



Research Article

Effect of Herbicides on Weed Infestation, Growth and Yield of Kenaf (*Hibiscus cannabinus* L.)

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ABSTRACT

Weed control is important in obtaining optimum kenaf fibre yields. An experiment was conducted during April to September, 2015 at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh to evaluate the effect of two pre- and two post-emergence herbicides on weed control, growth and yield performance of kenaf. Nine treatment combinations involving two pre-emergence herbicides (Panida and Commit), two post-emergence herbicides (Quilop and Pyzero) and hand weeding were taken as treatments; and the treatments were - T₁ = No weeding, T₂ = Hand weeding, T₃ = Panida, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzero, T₈ = Commit + Pyzero, T₉ = Panida + Hand weeding. The experiment was laid out in a randomized complete block design (RCBD) with three replications. The pre-emergence herbicides were applied at 2 days after sowing (DAS) while post-emergence herbicides were applied at 25 DAS at their recommended doses. The hand weeding was done at 25 DAS. The result revealed that the treatment T₆ (Commit + Quilop) showed the best control of weeds as reflected by the lowest weed density and dry matter. Most of the yield contributing characters was found highest at the treatment T₆ (Commit + Quilop). The present study concludes that the best weed control in kenaf could be achieved by applying Commit at 2 DAS followed by Quilop at 25 DAS.

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Introduction

Kenaf is one of the most domesticated annual crops planted in Indian-sub-continent as fibre crop and then distributed throughout the tropical and sub-tropical parts of the world (Karmakar et al., 2008). At present, 0.30 million tons of kenaf fibre is produced over the world of which 47%, 26%, 13%, 6% and 2% are contributed by India, China, Bangladesh, Brazil and Cuba, respectively. In Bangladesh, around 0.4 million hectares of land is now devoted to kenaf cultivation producing 0.08–0.09 million tons per annum with an average yield of 2.0 – 2.5 tons ha⁻¹ (FAO, 2021).

Kenaf can be grown in the marginal lands more profitability with minimum care than jute. Hiron et al. (2006) stated that kenaf can give higher yield even in the marginal, fallow and char lands with same management practices as jute. In marginal land, kenaf

cultivation is profitable than jute because it can be produced at minimal management practices with less labor and lower cost. Kenaf fibre is coarser than jute but has higher tensile strength, lighter in color and has greater resistance to moisture (Ahmad et al., 2020). The prices of jute and kenaf fibres are almost same and as a consequence, kenaf can replace jute in the marginal areas very easily.

Weed is one of the most important natural enemies in the most field crops and also a moderate to heavy yield reductions in kenaf have been reported from weed competition (Aluko et al., 2017). To produce enough biomass of high quality, there is need to identify various treatments and the best economically viable management practices for the control of weeds (Agbaje et al., 2008). Delayed weeding causes significant crop

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losses (Chikoye et al., 2004) especially when economic threshold of weed infestation is exceeded.

In Bangladesh, hand weeding by nirani is the traditional method for weed control in agriculture. This method is very laborious, time consuming and expensive for the crop production. In addition, during the peak period, the availability of labour is become a serious problem. According to the reports cost of weeding alone comes to 32.40% or even more of the total cost of cultivation. In India, estimates for weed control in jute is said to be 300-400 Taka per acre. In this regard, chemical method of weed control could be an alternative for maximum kenaf production (Islam et al., 2008). This practice is now gaining popularity all over the world because of its miraculous results in crop production and less cost involvement compared to traditional method of weeding (Ahmed et al., 2005). A number of research works on chemical weed control in jute have been reported but no work so far on kenaf has been found. Therefore, the present research has been initiated to find out the effective herbicides which control weed effectively and increases yield of kenaf.

Materials and Methods

Experimental duration and site

The experiment was carried out at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh during the period from April to September, 2015. It was located at 24° 75' N latitude and 90° 50' E longitude having an altitude of 18m above the mean sea level belongs to the Sonatola soil series, having calcareous dark grey soil under Agro-ecological Zone of the Old Brahmaputra Floodplain (AEZ-9) (UNDP and FAO, 1988). The land was medium high with silty loam in texture having a soil pH value of 6.5, low in organic matter content and its general fertility level was also low.

