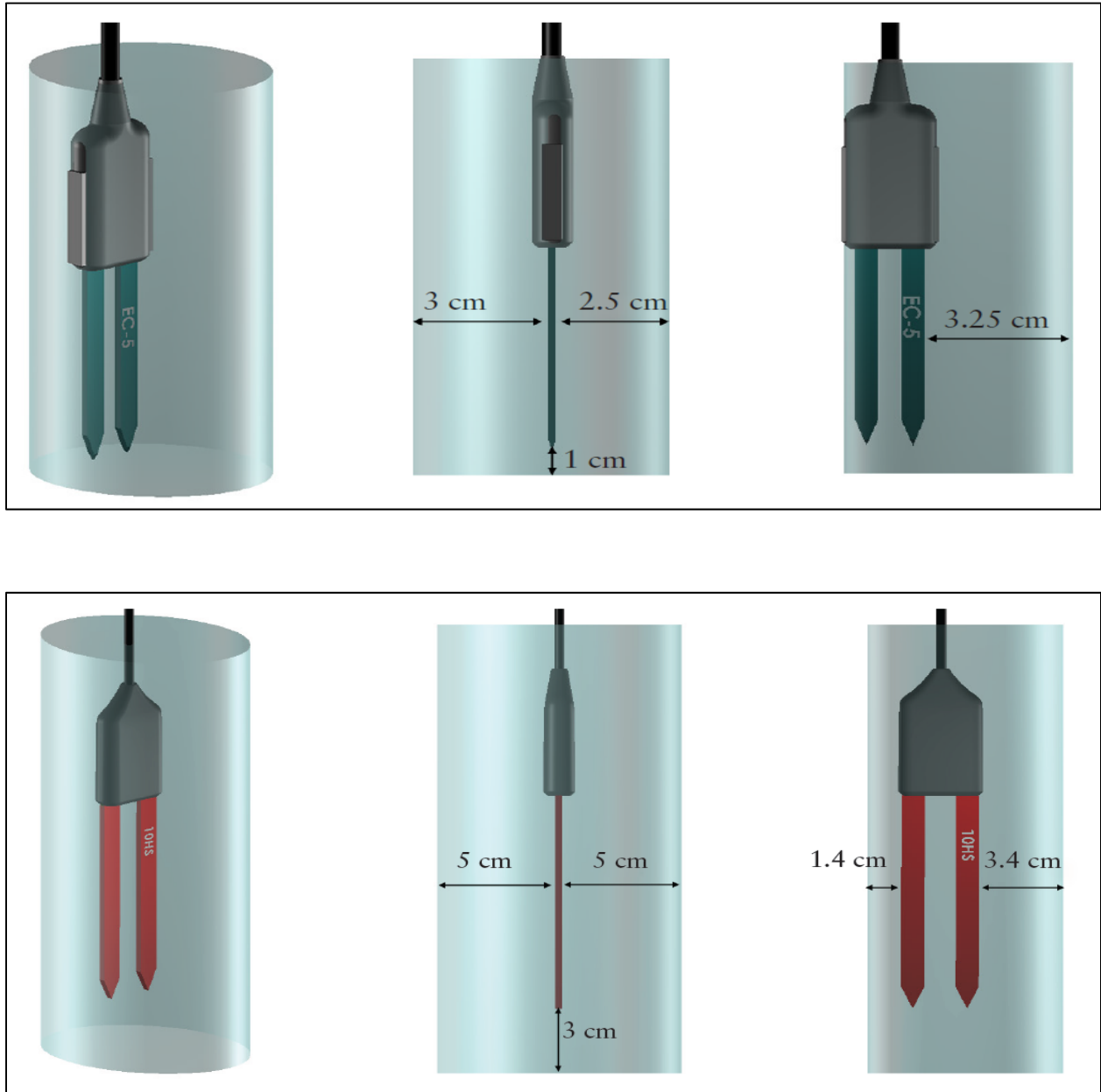


3. Sensor Installation and Understanding Variability

Sensor installation quality is one of the factors that can affect the accuracy of the VWC measurement by capacitance sensors.

The volume of influence of the capacitance sensors is also an important factor to take into consideration when installing capacitance sensors. The sensors provided by Decagon Devices, Inc. have different dimensions and volume of influence. Figure 6 illustrates the volume of influence of the EC-5, 10HS, 5TM and GS3 sensors in relation to their size and positioning of their prongs.



