

WEED CONTROL VIA INTERCROPPING WITH GLIRICIDIA. I. COTTON CROP¹

Controle de Plantas Daninhas por Meio da Consorciação com Gliricídia. I. Cultura do Algodoeiro

SILVA, P.S.L.², SILVA, J.C.V.³, CARVALHO, L.P.⁴, SILVA, K.M.B.⁵ e FREITAS, F.C.L.⁶

ABSTRACT - The majority of cotton grown commercially in the world has white lint, but recently, there has been a growing interest in colored lint cotton in several countries, including Brazil. The use of naturally-colored fiber reduces chemical pollution. The objective of this paper was to evaluate cotton cultivar fiber yield in response to weed control via intercropping with gliricídia. Cultivars BRS-Verde (greenish fibers), BRS-Rubi (reddish brown fibers), BRS-Safira (brown fibers), and BRS-187 8H (white fibers) were submitted to the following treatments: no hoeing, two hoeings (at 20 and 40 days after transplanting), and cotton intercropped with gliricídia. In the intercropped treatment, gliricídia was planted between rows of cotton plants, using one seedling pit¹, in pits spaced 50.0 cm apart. Twelve weed species predominated in the experiment, many of them belonging to the Poaceae family. Weeds occurred at different frequencies and in a non-uniform manner in the experimental area. Cultivars did not influence weed dry matter. Intercropping with gliricídia reduced weed dry matter but did not prevent reductions in cotton fiber and seed cotton yield, which were higher in hoed plots. Cultivar BRS Safira had the highest fiber yield, but no differences were observed between cultivars regarding to seed cotton yield.

Keywords: naturally-colored cotton fiber, *Gliricidia sepium*, cultivars.

RESUMO - A grande maioria do algodoeiro cultivado comercialmente no mundo possui fibra branca, porém atualmente existe crescente interesse em diversos países, inclusive no Brasil, pelo algodão de fibra colorida. O uso de fibras naturalmente coloridas reduz a poluição química, por dispensar o uso de corantes. O objetivo deste trabalho foi avaliar o rendimento de fibras de cultivares de algodoeiro em resposta ao controle de plantas daninhas por meio da consorciação com a gliricídia (*Gliricidia sepium*). Os cultivares BRS-Verde (fibras esverdeadas), BRS-Rubi (fibras marrons avermelhadas), BRS-Safira (fibras amarronzadas) e BRS-187 8H (fibras brancas) foram submetidos aos seguintes tratamentos: sem capinas, duas capinas (aos 20 e 40 dias após o transplante) e consorciação do algodoeiro com a gliricídia. Na consorciação, a gliricídia foi plantada entre as fileiras do algodoeiro, usando-se uma plântula por cova, em covas espaçadas por 0,50 m. Doze espécies de plantas daninhas ocorreram no experimento, a maioria delas pertencente à família Poaceae. As plantas daninhas ocorreram com diferentes frequências, distribuídas desuniformemente na área experimental. Os cultivares não influenciaram a matéria seca das plantas daninhas. A consorciação com a gliricídia reduziu a matéria seca das plantas daninhas, mas não evitou reduções nos rendimentos de algodão em fibra e em caroço, que foram maiores nas parcelas que receberam capinas. O cultivar BRS-Safira apresentou o maior rendimento de fibras, porém não houve diferenças entre cultivares quanto ao rendimento de algodão em caroço.

Palavras-chave: algodão de fibra naturalmente colorida, *Gliricidia sepium*, cultivares.

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² Universidade Federal do Semi-Árido – UFERSA, Caixa Postal 137, 59625-900 Mossoró-RN, CNPq fellow, <paulosergio@ufersa.edu.br>; ³ UFERSA, CNPq fellow, <julio-ufersa@hotmail.com>; ⁴ Embrapa-Algodão, Rua Osvaldo Cruz, 1143, Bairro Centenário, 58107-720 Campina Grande-PB, Brazil, <carvalho@cnpa.embrapa.br >; ⁵ Universidade do Estado do Rio Grande do Norte – UERN, Caixa Postal 70, 59610-090 Mossoró RN, <kmsbarbosa@yahoo.com.br>; ⁶ UFERSA, <franciscoaudio@ufersa.edu.br >.



