Measuring root turnover in minirhizotron images

1. Start with the first location in the first tube, and proceed with the following steps. Once you have completed these steps, start over with the next location.

2. Open the image that corresponds to the first recording session. No need to use WinRhizo, unless you want to-- the Windows Picture and Fax viewer should work just as well.

3. Open the image that corresponds to the second recording session, so that the two images can be viewed side-by-side.

4. Record the number of roots that grew during the interval between the first and second sessions. In other words, record the number of roots that appear in the second image but not the first image.

5. Record the number of roots that died during the interval between the first and second sessions. In other words, record the number of roots that are visible in the first image but not the second image, plus the number of roots that are fragmented in the second image but whole in the first image (see figure below).

   Note: there is no need to record the total number of roots in each image, since that has already been measured. If there are no roots visible in either image, mark "0" for roots that grew and "0" for roots that died.

6. Repeat steps 2-5, but for images from the second and third recording session. Continue until all recording sessions have been analyzed.

7. Move to the next location and go back to Step 1.
Measuring root death

First session

All roots are alive here

100% of this root died

This branch of the root died (~15% of root)

Second session

This branch of the root died (~60%)

The dead part of the root includes all portions of the root branch that are distal to the fragmented section