Journal of Agroecology and Natural Resource Management
p-ISSN: 2394-0786, e-ISSN: 2394-0794, Volume 3, Issue 1; January-March, 2016 pp. 116-116

http://www.krishisanskriti.org/Publication.html

Water Availability in Different Irrigation Regimes in Relation to Hydrogel under Zero-tilled Green Gram - Jute Relay System

B. Biswas[1*], P.K Bandyopadhyaya[2], S.K. Patra[3] and K.G. Mandal[4]

[1,2,3]Directorate of Research, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal-741234, India
[4]Indian Institute of Water Management (ICAR), Bhubaneswar 751 023, India
E-mail: [1]kripahi@yahoo.com

Abstract—*The field study was carried out during the summer season at the Central Research Farm of the Bidhan Chandra Krishi Viswavidyalaya (Latitude 22^{0}58$^/$ N, Longitude 88051/ E altitude 9.75 m amsl), Gayeshpur, India to investigate the effect of the application of hydrogel in modifying the hydraulic properties of different irrigation regimes under green gram-jute relay system. The main treatments consisted of four different irrigation regimes (0.4 ETc, 0.6 ETc, 0.8 ETc and without irrigation). The sub-treatments consisted of three levels of hydrogel application (5 kg/ha, 2.5 kg/ha and control).Hydrogel was mixed with top 10 cm soil before green gram sowing. Soil samples were taken with a core auger on the fourth, seventh, 14th and 21st after irrigation. The undisturbed soil of the rings of the core assembly was used for preparing the soil water retention curve, and the soil of the core was used for determining saturated hydraulic conductivity (Ks), bulk density and gravimetric soil water content. The measuring of soil water content (SWC) with a 2.5 kg/ha hydrogel application, the water release rates were relatively uniform throughout the entire period, whereas in 0.8 Etc, water release rates were very high initially (4-7 days) but fell appreciably afterwards.The result of the soil water characteristic curve revealed that water release per unit suction change in the 010 kpa range (unavailable to plants) in plots not treated with gel was higher compared to soil samples treated with gel. However, the water release per unit suction change in the 10-100 kpa range (available to plants) in soil samples not treated with gel was significantly lower compared to that in soil samples treated with gel for all irrigation regimes.The above result suggest that gel significantly improved the readily available water capacity (RAWC) of the soils. The time at which a critical SWC (SWC corresponding to 100 kpa) was reached was studied in order to further examine the suitability of gel in improving soil water retention regimes. The critical SWC with the 2.5 kg/ha hydrogel treatment reached approximately 7, 14, 22 and 4 days after irrigation in 0.4 ETc, 0.6 ETc, 0.8 Etc and without irrigation, respectively. The above-mentioned results thus reaffirmed the suitability of gel for longer period water availability (22 days) at 0.8 Etc, while hydrogel was found unsuitable for 0.4 Etc.in which critical soil water was reached early (4 days).*