INTRODUCTION

Cotton, the most important natural fiber, is of prime importance for the economy of many countries. It is the world's leading fiber crop with an annual production of 20 million tones and it is grown in more than 20 countries (Dutt et al., 2004). Until the 1980s, cotton was one of the most important crops grown in Brazil. Since then, exploitation of cotton crop has progressively declined in Brazil due to boll weevils, which became the major cotton pest. In recent years, several control methods have allowed the crop to coexist with boll weevils, and growers are beginning to exploit it once again.

Colored cotton is a naturally pigmented fiber. Shades of colored cotton can vary over seasons and geographic location due to climate and soil variations. Colored cotton has been grown and used by man since 2500 BC (Wanghmare & Koranne, 1998). Cultivation of colored cotton was discouraged and almost abandoned in the last half of the 20th century because of its low productivity, poor fiber quality and non-uniformity of colors (Dutt et al., 2004). With the concentrated research efforts over the last 50 years, superior white lint cultivars have been developed. These cultivars cover the majority of the cotton-grown area. Most cotton grown commercially in the world has white lint, but recently there is a growing interest in colored lint cotton in several countries (Dutt et al., 2004, Punitha & Raveendran, 2004), including Brazil (Carvalho et al., 2005).

During the process of bleaching and dyeing of white lint cotton to impart colors, dyeing and textile units regularly use several toxic chemicals including heavy metals. The water from these units is a main source of pollution in drinking water, soil and environment. Many of these chemicals are carcinogenic and may cause allergies, skin rashes and other related health problems to human beings (Dutt et al., 2004). Naturally colored fiber reduces chemical pollution. Therefore, increased attention has been paid to studies of colored cotton and its utilization around the world.

The adoption of intercropping system is usually justified by the better use of environmental resources as compared to

monocropping (Fukai & Trenbath, 1993). In addition, intercropping is also indicated as an alternative to the use of herbicides, by reducing or suppressing weed growth. A reduction in herbicide use is one of the main interests of modern agriculture and several alternatives are being investigated with this objective, including intercropping (Carruthers et al., 1998).

As an alternative to the existing shifting cultivation systems in the tropics, farmers are being encouraged to adopt agro forestry systems in which trees contribute pruning which may be used to mulch the associated crops. *Gliricidia sepium* (Jacq.) Walp, *Leucaena leucocephala* (Lam.) de Wit and *Senna siamea* (Lam.) Irwin & Barneby are trees widely tested for agro forestry technologies (Kamara et al., 2000). However, in addition to soil improvement, mulching material also suppresses weed growth (Budelman, 1988). Weed growth has been shown to be suppressed in alley cropping by canopy closure (Yamoah et al., 1986). Besides physically suppressing the weeds, plant residues decomposition can also release phytotoxic compounds that inhibit crop and weed growth (Tian & Kang, 1994). Plant species differ in their response to phytotoxic plant residues. *G. sepium* mulch had no allelopathic effect on maize or beans but significantly decreased the population of some weed species (Obando, 1987). Mulches from *G. sepium* and *S. siamea* reduced weed density and weed biomass, while *L. leucocephala* was less effective at reducing weed biomass and density (Kamara et al., 2000).

This study investigated a new type of intercropping, i.e., the use of an arboreal legume to control weeds in cotton. No data were found in the literature comparing soil cover and intercropping on weed control in cotton. In rice, though the dry weight of grass weeds at 30 days after seeding was lower with intercropping with *Sesbania rostrata* than with wheat residue mulch, they were similar at later stages. A lower broadleaved weed density and dry weight were observed with *Sesbania* than with mulch. It was concluded that application of wheat residue mulch at 4 t ha⁻¹ and *Sesbania* intercropping for 30 days was equally effective in controlling weeds associated with dry-seeded rice (Singh et al., 2007).



