

## **PRELIMINARY DATA, NOT FOR SHARING, NOT FOR PUBLISHING**

### **Capacitance potential as indicator of common bean plant rooting.**

*Jaumer Ricaurte, Duvan Pineda, Martín Otero, Jarden Molina, Amauri García, Seider Erley Culchac, Milan Urban.*

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 coerture area per plant ( $\text{cm}^2 \text{ plant}^{-1}$ ) did. The more area per plant, the more capacitance. Phenology stages and its interaction with rod depth, and this one with surface coerture 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

- Dietrich RC, Bengough AG, Jones HG, White PJ. ;doi:10. 1093/jxb/ers26. 2012. "A New Physical Interpretation of Plant Root Capacitance." J Exp Bot. 63(17):6149–6159.
- Howeler, RH. 1986. Los Suelos Del Centro Internacional de Agricultura Tropical En Palmira, Colombia. Documento de Trabajo No. 16. CIAT, Cali, Colombia.
- I.M. Rao, S. Beebe, P. Troy, J. Ricaurte, and C. Jara. 1997. Determine Genotypic Variation in Beans for Tolerance to Drought Itle. 177. Cali, Colombia.
- Rao, IM Beebe, S Ricaurte, J Grajales, MA García, R. 2006. Physiological Evaluation of Phosphorus Efficiency of Advanced Lines Selected for Drought Resistance. In: Annual Report 2006 Project IP - 1, Bean Improvement for the Tropics