Int.J.Curr.Microbiol.App.Sci (2019) *8*(3): 1004-1013

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 03 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.803.122

Management of *Mikania micrantha* in Young Robusta Coffee Plantation of Karbi Anglong District of Assam

A.R. Bora[1*], J. Deka[2], I.C. Barua[2] and B. Barman[1]

[1]Regional Coffee Research Station, Coffee Board, Diphu, Assam- 782 460, India
[2]Assam Agricultural University, Jorhat, Assam- 785 013, India

**Corresponding author*

Keywords

Mikania micrantha, Robusta Coffee, Karbi Anglong,

Article Info

Accepted:
10 January 2019
Available Online:
10 February 2019

A B S T R A C T

A field experiment was conducted at the Regional Coffee Research Station, Diphu, Assam during 2016 and 2017 for effective management of *Mikania micrantha* in young robusta coffee plantation. The experiment was laid out in factorial RBD with 3 replications of 9 treatments consisting of 3 gibberellic acid concentrations viz., 0 ppm, 250 ppm and 500 ppm and 3 weed management practices viz., Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha), Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha)+ 2,4-D (0.73kg/ha) and weedy check. During both the years, gibberellic acid 500 ppm recorded significantly higher density and dry weight of *M. micrantha* at 40 days after gibberellic acid application (DAGA) compared to other treatments, but different gibberellic acid treatments were at par in respect of *Micania density and dry weight* at 80, 120 and 160 DAGA as well as growth parameters of young coffee. In herbicide treatments, there was no *M. micrantha* during the entire period of experimentation. Application of Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha) and Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha) resulted significantly higher growth parameters of young coffee as compared to weedy check in both the years but the herbicide treatments were at par. The hormone and herbicide application did not interact significantly in respect of density and dry weight of *M. micrantha* at 80, 120 and 160 DAGA. It was concluded that *M. micrantha* could be managed effectively by application of Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}).

Introduction

Mikania micrantha is a perennial climbing vine and it is listed as one of the world's 32 worst invasive plants (Lowe *et al.*, 2000). It is native to Central and South America (Holm *et al.*, 1977) and widely distributed in the tropics and subtropics (Xie *et al.*, 2010). *M. micrantha* climbs up to the top of the plant canopy and creates a dense cover which damages or kills other plants by blocking light (Holm *et al.*, 1977). Further, it competes for water and soil nutrient and releases substances into soil that inhibit the growth of other plants (Huang et al., 2000, Li and Jin, 2010).

There are more than 100 species of coffee, out of these only two are commercially cultivated viz. *Coffea arabica* L. (*Arabica* type coffee) and *Coffea canephora* Pierre (*Robusta* type coffee). In Karbi Anglong district of Assam, robusta coffee is predominantly cultivated. *M. micrantha* is one of the most problematic weeds in robusta coffee plantations of Karbi Anglong district of Assam as the climatic conditions of the district are favourable for the weed. However, there is no recommended practice for management of *M. micrantha* in young coffee plantations. So, the study was undertaken in order to develop suitable agro-technologies for its management.

Materials and Methods

The study was carried out during 2016 and 2017 at the Regional Coffee Research Station (RCRS), Diphu, Assam located at 25°92'N latitude and 93°44'E longitude and altitude of 170 m above mean sea level.

During both the years, the weekly mean maximum temperature ranged from 20.7° C to 35.3° C whereas weekly mean minimum temperature ranged from 6.2° C to 28.3°. The weekly average relative humidity ranged from 85 to 96 per cent during the morning hours, while in the evening hours it ranged from 47 to 82.9 per cent. The total rainfall received during 2016 was 907.2 mm in 16 rainy days whereas it was 756.2 mm in 21 rainy days during 2017. The soil of the experimental site was sandy loam with pH value of 5.12.