The objective of this paper was to evaluate cotton cultivar fiber yield in response to weed control via intercropping with gliricidia.

MATERIAL AND METHODS

The experiment was carried out at the “Rafael Fernandes” Experimental Farm at the Universidade Federal Rural do Semi-Árido (UFERSA), 20 km from the county seat, in Mossoró-RN (5° latitude, 37° 20' WGr longitude and an altitude of 18 m), Brazil, using sprinkler irrigation. According to Köppen, the region's bioclimate is BSwH.

Cotton and gliricidia were grown in a transplantation system. Seeding was performed in Styrofoam trays with cells (35 mL volume) on 06.14.06. The substrate was prepared with 2/3 of a soil classified as Arenic Hapludult (Red–Yellow Argisol - PVA), and 1/3 vermicompost (humus). Analysis of the soil indicated pH = 7.20; P = 51.97 mg kg⁻¹; K⁺ = 0.20 cmol_c dm⁻³; Ca²⁺ = 4.50 cmol_c dm⁻³; Mg²⁺ = 1.60 cmol_c dm⁻³; Al³⁺ = 0.00 cmol_c dm⁻³; Na⁺ = 0.10 cmol_c dm⁻³. Analysis of a humus sample indicated: pH = 7.90; P = 120.1 mg kg⁻¹; K⁺ = 0.67 cmol_c dm⁻³; Ca²⁺ = 19.50 cmol_c dm⁻³; Mg²⁺ = 15.00 cmol_c dm⁻³; Al³⁺ = 0.00 cmol_c dm⁻³; Na⁺ = 0.19 cmol_c dm⁻³. Both crops were transplanted to the permanent site simultaneously, two to three days after emergence. The analysis of a soil sample from the permanent site, also classified as Arenic Hapludult (PVA), indicated: pH = 6.70; P = 60.70 mg kg⁻¹; K⁺ = 0.21 cmol_c dm⁻³; Ca²⁺ = 4.20 cmol_c dm⁻³; Mg²⁺ = 1.60 cmol_c dm⁻³; Al³⁺ = 0.00 cmol_c dm⁻³; Na⁺ = 0.18 cmol_c dm⁻³. Soil tillage was accomplished with a tractor, by means of two cross harrowings, and received 30 kg N (1/3 of total N applied), 60 kg P₂O₅, and 30 kg K₂O per ha as planting fertilization. The remaining N was applied in equal parts after each hoeing. Ammonium sulfate, single super phosphate, and potassium chloride were applied as sources of N, P₂O₅, and K₂O, respectively.

Pest control was performed with two deltamethrin sprays (250 mL ha⁻¹) at 7 and fifteen days after transplanting, respectively. The experiment was sprinkler-irrigated, with experimental plots arranged perpendicularly in relation to the row of sprinklers. The water

depth required for cotton (5.6 mm) was calculated considering a root-system effective depth of 0.40 m. Irrigation timing was based on water retained by the soil at a tension of 0.40 MPa. A two-day watering schedule was adopted, with three weekly applications. Irrigations were initiated after transplanting and suspended after the first bolls opened.

