

# EFFECT OF LITTER TYPE UPON FUEL-MOISTURE INDICATOR STICK VALUES

W. L. FONS and C. M. COUNTRYMAN

*California Forest and Range Experiment Station*<sup>1</sup>

Instructions for establishing fire-weather stations in Region 5 have usually specified that the fuel-moisture indicator sticks be placed over a bed of ponderosa pine needles. This specification was made to insure uniform ground-cover effect for all stations. Because ponderosa pine needles are not readily available in all areas of California fire control technicians have often asked if pine needles must be used in preference to local litter types.

To answer this question, the effect of litter type on fuel-moisture indicator stick values was measured as part of other litter studies at the Shasta Experimental Forest. Eight common types of litter were used: (1) ponderosa pine needles (*Pinus ponderosa*), (2) California black oak leaves (*Quercus kelloggii*), (3) snowbrush leaves (*Ceanothus velutinus*), (4) manzanita leaves (*Arctostaphylos* spp.), (5) white fir needles (*Abies concolor*), (6) bitterbrush leaves (*Purshia tridentata*) (7) mixed conifer needles (including white fir, ponderosa pine, sugar pine, incense cedar), (8) cured grass.

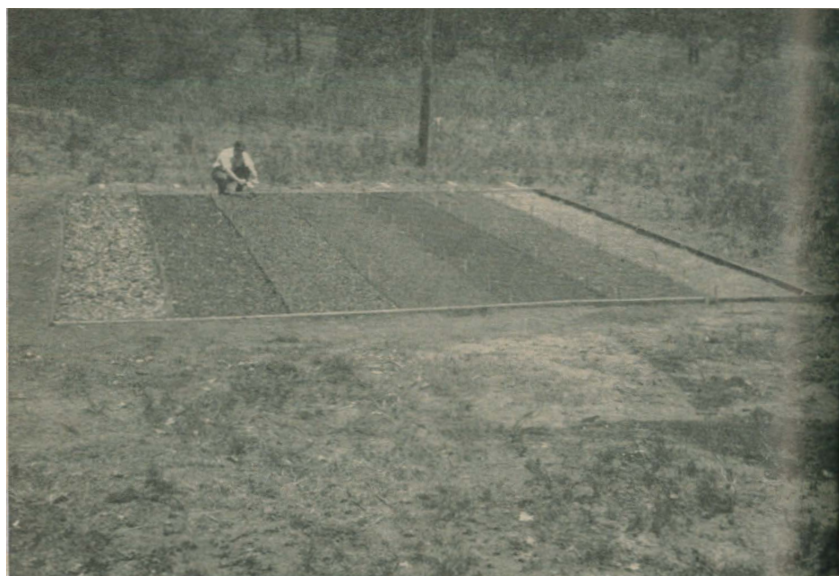


FIGURE 1.—Litter beds used in fuel-moisture studies at the Shasta Experimental Forest. Litter types from left to right are: Oak, snowbrush, manzanita, white fir, bitterbrush, mixed conifer, grass. The ponderosa pine litter bed (not shown) is a few feet to the left of the oak litter bed.

<sup>1</sup> Maintained by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of California, Berkeley, Calif.

Beds 3 feet wide, 30 feet long, and 3 inches deep were prepared for each kind of litter. A fuel-moisture stick was exposed 10 inches above each bed on wire supports (fig. 1). The sticks were weighed to the nearest 0.1 gram on a torsion balance at 4 p. m. daily.

After the sticks were tested over different litters, all of them were exposed over the ponderosa pine needle bed and weighed regularly to measure the variation in individual sticks. Curves were drawn showing the relation of the observed moisture content of each stick to that of the stick over ponderosa pine needles. These curves were then used to correct the observed stick moistures for stick differences.

The data for the stick over ponderosa pine needles were grouped into two broad moisture content classes. Then the average corrected moisture content was computed for the other sticks in each of these two classes. The indicated moisture content at 4 p. m. of these fuel-moisture sticks exposed over 8 kinds of litter was as follows:

| Litter type:                | Moisture content (percent)            |                                       | Average <sup>3</sup> |
|-----------------------------|---------------------------------------|---------------------------------------|----------------------|
|                             | 3.5-5.9<br>percent class <sup>1</sup> | 6.0-8.4<br>percent class <sup>2</sup> |                      |
| Ponderosa pine needles----- | 5.1                                   | 6.6                                   | 5.7                  |
| Oak leaves-----             | 5.1                                   | 6.2                                   | 5.6                  |
| Snowbrush leaves-----       | 4.9                                   | 6.2                                   | 5.4                  |
| Manzanita leaves-----       | 5.1                                   | 6.2                                   | 5.5                  |
| White fir needles-----      | 5.2                                   | 6.0                                   | 5.5                  |
| Bitterbrush leaves-----     | 5.3                                   | 6.1                                   | 5.6                  |
| Mixed conifer needles-----  | 4.7                                   | 6.1                                   | 5.2                  |
| Cured grass-----            | 5.0                                   | 6.0                                   | 5.4                  |

<sup>1</sup> Basis: 13 days.

<sup>2</sup> Basis: 9 days.

<sup>3</sup> Basis: 22 days.

None of the fuel-moisture sticks exposed over the different litter types used in this study showed any significant difference in indicated moisture content. Morris <sup>2</sup> found that there is no difference in the moisture content of sticks exposed 9 inches and 12 inches above Douglas-fir litter, bare ground, and gravel. It is thus probable that the type of ground cover immediately under fuel-moisture sticks is relatively unimportant when the sticks are exposed 9 inches or more above the surface. Ground cover of some type of dry litter is advisable, however, to keep the sticks from being splashed with mud during heavy rain.

<sup>2</sup> MORRIS, WILLIAM G., EFFECT OF GROUND SURFACE AND HEIGHT OF EXPOSURE UPON FUEL MOISTURE INDICATOR STICK VALUES. Pacific Northwest Forest Expt. Sta. Forest Research Note 30, pp. 5-6. 1940. [Processed.]