Water Re-Use

Sustainable waste water reuse technologies for irrigated land in NIS and southern European states

“Wet Clay Technology” decrease water repellency in sandy soils

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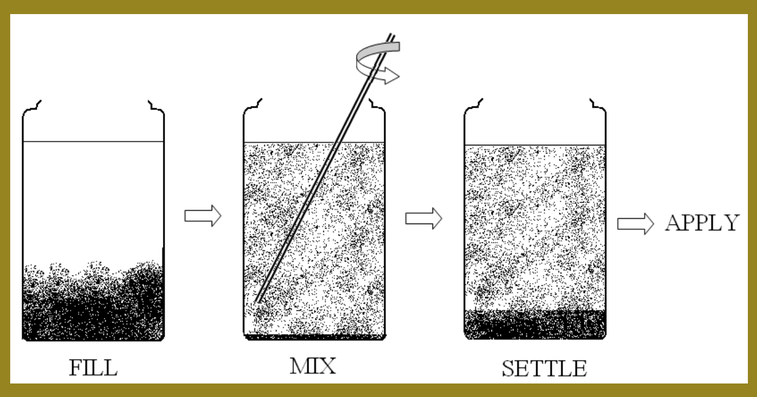
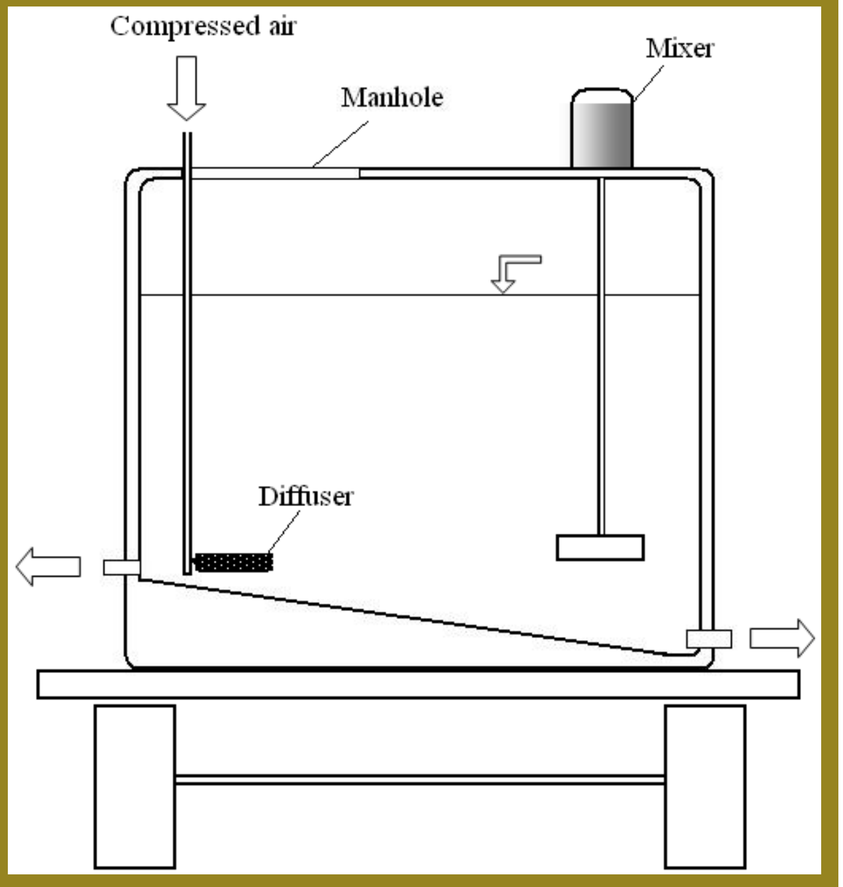
Introduction

