



Determination of water absorption and water holding capacities of different soil mixtures with MINIDRAIN system to enhance the plant growth

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Soil water holding capacity is the amount of water that a given soil can hold against the force of gravity. Soil texture and organic matter are the key components that determine soil water holding capacity. Soils with smaller particle sizes, such as silt and clay have larger surface area can hold more water compared to sand which has large particle sizes which results in smaller surface area. A study report showed that 1% increase in soil humus will result in a 4% increase in stored soil water (Morris, 2004) and 1 part humus holds 4 parts of water (Wheeler and Ward, 1998). Therefore, the more humus that can be added to the soil, the greater the water holding capacity of the soil. As the level of organic matter increases in a soil, the water holding capacity also increases due to the affinity of organic matter for water. The water holding capacity of the soil is determined by the amount of water held in the soil sample vs. the dry weight of the sample.

MINIDRAIN is a patented system made of geo-fabric (fleece) or combination of geosynthetics and humus. MINIDRAIN and vegetation nets developed by the company ÖKO-TEX (Linz, Austria) will improve the distribution of water and air in the soils, increase the growth of vegetation and reduce the soil erosion. Depending on the physical configuration, there are four different combinations of MINIDRAIN systems developed by ÖKO-TEX.

- a) Geotextile (fleece) strips of different sizes (e.g. 5x10x250 mm)
- b) Net formed strips (drainage nets) of different sizes
- c) Multilayer geotextile mats with humus, seeds or compost of different sizes (e.g. 10x30x200 mm)
- d) Multilayer geotextile net formed mats with humus, seeds or compost

This paper describes the experimental results of the water absorption and water holding capacity of different forms of MINIDRAIN under different soil mixes. In this experiment, potting soil, coarse sand and LECA (Light weight clay aggregates) balls are mixed with different proportion of MINIDRAIN systems and the water absorption and water holding capacities are measured. A comparison of the results for an optimal combination of soil and MINIDRAIN system has also been made.

The results show that, the soil mix with MINIDRAIN system with multilayer mats (with humus) have highest water absorption and water holding capacity among the tested soil mix combinations.