

Seedling Establishment



Emergence of Medusahead and Other Grasses from Four Seeding Depths

James A. Young, Raymond A. Evans and Richard E. Eckert, Jr. 1969. *Weed Science* 17:3, pp. 376-379.
Location: Reno, Nevada

Methods: Two 8-inch deep soil beds were prepared in a green-house: one filled with clay from an Orthic Grumusterts soil, and the other filled with sandy loam from a Haplargids soil. The soils were compacted until bulk densities were similar to those of the field profiles. In 1965, medusahead seed was collected from 23 locations in California, Idaho, Nevada, and Washington and then planted in a common garden in Reno, Nevada. Medusahead seed was then planted at 1, 2, 3, and 4-inch depths in each soil bed. Four replications of each selection were tested in a random-block design and emerging seedlings were counted daily.

This study also compared the emergence of medusahead at each depth with the emergence of the following grasses: 13 selections of downy brome; intermediate wheatgrass; crested wheatgrass; Fairway crested wheatgrass; Siberian wheatgrass; pubescent wheatgrass; streambank wheatgrass; Russian wildrye; Rye; Perennial ryegrass; and Italian ryegrass.

Results: Increased depth markedly reduced total emergence of medusahead and variability among selections. Selections of intermediate wheatgrass, pubescent wheatgrass and downy brome (among other grasses) greatly exceeded medusahead in emergence from all depths. Standard crested wheatgrass showed less emergence than medusahead from all depths, which suggests this grass is not suitable for reseeding or competing with medusahead infested rangelands.

In regards to the effect of soil type, total medusahead emergence from 1 and 2 inches was consistently higher on the loam soil bed than the clay soil bed. The same was true for all other grass species studied. Medusahead had the highest final emergence from a depth of 3 inches in the clay soil bed, although there was no difference between soils for emergence from 4 inches.

Nitrogen Interactions with Medusahead (*Taeniatherum caput-medusae* ssp. *asperum*) Seedbanks

James A. Young, James D. Trent, Robert R. Blank and Debra E. Palmquist. 1998. *Weed Science* 46:2, pp. 191-195.

Location: Noble Exlosure; Litchfield, California

Objective: To determine the influence of nitrogen enrichment, immobilization, and nitrification inhibition on the size and germination status of medusahead seedbanks.

Methods: The germination status of medusahead seeds in seedbanks was determined by periodically collecting field samples of surfaces oil and litter and bio assaying them in greenhouse emergence tests.

Individual treatments consisted of: (1) control, (2) calcium nitrate, (3) urea, (4) ammonium sulfate, (5) carbon, (6) nitrapyrin, and (7) carbon plus nitrapyrin. Nitrogen enrichment treatments were at the rate of 30 kg nitrogen ha⁻¹. Nitrapyrin was applied to inhibit nitrification at 2.2 kg ha⁻¹. Nitrapyrin is a chlorinated pyridine commercially used to inhibit nitrification and stabilize nitrogen. The carbon source, sucrose, was applied at 560 kg ha⁻¹. The carbon rate was based on twice the biomass of the microorganisms in the surface 15 cm of soil (U.S. Department of Agriculture, unpublished data). These treatments were repeated each year in December and February from 1989-1990 through 1994-1995.

Results: Control seedbanks had increased seedling emergence with KNO₃ or GA₃ enrichment of the bioassay substrate. The combination of these two materials increased emergence. Nitrogen enrichment increased seedling establishment in the field. Carbon enrichment in the field decreased seedling establishment and increased medusahead seeds in seedbanks. Nitrapyrin treatment decreased medusahead in the field similar to carbon enrichment. In comparison to the control or other treatments, GA₃ enrichment was not as effective

in increasing emergence from nitrapyrin treated bio assay samples. The combination of carbon and nitrapyrin treatments were very effective in eliminating medusahead emergence in the field, but in wetter years, it never completely eliminated medusahead seedling recruitment and subsequent reproduction. These treatments have promise for influencing succession in medusahead infestations if an adapted perennial species, capable of competing under low nitrogen levels, becomes available.

The Medusahead Problem in Idaho

Paul J. Torell, Lambert C. Erickson and Robert H. Haas. 1961. Weeds 9:1, pp. 124-131

This paper provides a good overall summary of medusahead, where it was found in areas of Idaho up to 1961, and possible control methods (burning, disking, herbicide, etc.).

“Medusahead is native to Europe...and 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.”pp 124

Medusahead Dispersal and Establishment in Sagebrush Steppe Plant Communities

Kirk Davies. 2008. Rangeland Ecol. & Manage 61:110-115.

Study Location: Oregon

Objective 1: To determine when seeds were released and how far they moved from mature medusahead plants.

Results:

- Medusahead seeds dispersed from the parent plants from early July to the end of October
- More seeds were trapped in August than in the other months
- Most medusahead seeds dispersed less than 18” from the edge of a patch of medusahead No seeds were captured beyond 6 feet.
- Medusahead was more likely to establish when more seeds were present

Objective 2: To determine medusahead establishment rates and its interactions with plant communities being invaded.

Results:

- Medusahead density and cover declined as the density of tall perennial bunchgrasses increased
- Medusahead density increased as annual grass density increased
- Promoting or maintaining tall perennial bunchgrasses in areas at risk of invasion can reduce the establishment success of medusahead
- Grass density, in combination with soil data, may be useful in predicting susceptibility to medusahead invasion