

Technical Data Report

Multicolor Ecological Agriculture Group Inc.

Effect of Multicolor Crop on Growth Parameters, NPK Uptake and Yield of Sweet Pepper

Objective

The objective of this study was to determine the effect of Multicolor Crop on growth parameters, NPK uptake and yield of sweet pepper.

Materials and Methods

The field trial was conducted on sweet pepper (*Capsicum annuum* L var. California wonder) in Indonesia. Treatments included: 1) Untreated control, 2) Multicolor Crop at 0.5 ml/liter of water, 3) Multicolor Crop at 1.0 ml/liter of water, 4) Multicolor Crop at 1.5 ml/liter of water, and 5) Multicolor Crop at 2.0 ml/liter of water. Multicolor Crop was applied at 40 and 60 days after transplanting. Multicolor Crop was obtained from Multicolor Ecological Agriculture Group Inc., USA. Sweet pepper was planted in 30 x 50 cm spacing under a clear plastic roof. One week before transplanting, 30 tons/ha of manure was applied to the soil. Fertilizer 15-15-15 (N- P₂O₅-K₂O) was applied at 1,500 kg/ha with 600 kg/ha being applied 2 days before transplanting, 450 kg/ha at 3 weeks after transplanting and 450 kg/ha at 6 weeks after transplanting.

All plots were irrigated three times per week. The study design was Randomized Block with 5 replications. Cultural practices followed local practices and were the same for treated and untreated plots. Data were collected for Leaf Area Index (LAI), Net Assimilation Rate (NAR), Multicolor Crop Growth Rate (CGR) at 60, 80 and 100 days after transplanting (DAT), number of branches and plant height at 80 DAT, NPK uptake at 50 and 80 DAT, yield and yield components.

Results

Foliar treatments with Multicolor Crop applications, ranging from 0.5 to 2.0 ml/liter of water, significantly improved growth parameters and yield of sweet pepper, with greatest improvements at the higher application rates of Multicolor Crop. Plant height significantly increased by 5.25 cm with Multicolor Crop application at 2.0 ml/liter of water (Table 1). Application of Multicolor Crop at 1.5 ml/liter of water significantly reduced the number of days from transplanting to first harvest by approximately nine days and increased the number of branches per plant on average by 0.7 (Table 1). Additionally, the same rate of Multicolor Crop significantly improved leaf area index (LAI) by 0.65, net assimilation rate (NAR) by 0.58 and crop growth rate (CGR) by 21.5 (Table 2) and significantly increased the number of flowers per plant on average by 13, number of fruits per plant by 3, fruit weight by 225 g and total yield of sweet pepper by 15 t/ha. The concentration of N, P and K with Multicolor Crop application at 1.5 ml/liter of water was 0.55%, 0.05% and 0.71% higher in flower + fruit and 3.94%, 0.09% and 0.58% greater in stem + leaf, respectively, at 50 days after transplanting (DAT) (Table 4). At 80 DAT, N, P and K concentration was 1.26%, 0.16% and 3.6% higher in flower + fruit, and 0.36%, 0.21% and 1.79% greater in stem + leaf, respectively, with the same application rate of Multicolor Crop (Table 5).

Table 1. Effect of Multicolor Crop rate on number of days from transplanting to first harvest, plant height at 80 days after transplanting and number of branches per plant of sweet pepper. Indonesia.

Treatment	From transplanting to first harvest	Plant height	Branches
	number of days	cm	number/plant
Control	92.28 b*	23.24 c	2.71 c
Multicolor Crop at 0.5 ml/liter of water at 40 and 60 days after transplanting	92.00 b	25.38 b	2.99 bc
Multicolor Crop at 1.0 ml/liter of water at 40 and 60 days after transplanting	88.46 b	25.46 b	3.08 b
Multicolor Crop at 1.5 ml/liter of water at 40 and 60 days after transplanting	83.48 a	25.75 b	3.42 a
Multicolor Crop at 2.0 ml/liter of water at 40 and 60 days after transplanting	90.74 b	28.49 a	3.05 b

* Means followed by the same letters within a column are not significantly different at $P < 0.05$.

Table 2. Effect of Multicolor Crop rate on Leaf Area Index (LAI) and Net Assimilation Rate (NAR) at 100 days after transplanting (DAT) and Multicolor Crop Growth Rate (CGR) at 80 DAT for sweet pepper. Indonesia.

Treatment	Leaf Area Index (LAI)	Net Assimilation Rate (NAR)	Crop Growth Rate (CGR)
	100 DAT	100 DAT	80 DAT
Control	0.47 c*	0.31 d	24.27 c
Multicolor Crop at 0.5 ml/liter of water at 40 and 60 days after transplanting	0.52 c	0.71 abc	29.39 bc
Multicolor Crop at 1.0 ml/liter of water at 40 and 60 days after transplanting	0.66 b	0.72 ab	39.79 ab
Multicolor Crop at 1.5 ml/liter of water at 40 and 60 days after transplanting	1.12 a	0.89 a	45.75 a
Multicolor Crop at 2.0 ml/liter of water at 40 and 60 days after transplanting	0.49 c	0.48 bcd	26.98 c

* Means followed by the same letters within a column are not significantly different at $P < 0.05$.

