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Short Communication

Effect of integrated weed management in cucumber

H Usha Nandhini Devi * and L Pugalendhi

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Cucumber (*Cucumis sativus* L.) is one of the popular vegetable crops of the cucurbitaceae family owing to its uses as a vegetable crop and for its medicinal uses. (Keerthika et al.2016). It is mainly grown for its tender fruits which are used as a salad and for pickling. Fruits act as a coolant and are used in treating jaundice, indigestion and constipation (Mohan et al. 2016). Cucumber faces several production constraints of which competition from weed population for soil, space, water, light and nutrients forces the plant to produce lesser yield. (Osundare et al. 2019) The removal of weed either manually or chemically adds to the cost of cultivation. Manual weeding has been found to be very effective in controlling weed population in cucumber, however, it is very tedious and costlier because of more manpower requirement (Rao and Nagamani 2010). In the early phase of the crop growth the weeds emerge and compete with the crop in the first four weeks, resulting in drastic yield reduction. Most of the herbicides recommended are pre emergence or pre-transplant applications for effective weed management because of very limited tolerance to most herbicides. Polyethylene mulch has also been shown to increase cucurbit yield and earliness. Mulches inhibit the germination and growth of most broadleaf and grassy weeds. The main objectives of mulching are weed control, conservation of soil moisture and modification of soil temperature (Olsen and Gounder 2001). Locally available materials in the farm such as paddy straw, paddy husk, saw dust, dried leaves can also be employed to suppress weed population, control soil moisture and to increase cucumber yield. (Shrestha et al. 2008). Weeds have been a great problem to agricultural production and attempt to combat weeds interaction with desired crop have been efforts towards improving production and ensuring sustainable agriculture. Broad leaved, sedges and grasses have been identified as serious problem to the yield and full expression of traits *Cucumis sativum* (Hector et al. 2016). Weeds reduce the yield of vegetables by competing with crops for water, nutrients and light (Adams et al. 1992, Lichtenstein et al. 1962, Bartha et al. 1967, Gigliotti and Allievi 2001) reiterated that most soils under vegetable cultivation are contaminated with pesticides. Gafar et al. (2010) also confirmed that pesticide residues have been found in vegetables. Many of these chemicals were abnormally used to control weeds and pests on crops, making it unsafe for human. Weeds are managed in three different ways; avoidance, control and eradication. Keeping this in view, the present study was undertaken to assess the feasibility of different combinations of treatments to suppress the weed population in cucumber.

The trial was conducted at the Department of Vegetable Science, Horticultural College and Research Institute, Coimbatore during 2019-2020. The experiment consisted of eleven treatments replicated thrice and laid in a Randomized Block Design. The following were the treatment combinations used to study the weed population: T_1 - Pre emergence application of Pendimethalin @0.75ai/ha; T_2 - Pre emergence application of Pendimethalin @0.75ai/ha + one hand weeding 45 DAS; T_3 - Post emergence application of Quizalofop @ 40g/ha @25DAS; T_4 - Post emergence application of Quizalofop @ 40g/ha @25DAS+ one hand weeding 45 DAS; T_5 - Pre emergence application of Pendimethalin @0.75ai/ha + Post emergence application of Quizalofop @ 40g/ha @ 25DAS; T_6 - Pre emergence application of Pendimethalin

Department of Vegetable Science, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore -641003
*Corresponding author, E mail: drushajana@rediffmail.com

@0.75ai/ha + Post emergence application of Quizalofop @ 40g/ha @ 25DAS+ one hand weeding 45 DAS; T_7- Mulching with black polyethylene; T_8 - Organic mulch; T_9 - Hand weeding 25 and 45 DAS; T_{10} - Weed free check; and T_{11} - Weedy check. The observations were recorded on weed growth parameters *viz*., number of weeds (grassy, broad leaf/sedges/m^2), percentage of 2-3 dominant weeds, weed intensity, weed biomass (fresh)(g/m2) and weed dry matter (g/m^2). The mean value of observations recorded on different weed parameters was subjected to statistical analysis. The analysis of variance for weed parameters was done by the method suggested by Panse and Sukhatme (1967).

The observations recorded on number of weeds (grassy, broad leaf/sedges/m^2), percentage of 2-3 dominant weeds, weed intensity, weed biomass (fresh)(g/m^2) and weed dry matter (g/m^2) are presented in Table 1.

