Fisch) Schult., and intermediate wheatgrass, *Agropyron intermedium* (Host) Beauv. Such invasions indicate that the weed can invade and become a problem on infested ranges that have been reseeded with wheatgrasses.

Experimental reseeding and observations on larger reseeded private ranges have established that in some instances this does happen. The evident result of attempting to reseed medusahead-infested ranges without adequate prior control of the weed has been a rapid suppression of the wheatgrasses, which are notably slow in becoming well established. The consequent result is that in one place a six-year-old stand of desert wheatgrass is known to be held in a state of suppression by medusahead competition (Figure 4).



Figure 3. A close-up view of the stand shown in Figure 2. Note the extremely dense medusahead cover that practically excludes desirable forage species.

Although more investigations are needed to assess fully the reasons for the weed's extreme competitive ability, it seems proper to ascribe a considerable amount of it to these circumstances: the species is a prolific seed producer; its seeds are highly viable and germinate readily; its vigorous seedlings have a high survival rate; and its herbage is very unpalatable to livestock.

Major et al. (5) believe that medusahead stands can possibly produce up to 6,000 seeds per square foot. Sharp and Tisdale⁵ noted medusahead stands contained up to 1,855 plants per square foot. Sharp et al. (8) report germination of 98 percent for medusahead seed. Since medusahead is unpalatable, the plants gain an additional advantage by virtue of being avoided while the associated palatable species are heavily grazed. Bovey⁷, in attempting to utilize the plant, found that ensiling did not soften the herbage nor make it acceptable to livestock. The same investigator reported that medusahead herbage contains 11.32 percent silicon dioxide as compared to 4.45 percent in cheatgrass. This might account for its unpalatable qualities and also for its slow rate of decomposition in the field.

Another attribute that contributes to medusahead's potential as a range weed is the fact that the species is possessed of a broad ecologic amplitude. Throughout the extreme range of the known medusahead stands in Idaho, from Owyhee County to Nez Perce County (Figure 1), the weed occurs on soils that vary widely in profile development, depth, and subsoil characteristics. Laboratory studies by Erickson⁸ show the species is adapted to soils varying widely in textural and chemical composition. McKell et al. (6)

⁸L. C. Erickson, unpublished data.



Figure 4. A six-year-old stand of desert wheatgrass held in a state of partial suppression by medusahead.

report that medusahead is the number one annual weed problem on a California range having an annual rainfall of 39.6 inches. In Idaho the weed is supplanting cheatgrass and competing with weakened resident perennial grasses on ranges whose annual precipitation varies from 10 to 20 inches. Parish⁹ investigated the climatic characteristics of the medusahead-infested areas in the western states. He noted that seasonal periodicity of precipitation was of greater significance than total precipitation in the moisture requirement of the species. Generally, medusahead was found to be associated with regions of fall, winter, and spring precipitation followed by dry summers. This climate is essentially true of all of Idaho's some 6,000,000 acres of cheatgrass ranges. These considerations provide no evidence to presume that the weed is not adapted to all of the state's cheatgrass ranges.

⁹R. L. Parish, unpublished master's thesis, Univ. of Idaho Library, June, 1956.

Medusahead has an additional characteristic that adds to its problem as a weed. The dead herbage from each year's growth decomposes more slowly than is true of ordinary plant tissue, and a considerable amount of litter accumulates. A notable result of this litter is to suspend medusahead seed above the mineral soil where it survives at least one year following its maturation on the plants. This "old" seed is a significant factor in the perpetuation of the weed where control operations eliminate only a single year's medusahead growth. Also, the litter impedes tillage operations, and it adds to the total combustible material.

ECONOMIC LOSSES FROM MEDUSAHEAD

Forage losses constitute an important part of the medusahead problem. With reservation for the inaccuracies involved in ascribing a monetary value to range weed losses, Parish⁹ suggested that a gross annual loss of five dollars per acre might be attributed to medusahead on the infested ranges in southwestern Idaho. If this figure is applied to the 700,000 acres of medusahead reported by the Bureau of Land Management⁶, an annual gross loss of \$3,500,000 might be charged to medusahead in this one area of Idaho.

The potential threat that medusahead poses to Idaho's ranges must also be considered. If the species were to occupy all of the state's some 6,000,000 acres of downy brome, the full impact would be reckoned in terms of the loss of spring and fall use that these ranges now furnish. The elimination of these seasons of range use would be catastrophic to range livestock operations as they are now practiced.