Climate

The climate of the locality is sub-tropical nature is characterized by high temperature and heavy rainfall. Rainfall, temperature and humidity of this area are presented in figure 1 (Source: Weather Yard, Department of Irrigation and Water Management, Bangladesh Agricultural University, Mymensingh). The average monthly temperature ranged from 24.6°C (March) to 29.3°C (September). The average monthly humidity was the lowest in March (74.5%) and the highest in August (87.7%) and the highest monthly average rainfall was 484.1 mm (June).

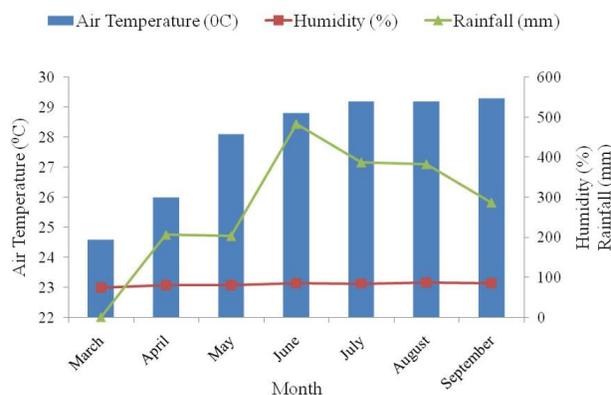


Figure 1. Monthly temperature, relative humidity, and rainfall of the experimental site during the crop growth period from March to September, 2015

Experimental treatments and design

The experiment consisted of nine treatment combinations comprising two pre-emergence herbicides (Panida and Commit) and two post-emergence herbicides (Quilop and Pyzero) along with hand weeding treatments. The treatments were - No weeding (T₁), Hand weeding at 25 DAS (T₂), Panida at 2 DAS (T₃), Commit at 2 DAS (T₄), Panida at 2 DAS + Quilop at 25 DAS (T₅), Commit at 2 DAS + Quilop at 25 DAS (T₆), Panida at 2 DAS + Pyzero at 25 DAS (T₇), Commit at 2 DAS + Pyzero at 25 DAS (T₈), and Panida at 2 DAS + Hand weeding at 25 DAS (T₉). The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. The total number of unit plots was 27 and the size of each plot was 10 m² (4 m × 2.5 m).

Crop husbandry

The land was thoroughly prepared by ploughing and cross ploughing with a tractor drawn disc plough followed by laddering. Kenaf was fertilized with urea-TSP-MP-gypsum@ 70-30-30-15 kg ha⁻¹ respectively considered as the recommended rate of fertilizer (FRG, 2012). The entire amount of TSP, MP, gypsum, and one-third of urea were applied at the time of final land preparation and the two-third of urea was top dressed in two installments at 30 and 45 days after sowing (DAS). Kenaf (variety HC-95) was used as the test crop. The seed rate for kenaf was@ 25 kg ha⁻¹. Seeds were sown on 16 April, 2015 in line maintaining a line to line distance of 25 cm. The sowing depth was maintained at about 3-4 cm from the soil surface. After sowing, the seeds were covered with soil by hand. The crop was thinned out two times by uprooting kenaf seedling @ 15 and 30 DAS in order to keep the population same in all the plots. Due to frequent rainfall during the crop growth period, no irrigation was given. But drainage

was needed at the time of heavy rainfall. During early stage of crop growth, weeding was done as per treatment combinations. Weeding operation was followed by top dressing as urea fertilizer. No major insect pest and disease infestations were observed in the experimental crops.

Data collection

Crop was harvested at maturity on 15 September and before harvesting five plants were selected and cut the ground level randomly from each plot to study the yield contributing characters of kenaf. Plants from central (2.0 m × 1.5 m area) were cut with sickle at ground level and tied in small bundles and heaped for one week for shedding of leaves. After shedding of leaves, the kenaf bundles were placed plot-wise in pond water for retting. The retting process was completed by 21 days of placement in pond water. After proper retting the fibers were extracted by stripping and washing thoroughly in water. Then the extracted fibres and kenaf sticks were dried in the sun on bamboo bar. After drying the fibres and dried sticks were weighted to record the yield. Data on weed population were collected from each plot at 45 DAS of the kenaf plants by using 0.25 m × 0.25 m quadrat. After counting the weed density, the weeds inside each quadrat were uprooted, cleaned, separated species-wise. The collected weeds were dried and the dry weight of

weeds was taken by an electrical balance and expressed in g m⁻².