The experiment was laid out in factorial randomised block design with 3 replications of 9 treatments consisting of 3 gibberellic acid concentrations viz., 0 ppm, 250 ppm and 500 ppm and 3 weed management practices viz., Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha) at 5-10cm weed height, Oxyfluorfen (0.29kg/ha) followed by Glyphosate (0.99 kg/ha)+ 2,4-D (0.73kg/ha) at 5-10cm height of weed and weedy check. Gibberellic Acid (GA) was applied on the soil surface after removal of all the weeds from the plot. Oxyfluorfen (0.29kg ha^{-1}) was applied on the soil surface 20 days after GA application after thoroughly cleaning the soil surface. Glyphosate (0.99 kg ha^{-1}) and 2,4-D (0.73kg ha^{-1}) were applied 80 days after Oxyfluorfen application when the weeds attained about 5-10 cm height. Pits of size 45 cm x 45 cm x 45 cm were dug in the month of April, 2016 and exposed for weathering for 15 to 20 days. After that, the pits were filled with the surrounding top soil with the addition of 2 kg FYM and 30 g rock phosphate. Vigorous and disease free *Coffea canephora* selection 3R (CxR) saplings with six pair of leaves were planted in the field in the month of July, 2016.

Agricultural lime @ 2.5 tonne per hectare was applied during the month of November, in the second year of cultivation. The recommended dose of fertilizer @ 38:28:38 gram of N, P_2O_5 and K_2O per sapling in the form of urea (46% N), rock phosphate (20% P_2O_5) and muriate of potash (60% K_2O) was applied in two equal splits in the month of April and September. The coffee saplings were allowed to grow up to 1.2 m height. When the saplings reached the recommended height, the vertically growing main stem was cut 5 cm above the node near the recommended topping height of 1.2 m.

Results and Discussion

M. micrantha density and dry weight in the field

During both the years of experimentation, application of GA 500 ppm recorded significantly higher *M. micrantha* density and dry weight at 40 days after gibberellic acid application (DAGA) compared to GA 250 ppm and no GA application (Table 1 and 4).

At 80, 120 and 160 DAGA, there was no significant difference in *M. micrantha* density and dry weight in different GA concentrations during both the years of experimentation (Table 2 and 5). This might be attributed to elimination of *M. micrantha* from the field due to application of herbicides in the field at 20 and 100 DAGA. In both the years of experimentation, significantly higher *M. micrantha* density and dry weight was recorded in weedy plots at 40, 80, 120 and 160 DAGA.

In herbicide treatments i.e. Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) and Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1}), *M. micrantha* density was nil. This might be due to effective control of *M. micrantha* by the herbicides.

In both the years of experimentation, a significant interaction effect of hormone and herbicide application on density at 40 DAGA (Table 3 and 6) was resulted due to GA and weed management treatments and the lowest values of *M. micrantha* density were observed with different GA levels combined with herbicide treatments. This could be due to the fact that *M. micrantha* was eliminated by the effect of herbicides and GA was effective only up to 40 DAGA.

Table.1 Density of *M. micrantha* in young coffee at 40 and 80 DAGA as influenced by hormone and herbicide application

Treatments	*M. micrantha* density (No. m^{-2})			
	40 DAGA		80 DAGA	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	1.03 (0.78)	1.06 (0.89)	1.9 (1.89)	1.27 (1.78)
H_2: With GA 250 ppm	1.20 (1.44)	1.20 (1.44)	1.34 (2.11)	1.30 (1.89)
H_3: With GA 500 ppm	1.38 (2.33)	1.34 (2.11)	1.34 (2.11)	1.34 (2.11)
SEM(±)	0.04	0.04	0.05	0.05
CD (P=0.05)	0.13	0.11	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg ha^{-1}) fb Glyphosate (0.99 kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_2: Oxyfluorfen (0.29kg ha^{-1}) fb. Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_3: Weedy	2.20 (4.56)	2.19 (4.44)	2.56 (6.11)	2.50 (5.78)
SEM(±)	0.04	0.04	0.05	
CD (P=0.05)	0.13	0.11	0.14	0.14
Interaction (HxG)	S	S	NS	NS
CV(%)	10.49	9.39	10.42	10.46

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.2 Density of *M. micrantha* in young coffee at 120 and 160 DAGA as influenced by hormone and herbicide application

Treatments	*M. micrantha* density (No. m^{-2})			
	120 DAGA		160 DAGA	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	1.25 (1.67)	1.20 (1.44)	1.12 (1.11)	1.18 (1.33)
H_2: With GA 250 ppm	1.27 (1.78)	1.25 (1.67)	1.15 (1.22)	1.20 (1.44)
H_3: With GA 500 ppm	1.30 (1.89)	1.25 (1.67)	1.15 (1.22)	1.20 (1.44)
SEM(±)	0.07	0.05	0.04	0.04
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg ha^{-1}) fb Glyphosate (0.99 kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_2: Oxyfluorfen (0.29kg ha^{-1}) fb. Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_3: Weedy	2.41 (5.33)	2.29 (4.78)	2.01 (3.56)	2.16 (4.22)
SEM(±)	0.07	0.05	0.04	0.04
CD (P=0.05)	0.15	0.15	0.12	0.13
Interaction (HxG)	NS	NS	NS	NS
CV (%)	11.80	11.82	10.50	11.24