A randomized block experimental design in split-plot with five replicates was adopted. Each subplot consisted of four rows, each 6.0 m in length. The area occupied by the two central rows was considered as usable area, and one pit at the end of each central row was eliminated. Cultivars BRS-Verde, BRS-Rubi, BRS-Safira, and BRS-187 8H (assigned to the plots) were submitted to the following treatments: no hoeing, two hoeings (at 20 and 40 days after transplanting), and cotton intercropped with gliricidia. The cotton seeds were supplied by EMBRAPA's Centro Nacional de Pesquisa do Algodão (National Center for Cotton Research), including the information provided below for each cultivar; gliricidia seeds were supplied by Assessoria e Serviços a Projetos em Agricultura Alternativa (AS-PTA - Consulting and Services for Alternative Agriculture Projects), a non-governmental organization with a branch in Campina Grande-PB. Cultivar BRS-Verde resulted from a cross between white-fiber cultivar CNPA 7H and the Arkansas Green cultivar, introduced from the USA, and has greenish fibers, with a resistance of 25.9 gf tex⁻¹ and a 2.5% span length of 29.6 mm. Here, gf refers to gram force or gram weight, which is the force necessary to give 1.0 gram an acceleration of 980 cm s⁻², 1.0 tex = 1 mg m⁻¹ (Fonseca & Santana, 2002) and 2.5% span length means that at least 2.5% of total fibers have length exceeding this value (Basra, 1999). Cultivar BRS Rubi resulted from a cross between a material introduced from the USA, which had dark brown fiber, and cultivar CNPA 7H, having reddish brown fibers, with a resistance of 24.5 gf tex⁻¹ and a 2.5% span length of 25.4 mm. BRS Safira resulted from a cross between the same material introduced from the USA that gave origin to BRS Rubi, and white-fibered cultivar CNPA 87-33, having brown fibers, with a resistance of 24.2 gf tex⁻¹ and a 2.5% span length of 24.2 mm. White-fibered BRS 187 8H came from line CNPA 86-1190-5, which resulted from a cross



between lines CNPA 77/105 and the American D₃-79. Weeding was performed with a hoe, and the same worker was assigned to do the service in each block. In the intercropped treatment, gliricidia was planted at the same cotton transplantation time, between the cotton plant rows, using one seed pit⁻¹, in pits spaced 50.0 cm apart.

Plant height and first branch height were measured in all plants in the usable area of each subplot, after the last harvest of open bolls. The distance from ground level to the upper end of the plant was considered as plant height. Cotton yield was evaluated by weighing and counting all open bolls harvested from the usable area of each subplot. Fiber and seed cotton yield were estimated from a sample of approximately 500 g. Fiber and seed cotton yield were corrected to 10% moisture content.

Gliricidia dry biomass of the above-ground part and plant height were evaluated in samples consisting of three plants randomly taken from each subplot. In order to estimate dry biomass, plants were placed in a forced air circulation oven adjusted to 75 °C until constant weight was achieved. Plant height was evaluated by measuring the distance from ground level to the upper end of the plant.

Weeds were collected in a 1.0 m × 0.8 m area, in the central part of each subplot, cut even with the ground. Weeds were botanically identified and evaluated for dry biomass of the above-ground part. Based on the botanical identification data, the index of occurrence was calculated as the ratio between the number of subplots where the species occurred and the total number of experimental subplots (60). Dry biomass of the above-ground part of weeds was obtained by a similar procedure as the one used to obtain gliricidia dry biomass.

The data were submitted to analysis of variance using software developed by Universidade Federal de Viçosa (Ribeiro Júnior, 2001), and means were compared by the Tukey test at 5% probability. The percentage data were transformed to arc sin square root percentage before analysis.

RESULTS AND DISCUSSION

Only twelve weed species occurred in the experiment (Table 1), most of them belonging

Table 1 - Weed species found in the experiment for evaluate cotton cultivars fiber yield in response to weed control

Order N ^o	Botanical name	Family	Index of occurrence (%)	Order N ^o	Botanical name	Family	Index of occurrence (%)
1	<i>Alternanthera tenella</i> Colla	Amaranthaceae	56.3	7	<i>Dactyloctenium aegyptium</i> (L.) Beauv	Poaceae	8.3
2	<i>Amaranthus viridis</i> L.	Amaranthaceae	29.2	8	<i>Ipomoea bahiensis</i> Willd. ex Roem. et & Schult	Convolvulaceae	22.9
3	<i>Cenchrus echinatus</i> L.	Poaceae	6.3	9	<i>Merremia aegyptia</i> (L.) Urban	Convolvulaceae	2.1
4	<i>Chloris virgata</i> Sw.	Poaceae	4.2	10	<i>Panicum maximum</i> Jacq.	Poaceae	6.3
5	<i>Commelina benghalensis</i> L.	Commelinaceae	81.3	11	<i>Spermacace verticillata</i> L.	Rubiaceae	10.4
6	<i>Cucumis anguria</i> L.	Cucurbitaceae	45.8	12	<i>Turnera ulmifolia</i> L.	Turneraceae	2.1

