

EFFECT OF SUPER ABSORBENT POLYMERS (SAPS) ON SOIL PROPERTIES TO COMBAT WATER STRESS IN BLACK PEPPER (*Piper nigrum L.*) PLANTS IN NURSERY

Rasanjali K.G.A.I.^{1*} and De Silva C.S.¹

¹Department of Agricultural and plantation Engineering, Faculty of Engineering Technology, The Open University of Sri Lanka

*rasanjali429@gamil.com

Current climatic changes are increasing the incidence and severity of droughts. Super absorbent polymers (SAPs) have been established as a soil conditioner and it is vital to reduce soil water loss and increase crop yield. This research focused to overcome drought problems by using super absorbent polymers for local type black pepper plants in nursery. This research was focused to investigate the effect of super absorbent polymer on soil moisture, bulk density, porosity, pH, electrical conductivity (EC), soil nitrate, and water soluble P and growth parameters of black pepper plants in nursery. The experiment was conducted at Intercropping and Betel Research station, Narammala. GK-49 (Galekoluwa) pepper variety used with Zeba. Zeba is an organic based Super Absorbent Polymer and corn starch is the main ingredient. An experiment was carried out in a factorial layout based on Complete Random Design (CRD) with three replications. The factors were three levels of irrigation interval as 4 days, 8 days, 10 days and four levels of Zeba as no Zeba, 1 g of Zeba, 1.5 g of Zeba and 2 g of Zeba. Irrigation was done according to the treatments to fulfill the field capacity. Soil parameters were measured at 2 weeks interval and all the data were analysed using SAS university package. Results of statistical analysis showed the weight of Zeba, irrigation intervals and their interaction had a significant effect on soil parameters. Soil porosity and soil EC were increased with the weight of Zeba. Super absorbent polymers increase soil pores and it results in increased soil volume. As a result of that bulk density was decreased. All the treatments with Zeba showed higher moisture content than no Zeba treatments. Treatments with Zeba showed higher plant performance and resulted in lower soil nitrogen content in the final media due to high absorbency by plants. 2 g of Zeba with 4 days or 8 days of irrigation intervals were the best treatments on black pepper nursery. The results of this study showed that Zeba can store and absorb considerable water and reduce the unfavourable effects of water stress due to global warming on black pepper plants in nursery.

Keywords: *Irrigation, Soil, parameters, Zeba, Moisture*