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.3 Density of *M. micrantha* (Nos. m^{-2}) in young coffee at 40 DAGA due to interaction of hormone and herbicide application in 2016 and 2017

Hormone application	Herbicide application					
	G_1: Oxyfluorfen fb Glyphosate		G_2: Oxyfluorfen fb Glyphosate + 2,4-D		G_3: Weedy	
	2016	2017	2016	2017	2016	2017
H_1: Without GA	0.71	0.71	0.71	0.71	1.68	1.77
H_2: With GA 250 ppm	0.71	0.71	0.71	0.71	2.19	2.19
H_3: With GA 500 ppm	0.71	0.71	0.71	0.71	2.73	2.61
SEM(±)	0.07	0.07				
CD (P=0.05)	0.22	0.20				
CV(%)	10.49	9.39				

GA – Gibberellic acid, DAGA – Days after gibberellic acid application

Table.4 Dry weight of *M. micrantha* in young coffee at 40 and 80 DAGA as influenced by hormone and herbicide application

Treatments	*M. micrantha* dry weight (g m^{-2})			
	40 DAGA		80 DAGA	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	0.80 (0.15)	0.81 (0.18)	1.09 (0.98)	1.06 (0.90)
H_2: With GA 250 ppm	0.86 (0.30)	0.84 (0.25)	1.11 (1.07)	1.09 (0.97)
H_3: With GA 500 ppm	0.92 (0.44)	0.91 (0.41)	1.11 (1.06)	1.10 (1.02)
SEM(±)	0.02	0.02	0.03	0.04
CD (P=0.05)	0.05	0.05	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg ha^{-1}) fb Glyphosate (0.99 kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_2: Oxyfluorfen (0.29kg ha^{-1}) fb. Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_3: Weedy	1.17 (0.89)	1.15 (0.84)	1.89 (3.10)	1.84 (2.89)
SEM(±)	0.02	0.02	0.03	0.04
CD (P=0.05)	0.05	0.05	0.09	0.11
Interaction (HxG)	S	S	NS	NS
CV (%)	5.29	6.15	7.96	10.48

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.5 Dry weight of *M. micrantha* in young coffee at 120 and 160 DAGA as influenced by hormone and herbicide application

Treatments	*M. micrantha* dry weight (g m^{-2})			
	120 DAGA		160 DAGA	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	1.32 (2.01)	1.27 (1.77)	1.46 (2.79)	1.54 (3.28)
H_2: With GA 250 ppm	1.34 (2.15)	1.31 (2.01)	1.50 (3.04)	1.59 (3.65)
H_3: With GA 500 ppm	1.37 (2.27)	1.32 (2.01)	1.51 (3.11)	1.59 (3.59)
SEM(±)	0.05	0.05	0.07	0.07
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg ha^{-1}) fb Glyphosate (0.99 kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_2: Oxyfluorfen (0.29kg ha^{-1}) fb. Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1})	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)	0.71 (0.00)
G_3: Weedy	2.62 (6.42)	2.50 (5.79)	3.06 (8.95)	3.30 (10.52)
SEM(±)	0.05	0.05	0.07	0.07
CD (P=0.05)	0.16	0.16	0.20	0.22
Interaction (HxG)	NS	NS	NS	NS
CV (%)	12.16	12.19	13.65	13.89

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.6 Dry weight of *M. micrantha* (g m^{-2}) in young coffee at 40 DAGA under interaction of hormone and herbicide application in 2016 and 2017

Hormone application	Herbicide application					
	G_1: Oxyfluorfen fb Glyphosate		G_2: Oxyfluorfen fb Glyphosate + 2,4-D		G_3: Weedy	
	2016	2017	2016	2017	2016	2017
H_1: Without GA	0.71	0.71	0.71	0.71	0.98	1.02
H_2: With GA 250 ppm	0.71	0.71	0.71	0.71	1.18	1.12
H_3: With GA 500 ppm	0.71	0.71	0.71	0.71	1.35	1.31
SEM(±)	0.03	0.04				
CD (P=0.05)	0.08	0.09				
CV(%)	5.29	6.15				

GA – Gibberellic acid, DAGA – Days after gibberellic acid application.

