that sawdust could serve as a roughage source in wintering rations for breeding stock up to 25% of the total ration.

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Chromatographic Identification of Big Sagebrush Seed

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Highlight: Paper and thin-layer chromatography of big sagebrush seed provides a rapid, simple means of identifying more palatable forms of this shrub. Methanol extraction of seed for 24 hr followed by two-dimensional paper (*n*-butanol:acetone:water, 4:1:3; acetic acid:water; 15:85) or single-dimensional thin-layer chromatography (chloroform:methanol:water; 85:10:5) reveals distinctive differences between *Artemisia tridentata* subsp. *tridentata* and the more palatable subsp. *vaseyana* and *wyomingensis*. A bright, iridescent blue spot characterizes the more palatable subspecies; the same spot is much smaller and duller in *A. tridentata* subsp. *tridentata*.

Utilization of big sagebrush (*Artemisia tridentata*) as a forage shrub in current range improvement projects has become more promising with the development of techniques by which the more palatable forms of this shrub can be identified (Hanks et al., 1971). Under properly controlled conditions, these forms (subsp. *vaseyana* and *wyomingensis*) can then be

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used as a seed source for reseeding programs where shrubs are desired for which animals show some grazing preference. However, all too frequently the sources of available seed are from populations where the preferential utilization by big game or livestock is unknown. Under these circumstances, a means of detecting the types of big sagebrush from which the seed lots were collected would be a valuable aid in the proper management of reseeding programs. Taylor et al. (1964) pointed out the differential fluorescence between moist *A. tridentata tridentata* and *A. tridentata vaseyana* seeds. When viewed under long wave ultraviolet light the *A. tridentata vaseyana* seeds fluoresce more brightly. The following procedure describes a more definitive means of distinguishing subsp. *vaseyana* and *wyomingensis* seed from those of the less palatable subsp. *tridentata*.

One-half gram seed samples (98% purity) are placed in vials containing 10 ml absolute methanol and allowed to extract for 24 hr. The extract is decanted and evaporated to a final volume of 1.0 ml. Two-dimension chromatograms are developed by the application of 40 μ l of this extract to Whatmann 3 MM chromatographic paper¹ using butanol:acetone:water (4:1:3) as the first solvent system and acetic acid:water (15:85) as the second. The appearance of a bright, iridescent blue spot, $R_f = .54/.78$

$$(R_f = \frac{\text{distance of spot from origin}}{\text{distance of solvent front from origin}})$$

under ultraviolet light is indicative of either subsp. *vaseyana* or *wyomingensis* seed. If the above spot is present but lacking in iridescence, the seed belongs to the subsp. *tridentata*.

If instant thin-layer chromatography (ITLC) apparatus is available, the time required for seed identification is greatly reduced. The solvent system, chloroform:methanol:water (85:10:5), with silica gel-impregnated Gelman ITLC strips produces a band analogous to the spot described above with an $R_f = .67$.

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¹The use of trade names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U.S. Department of Agriculture of these products to the exclusion of others which may be suitable.