Madras Agric. J., 99 (7-9): 511-513, September 2012
https://doi.org/10.29321/MAJ.10.100127

Short Note

Relative Composition of Weeds and Integrated Weed Management in Mulberry Garden

R. Shanmugam[1*], R. Krishnan[2], C. Chinnuswamy[3] and M. Muthuswami[4]

[*1]Department of Sericulture,
[2]Department of Remote Sensing and GIS, [3]Department of Agronomy,
[4]Department of Agricultural Entomology,
Tamil Nadu Agricultural University, Coimbatore - 641 003

Crop-weed competition is a limiting factor in the growth of mulberry plant and weed management practices had marked influence on weed density and weed dry matter production. Based on the weed survey in the farmers field and investigations compared to chemical weeding intercropping with cowpea had an increased weed control effect in mulberry plantations. The lowest density and dry matter of weeds were recorded in cowpea intercropping treatment. Reduced density and dry matter production of weeds resulted in increased production of mulberry growth and yield.

Key words: Glyphosate, Paraquat, Mulberry, Weed management, *Cynodon dactylon*, Cowpea

Mulberry (*Morus alba*) cultivation plays a vital role in determining overall productivity of silk. About 60 per cent of total cost of cocoon production goes to mulberry leaf production alone. The weeds compet with mulberry for space, nutrients, light and soil moisture. A survey of the mulberry gardens of the Central Sericultural Research and Training Institute at Mysore showed the occurrence of 130 weeds belonging to 36 families. *Cynodon dactylon* and *Cyperus rotundus* were among the most trouble some perennial weeds infesting mulberry fields and both of them together accounted for 79 % of the total weed population (Kasiviswanathan *et al.,* 1978). Crop-weed competition is a limiting factor in the growth of mulberry plant and the crop loss is to the tune of 31.6 per cent. The extent of yield reduction largely depends on growth behaviour of individual weed species. Keeping the above fact in view, weed survey in the farmers field and investigations were carried out to assess the relative composition of weeds as affected by different management methods and its effect on mulberry. Hence, the present study was taken up to assess the relative intensity of *Cynodon dactylon* and other weeds in the farmers' field and to develop an effective management package.

Materials and Methods

Weed survey was conducted for a period of one year (January 2005 to December 2005) in the farmers' field at eleven mulberry farms (Annur and surroundings (Coimbatore Dt.), Othaguthirai and surroundings (Erode Dt.) and were identified and grouped into grasses, sedges and broad leaved weeds. Weed density was estimated from replicated samples of one square meter.

*[1]Corresponding author email: sunmuga152@gmail.com

Field experiments were conducted in the Department of Sericulture, Tamil Nadu Agricultural University, Coimbatore, in an established mulberry garden with V1 variety (two years old) in Field No. 68 The mulberry field was divided into 24 plots to accommodate eight treatments in three replications. Single plot size was 40 (8 x 5m) square meter with a spacing of 90 x 90 cm. The experiments were conducted (January 2006 to May 2006) in a Randomized Block Design (RBD) in three replications. The treatments imposed were hand weeding twice (one immediately after pruning and the second on 25th day of pruning), hand weeding and mulching (hand weeding immediately after pruning followed by mulching within a week with coir pith @ 12.5 t/ha), post emergence application of glyphosate 10 ml + 20 g Ammonium sulphate+ 2 ml soap per liter of water, post emergence application of glyphosate 10 ml + 20 g Ammonium sulphate+ 2 ml soap per liter of water and mulching with coir pith @ 12.5 t/ha, post emergence application of paraquat 6 ml + 2 ml of soap per liter of water, post emergence application of paraquat 6 ml + 2 ml of soap per liter of water and mulching with coir pith @ 12.5 t/ha, hand weeding after pruning and intercropping with cowpea and un-weeded check. For the intercrop treatment, cowpea variety CO1 was sown in between mulberry rows at spacing of 30 x 15 cm. Seeds were sown at the rate of 20 kg/ ha. Three rows of intercrop were raised in between two rows of mulberry. Coir pith was applied at 12.5 t/ ha in the inter row spacing after hand weeding and herbicide application in the respective treatments. Recommended package of practice was followed for the cultivation of mulberry.

The weed density and dry weight were taken at the start of experiment and on 60th day from each

plot randomly at five different places and expressed as number per square meter and gram per square meter. Five mulberry plants were labeled at random in each plot excluding the border rows for recording all growth and yield parameters. Mulberry yield parameters were recorded on 60th day of pruning. The results were subjected to analysis of variance and tested for significant difference (Panse and Sukhatme, 1978).