Table 3. Effect of Multicolor Crop rate on number of flowers and fruits per plant, fruit weight and total yield of sweet pepper. Indonesia.

Treatment	Flowers	Fruits	Fruit weight	Total yield
	number/plant		g	t/ha
Control	19.70 b*	4.68 b	269.55 c	17.97 d
Multicolor Crop at 0.5 ml/liter of water at 40 and 60 days after transplanting	22.80 b	5.10 b	346.28 b	23.09 c
Multicolor Crop at 1.0 ml/liter of water at 40 and 60 days after transplanting	22.52 b	6.42 ab	444.39 a	29.63 ab
Multicolor Crop at 1.5 ml/liter of water at 40 and 60 days after transplanting	33.14 a	7.90 a	494.52 a	32.97 a
Multicolor Crop at 2.0 ml/liter of water at 40 and 60 days after transplanting	20.00 b	4.64 b	289.76 bc	19.32 cd

* Means followed by the same letters within a column are not significantly different at $P < 0.05$.

Table 4. Effect of Multicolor Crop rate on N, P and K uptake inflower + fruit and stem + leaf of sweet pepper at 50 days after transplanting (DAT). Indonesia.

Treatment	Flower + Fruit			Stem + Leaf		
	N	P	K	N	P	K
	% uptake at 50 DAT					
Control	3.40 d*	0.18 b	4.36 c	0.34 c	0.34 c	3.71 c
Multicolor Crop at 0.5 ml/liter of water at 40 and 60 days after transplanting	3.86 b	0.22 a	4.58 b	3.36 c	0.38 bc	3.90 b
Multicolor Crop at 1.0 ml/liter of water at 40 and 60 days after transplanting	3.91 ab	0.22 a	4.81 b	3.53 b	0.40 b	4.26 a
Multicolor Crop at 1.5 ml/liter of water at 40 and 60 days after transplanting	3.95 a	0.23 a	5.07 a	4.28 a	0.43 a	4.29 a
Multicolor Crop at 2.0 ml/liter of water at 40 and 60 days after transplanting	3.78 c	0.19 b	4.36 c	3.49 b	0.39 b	3.87 b

* Means followed by the same letters within a column are not significantly different at $P < 0.05$.

Table 5. Effect of Multicolor Crop rate on N, P and K uptake in flower + fruit and stem + leaf of sweet pepper at 80 days after transplanting (DAT). Indonesia.

Treatment	Flower + Fruit			Stem + Leaf		
	N	P	K	N	P	K
	% uptake at 80 DAT					
Control	3.57 e*	0.14 e	3.83 e	2.83 d	0.26 c	4.32 d
Multicolor Crop at 0.5 ml/liter of water at 40 and 60 days after transplanting	4.12 c	0.21 bc	6.11 d	3.02 c	0.34 b	4.95 b
Multicolor Crop at 1.0 ml/liter of water at 40 and 60 days after transplanting	4.33 b	0.23 b	7.10 b	3.11 b	0.46 a	5.02 b
Multicolor Crop at 1.5 ml/liter of water at 40 and 60 days after transplanting	4.83 a	0.30 a	7.43 a	3.19 a	0.47 a	6.11 a
Multicolor Crop at 2.0 ml/liter of water at 40 and 60 days after transplanting	3.91 d	0.21 b	6.44 c	2.65 e	0.31 b	4.46 c

* Means followed by the same letters within a column are not significantly different at $P < 0.05$.

Conclusions

Comparing different Multicolor Crop application rates, ranging from 0.5 to 2.0 ml/l of water, generally higher rates significantly improved the growth parameters and yield of sweet pepper compared to the untreated control. Plant height significantly improved by 22.6% with Multicolor Crop application at 2.0 ml/liter of water. Application of Multicolor Crop at 1.5 ml/liter of water significantly reduced the time from transplanting to harvest by 9.5% and significantly increased the number of branches per plant by 26.2%, leaf area index by 138.3%, net assimilation rate (NAR) by 187.1% and Multicolor Crop growth rate by 88.5%. Also, the same rate of Multicolor Crop significantly improved the number of flowers per plant by 68.2%, number of fruits per plant by 68.8%, fruit weight and total yield by 83.5%. The concentration of N, P and K with Multicolor Crop application at 1.5 ml/liter of water was significantly improved by 16.2%, 27.8% and 16.3% in flower + fruit and 1,158.8%, 26.5% and 15.6% in stem + leaf, respectively, at 50 days after transplanting. At 80 days after transplanting, N, P and K concentration was significantly higher by 35.3%, 114.3% and 94.0% in flower + fruit, and 12.7%, 80.8% and 41.4% in stem + leaf, respectively, with the same application rate of Multicolor Crop.