Table 1: Observations on weeds species in cucumber

Treatments	No. of weeds (grassy, broad leaf & sedges/m^2)	Percentage of 2-3 dominant weeds	Weed biomass (fresh) (g/m^2)	Dry matter (g/m^2)
T_1 (Pre emergence application of Pendimethalin @ 0.75ai/ha)	82.0	33.0	296.2	55.5
T_2 (Pre emergence application of Pendimethalin @0.75ai/ha + one hand weeding 45 DAS)	78.3	65.3	268.9	92.5
T_3 (Post-em application of Quizalofop @ 40g/ha @ 25DAS)	77.0	63.0	252.2	95.7
T_4 (Post emergence application of Quizalofop @ 40g/ha @ 25DAS+ one hand weeding 45 DAS)	44.0	28.3	141.8	54.6
T_5 (Pre emergence application of Pendimethalin @ 0.75ai/ha + Post-em application of Quizalofop @ 40g/ha @ 25DAS)	105.6	68.6	272.0	125.9
T_6 (Pre emergence application of Pendimethalin @ 0.75ai/ha + Post emergence application of Quizalofop @ 40g/ha @ 25 DAS+ one hand weeding 45 DAS)	163.3	78.6	400.2	149.1
T_7 (Mulching with black polyethylene)	66.6	29.0	230.4	88.5
T_8(Organic mulch)	131.3	56.3	407.3	145.2
T_9 (Hand weeding 25 and 45 DAS)	158.3	75.6	407.3	152.3
T_{10} (Weed free check)	71.33	53.3	162.1	99.2
T_{11} (Weedy check)	193.0	108.3	510.0	174.5
CD (0.05)	42.8	26.2	31.5	48.3
CV%	47.4	44.1	36.5	40.6

Number of weeds/m^2: Among the treatments, the number of weeds/ m^2 was the highest (193.0) in T_{11} (Weedy check) whereas the lowest (44.0) was observed in T_4 (Post emergence application of Quizalofop @ 40g/ha @ 25DAS+ one hand weeding (45 DAS). The higher number of weeds in the weedy check plots may be attributed to the availability of water, space and nutrients to the weeds for free and aggressive growth in the early phase of crop growth whereas the weed growth was curtailed in the herbicide applied plots. The results are in accordance with Bobby et al. 2017 who recorded lowest weed density in black polyethylene mulch treatments and the weed population was the highest in unweeded control plots. Similarly Ngouajio et al. (2008) reported complete elimination of weeds when black polyethylene mulches were used as one of the treatments. Likewise Schonbeck (1999) observed that black polythene mulching favoured suppression of weed growth.

Percentage of 2-3 dominant weeds: The percentage of 2-3 dominant weeds was the highest (108.3) in T_{11} (Weedy check) while it was the least (28.3) in T_4 (Post emergence application of Quizalofop @ 40g/ha @25DAS+ one hand weeding 45 DAS). In a study conducted by Nandhini et al (2021) to find the smothering effect of sweet potato on the weed population in coconut garden, it was found that the percentage of dominant weeds was higher in control plot confirming that sweet potato when grown as cover crop smothered the weed population.

Weed biomass (fresh): The weed biomass (fresh) was the highest (510.0 g/m^2) in T_{11} (Weedy check) whereas it was the lowest (141.8) in T_4 (Post emergence application of Quizalofop @ 40g/ha @25DAS+ one hand weeding 45 DAS). This might be due to the suppression of photosynthetic activity

of weeds in the weedicide treated plot resulting in the reduction of the weed population. Nandhini et al (2021) revealed that the lowest weed biomass was observed when sweet potato was grown as cover crop in coconut garden.

Weed dry matter: The dry matter was the highest (174.5 g/m^2) in T_{11} (Weedy check) while it was the lowest (54.6) in T_4 (Post emergence application of Quizalofop @ 40g/ha @25DAS+ one hand weeding 45 DAS).This is attributed to the fact that the suppression of weed population due to herbicide treatment would have resulted in lesser dry matter content in treated plot compared to the control.

From the experiment it can be concluded that Post emergence application of Quizalofop @ 40g/ha @25DAS along with one hand weeding 45 DAS has been beneficial in improving the seed growth parameters such as germination percentage, speed of germination, vigour index I and vigour index II than the other treatments experimented in the study. Hence, it can be suggested that Post emergence application of Quizalofop @ 40g/ha @25DAS along with one hand weeding 45 DAS is effective in controlling the weed population in cucumber.

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