Table.7 Sapling height (cm) of young coffee at different days after planting as influenced by hormone and herbicide application

Treatments	90 DAP		180 DAP	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	22.07	90.84	30.28	96.18
H_2: With GA 250 ppm	27.26	93.22	30.36	98.78
H_3: With GA 500 ppm	27.08	84.34	30.57	99.51
SEM(±)	0.86	5.74	1.03	5.02
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	28.41	99.91	32.39	103.56
G_2: Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	27.96	100.00	31.91	106.70
G_3: Weedy	25.01	67.51	26.90	84.21
SEM(±)	0.86	5.74	1.03	5.02
CD (P=0.05)	2.59	17.20	3.09	15.05
Interaction (HxG)	NS	NS	NS	NS
CV (%)	9.55	19.24	10.16	15.34

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.8 Sapling girth (cm) of young coffee at different days after planting as influenced by hormone and herbicide application

Treatments	90 DAP		180 DAP	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	0.8	4.34	1.21	4.89
H_2: With GA 250 ppm	0.93	4.28	1.18	4.84
H_3: With GA 500 ppm	0.97	4.48	1.21	5.20
SEM(±)	0.06	0.21	0.08	0.31
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	1.08	4.62	1.38	5.57
G_2: Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	1.10	4.98	1.40	5.76
G_3: Weedy	0.70	3.50	0.82	3.61
SEM(±)	0.06	0.21	0.08	0.31
CD (P=0.05)	0.18	0.64	0.23	0.92
Interaction (HxG)	NS	NS	NS	NS
CV (%)	19.26	14.70	19.59	18.51

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.9 Leaf number (Nos.) of young coffee at different days after planting as influenced by hormone and herbicide application

Treatments	90 DAP		180 DAP	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	16.13	53.03	18.30	64.58
H_2: With GA 250 ppm	16.18	50.13	18.93	60.03
H_3: With GA 500 ppm	16.27	56.52	19.06	68.40
SEM(±)	0.82	3.47	0.76	4.03
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	17.19	64.04	20.54	77.91
G_2: Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	17.22	67.72	20.93	80.01
G_3: Weedy	14.27	27.92	14.81	35.09
SEM(±)	0.82	3.47	0.76	4.03
CD (P=0.05)	2.45	10.42	2.29	12.09
Interaction (HxG)	NS	NS	NS	NS
CV (%)	15.14	19.58	12.21	18.81

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.10 Leaf area (cm^2) of young coffee at different days after planting as influenced by hormone and herbicide application

Treatments	90 DAP		180 DAP	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	1206.89	8034.55	1555.69	10235.58
H_2: With GA 250 ppm	1209.63	7595.20	1609.98	9515.28
H_3: With GA 500 ppm	1216.85	8563.12	1634.13	10841.40
SEM(±)	61.28	528.01	65.57	641.21
CD (P=0.05)	NS	NS	NS	NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	1278.27	9702.73	1780.58	12348.91
G_2: Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	1289.38	10259.92	1789.90	12681.76
G_3: Weedy	1065.72	4230.22	1229.32	5561.59
SEM(±)	61.28	528.01	65.57	641.21
CD (P=0.05)	183.27	1578.32	195.99	1916.53
Interaction (HxG)	NS	NS	NS	NS
CV (%)	15.14	19.58	12.26	18.81

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.11 Number of primary branch (Nos.) in young coffee at different days after planting as influenced by hormone and herbicide application

Treatments	90 DAP		180 DAP	
	2016	2017	2016	2017
Hormone application (H)				
H_1: Without GA	0	5.16	0	7.84
H_2: With GA 250 ppm	0	5.09	0	7.62
H_3: With GA 500 ppm	0	5.38	0	7.92
SEM(±)		0.33		0.50
CD (P=0.05)		NS		NS
Herbicide application (G)				
G_1: Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	0	6.33	00	9.20
G_2: Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	0	6.62	00	9.27
G_3: Weedy	0	2.67	00	4.92
SEM(±)		0.33		0.50
CD (P=0.05)		0.97		1.51
Interaction (HxG)		NS		NS
CV (%)		18.72		19.36

GA – Gibberellic acid, DAGA – Days after gibberellic acid application, fb- followed by.
Figures in parenthesis are mean of original values. Data subject to square root transformation.