to the family Poaceae. Such small number of species could be associated with the intensive cultivation of corn in the area where the experiment was conducted (two cultivations per year, for almost ten years). Usually, weed biomass production, as well as weed density and diversity, are smaller in traditional cultivations (intensive soil tillage and high doses of chemical products), intermediate in reduced tillage systems, and higher in organic systems (Menalled et al., 2001). Weed population in a given area depends on several factors, and although the population comprises different species, few of them are predominant, corresponding from 70 to 90% of the total species (Buhler, 1999). Some species occurred more frequently than others. The species *Commelina benghalensis*, for example, occurred in 85% of the experimental units, while the species *Acanthospermum hispidum*, *Merremia aegyptia*, and *Turnera ulmifolia* occurred at frequencies lower than 2% (Tables 1 and 2).

The species were not uniformly distributed over the experimental field (Table 2). Lack of uniformity occurred among blocks, among plots of the same block, and among subplots of the same plot. Block 1, for example, presented 77% of the species found (Table 1), while block 4 only 46%. In block 2, the plot cultivated with BRS Verde had only 23% of the weed species, whereas twice that percentage was found in plots grown with BRS Safira and BRS Rubi. The number of weed species was frequently higher in non-hoed and intercropped subplots than in hoed plots. It is likely that the treatments had some influence on weed species distribution, but other factors, especially those associated with soil (humidity, fertility, seedbank, etc.) were also involved.

There was no effect of cultivars × weed control interaction on the evaluated characteristics. For this reason, only the means for the main effects of both treatment groups are presented here (Tables 3 and 4).

The cultivars did not influence mean dry matter of the above-ground part of weeds (304.3 g m⁻²) and gliricidia mean plant height (83 cm), but did influence dry matter of the above-ground part of this legume (Table 3). Cultivar BRS Rubi reduced gliricidia plant height the most. Cultivar BRS Rubi also

Table 2 - Weed distribution in the experiment for evaluate cotton cultivars (BRS Rubi, BRS Verde, BRS 187 8H and BRS Safira) fiber yield in response to weed control (hoeing, no hoeing and intercropping with gliricidia) (numbers follow the order shown in Table 1)

Fourth block											
BRS Rubi			BRS Verde			BRS 187 8H			BRS Safira		
Hoeing	No hoeing	Intercropped	No hoeing	Hoeing	Intercropped	No hoeing	Hoeing	Intercropped	No hoeing	Hoeing	Intercropped
1, 2, 5, 11	1, 2, 5, 6	1, 5	1, 2, 6	1, 5	1, 5, 6	1, 5, 6	1, 5, 6	1, 5, 6	1, 5, 6, 8	1, 5, 6, 8	1, 2, 5
Third block											
BRS 187 8H			BRS Verde			BRS Safira			BRS Rubi		
Hoeing	No hoeing	Intercropped	Hoeing	No hoeing	Intercropped	No hoeing	Hoeing	Intercropped	Hoeing	No hoeing	Intercropped
1, 5	2, 5, 6	5	5, 7	1, 2, 6, 11	1, 5, 6	1, 5, 6, 8	1, 5, 6	1, 5, 6	5	1, 2, 3, 5	1, 2, 5, 8
Second block											
BRS 187 8H			BRS Safira			BRS Verde			BRS Rubi		
Intercropped	Hoeing	No hoeing	No hoeing	Hoeing	Intercropped	Hoeing	Intercropped	No hoeing	Hoeing	Intercropped	No hoeing
5, 8	5, 6	1, 5, 6, 8	5, 10	5, 6, 8, 9	1, 5, 6	1, 5	1, 5, 6	1, 5, 6	5	1, 2, 3, 5, 6	2, 3, 7
First block											
BRS Rubi			BRS Safira			BRS 187 8H			BRS Verde		
Intercropped	Hoeing	No hoeing	Intercropped	Hoeing	No hoeing	No hoeing	Hoeing	Intercropped	No hoeing	Hoeing	No hoeing
1, 2, 5	1, 6, 7	1, 5, 6, 8, 11	1, 6, 8, 10	-	6	-	-	2, 4, 5, 10	5, 8, 12	6	6, 13



