

in October and in the following May suggests that this level prevailed throughout the winter. If so, this is a distinct contrast to some of the associated grasses. If the relatively high crude protein content of roughleaf ricegrass is present throughout the winter months, this could make it a valuable fall, winter, and spring forage for wildlife. Casual observations indicated that deer and rabbits fed on this grass but the extent of its contribution to the diet of either was unknown.

Still another characteristic of roughleaf ricegrass is of interest. Flower stalks appeared at the same time the new leaves were elongating in early spring. The grass was in flower in mid- to late-May where the six plants were being measured. By the time maximum leaf length had been attained, seed was matured and the flower stalks had become prostrate. The flower stalks remained throughout the summer period as radiating spokes from the plant center.

LITERATURE CITED

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METHODS FOR MARKING WOODEN PLOT STAKES¹

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In range research, there is frequent need for temporary, inexpensive, easy-to-apply markings for wooden stakes. For longer term use, embossed metal tape is satisfactory, but it is slow and expensive. For temporary markings on wooden stakes, several promising marking media were evaluated at Fort Collins, Colo-

rado, during 1959, 1960, and 1961.

Marked stakes were put out in the field in bare ground on April 29, 1959. Observations were made to determine legibility of the markings on June 2, August 6, and November 16, 1959, April 10, 1960, and October 23, 1961. Unless otherwise indicated, legibility determinations mentioned in the results are from the April 10, 1960, observations. Legibility was rated as excellent, good, fair, poor, and illegible to the observer when standing 4 feet from the stake. All the markings were tried on both painted and unpainted stakes. Two replications were used. The stake treatments and marking media used are described and evaluated below.

Stake Treatments

Unpainted ponderosa pine stakes were used untreated and treated with a light coating of a pentachlorophenol compound. Heavy treating with pentachlorophenol commonly leaves the wood too oily to accept some types of marking. The light treatment of "penta" did not reduce wood checking or maintain wood brightness and had no influence on the durability of the markings.

One coat of aluminum paint provided a surface difficult to mark with some media, and the paint was inclined to flake off taking the markings with it after a few months' exposure to weather.

Two coats of indoor-outdoor white enamel gave excellent durability, almost completely eliminated checking of the wood, and provided an excellent contrasting background for those markings suited to enameled surfaces. One coat of white enamel did not give adequate coverage.

Marketing Media

All markings were put on both sides of the stakes so that any differences between north and south exposures could be ob-

served. The markings on the north side of the stakes faded a little less rapidly, but the difference was slight.

Tech Pen²: This pen resembles a large ballpoint pen but dispenses a quick-drying lacquer-like substance rather than ink. Legibility on white enamel remained excellent but dropped to fair to poor on plain stakes. The markings were not legible on the aluminum paint by November. Some difficulty was experienced keeping the writing fluid flowing under all conditions, particularly on dirty stakes. Both red and black ink were tried, but apparently they did not differ. Tech Pen marking on white enamel was the only combination of marking media and stake treatments that provided excellent legibility on October 23, 1961.

Magic Marker (red and black ink) and felt-tip pen (black ink): The red ink faded more rapidly than the black. All three faded rapidly and were generally illegible by November. Marking on painted surfaces faded more rapidly than that on plain wood. These marking media were considered generally unsatisfactory when exposed to weather.

China marking pencil (grease pencil, wax pencil): This is an old standby for marking stakes. Legibility remained fair on plain and aluminum painted stakes, but was excellent on white enameled stakes on April 10, 1960 and was still good on October 23, 1961. In very cold weather, these pencils frequently will not leave a good mark on the stake. In hot weather, the

¹ A contribution of Crops Research Division, ARS, USDA, in cooperation with Colorado State University and Rocky Mountain Forest and Range Experiment Station, Forest Service, USDA.

² Trade names have been used for simplicity. This does not imply endorsement of the U. S. Department of Agriculture. Other similar items can be expected to perform similarly.

"lead" frequently melts so that marking is difficult and messy. The heat-softened "lead" will sometimes jam mechanical pencils beyond repair.

Weatherproof pencil: Markings remained good on plain stakes and fair on white enamel, but became illegible on aluminum paint by November. The weatherproof pencil was generally satisfactory, but the "lead" broke off frequently. They are best suited for use on unpainted wood stakes where markings were still fair to good legibility on October 23, 1961.

Carpenters pencil (soft lead): Legibility remained fair on the unpainted stakes, but became poor to illegible on the aluminum-painted and white-enamelled stakes by November. The carpenters pencil initially produced only a fair marking on the painted and enameled surfaces and should be used only on plain wood surfaces.

Ballpoint pens with waterproof ink: A ballpoint pen sold for marking wooden plant tags and two brands of ballpoint pens used for marking laundry received a 7-month test during 1960. All three retained good legibility at the end of this period. The darker the original marking the better the legibility held up. Darkness of marking depended on rate of ink flow and this varied between the different pen brands. These ballpoint pens appeared to be especially useful because their narrow written lines permitted putting a large amount of information on a small stake. They did not make a satisfactory mark on either aluminum paint or white enamel. (The ballpoint laundry marker has also been found excellent for marking germination blotters before wetting.)

Conclusions

Light treating with a pentachlorophenol compound was no better than no treatment for wood stakes. Aluminum paint flaked off and was difficult to

mark. Two coats of white enamel proved very durable.

On unpainted wood stakes, the Weatherproof pencil produced the most durable markings, but the soft carpenters pencil and the china marking pencil were also satisfactory. Markings made with the Tech Pen and china marking pencil retained excellent legibility on the white-enamelled stakes. In a test of shorter duration, markings made with ballpoint pens containing waterproof ink had good legibility retention on unpainted stakes.

GERMINATION OF SWITCHGRASS

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Switchgrass, (*Panicum virgatum* L.) is one of the dominants of the tall grass prairies. Moreover, it is one of the few native American forage species of which certain strains have been domesticated. Local strains are commonly used in range seedings and the domesticated strains are used in tame pasture plantings for summer grazing.

Publications by Blake (1935), Hoover (1939), and Cornelius (1946) have dealt with many features of germination and establishment. Problems of genetics and plant breeding have been treated by Cornelius and Johnston (1941), Nielsen (1941, 1947), and Jones and Newell (1946). Ecotypic variations recently have received comprehensive treatment by McMillan (1959).

The present study resulted from an observation of switchgrass on an unusual site. At an alkali lake in the Nebraska Sandhills, north of Thedford, a low nearly level ridge jutted into the lake area. The land surface was about 3 feet above the water level and the soil contained some visible accumulated