TECHNICAL NOTES

A Rapid Method for Washing Roots¹

WILLIAM K. LAUENROTH AND WARREN C. WHITMAN

Graduate Research Assistant and Professor of Botany, North Dakota State University, Fargo.

Highlight

The use of a system consisting of two sieves and a pail with a spout on it greatly facilitates washing soil material from roots. Washing into the first sieve can be continued until all visible soil material is removed. The capacity of the system was 150 to 180 samples per eight hour day. The major soil type on the sampling area was a Flasher loamy fine sand.

The lack of quantitative information about the production of underground plant parts has seriously impaired attempts to understand primary productivity of native vegetation. It has been known for quite a while that a large proportion of the energy fixed in photosynthesis is transferred to root systems, but few researchers have reported quantitative estimates. An important reason for the lack of this information is that root samples require a larger amount of time to process than do aboveground samples. Upon examining the processing time, the largest part of it is spent removing



Fig. 1. One-gallon can, three-gallon pail, and sieves showing washing position.

the roots from the soil material. Any method that can reduce the time required to wash the samples will greatly facilitate collections of a large enough number of samples to give reliable estimates of root production.

This report describes a rapid method of washing roots. The method has been employed successively on samples taken from a mixed grass prairie in western North Dakota. The major soil type on the site was Flasher loamy fine sand which averaged 84% sand to a depth of four feet.

The method involves placing the sample in a one-gallon can (Fig. 1) that has a sieve (40 mesh) soldered on the lower end. The one-gallon can is positioned on top of a three-gallon pail by means of two ¼ inch wire supports. The spout of the three-gallon pail is positioned over a sieve (32 mesh) that will collect the washed roots. A series of these units are placed on a table (Fig. 2) that has a center slot which is notched to hold the 32 mesh sieves. Beneath the slot is a trough



Fig. 2. Washing system with sieves and pails in position. Washing pressure is controlled by adjusting the nozzles above the cans.

which carries away waste water. Water is supplied through ½ inch garden hose and ½ inch galvanized pipe.

The washing procedure is as follows. A stream of water from the nozzle is directed into the one-gallon can directly onto the soil core and is continued until all the soil materal has been separated from the roots. The one-gallon can is then turned over and its contents, large soil particles and and roots, are washed into the three-gallon pail. The soil particles are allowed to sink and the roots are then either decanted or washed into the 32 mesh sieve.

The system was designed to have one or more persons operating on the washing side and one person removing the roots from the sieves and placing them in bags. A minimum amount of training is necessary for either job. With three persons working using four units the capacity of the system was 150 to 180 samples per eight hour day. The

¹ Received October 24, 1970; accepted for publication November 3, 1970.

samples consisted of five cores, 2.54 cm in diameter and 10 cm in length.

The method described here is quite similar to that of McKell, Wilson and Jones (1961), with one important modification. The initial washing in the one-gallon can insures that all of the roots are separated from the soil material. We tried the method of McKell et al. (1961) and found that a large number of roots remained on the bottom of the container with soil particles attached. It was necessary to break these by hand. Using our method, washing in the one-gallon can is continued until all visible soil material is washed free.

The major source of error in our method is the possibility that some of the root material is broken up by the initial washing into fragments small enough to pass through the final sieve. Williams and Baker (1957) found that rootlets and root hairs were not broken off when root material was subjected to a hard spray of water.

subjected to a hard spray of water.

A pre-soaking procedure was not deemed necessary under our conditions

equally well on pre-soaked samples.

Literature Cited

although the method would work

McKell, C. M., A. M. Wilson, and M. B. Jones. 1961. A flotation method for easy separation of roots from soil samples. Agron. J. 53:56–57.

WILLIAMS, T. E., AND H. K. BAKER. 1957. Studies in the root development of herbage plants. I. Techniques of herbage root investigations. J. Brit. Grassland Soc. 12: 49-55.