Data analysis

The recorded data were compiled and tabulated in proper form and subjected to statistical analysis. Analysis of variance was done following Randomized Complete Block Design (RCBD) with the help of computer package program MASTAT-C and mean differences were adjudged by Duncan's Multiple Range Test (Gomez and Gomez, 1984).

Results

Infested weed species in the experimental site

Twenty-five weed species were found in the field belonging to thirteen families of which seventeen were annuals and eight were perennial. Their local name, scientific name, family, morphological type, life cycle of the weeds has been presented in Table 1. The most important weed species throughout the growing season were *Echinochloa crusgalli*, *Echinochloa colonum*, *Paspalum scrobiculatum*, *Marsilea quadrifolia*, *Fimbristylis miliacea*, *Ludwigia hyssopifolia*, *Digitaria sanguinalis*, *Cyperus difformis*, *Wahlenbergia marginata*, *Cyperus rotundus*, *Eragrotis gangetica*, *Fimbristylis dipphylla*, *Cynodon dactylon* and *Eclipta alba* having higher degree of infestation.

Table 1. Weed species infesting the kenaf field

Sl. No.	Local name	Scientific name	Family	Morphological type	Life cycle
1	Choto shama	<i>Echinochloa colonum</i>	Gramineae	Grass	Annual
2	Boro shama	<i>Echinochloa crusgalli</i>	Gramineae	Grass	Annual
3	Angta	<i>paspalum scrobiculatum</i>	Gramineae	Grass	Perennial
4	Joina	<i>Fimbristylis miliacea</i>	Cyperaceae	Sedge	perennial
5	Sushni shak	<i>Marsilea quadrifolia</i>	Marsileaceae	Broad leaf	Annual
6	Panilong	<i>Ludwigia hyssopifolia</i>	Onagraceae	Broad leaf	Annual
7	Angulee ghash	<i>Digitaria sanguinalis</i>	Gramineae	Grass	Perennial
8	Subuj nakful	<i>Cyperus defformis</i>	Cyperaceae	Sedge	Perennial
9	Halud nakful	<i>wahlenbergia marginata</i>	Campanulaceae	Sedge	Annual
10	Mutha	<i>Cyperus rotundus</i>	Cyperaceae	Grass	Perennial
11	Chira ghash	<i>Eragrotis gangetica</i> ,	Gramineae	Grass	Annual
12	Durba	<i>Cynodon dactylon</i>	Gramineae	Herd	Perennial
13	Matichech	<i>Fimbristylis dipphylla</i>	Cyperaceae	Sedge	Annual
14	Lazzabati	<i>Mimosa invisa</i>	Leguminosae	Sedge	Perennial
15	Ghagra	<i>Xanthium italica</i> ,	Compositae	Herd	Annual
16	Kanainala	<i>Cyanitos axillaris</i>	Commelinaceae	Grass	Annual
17	Chapra	<i>Eleusine indica</i>	Gramineae	Grass	Annual
18	Latka	<i>Lupia germinata</i>	Verbanaceae	Grass	Annual
19	Kanaibashi	<i>Commelia benglensis</i>	Commelinaceae	Grass	Annual
20	Hazardana	<i>Phyllanthus niruri</i>	Euphobiaceae	Grass	Annual
21	Fulka	<i>Lepochloa chinensis</i>	Gramineae	Grass	Annual
22	Khetpapri	<i>Hedyotis corymbosa</i>	Scrophulariaceae	Herb	Annual
23	Fushka begun	<i>polygonum coccineum</i>	solanaceae	Grass	Annual
24	Gaicha	<i>Polygomum orientale</i>	Gramineae	Grass	Annual
25	Bish katali	<i>Paspalum commersoni</i>	Polygonaceae	Herb	Annual

Effect of different weed control methods on weed growth

Treatments had significant impact on weed population and dry matter weight at 45 DAS (Table 2). The highest number of weed (86.00 m⁻²) was found in no weeding plot and the lowest weed population (15.33 m⁻²) was observed in T₆(Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @

650 mL ha⁻¹ at 25 DAS) treatment. In no weeding plots, the highest dry weight of weed (38.96 g m⁻²) was recorded and the lowest dry weight of weed (5.85 g m⁻²) was observed in T₆ (Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS) treated plots at 45 DAS.