Results and Discussion

Weed survey

Weed survey revealed that the weed count varied from 6 to 19 per square meter with an average of 13.55. Out of this, the mean density of grasses, sedges and broad leaved weeds was 5.91(43.63%), 1.91(14.10%) and 5.73 (42.29%) respectively (Table 1). Of the total number of weeds,

Table 1. Relative density of weeds in the farmers' field

Mulberry Farm .No	Mulberry Variety	Total weeds (No/m2)	Weeds count (No/m2)			Relative weed density (%)			No. of CD	Relative density of CD
			G	S	B L	G	S	B L		
1.	V1	19	10	3	6	52.6	15.70	31.50	8	42.10
2.	V1, S36	14	7	5	2	50.0	35.70	14.20	7	50.00
3.	V1, S36	16	8	2	6	50..0	12.50	37.5	8	50.00
4.	V1, S36	16	5	3	8	31.50	18.50	50.00	5	31.20
5.	V1, S36	16	5	1	10	31.20	62.50	62.50	5	31.20
6.	V1, S36	14	3	4	7	21.40	28.50	50.00	3	28.50
7.	V1, S36	9	5	1	3	55.50	11.10	33.30	5	55.50
8.	V1, S36,MR2	11	3	2	6	27.20	18.80	54.00	3	27.20
9.	V1, MR2	6	3	-	3	50.00	-	50.00	3	50.00
10.	V1, S36	10	6	-	4	60.00	-	40.00	3	30.00
11.	V1	18	10	-	8	55.50	-	44.40	8	44.40
Mean	13.55	5.91	1.91	5.73	43.63	14.10	42.29	5.27	38.89	

G-grass, **S-** sedge**, BL-** broad leaved weeds, **CD-** *Cynodon dactylon*

population of *Cynodon dactylon* alone was 5.27 which accounted for 38.89 per cent. Earlier, Kasiviswa nathan *et al.* (1978) reported that *Cynodon dactylon* and *Cyperus rotundus* were the most trouble some weeds infesting mulberry garden and accounted for 79 per cent of the total weed density.

Weed flora

In the experimental site, a total of 13 species of weeds were recorded (Table 2). This comprised of three species of grassy weeds, one species of sedges and nine species of broad leaved weeds. Earlier fifty seven species of weeds belonging to 28 families including a Pteridopthyte was reported to occur in mulberry fields (Dhar *et al.*, 1975).

Table 2. Weed flora of the experimental site

Common Name	Scientific Name
Grasses	
Bermuda grass	*Cynodon dactylon*
Javanese wool plant	*Aerva tomentosa*
Crow foot grass	*Chloris barbata*
Sedges	
Nut sedge	*Cyperus rotundus*
Broad leaf weeds	
Carrot grass	*Parthenium hysterophorus*
Slender amaranth	*Amaranthus viridis*
	Euphorbia hirta.
Wild mustard	*Cleome viscose*
Wild jute	*Corchorus capsularis*
Carpet weed	*Mollugo lotoides*
African spider flower	*Gynandropsis pentaphylla*
Tridax	*Tridax procumbens*
	Croton sparsiflorus

Effect of treatments on weed density

Among the weeds, the grassy perennial weed *Cynodon dactylon* was the major weed species survived in all the plots irrespective of the treatments whereas the broad leaf weeds were effectively controlled to a nil density in most of the treatments. On 60th day of pruning the density of *C. dactylon,* the most troublesome to control, was significantly less in plots intercropped with cowpea after one hand weeding. In this treatment, the density of total weeds and *Cynodon dactylon* on 60 DAP was 3.60 and 2.00 per square meter respectively as against a density of 15.40 and 9.00 recorded in unweeded check (Table 3.). Anthony and Rene Van Acker (2005) also reported from their wheat experimental results that intercropping can enhance both weed suppression and crop production. The dry weight of total weeds was the lowest (1.60 g/m2) in the same treatment, hand weeding after pruning and intercropping with cowpea and the dry weight of *Cynodon dactylon* was also reduced to 1.00 g per square meter by this treatment.

Effect of weed density on mulberry

Comparing the different management practices to control the weeds, one hand weeding after pruning and intercropping with cowpea had significantly and positively influenced the biometric parameters like shoot length, number of branches per plant, number of leaves per branch and internodal length and yield

Table 3. Weed density (No./M2) and dry weight on 60 DAP as affected by the treatments.

