

Seed Bank Monitoring

Bioassay Sampling identifies the number of viable seeds in the seed bank without having to perform laborious duties of sieving, collecting and counting each seed. The **bioassay techniques** we use were developed in England in the late 1800s and refined by James A. Young, Raymond Evans and Dick Eckert in the mid 1960s. It is an excellent tool to alert the land manager on just what is in the seed bank as well as how effective their weed control program has been. Here is a brief description on how we perform our **bioassay sampling**: To start with, you will need a hand trowel, small plastic bags (e.g. 4"x4"x12"), and plastic cups (4" radius x 3" depth) with coffee filters. To randomly sample the site you are going to collect bioassay samples simply collect soil in a 4"x4"x2" area including the litter layer.



Square foot quadrat in which a 4"x4"x2" sample of soil is collected to sample the seed bank for viable seeds.



Place the soil sample in the plastic bag and tie the top of the bag so that no soil is lost and it is safe for transporting



The sample will fill a 16oz cup about $\frac{3}{4}$ full when plastic bags with soil are returned to a greenhouse

The number of samples collected depends on the available bench space available at the greenhouse you will be using to water these samples and record emergence. In a one acre plot we usually collect 80-100 samples.



Bioassay Seed Bank Sampling

Often we use 5 gallon buckets to transport the bioassay samples back to the truck for transport to the greenhouse. Make sure you mark the samples and then the cups to identify your samples (e.g. disced, undisced). Samples should not be left in plastic bags for more than a day or left in hot sunlight as to not kill seeds.



Disced soil (good weed control)



Un-Disced soil (No weed control)

The bioassay cups should have a small hole in the bottom of them for drainage (we just power drill small holes) and lined with a coffee filter if possible. Once you wet the samples real good you simply count emergence on the 7th day (pull the emerging seedlings with the seed still intact), continue to water and perform this task on the 14th day and 28th day. Following the recording of emerging seedlings that you have successfully pulled, you will have a total of the active seed bank for that sample. Multiply the recorded number per sample by 9 and this will give you the active seed bank/ft².