Table 2. Effect of herbicide treatment on weed density, weed dry matter and crop dry matter at 45 DAS

Treatment	Weed density (m ⁻²)	Crop dry matter (g m ⁻²)	Weed dry matter (g m ⁻²)
T ₁	86.00a	92.55e	38.96a
T ₂	32.00e	105.5cde	12.45d
T ₃	56.00c	119.1abc	24.27b
T ₄	65.00b	100.8de	22.56b
T ₅	49.33d	113.2bcd	16.30c
T ₆	15.33f	133.1a	5.85e
T ₇	48.00d	124.0ab	18.19c
T ₈	55.00c	109.2bcd	12.44d
T ₉	58.00c	122.2ab	9.563d
LSD _{0.05}	4.52	13.85	2.86
S	1.51	4.62	0.956
Level of significance	**	**	**
CV (%)	5.06	7.06	9.29

In a column figures having common letter(s) do not differ significantly whereas figures with dissimilar letter differ significantly as per DMRT.

** = Significant at 1% level of probability, CV = Co-efficient of variation

Here, T₁ =No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

Effect of different weed control methods on kenaf

Kenaf plant significantly affected by the herbicide treatments. The highest dry weight of crop (133.1 g m⁻²) was found by the treatment T₆(Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS) which was statistically similar (122.2 g m⁻²) with the treatment T₉ (Panida @ 1 L ha⁻¹ at 2 DAS + Hand weeding at 25 DAS). The lowest dry weight of crop (92.55 g m⁻²) was observed in no weeding treatments (Table 2).

Significant variation was observed in plant number due to different weed control treatments at different days after sowing (Figure 2). At 3 days after sowing (DAS), the highest plant density (32.00 m⁻²) was found in (T₆) Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS treated plot and the lowest plant number (25.00 m⁻²) was observed in Commit + Pyzera treatment (T₈). The maximum plant density (25.00 m⁻²) at 45 DAS, was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS (T₆) and the minimum plant density (19.00 m⁻²) was obtained from no weeding treated plot (T₁). At the harvested time, the highest plant density (21.00 m⁻²) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS (T₆) and the lowest plant density (16.00 m⁻²) observed in no weeding treated plot.

The tallest plant (4.793 m) was found by the Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS (T₆) and the shortest plant (3.873 m) was observed in no weeding treatment (Table 3). Plant and stick diameter

(base, middle and top) per plant was found significantly influenced by different weed control methods at 150 DAS (Table 3 and Figure 3). The maximum middle diameter of plant (13.50 mm) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS treated plot and the lowest plant middle diameter (11.27 mm) was found in no weeding method. The highest top diameter of plant (11.27 mm) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS on treated plots and the second highest plant top diameter (11.13 mm) was obtained from Panida @ 1 L ha⁻¹ at 2 DAS. The lowest plant top diameter (9.667 mm) was found in no weeding method. Plant base diameter was found non-significant.

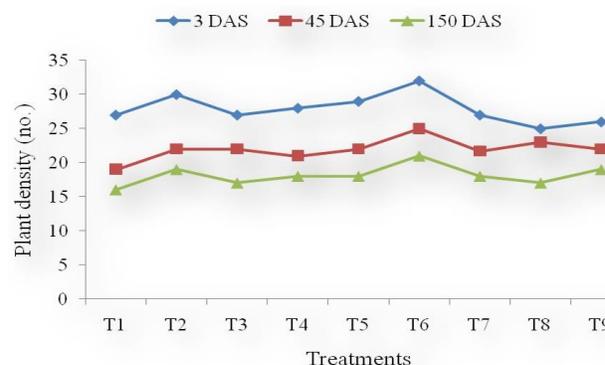


Figure 2. Effect of herbicide treatments on plant population at different days after sowing (DAS). Here, T₁ =No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

The highest base diameter of stick (12.53 mm) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS (T₆) and the lowest plant base diameter (11.40 mm) was observed in no weeding treated plots (Figure 3). The maximum middle diameter of stick (11.00 mm) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS on treated plots and

the lowest stick middle diameter (8.467 mm) was found in no weeding method. The top diameter of stick (8.533 mm) was the highest at T₆ followed by all other treatments except no weeding treated plots. The lowest stick top diameter (6.733 mm) was found in no weeding method.