Treatment	Initial							
	Density	Dry matter (g/m2)	Total Weeds	*Cynodon dactylon*	Other Grasses	Sedges	Broad leaf weeds	Weed drymatter (g/m2)
(T1) Unweeded check	22.60	12.02	15.40	9.00	1.00	3.00	2.40	6.80
	(4.75)	(3.46)	(3.92)	(3.00)	(1.00)	(1.73)	(1.55)	(2.61)
(T2) Hand weeding twice	20.00	10.2	6.00	4.30	1.70	0.00	0.00	3.20
	(4.47)	(3.19)	(2.45)	(2.07)	(1.30)	(0.71)	(0.71)	(1.79)
(T3) Hand weeding and mulching	19.60	9.40	4.60	3.30	0.00	1.30	0.00	2.50
	(4.43)	(3.06)	(2.14)	(1.82)	(0.71)	(1.14)	(0.71)	(1.58)
(T4) Post emergence application of glyphosate @ 10 ml + 20 g ammonium sulphate + 2 ml soap per liter of water	21.30	12.1	7.00	5.00	1.00	1.00	0.00	2.70
	(4.62)	(3.48)	(2.65)	(2.24)	(1.00)	(1.00)	(0.71)	(1.64)
(T5) T4 + mulching with coir pith @12.5t/ha	21.30	11.8	6.60	4.30	1.00	1.30	0.00	3.50
	(4.62)	(3.44)	(2.57)	(2.07)	(1.00)	(1.14)	(0.71)	(1.87)
(T6) Post emergence application of paraquat 6 ml + 2 ml of soap per liter of water	22.00	13.4	7.30	5.60	0.00	0.00	1.70	4.40
	(4.69)	(3.66)	(2.70)	(2.37)	(0.71)	(0.71)	(1.30)	(2.10)
(T7) T6 + mulching with coir pith @12.5t/ha	21.60	12.4	7.30	5.30	0.00	1.00	1.00	3.30
	(4.65)	(3.52)	(2.70)	(2.30)	(0.71)	(1.00)	(1.00)	(1.82)
(T8) Hand weeding after pruning and intercropping with cowpea	19.30	8.00	3.60	2.00	0.00	1.60	0.00	1.60 and
	(4.39)	(2.83)	(1.90)	(1.41)	(0.71)	(1.26)	(0.71)	(1.26)
S. Ed	0.17	0.81	0.11	0.11	0.02	0.02	0.02	0.01
C. D at 5 %	NS	NS	0.23	0.25	0.05	0.05	0.04	0.03

Figures in the parentheses are square root transformed values

parameters like 100 leaf weight and leaf yield. Mulberry leaf yield increase due to intercropping with cowpea was 47 per cent more than unweeded check (Table 4). Lei Gong *et al.* (1994) reported that when intercropping is followed in mulberry plantations, activities related to intercrop planting, managing and harvesting bring in an increased number of operations such as ploughing, weeding and irrigation to the field.

Table 4. Effect of weed density on the biometric parameters of mulberry

Treatment	Shoot length (cm)	No. of branches/ plant	No. of leaves/ branch	Internodal length (cm)	100 leaf weight (g)	Leaf yield (kg/ha/ harvest)
(T1) Unweeded check	87.15	8.40	22.15	3.76	265.27	8791.5
(T2) Hand weeding twice	96.70	9.40	26.00	3.88	409.13	12272.6
(T3) Hand weeding and mulching	97.50	9.50	26.40	3.97	415.22	12322.0
(T4) Post emergence application of glyphosate @ 10 ml + 20 g ammonium sulphate + 2 ml soap per liter of water	91.60	9.30	24.00	3.73	334.64	10573.0
(T5) T4 + mulching with coir pith @12.5t/ha	92.40	9.30	24.69	3.79	372.14	10862.3
(T6) Post emergence application of paraquat 6 ml + 2 ml of soap per liter of water	91.00	9.00	23.10	3.79	301.52	10474.7
(T7) T6 + mulching with coir pith @12.5t/ha	92.34	9.10	24.15	3.78	368.15	10767.7
(T8) Hand weeding after pruning and intercropping with cowpea	99.00	9.50	28.15	3.85	450.35	12935.4
S. Ed	1.68	0.22	0.54	0.14	15.61	49.2
C. D at 5 %	3.71	0.50	1.21	NS	33.15	104.1

References

Anthony Szumigalski and Rene van Acker. 2005. Weed suppression and crop production in annual intercrops. *Weed Sci.,* **53**: 813 - 825.

Dhar K.L., Sitarama Iyengar M.N., Sumbly S.N. 1975. A survey of common weeds in mulberry farms of Kashmir. *Indian J. Seri.,* **14**: 16 - 21.

Kasiviswanathan, K., Chowdhury P.C., Venkataramu, C. V., Verma, R.S. 1978. Screening herbicides for weed control in mulberry field. *Indian J. Seri.,* **17**: 15 - 22.

Lei gong, Yong wang, Tian-shun tu, Jin song xu. 1994. An analysis on economic benefit of intercropping in mulberry field in tongxian, Zhejiang Province, China, *Indian J. Seri.,* **33**: 195 - 197.

Panse, V.G. and Sukhatme P.V. 1978. Statistical Methods for Agricultural Workers. Indian Council of Agricultural Research, New Delhi. 327p.

Received: January 9, 2012; Accepted: March 26, 2012