Finally, medusahead-infested ranges are an extreme fire hazard. The cost of suppressing medusahead fires has become a matter of great concern to the Bureau of Land Management. Personnel from this organization reported an expenditure in excess of \$10,000 to control one 22,000-acre medusahead fire, in 1958.

PROSPECTS FOR MEDUSAHEAD CONTROL IN IDAHO

The immediate problem that prevails in southwestern Idaho indicates a pressing demand for reseeding studies. It is evident that some method which will ensure the successful establishment of forage grasses on these ranges offers the best promise of securing some control of the weed and of realizing a return greater than the negligible amount that is now being obtained.

On the basis of research already accomplished it is clear that the requirements for medusahead control are easier stated than achieved. Past research failures to obtain satisfactory stands of forage grasses on medusahead sites have shown that a single operation to control the weed prior to the seeding of the forage species is not adequate. Sufficient medusahead seeds have remained to provide a stand of the weed so dense that the forage seedlings cannot survive.

Recent investigations have combined burning, dalapon, disking,

and plowing in various combinations which have provided for the control of two successive medusahead seed crops prior to seeding the desired forage species. The results obtained to date have been encouraging: it appears that sufficient control has been achieved to permit desert wheatgrass seedlings to become established. However, it remains to be determined whether the control has really been sufficient to assure the survival of wheatgrass stands. Unless the resurgence of medusahead is delayed long enough to permit the development of a vigorous stand of desert wheatgrass, the weed can be expected to form a dense stand that will hold the wheatgrass in a state of perpetual suppression.

As a means of securing the necessary degree of medusahead control, burning deserves particular consideration. A single burn will not remove sufficient medusahead seed to permit the successful establishment of wheatgrasses. In this regard, Erickson⁸ has found that the thermal death point of medusahead seed is relatively high as compared with that of other grass species. A temperature of 232°F. over a period of 7 minutes was necessary to devitalize the seed completely. However, burning will enhance the effectiveness of tillage and herbicidal treatments by removing the heavy layer of medusahead litter, by destroying some seed, and by placing the remaining seed in contact with the mineral soil where they can be germinated and subsequently destroyed. With the possibilities that controlled burning appears to offer, a considerable amount of experimentation is indicated. This should include date-of-burning studies by season as well as repeated burning by years. These treatments should be incorporated in combination with tillage and herbicides followed by reseeding with desirable forage species.

Although the control of established medusahead stands primarily depends on the development of methods by research, the importance of prevention deserves much more attention than it has received. It is a strange paradox that a weed which poses a serious threat to Idaho's livestock industry is recognized by few people beyond the infested areas. Consequently, the migration of medusahead into a new location often is not noticed until a sizable area that livestock will not graze develops. By this time it is not feasible to eradicate the weed, and it simply continues to spread.

Besides the need for the recognition of medusahead and a systematic attempt to locate new infestations by annual surveys, every possible means should be utilized to rehabilitate susceptible cheatgrass ranges. Ideally, those ranges should be reseeded to well-adapted perennial grasses. Even though a reasonably satisfactory method can probably be developed for reseeding medusahead ranges, it will in all probability be easier and more economical to reseed before a new range area is infested with the weed.

LITERATURE CITED

1. ABRAMS, LEROY. *Illustrated Flora of the Pacific States*. Vol. 1. p. 248. Stanford Univ. Press. 1955.
2. FURBUSH, PAUL. Control of medusahead on California ranges. *Jour. For.* 51:118-121. 1953.

3. HIRONAKA, M., TISDALE, E. W., and SHARP, L. A. A study of the medusahead problem in Idaho. WWCC Res. Prog. Rpt. p. 19. 1955.
4. MAJOR, J. Responses of medusahead, *Elymus caput-medusae* L., to different planting dates. WWCC Res. Prog. Rpt. p. 29. 1958.
5. ———, MCKELL, C. M., and BERRY, L. J. Improvement of medusahead infested rangeland. California Agric. Exp't. Sta. Ext. Serv. Leaf. 123. 1960.
6. MCKELL, C. M., BURGESS, K. L., and MAJOR, J. Herbicides on rangeland forage. Calif. Agr. 13(4):7-15. 1959.
7. PECK, MORTON E. Invasion of exotic plants and their economic significance in Oregon. Northwest Sci. 22(3):126-131. 1948.
8. SHARP, L. A., TISDALE, E. W., and HIRONAKA, M. Viability of medusahead seed collected in Idaho. Jour. Range Mgn't. 10(3):123-126. 1957.
9. ST. JOHN, HAROLD. Flora of Southeastern Washington and Adjacent Idaho. Students Book Corp. Pullman, Wn. 1937.