Table 3. Effect of weed control treatments on plant at base, middle and top of kenaf at 150 days after sowing (DAS)

Treatment	plant height (m)	Plant diameter plant ⁻¹		
		Base (mm)	Middle (mm)	Top (mm)
T ₁	3.873d	14.80	11.27c	9.667c
T ₂	4.577ab	15.10	11.90bc	9.867c
T ₃	4.430abc	15.80	12.97ab	11.13ab
T ₄	4.523ab	15.50	12.13abc	10.40bc
T ₅	4.270bc	15.30	12.50abc	9.80c
T ₆	4.793a	16.47	13.50a	11.27a
T ₇	4.493ab	16.33	13.17ab	10.13c
T ₈	4.040cd	16.03	13.03ab	10.13c
T ₉	4.513ab	16.27	13.33a	10.20c
LSD _{0.05}	0.375	1.16	1.22	0.821
S \bar{x}	0.125	0.388	0.408	0.273
Level of significance	**	NS	**	**
CV (%)	4.93	4.27	5.60	4.61

In a column figures having common letter(s) do not differ significantly whereas figures with dissimilar letter differ significantly as per DMRT.

** = Significant at 1% level of probability, NS = Non-significant, CV = Co-efficient of variation

Here, T₁ = No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

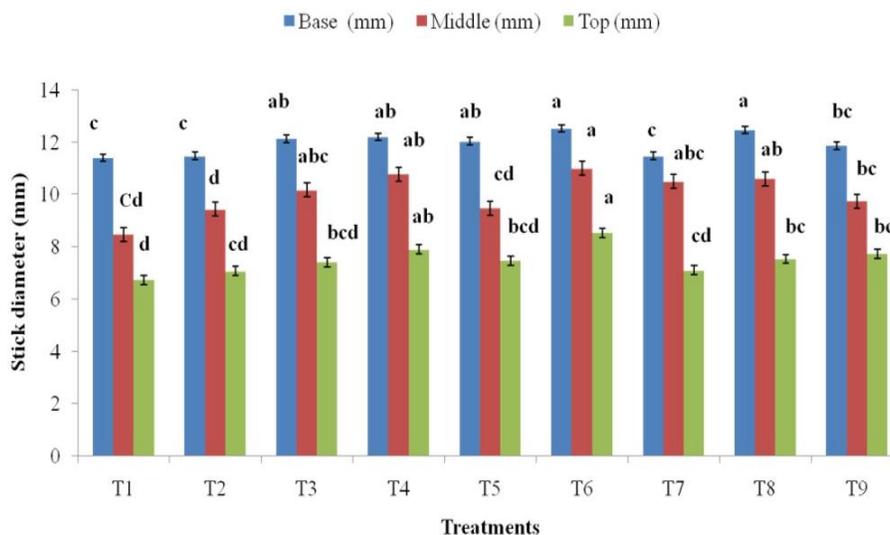


Figure 3. Effect of weed control treatments on stick diameter at base, middle and top of kenaf at 150 days after sowing (DAS). Here, T₁ = No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding

Yield influenced by weed control methods

Fresh plant, stick, and bark weight showed significant difference on different weed control methods which affect the yield of kenaf. The maximum fresh plant weight (0.3260 kg) was found in Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS on treated plots and the minimum fresh plant weight (0.1287 kg) was obtained from control plots (Table 4). The highest fresh

bark weight (0.139 kg plant⁻¹) and fresh stick weight (0.178 kg plant⁻¹) were produced by Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS. The lowest fresh bark weight (0.066 kg plant⁻¹) and fresh stick weight (0.0960 kg plant⁻¹) were observed in no weeding treatment. The maximum dry fibre (0.0253 kg plant⁻¹) and dry stick weight (0.0907 kg plant⁻¹) were produced by the treatment (T₆) Commit @ 1 L ha⁻¹ at 2 DAS +

