
TECHNICAL NOTES

How to Prepare a Range Soil Monolith

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Highlight: *Step-by-step instructions are given for preparation of range soil and vegetation monoliths. These are slices of range vegetation and soil mounted on boards for demonstrations and educational purposes. A complete list of materials needed for preparation of monoliths is described.*

This technical note gives improved procedures for the preparation of range soil monoliths. These monoliths with range vegetation are useful to show production, root growth, and kind of soil. They show what is happening to the soil,

root development, and soil properties. Monoliths are useful visual aids. Range conservationists working with ranchers find them of particular value when explaining range condition classes, soil moisture relationships, relationships between plants, blend of soil and site, and effects of grazing management (Anderson, 1951). The range soil monoliths are 3 x 4 ft in size and weigh 100-150 lb. They can be hauled to rural community meetings without damage and are useful as office displays.

Method of Preparation

The range soil monoliths were prepared by using the same procedures described by Smith et al. (1952), using some revisions of solutions by Berger and Muckenhirn (1945). Following is a step-by-step procedure for preparing a range

soil monolith:

1. Carefully select the section to be represented on the monolith. A strip should be stretched over plant specimen to help maintain their alignment on the mount.
2. Dig a pit into the area marked. Extend the pit at least a foot on either side of the desired monolith section.
3. Mark off the area to be worked down. Use a straightedge as the surface is prepared (Fig. 1). The final surface should be about 2 inches from the crown centers of the plants and vertical and smooth as possible for close adhesion to display board. A hole left by removal of gravel cobbles should be filled with soil.
4. Using a hand pump that delivers a coarse spray, apply a thin solution

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Fig. 1. Shows area marked off and soil face being smoothed down ready to apply the thick solution of cellulose acetate.



Fig. 2. Display board placed against the prepared surface after the thick solution of cellulose acetate has been applied.

140 g of cellulose acetate in sufficient acetone to make 1 gal of solution. Spray this solution until it has penetrated approximately 1/2 inch, being careful not to let a film form. This spray fixes the soil. Let the penetrating solution dry about 30 minutes or until the surface is not sticky.

5. Apply a thick solution of 450 g of cellulose acetate in sufficient acetone to make 1 gal solution to the entire surface, starting at the top and using a brush guide so it coats all the surfaces (do not brush as it may break the penetrated surface). The solution should be about the consistency of honey. In case more stability is needed, cheesecloth may be placed on the soil before pouring on the thick

cellulose acetate solution.

6. Place the display board against the wetted surface (Fig. 2). Apply pressure to hold the board against the monolith surface. Allow the cellulose acetate to harden for about 24 hours.

7. Using a sharp spade, clean out an area on either side of the board. Cut back at least 6 inches and then begin to cut around behind the monolith, being sure to leave at least 4 inches of soil material on the board. Tie off small 6- to 8-inch sections as you work around behind the board so the monolith will not break away from the board (Fig. 3). After the entire monolith has been loosened from the pit and tied to the board, remove it from the pit and move it where it can be



Fig. 3. Tying the range soil monolith to the display board before removing from the pit.

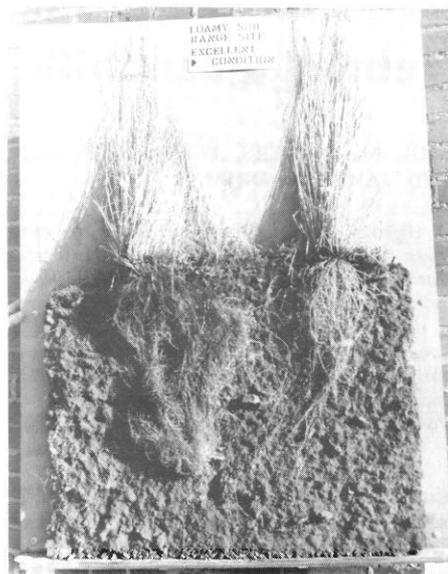


Fig. 4. Finished range soil monolith.

worked down.

8. Remove the excess soil by using compressed air, if possible, working the monolith down to a thickness of about 2.5 to 3 inches. The use of compressed air preserves the roots and soil structure.

9. After the monolith has dried, spray the entire surface with a final solution made up of 240 g of VYHH resin in 2/3 acetone, 1/3 methyl isobutyl ketone, making a gallon of solution. This solution fixes the soil and plant materials, leaving no visible residue. This step is important to prevent loss of soil materials. If a sheen develops, it can be removed by spraying with methyl isobutyl ketone on the soil surface. Clean the edges of the monolith and paint or varnish the board (Fig. 4).

10. Store the monolith in a cool, dry, dark place so that the plants will retain

as much of their natural color as possible.

Materials and Equipment

The following materials and equipment are required for each range soil monolith:

Mounting Board: 3 x 4 ft, of 3/4-inch waterproof plywood.

Adherent solution: 450 g of cellulose acetate in sufficient acetone to make 1 gal of solution.

Penetration solution: 140 g cellulose acetate in sufficient acetone to make 1 gal

of solution.

Final solution: Approximately 240 g of VYHH resin in 2/3 acetone, 1/3 methyl isobutyl ketone, making 1 gal of solution.

String

Paintbrush

Small pick, butcher knife

Sharp spades, shovel

Cheesecloth

Strips of cloth: 6- to 8-inch strips long enough to tie around monolith while loosing soil pit.

Straightedge

Carpenter level

Lumber: several pieces 2 x 4 inches, 4 ft long

Literature Cited

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Smith, Henry W., R. A. McCreery, and C. D. Moodie. 1952. Collection and preservation of soil profiles. *Washington Agr. Exp. Sta. Soil Sci.* Vol. 73.

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