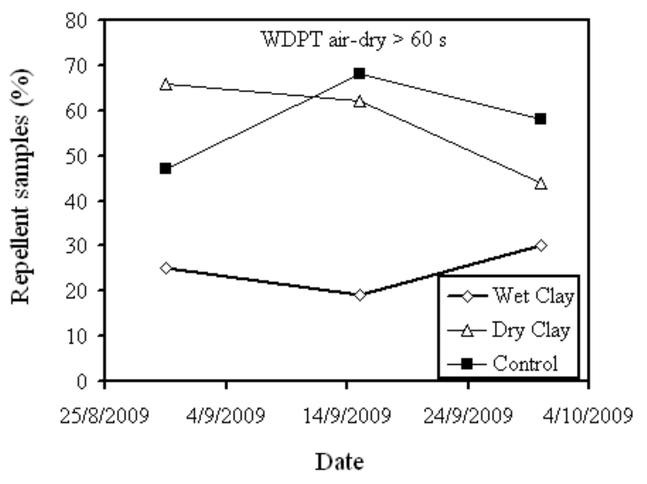
Clay amendment has been traditionally used to decrease water repellency in sandy soils. However, the quantities required (10-15%) are often prohibitive for use in large-scale projects. The application of clay in suspension (wet clay technology, WCT) was therefore proposed as an alternative mean for clay amendment. For this reason the required quantity of a clayey soil was mixed with freshwater (at 1:5 soil:water). After 2 min of settling time, the supernatant was applied to a water repellent sandy soil using a watering can. The use of wet clay at a rate of 1 kg/m^2 was effective to decrease soil water repellency immediately after application. The number of wettable samples during the 5 week monitoring period, was maintained between 38-50%, compared to 9-31% after conventional dry application, and 13-21% for the control soil. Therefore, WCT was beneficial in decreasing soil water repellency. By this way, it is possible to significantly decrease the amount of clay required for soil reclamation. This is especially important for regions were clay is expensive and/or not abundant. A compact and portable equipment for WCT preparation is therefore proposed for field application. This poster presents information on the use of wet clay technology based on the outcomes of the EU co-funded Water Reuse project in the southern Mediterranean area.

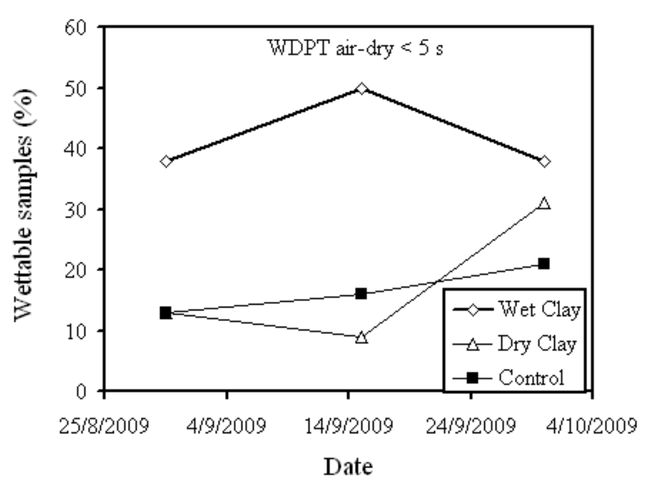
Manual preparation of clay suspensions for water repellency mitigation



Portable equipment for wet clay preparation







Evolution of soil hydrophobicity and wettability during the study period

Conclusions

The advantages of using wet clay are:

- It can decrease soil water repellency in sandy soils. Because the water is absorbed uniformly by the soil, evaporation and run-off are decreased, and irrigation uniformity is improved, thus it is not necessary to “overwater” the difficult parts of the field.
- Wet clay application is beneficial immediately after application, and compared to dry application shows superior performance.
- By implementing wet clay it is possible to significantly decrease the amount of clay required for water repellency mitigation in sandy soils. Compared to 10-15% of clay when applied in dry, only 1-1.5% is required in suspension. This is especially important for regions were clay is expensive and/or not an abundant material.
- Wet clay technology enables the use of a soil with a lower clay content to be used for repellency mitigation, since the coarse fractions (sand) are separated from the finer, due to the method used.
- Additionally, clay particles can be evenly distributed to a repellent surface soil (since they move together with the water flow), and infiltrate partially into the soil profile, thus the requirements for mechanical clay distribution are minimum.

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