

ABSTRACT

Tomato (*Solanum lycopersicum* L.) is a nutritious vegetable consumed worldwide. Open field production faces a number of constraints including biotic and abiotic stresses. The general objective of the study was to enhance tomato productivity through provision of an alternative pest control and protected cropping system that is relatively affordable to small scale farmers. The study entailed a field production and laboratory postharvest experiment at the Horticulture Research Field, Egerton University. Cultivar “Rio Grande” was grown under five agronet covers; white, grey, yellow, blue and multi-coloured with open field as the control. Randomized Complete Block Design (RCBD) was used for the field experiment and Completely Randomized Design (CRD) for the laboratory experiment. Data collected were analyzed using analysis of variance (ANOVA) and means separated using Tukey’s Honestly Significant Difference Test (THSD) at $p \leq 0.05$. Net covers modified the crop microclimate with highest increase in temperature, soil moisture and, relative humidity recorded under white (4.5°C), blue (15.6%) and multi-coloured covers (11.4%), respectively compared to the control. Photosynthetically active radiation (PAR) was reduced under covers with the highest reduction of 47.5% recorded under the blue agronet cover. Generally, covered plots recorded lower pest populations than the control treatment throughout the study. Populations of whitefly reduced by 41.6-65.9% under yellow net cover. Regardless of net colour, aphid and mite populations reduced by between 15.1-43.7% and 26.2-52.5%, respectively. Thrips population was lowered under the coloured-colour nets (blue and yellow) by 51.6-61.4%. Growing tomato under agronet covers improved plant height and internode length by between 6.67 – 34.09% and 13.52-23.06%. Tomato under white net cover had higher branching and stem thickness by between 57.4-72.2 and 23.9-40.1% with higher yield of 24.9 t/ha. Covering tomato plants with white cover recorded highest marketable yields of 18t/ha while the lowest marketable yields of 11t/ha was recorded under blue net cover. Fruits obtained from white cover tended to be firmer (23.7-275%) with higher (18.8-38.9%) sugar acid ratio. Longer shelf life of 8-12 days was recorded under agronet covers compared to fruits from open field with fruits obtained from blue cover registering highest lycopene content of 13.4mg/kg. Study findings indicate that use of agronet covers especially the white cover could improve microclimate, protect tomato against insect pests and can be considered a viable strategy for minimizing on the use and cost of pesticide application for enhanced environmental safety and better yields and quality of tomato for smallholder tomato growers.

