

CALIBRATION CHARTS FOR RADSON NO. 200 MOISTURE METER

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Objective

To make calibration charts for determining moisture content in four western coniferous seed: Jeffrey pine, ponderosa pine, sugar pine, and Douglas-fir.

Moisture Meter Operation

The essential parts of the Radson No. 200 moisture meter are:

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|-------------------|---------------------|
| 1. Power switch | 8. Scale indicator |
| 2. Dial | 9. Auxiliary weight |
| 3. Balance lights | 10. Thermometer |
| 4. Balance knob | 11. Drawer |
| 5. Hopper | 12. Temperature con |
| 6. Dump button | version chart |
| 7. Grain cup | |

A sample of seed is weighed on the moisture meter and poured into the hopper. The meter must first be balanced according to directions. When the seed is dumped into the test hopper, the capacitance in the system changes, causing one of the two balance reference lights to go out. The main dial, attached to a

capacitor, is rotated until both lights are again on.

Beneath the scribed mark on the fiducial is a reference number. This number refers the user to a special chart giving a direct percentage moisture reading for the commodity being tested. In addition to the various commodities shown on the face of the dial, the meter has a Scale A, which we used for determining moisture in tree seed.

Calibration

In our tests the samples varied in weight from about 135 grams to 200 grams. The instrument was balanced empty on Scale A at 0, instead of at the calibrate or balance mark on the dial.

To determine the calibration curves, the meter reading was plotted against moisture content obtained by oven weights. Many samples had to be processed to get a good distribution for plotting. From the curves, calibration tables giving moisture percents from the A-Scale readings were prepared for each species (tables 1-4).

TABLE 1.--Ponderosa pine

Meter reading	Percent of moisture
40- 55	4- 5
56- 65	6- 7
93-100	8- 9
112-118	10-11
120-124	12-13
134-154	14-15

TABLE 2.--Jeffrey pine

Meter reading	Percent of moisture
50- 60	4- 5
68- 85	6- 7
88-100	8- 9
101-111	10-11
125-135	12-13
138-145	14-15

TABLE 3.--Sugar pine

Meter reading	Percent of moisture
50- 60	4- 5
65- 70	6- 7
82- 95	8- 9
98-100	10-11
125-140	12-13
142-150	14-15

TABLE 4.--Douglas-fir

Meter reading	Percent of moisture
42- 48	4- 5
55- 70	6- 7
80- 90	8- 9
95-100	10-11
112-120	12-13
125-130	14-15

Procedure for use of the instrument would be as follows:

1. Rotate dial on A Scale to O.
2. Turn lower balance and hold.
3. Adjust lights to equal brightness with upper balance.
4. Pour seed in cup (with weight) until the scale dips.
5. Remove cup and pour seed into hopper.
6. Turn lower balance to On, hold it in that position, and turn the dial to the left for reading on the A Scale. Read the scale when the two balance lights are in equal brightness. Using the chart, convert the meter reading to percent of moisture.
7. After reading, press dump button and remove sample.

Discussion

In our analysis of more than 80 samples, we found that the instrument readings were remarkably consistent, providing the samples

were homogeneous. For example, on one seed sample, the instrument gave a reading that didn't compare to any other readings. Somewhat baffled at first, we examined the seed and found that they had been collected much too early, and were therefore underdeveloped. Also the seed moisture had to be stabilized to give reliable readings, as found when soaking the seed for the moisture determinations. About 24 hours was necessary after soaking for the seed moisture to become fairly stable.

Although our plots ranged from 1-1/2- to 17-percent moisture, we made our charts in the 4- to 15-percent range.

The test takes only about a minute (1).

Literature Cited

(1) Jones, LeRoy.

1960. Rapid moisture determination of tree seed with an electronic meter. U.S. Forest Serv. Tree Planters' Notes 43: 7, illus.