

EXPERIMENTAL CYLINDER COMPARISONS FOR MONITORING SEEDLING EMERGENCE. Kurt Spokas, Frank Forcella, David Archer, and Dean Peterson, Soil Scientist, Research Agronomist, Agricultural Scientist, and Agricultural Science Research Technician, USDA-Agricultural Research Service, Morris, MN 56267.

PVC cylinders are used routinely to examine weed seed bank dynamics. Recent observations in our field experiments led us to examine the impacts of artificial barriers, like PVC, on the soil microclimate conditions within weed emergence trials. Barriers examined in this study were: (a) PVC, where soils inside and outside were separated completely; (b) aluminum window screen, where soils inside and outside were connected partially; and (c) an auger hole refilled with soil, but with no artificial barrier. Microclimate conditions were monitored inside and outside of the barriers. Soil temperatures were monitored at 1, 2, 3, 4, 5, 6, 7, 9, 11, 15 and 20 cm, whereas soil moisture was monitored only at 2, 5, and 10 cm in each treatment. Soil moisture potentials inside of the PVC cylinders were typically higher than those for outside soils and screened soils. This indicated more soil moisture available to weed seeds inside of the PVC cylinder than outside, with a maximum observed deviation of 0.4 MPa among the various treatments. Temperature differences possessed a diurnal pattern, where the maximum difference in temperature occurred near solar noon (max 17 C difference at 1 cm), with the PVC cooler than the undisturbed soil. At night, the PVC-enclosed soil was warmer, with a maximum deviation of 8 C at 1 cm. Temperature differences lessened with depth, and at 20 cm no differences occurred among treatments and time. These temperature differences could be a result of the differences in soil moisture, since thermal conductivity is a function of water content. This impact on the microclimate conditions also impacted weed seedling emergence. Seedlings of giant foxtail (*Setaria faberii*), velvetleaf (*Abutilon theophrasti*), and wild oat (*Avena fatua*) emerged similarly from within screened soils and the soil-only barriers, whereas the emergence within PVC cylinders was delayed by approximately 7 days. These results will aid other researchers in devising more effective protocols for experiments involving weed seed bank dynamics.