Table.12 Mortality (%) of young coffee at different years as influenced by hormone and herbicide application

Treatments	2016	2017
H_1 G_1: Without GA; Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	0	0
H_1 G_2: Without GA; Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	0	0
H_1 G_3: Without GA; Weedy	20.00	23.20
H_2 G_1: With GA 250 ppm; Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	0	0
H_2 G_2: With GA 250 ppm; Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	0	0
H_2 G_3: With GA 250 ppm; Weedy	22.00	24.00
H_3 G_1: With GA 500 ppm; Oxyfluorfen (0.29kg/ha) fb Glyphosate (0.99 kg/ha)	0	0
H_3 G_2: With GA 500 ppm; Oxyfluorfen (0.29kg/ha) fb. Glyphosate (0.99 kg/ha) + 2,4-D (0.73kg/ha)	0	0
H_3 G_3: With GA 500 ppm; Weedy	25.00	25.68

GA – Gibberellic acid

Growth of young coffee

The growth parameters like sapling height, sapling girth, leaf number, leaf area and number of primary branches at 90 and 180 days after planting (DAP) were statistically at par among GA treatments in both the years (Table 7, 8, 9,10 and 11). The effect of GA application was visible up to 40 DAGA only, thereafter it disappeared. This might be the reason that no effect of soil applied GA was observed on sapling height, sapling girth, leaf number, leaf area and number of primary branches. Weed management practices recorded significant effect on growth of young coffee saplings at 90 and 180 DAP in both the years. Application of Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) and Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) + 2,4-D (0.73kg ha^{-1}) resulted significantly higher sapling height, sapling girth, leaf number, leaf area and number of primary branches of young coffee than that of control. Both the herbicide application treatments were at par in both the years in regard to growth of young coffee in 2016 and 2017. Effective control of all weeds by the sequential application of herbicides as compared to weedy check might have resulted better growth of young coffee plants.

Mortality

The data on mortality of young coffee is presented in Table 12. In both 2016 and 2017, mortality was observed only in weedy plots whereas no mortality of coffee saplings was recorded in herbicide treatments. In herbicide treated plots, weeds were completely eliminated due to the effect of herbicides. The mortality of coffee saplings in control plots might be due to adverse effect of *M. micrantha*.

In the present investigation, the treatment combinations of without GA and Oxyfluorfen (0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) + 2,4D (0.73kg ha^{-1}) as well as combination of without GA and Oxyfluorfen

(0.29kg ha^{-1}) followed by Glyphosate (0.99 kg ha^{-1}) showed best result in terms of *M. micrantha* control and higher growth parameters of young coffee. Therefore, it could be concluded that effective management of *M. micrantha* can be done by application of Oxyfluorfen (0.29kg ha^{-1}) fb Glyphosate (0.99 kg ha^{-1}).

References

Holm, L.G., Plucknett D.L., Pancho, J.K. and Herberger, J.P. 1977. The world's worst weeds: distribution and biology. University Press of Hawaii, Honolulu. Pp. 609.

Huang, Z.L., Cao, H.L., Liang, X.D., Ye, W.H., Feng, H.L. and Cai, C.X. 2000. The growth and damaging effect of *Mikania micrantha* in different habitats. Journal of Tropical and Subtropical Botany 8: 131-138.

Li, J.M., Jin, Z.X. 2010. Potential allelopathic effects of *Mikania micrantha* on the seed germination and seedling growth of *Coix lacryma-jobi*. Weed Biol Manage 10(3):194-201.

Lowe, S., Browne, M., Boudjelas, S. and Depoorter, M. 2000. 100 of the World's Worst Invasive Alien Species. A selection from the Global Invasive Species Database. IUCN/SSC Invasive species specialist Group (ISSG), Auckland, New Zealand.

Xie, L. J., Zeng, R.S., BI, H. H., Song, Y.Y., Wangi, R. L., Su, Y.J., Chen,M., Chen, S. and Liu, Y.H. 2010. Allelochemical mediated invasion of exotic plants in China. Allelopathy Journal 25 (1): 31-50.

How to cite this article:

Bora, A.R., J. Deka, I.C. Barua and Barman, B. 2019. Management of *Mikania micrantha* in Young Robusta Coffee Plantation of Karbi Anglong District of Assam. *Int.J.Curr.Microbiol.App.Sci.* 8(03): 1004-1013. doi: https://doi.org/10.20546/ijcmas.2019.803.122