showed the lowest plant-height (together with cultivar BRS Verde) and first-branch-height values (Table 3). Cultivar BRS 187 8H had the highest fiber and open-boll weights, but cultivar BRS Safira had the highest fiber yield. Although there were no differences between cultivars as to number of open bolls per plant, a higher number of open bolls per plant was seen in cultivar BRS Safira, which showed the highest fiber yield. There were no differences between cultivars with regard to seed cotton yield (Table 3).

Hoeing decreased dry matter of the above-ground part of weeds and first branch height (lower branch) in cotton (Table 4). Reduction in growth of the above-ground part of weeds is obvious when hoeing is adopted, but there is no plausible explanation for the reduction in first branch height in cotton. Maybe the competition with weeds at the initial stages of cotton growth determines some plant etiolating in the crop, resulting in greater distance between the ground level and the insertion point of the first branch. This initial period of cotton growth contrasts with the high growth rates of weeds (Freitas et al., 2002). On the other hand, weed control by hoeing determined greater plant height, fiber yield, seed cotton yield, and number of open bolls per plant, but did not influence fiber weight open-boll⁻¹ or open-boll weight.

The coefficient value of experimental variation for weed dry matter data was relatively high (Tables 3 and 4). The lack of uniformity in weed distribution among plots of the same block may have contributed to this high coefficient, but other factors might have been involved, including the sample size taken

for dry matter weed evaluation (LeClerc et al., 1966).

Crop yield reduction due to weed presence is attributed to competition for water, nutrients, and light (Carruthers et al., 1998). In the present work, since the crop was irrigated, competition for water might have been negligible. On the other hand, the removal of nutrients by weeds may have had an impact on the availability of nutrients for the crop. For example, in maize, N absorption by weeds varied from 32.4 kg ha⁻¹ to 52.3 kg ha⁻¹, depending on the type of weed control; in the case of P₂O₅, varied from 4.3 kg ha⁻¹ to 7.2 kg ha⁻¹ and in the case of K₂O, from 32.1 kg ha⁻¹ to 38.9 kg ha⁻¹. Competition for light must be intense at the initial stages of cotton growth due to the previously-mentioned growth differences between cotton and weeds. After those stages, cotton reaches greater height than most weeds, so competition for light should be smaller and limited to the lower leaves, except in the case of “climbing-type” weeds.

In addition, weeds can reduce growth of the crop's root system (Gomes et al., 2007). Due to a limited root system, the plant has smaller capacity to absorb nutrients, resulting in smaller growth of the above-ground part, with a consequent reduction in total photosynthesis (Silva et al., 2004).

Reductions in cotton plant height and cotton yield caused by weeds in the present work were also observed by other authors (Freitas et al., 2002). However, several authors observed cotton yield reductions around 90% (Freitas et al., 2002), while a reduction of

Table 3 - Means obtained for dry matter of the above-ground part of weeds and traits of gliricidia plants and cotton cultivars (means of four replicates and three “weed control treatments”)

Cultivars	Dry matter of above-ground part of gliricidia (g per plant)	Plant height (cm)	Height of first branch (cm)	Fiber weight (g per open boll)	Open boll weight (g per open boll)	Fiber yield (kg ha ⁻¹)	N ^o open bolls per plant	Seed cotton (kg ha ⁻¹)
BRS 187 8H	19.2 ab	148 a	19.0 a	1.93 a	5.48 a	1036 ab	10.28 a	2790 a
BRS Rubi	8.4 b	126 b	15.0 b	1.23 c	3.76 c	758 b	12.68 a	2307 a
BRS Safira	51.1 a	140 ab	17.0 ab	1.55 b	4.38 b	1088 a	13.29 a	2975 a
BRS Verde	36.0 ab	138 b	16.0 ab	1.41 bc	4.22 b	781 b	9.91 a	2261 a
CVplot, %	59.6	12.4	17.2	13.6	7.8	25.5	16.2	28.4

Means followed by the same letter do not differ at 5% probability by Tukey test.