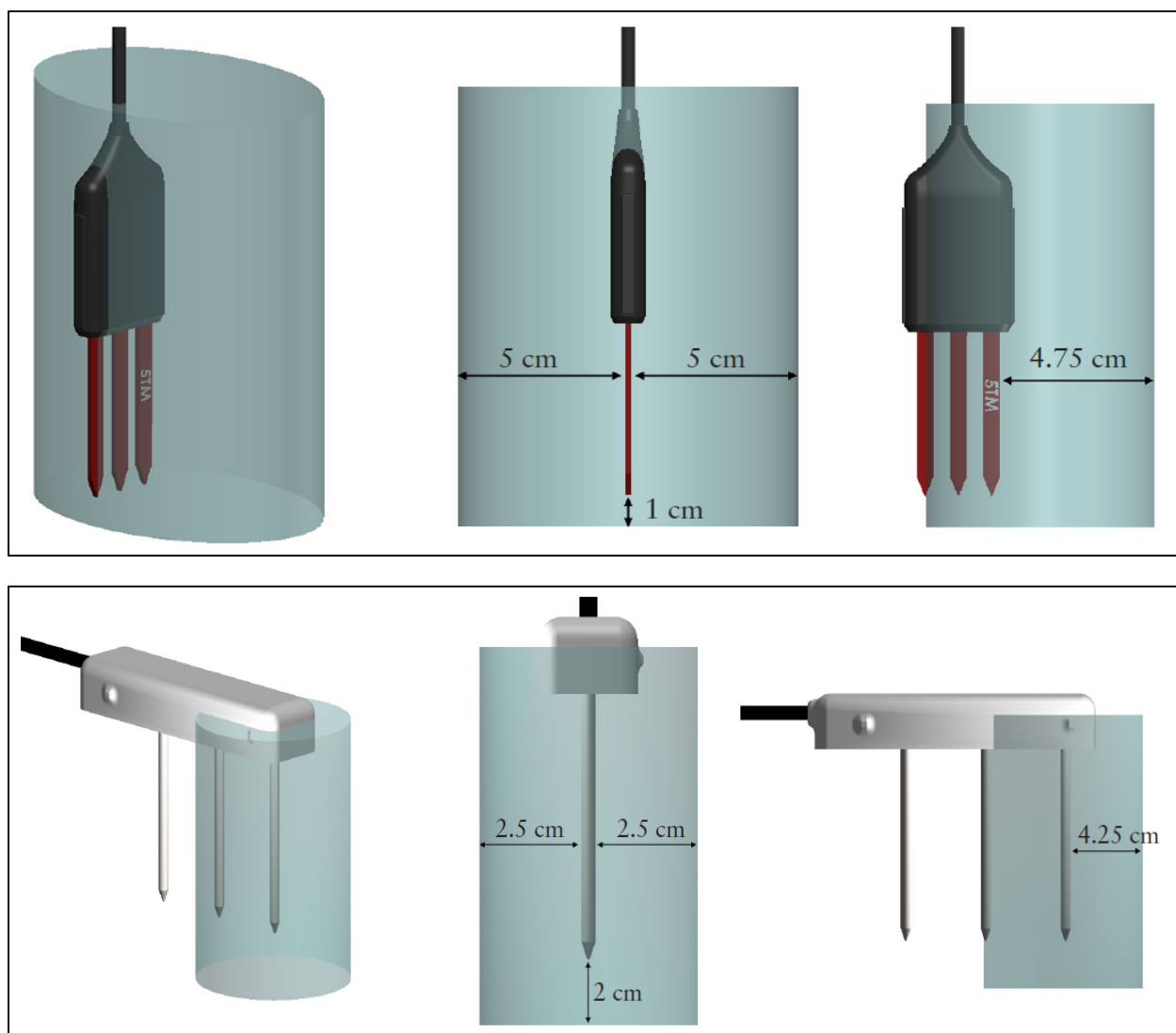


Figure 6. Volume of influence for Decagon's 10HS, 5TE, EC5 and GS3 sensors (from top to bottom)

How roots may affect sensor readings (by Dr. Taryn Bauerle)

Clearly, the goal of measuring soil moisture is measure the moisture available to the plants root system. However, not all root systems of plants are built the same. In other words, some plants may place the majority near the surface of the soil, some plant's roots may dive deep into the container and some root systems may have a mixture of the two. These differences in what we call root "architecture" influence where a plant is taking up the majority of its water. Understanding differences in root system architecture can inform us on where to place a soil moisture sensor to truly capture the soil moisture content of the root zone. Placing the soil moisture sensor in the area of active roots will provide a more accurate reading of the root zone. Caution should be taken with a small subset of plants that produce large woody masses belowground such as Oak. For plants with this behavior we recommend placing

your soil moisture sensors with ample distance away from the large woody mass to avoid any interference with the sensor.

It is also important to note, as plants develop, their root systems explore the soil which may affect soil moisture sensor readings. In order to best manage your irrigation through soil moisture monitoring it may be best to change the location of your soil moisture sensor as the tree grows through the season. For example, when trees are first transplanting into their container the root system is usually placed in the center of the container. Therefore, placing your sensor in the central container location at planting makes the most sense. However, as the root system develops it is important to consider moving the sensor to the active rooting zone.