Capacitance potential as indicator of common bean plant rooting.

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Reports for several species has shown the relationship between electrical capacitance and root mass, length and surface area when it was measure from plant base to one electrode in rooting substrate. It has used to measure root size for 30 years (Dietrich RC, Bengough AG, Jones HG 2012). Preliminary results from this study showed both rod position and rod depth did not affected plant parallel capacitance values, although, surface coverture area per plant (cm² plant⁻¹) did. The more area per plant, the more capacitance. Phenology stages and its interaction with rod depth, and this one with surface coverture area per plant influenced capacitance measurements. There was high genotypic variation for parallel and series capacitance within a group of 12 bean genotypes. Three common bean genotypes identified with higher series capacitance ((BFS 142, SAB 659 and BFS 29) showed intermedium to thick base stems. Higher parallel and series capacitance, related to higher plant biomass (leaf, stem, pod wall, seed and canopy at the end of the plant cycle) and seed number beside stem base diameter would indicate that this measurement has potential to help on finding better bean genotypes. Top 20 cm depth root biomass, showed more relation to shoot plant attributes than projected and surface root area. Root biomass was relate to parallel and series capacitance of intact plant. This study confirm capacitance would be useful as an indicator of common bean root biomass. Series capacitance would be better indicator than parallel capacitance because resulted more tide related to projected and surface root area variables. Intact plant capacitance evaluation is a more confident method than cutting plant for capacitance evaluation.
Figure 3. Third field common bean (cv. Amadeus) experiment showing plant distribution 26 days after planting in a Vertisol at CIAT Palmira-Colombia.

References


