

Available water retention for the saline affected agricultural land
in arid and semi-arid region
- Effects of saline irrigation on water stress and agricultural
land use planning

Rokuro YASUTOMI (Tokyo University of Agriculture)
Kengo WATANABE, Seisyu TOJO, A.M.MUNIR, Syuichi SUGI
(Tokyo University of Agriculture and Technology)

Summary

The water retention curve against water content of soil is indispensable for the calculation of available water content. The water potential of soil is illustrated using pF curve which is often calculated only by capillary potential without any adjustment of osmotic effect. Above all the measurement at the low pressure of available water range depends on the capillary tension. The irrigation of saline containing water will give a stress to the crops. This experiment shows the negative effects of saline water irrigation against the crop growth, and also discusses on the necessity of osmotic adjustment for the water management in arid and semi-arid regions.

The experimental crop tested for the water stress by the osmotic effect is COMATSUNA (Brassica Campestris L. Var. Perviridis) which grows in a short term of 4 weeks. The experiment for the water stress of the crop in test pots was carried out in the growth chamber of phytotron with constant temperature (25°C) and humidity (70%) after the pF curves adjusted by the osmotic potential of the soil were produced. The salinity at the same time osmotic pressure in the soil were increased by every irrigation. The increasing salinity and osmotic pressure suppressed the rate of evapo-transpiration. The osmotic potential in saline water shares a large part of potential energy of the water relating to the wilting point of crops. It will be necessary for us to take account of the soil-water system as a new soil water crop system in arid and semi-arid region. The land use planning should be produced in regard to the water resources for irrigation relating to available water amount.