Table 4 - Means obtained for dry matter of the above-ground part of weeds and characteristics of cotton cultivars in response to weed control method (means of four replicates and four cotton cultivars)

Method of weed control	Weed dry matter (g m ⁻¹)	Height of first branch (cm)	Plant height (cm)	Fiber yield (kg ha ⁻¹)	Seed cotton (kg ha ⁻¹)	Nº open bolls per plant	Fiber weight (g per open boll)	Open boll weight (g per open boll)
Hand-weeding	27.4 c	15.5 b	143 a	1129 a	3362 a	15.75 a	1.57 a	4.60 a
With <i>G. sepium</i>	353.4 b	17.4 a	136 ab	841 b	2244 b	9.89 b	1.62 a	4.40 a
No-weeding	562.0 a	17.4 a	135 b	776 b	2143 b	9.00 b	1.48 a	4.38 a
CVsubplot, %	52.1	8.7	6.5	16.5	17.2	9.9	16.0	14.7

Means followed by the same letter do not differ at 5% probability by Tukey test.

approximately 31% was observed in the present work (Table 4). Obviously, varietal and environmental factor differences could be responsible for these yield reduction differences. Nonetheless, an important factor must have been the irrigation used in the present work. Weed density and biomass could be smaller in irrigated (as in the present work) than in non-irrigated experiments, due to a greater capacity of the crop to suppress weeds when irrigated (Sankula et al., 2004).

Weed dry matter was smaller in plots intercropped with gliricidia than in non-hoed plots (Table 4). Nevertheless, the means for all cotton characteristics in both of these treatments were statistically equal (Table 4). This means that gliricidia controlled weeds, although such control was not sufficient to prevent cotton yield losses. In terms of dry mass of the above-ground part of weeds, weed control provided by gliricidia amounted to 37%. It must be pointed out that the gliricidia plants were spaced 50 cm from each other. It should be pointed out that these plants might exert better control over weeds when row spacing between them is reduced.

Greater competitive ability of a species in competition with other species should depend on the characteristics of plants of both species (McDonald, 2003; Bertholdsson, 2005) (cotton-gliricidia and gliricidia-weeds, for example, in this work) and environmental conditions (Lemerle et al., 2001). With regard to cotton-gliricidia competition, excluding those characteristics related to gliricidia and environmental conditions, it is interesting to speculate why some varieties of cotton reduced the growth of gliricidia (Table 3). Plant height

is often given as an important competitive characteristic. That does not seem to be the case in this study, because cotton cultivars with greater or smaller plant height reduced gliricidia growth. So, it seems reasonable to accept that other shoot (Sankula et al., 2004), root system (Ford & Pleasant, 1994) or allelopathic characteristics (Bertholdsson, 2005) of cotton cultivars reduced gliricidia growth (Table 3). In the case of gliricidia-weed competition, since gliricidia “cultivar” was the same in all treatments, weed growth reduction, due to competition, may have been due to characteristics similar to those indicated for the cotton, as well as plant height, but allelopathy seem to play an important role (Obando, 1987; Kamara et al., 2000).

It can be concluded that twelve weed species predominated in the experiment, many of them belonging to the Poaceae family. Weeds occur at different frequencies and in a non-uniform manner in the experimental area. Cultivars did not influence weed dry matter. Intercropping with gliricidia reduced weed dry matter, but did not prevent reductions in cotton fiber and seed cotton yield, which were higher in hoed plots. Cultivar BRS Safira had the highest fiber yield, but there were no differences between cultivars with regard to seed cotton yield.

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