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Impact and the Control of Root-Knot Nematodes in Tomato Production in Nepal

JENISH NAKARMI¹, RABIN RIJAL², SHASHANK KAFLE², GOPAL BAHADUR K.C.², FLORIAN M.W.
GRUNDLER¹

¹*University of Bonn, Inst. of Crop Science and Resource Conservation; Molecular Phytomedicine, Germany*

²*Tribhuvan University, Institute of Agriculture and Animal Science (IAAS), Nepal*

Abstract

Root-knot nematodes (RKN), one of the economically most important plant parasitic nematodes, cause severe losses all over the world. In Nepal, devastation caused by RKN is increasing rapidly especially in tomato production. Efficient management strategies against RKN are very limited. Therefore we studied the efficacy of different biological, botanical and synthetic agents in field trials performed in polyethylene houses at Bhaktapur and Kavre districts of Nepal simultaneously. Using randomised complete block design (RCBD), experiments were carried with six different treatments including untreated control with four replications during March to November 2019. Hybrid tomato (cv. Srijana), one of the most popular tomato varieties among the farmers in Nepal was used as model plant. The treatments included BioAct Prime (*Purpureocillium lilacinum*), Serenade ASO (*Bacillus subtilis* strain QST 713), and Velum Prime (Fluopyram), and Neem extract (Azadirachtin), combination of the BioAct Prime and Serenade ASO along with control (without any treatment). Observations were obtained on the plant growth, total yield and the disease parameters from six randomly selected plants by systematic sampling at certain intervals. The treatments varied significantly in the total yield, single fruit weight, egg population density in the root per system (RPS) of tomato plants, root length and fresh plant height taken during final harvest. Total yield was highest in Serenade ASO (112.23 kg plot⁻¹), followed by Velum Prime (105.27 kg plot⁻¹) with significant difference between two treatments, while average single fruit weight was maximum in Velum Prime (47.60 g) and Serenade ASO (47.58 g). Galling Index (GI) in RPS was observed lowest in Serenade ASO (3.083), accompanied by Velum Prime (3.042). Similarly, the lowest no. of eggs RPS was also observed in Serenade ASO (69687.5), followed by Velum (78250). Serenade ASO, a bio-control agent, appeared to be a good substitute of Velum Prime, a chemical nematicide, in suppression of RKN in the tomato poly house and high yield of tomato with the safe environment.

Keywords: Bio-control agents, Nepal, root-knot nematodes, *Solanum lycopersicum*, Velum Prime