Quilop @ 650 mL ha⁻¹ at 25 DAS treatments. The lowest dry fibre weight (0.0180 kg plant⁻¹) and dry stick weight (0.052 kg plant⁻¹) was observed in no weeding treatment (Table 4). The maximum fresh bark yield (7.93 t ha⁻¹) was produced by the Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 mL ha⁻¹ at 25 DAS treatment and the second highest fresh bark yield (7.90 t ha⁻¹) was produced by commit @ 1.0 L ha⁻¹ at 2 DAS on treated

plots. The highest fibre yield (3.73 t ha⁻¹) was produced by the Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 ml ha⁻¹ at 25 DAS treatment. The lowest result was in no weeding treatment (Figure 4). Treatment T₆ (Commit @ 1 L ha⁻¹ at 2 DAS + Quilop @ 650 ml ha⁻¹ at 25 DAS) showed the highest fresh stick yield (19.2 t ha⁻¹) and dry stick yield (9.600 t ha⁻¹). The lowest result was recorded from control treatment (Figure 5).

Table 4. Effect of herbicide treatments on bark, stick, fibre and plant weight of kenaf

Treatment	Fresh weight (kg) plant ⁻¹	Fresh weight of stick (kg) plant ⁻¹	Fresh weight of bark (kg) plant ⁻¹	Dry weight of stick (kg) plant ⁻¹	Dry weight of fibre (kg) plant ⁻¹
T ₁	0.1287 c	0.0960c	0.066d	0.052c	0.0180d
T ₂	0.2787ab	0.156ab	0.117b	0.0747ab	0.0246ab
T ₃	0.2720ab	0.148ab	0.107b	0.0793ab	0.0240abc
T ₄	0.2620b	0.147ab	0.109b	0.0747ab	0.0233abc
T ₅	0.2720ab	0.152ab	0.114b	0.0827ab	0.0226bc
T ₆	0.3260a	0.178a	0.139a	0.0907a	0.0253a
T ₇	0.2453b	0.134b	0.103bc	0.0763ab	0.0240abc
T ₈	0.2453b	0.125bc	0.084cd	0.0680bc	0.0220c
T ₉	0.2560b	0.140ab	0.099bc	0.0800ab	0.0226bc
LSD _{0.05}	0.055	0.033	0.0209	0.017	0.0023
$\bar{S}\bar{x}$	0.018	0.011	0.0070	0.0059	0.00077
Level of significance	**	**	**	*	**
CV (%)	14.92	13.71	11.61	13.74	5.79

In a column figures having common letter(s) do not differ significantly whereas figures with dissimilar letter differ significantly as per DMRT.

* = Significant at 5% level of significant, ** = Significant at 1% level of probability

Here, T₁ = No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

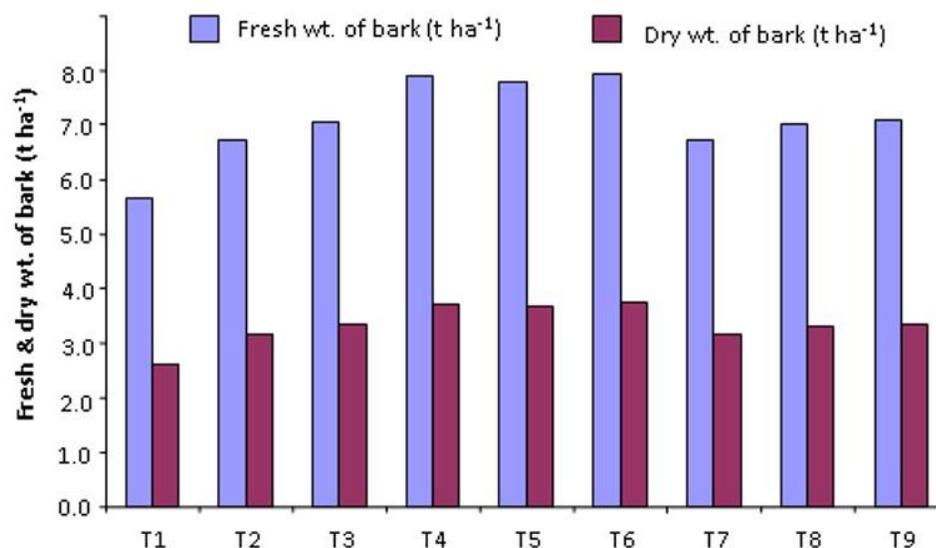


Figure 4. Effect of herbicide treatments on fibre yield of kenaf. Here, T₁ = No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

