

STRATEGIES FOR ESTABLISHING BIG SAGEBRUSH ON MINED LANDS

by

J. R. Cockrell, G. E. Schuman,¹ D. T. Booth

Abstract: Reclamationists are often required to reestablish big sagebrush (*Artemisia tridentata* spp. *wyomingensis*) on Wyoming mined lands. Establishment from seed, though more cost-effective than transplanting seedlings, has proven difficult. A study was initiated in 1991 to define effective strategies for establishing sagebrush from seed. Strategies being assessed include: the use of direct-applied (fresh) vs. stored topsoil; the use of stubble and surface-applied straw mulches for microsite modification; the effect of competition from concurrently seeded grass species; and the use of fourwing saltbush as an ecological pioneer species. Fresh topsoil averaged 342 mg/kg calcium, 108 mg/kg magnesium and 632 mg/kg total Kjeldahl nitrogen, significantly higher than in the stored topsoil (170 mg/kg Ca, 67 mg/kg Mg and 494 mg/kg TKN). Fresh topsoil also had a higher population of vesicular-arbuscular mycorrhizae (VAM) spores (4114 spores/g, compared to 2617 spores/g for stored topsoil). Preliminary density of grass seedlings (227/m² for fresh topsoil, 208/m² for stored), fourwing saltbush (1.57/m² for fresh, 1.18/m² for stored) and sagebrush (1.53/m² for fresh, 0.13m/2 for stored) seem to confirm the benefits of fresh topsoil. Mulching treatments all exhibited higher spring sagebrush counts (1.17/m² for stubble, 1.25/m² for surface-applied straw, and 0.65/m² for stubble plus straw) than the control (0.01/m²). Competition from grasses is highly significant: control plots averaged 1.88 sagebrush seedlings/m², compared to 0.34 seedlings/m² on plots seeded with 17.5 kg grass (PLS)/ha and 0.09 seedlings/m² on plots seeded with 35.6 (PLS)/ha. At present, no conclusions can be drawn concerning the efficacy of fourwing saltbush as a pioneer species.

¹ G. E. Schuman, USDA High Plains Grasslands, 8408 Hildreth Road Cheyenne, Wy, 99164

