Selection of forage pigeon-pea (*Cajanus cajan* Millsp) lines for soil decompaction

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Key words

Introduction Acc lin Camargo & All umportant nong species fit to promo decompaction, due to the capacity d soil lay ince differences not only species but also within species have r this charact t within a s like *Cajanus cajan* seem an excellent aid to help solving the npaction. Thi the purp electing, among forty pige pure lines, the most efficient genot

Materials and methods In a series of five experiments, seeds pigeon-pea lin were planted VC tub containing an upper 30 mm layer of vermiculite, compacted clayey soil (t sity of 1,6 g/) and a low rmiculit layer, in a randomized block design with four replications, in a greenhouse Nine pr seeds were plant mm diameter tube. Around two weeks after planting, the plants were harvested and dry mass of their parts was deter all experiments, the cultivar Fava Larga served as the contr main measured characteristic was the amoun produced in the compacted soil layer. Three lines were selected and went though a series of three experiments where id pigeon-pea root and shoot dry mass, root development of Tanz nia grass plants (*Panicum maximum* Jacq.) seeded after pigeon-pea harvest was evaluated. The experiments had ten blocks, half of which had the pigeon-pea plants completely harvested after approximately two weeks. In the other half, the aerial part of the pigeon-pea plants was removed; Tanz nia seeds were planted and after about two weeks the plants were harvested and the same type of data were collected. Sample compacted blocks went through computerized tomography to check their soil bulk density uniformity

Results In the series of five experiments, three lines were select ce they yielded significantly more roots in the compacted soil blocks: g5~94, g8~95 and g124~95, although high variation coefficients were found. These lines went trough new experiments: in the first one, sand was used in the place of the upper vermiculite and that caused, due to water infiltration, soil penetration resistance to fall from 3,8 MPa to 1,6 MPa, in two weeks. For that reason, the second part was not performed and Tanzânia grass seeds were not planted. Also in this case, g5~94 had significantly higher amount of roots in the compacted layer than the control. A second experiment was performed, using again vermiculite in the upper layer. When the pigeon-pea plants were harvested, average penetration resistance of the soil blocks was 11,6 MPa and the tubes that had received the Fava Larga plants had significantly (Duncan $p<0,05$) higher resistance than those that received the g8~95 plants. Dunnett test ($p<0,05$) revealed superiority of g5~94 and g8~95 over the control, in quantity of roots in the compact layer, but no difference was found among th pla e variation coefficient went up to 19%. In the third experiment, the ame scheme w ly th l and g8~95 lines were used. When the pigeon-pea plants were harvested the MP d the varia 20,7%. When the Tanzânia plants were harvested, enetration resistance ranged from 1,(MPa and the variati fficient was 68,5%, demonstrating that the longer aying of the plants in the greenhouse cause problems in il properties, confirming observations by De Maria 1999) about problems to evaluat litions. Root dry mass of the two lines were significantly higher than at of the control (Dunnett p< ânia grass grown where those lines had been grown were only merically higher than those of the control probably due o the high variation coefficients. Tomographical images revealed at the blocks were uniformly co acted at horizontallly e soil bulk densities ranged from 1,41 to 1,52 g/cm³.

Conclusions There is genetic variability in the *Cajanus cajan* species to penetrate compacted soil layers and two genotype 94 and g8~95 were the most efficient. The artificially compacted soil blocks used were adequate for the purpose experiments, since tomographical images revealed their soil bulk density uniform

References

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