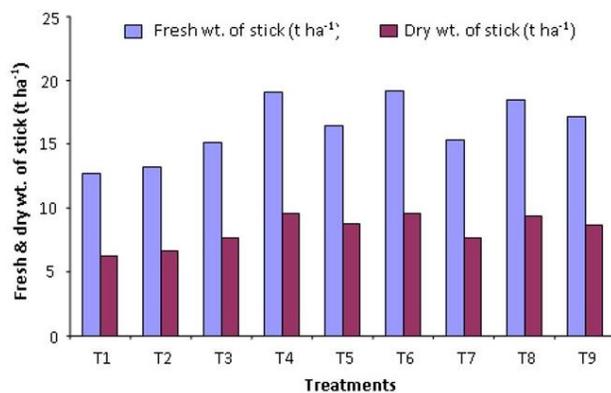


Figure 5. Effect of herbicide treatments on stick yield of kenaf. Here, T₁ = No weeding, T₂ = Hand weeding, T₃ = Pandia, T₄ = Commit, T₅ = Panida + Quilop, T₆ = Commit + Quilop, T₇ = Panida + Pyzera, T₈ = Commit + Pyzera, T₉ = Panida + Hand weeding.

Discussion

Different weed control methods had significant influence on kenaf fibre yield and weed growth in kenaf field. Weed growth in the field might be varied with the effectiveness of different weed control methods. In no weeding method, weed crop competition was higher than other weed control methods and weed suppressed the growth of kenaf which might be reduced the number of plants. This was due to severe competition of weed for moisture, space, light and nutrients between weed and crop throughout the crop season (Alam et al., 2010). As a result, minimum dry weight of plant was observed in no weeding treatment. Similar findings were also reported by (Gogoi and Kalita, 1992). But different herbicides reduced weed population and thereby decreased weed crop competition during entire growth stage. Weed competition was severe in weedy check condition and thus plant height of kenaf was reduced. Similar results also were reported that Borgohain et al. (1990) that plant height was significantly reduced by heavy infestation of weeds. On the other hand, in different weed control methods through the crop growth period competition between weed and kenaf was less therefore plant height was increased. The results are in conformity with those reported by Gupta (1984) and Gogoi and Kalita (1992). Due to severe competition, crop bark and stick weight was the lowest in no weeding treatment which was eventually reduced the fibre and stick yield of kenaf. Similar findings were also reported by Mishra and Nayak (1995). Among the weed management practices, commit @ 1.0 L ha⁻¹ helped to create good growth of kenaf up to 150 DAS. This might be due to effective control of weed growth and germination of weed by commit @ 1.0 L ha⁻¹ from germination to 150 DAS. As a result, weed management is more effective through herbicides than hand weeding method. This finding was similar to that of Ray et al. (1988), Barman (1998) and

Rajput (2000). Ashraf et al. (2006) reported that herbicide performed better than weedy plot in respect of crop yield.

Conclusion

Kenaf growth, fibre yield and weed growth in kenaf field varies with different weed control methods. The results of the present study showed that pre-emergence herbicide Commit @ 1.0 L ha⁻¹ in combination with post emergence Quilop @ 650 mL ha⁻¹ effectively controlled weed infestation. Commit @ 1.0 L ha⁻¹ in combination with Quilop @ 650 mL ha⁻¹ treatment produced the highest yield attributing characters and fibre yield of kenaf. From this result, it may be concluded that weed management is more effective through herbicides than hand weeding and the application of Commit @ 1.0 L ha⁻¹ at 2 DAS and Quilop @ 650 mL ha⁻¹ at 25 DAS could be considered as the best weed control practice for optimum yield of kenaf.

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