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PENETRATION RESISTANCE IN SUGAR BEET IRRIGATED FIELD CROP

The increase of the soil's compaction affected the sugar beet growth and changed the root system morphology: the main root is shorter and secondary roots are irregularly distributed and more superficial. The no tillage (direct drilled) and minimum tillage systems increase the bulk compacity of the top soil layer when compared with the classic soil tillage preparation. The soil's penetrability was measured, near the soil water field capacity condition, by an automatic penetrometer.

The goal was to compare tillage systems on some types of soils with irrigated sugar beet. The experimental results allow us to conclude that the general behaviour of the sugar beet plant are:

- Penetration resistance (PR), near the soil surface, is greater in tillage conservation systems than in classic tillage system, and inversely than in the deep soil's layers. PR less than 1 MPa don't limited root penetration. Root growth is drastically limited by PR > 2.5 a 3 MPa.
- The increase of the superficial soil layer compaction shortened the elongation of the main root, enlarged the diameter and elevated the top part "colon" of the plant in relation to the soil surface.

In swelling soils, the finest roots are concentrated in tillage layer, with few fine roots deeply, when in no tillage system fine roots are irregularly distributed by a greater volume of soil. In this type of soils morphology of roots are better guide by craks soil system than PR values. In non-swelling soils, the sugar beet root system is drastically limited when PR reached 2 MPa.

Bulk soil compaction is negativly related with the potential soils productivity but yields are more affected in non swelling soils than in swelling soils, which are auto structure regeneration. In spite of the greater bulk compaction in the top soil layer in no tillage and minimum tillage systems yields of sugar beet are, in most of the study cases, better than in classic tillage.

Other languages: not available

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