Excavation of Holes for Root Harvest and Soil Sampling at NDFF

This procedure has been written to ensure the safety of researchers while excavating holes and collecting samples. Any individual intending to assist with the hole excavations or collection of samples from the soil holes must read this document as well as the NDFF/MGCF Site Specific Health and Safety Plan, and sign the waivers attached.

The Basic Do’s and Do Not’s

1. Read and sign this document prior to excavation or soil sampling.
2. If you are uncertain about any part of the procedure, please request further explanation or a demonstration by qualified NDRC staff.
3. Only qualified operators trained in excavation will be allowed to operate the excavator.
4. All personnel will be required to wear safety glasses and steel toed shoes when excavating the holes. If significant dust becomes airborne, a dust mask will be worn.
5. The outriggers must be deployed before the excavator may begin excavation.
6. No personnel may be standing within the swing radius of the excavator during excavation.
7. Personnel should never stand within 6 ft of the sides of the holes, except the entry point.
8. When the excavator is in operation, an observer must be present to guide the operator and watch for encumbrance. The observer will immediately signal the operator to stop if abnormal conditions occur. The observer will help ensure the safety of other staff by reminding them to stay outside the excavator swing radius and will provide general instruction to the operator.
9. The soil holes must be filled in after sampling is completed.

Step by Step Procedures

1. Ensure the absence of underground utilities or surface infrastructure prior to operation.
2. Drive excavator into position next to designated soil hole location
3. Apply parking brake and place stick shift in neutral.
4. Depress clutch, engage PTO, then slowly release clutch.
5. Deploy outriggers until observer indicates full deployment.
6. Begin excavation. All soil removed from pit must be placed at least 4 ft from the sidewalls of the hole.
7. When the hole is completed, including walkout slope, raise outriggers.
8. With the assistance of an observer, drive away from the hole location and onto the next hole location or parking area.
9. Personnel collecting soil samples will have an observer present to watch for any potential sidewall collapse and may only collect samples from the hole after an excavation competent person inspects the hole.
10. When excavation and/or soil collection is completed the holes will be filled in.
Project Description:
The purpose of this effort is to excavate along the sides of existing minirhizotron tubes as well as within the rooting zone of select shrubs to allow root harvest and soil sampling. The size of the holes will be approximately 2-3 ft wide and at least 3 ft deep (see Figure 1 below). The number of holes that will be excavated will depend upon soil conditions and available time/resources. It is anticipated that at least 10-20 holes per plot will be excavated and will be located adjacent to minirhizotron tubes and select shrubs (see example in Figure 2). Root and soil samples will be extracted from each hole at a number of specific depths as well as depths where roots are present. Because the size/depth of the holes will not exceed the height of an average person, shoring of the hole side walls will not be performed. However, an observer/assistant will be present when samples are collected to help ensure the safety of the person collecting samples. After all samples have been extracted the holes will be refilled.

Figure 1. Schematic of hole dimensions.

Figure 2. Example of likely hole locations within one of the NDFF treatment plots.