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Research Article

EFFECT OF WEEDING PERIOD INTERRUPTION ON THE OILSEED *CITRULLUSLANATUS* REPRODUCTIVE PHASE

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ABSTRACT

The success of any weed control program requires the prior identification of the sensitive phase of the crop to a grassing. In this context, field experiments were conducted during two years at Manfla (Côte d'Ivoire) to study the response of yield and its components to weeding time interruption. Two controls (negatif and positif) and three weeding time interruption (treatment 1, treatment 2 and treatment 3) were performed during the reproductive phase in three blocks design experiment. Statistical analysis indicated that treatment 1, treatment 2, treatment 3 and positif control recorded similar value of seed yield. Thus the reproductive phase of this cucurbit is not influenced by weeds. The weeding of plots for this crop can be limited to the vegetative phase to ensure it production.

INTRODUCTION

In traditional cropping systems, weeds are one of the main causes of yield decline (Mandumbu and Karavina, 2012). The extent of damage caused by these weeds varies with the time of grassing (Khokhar *et al*., 2007). In this context, the identification of the most sensitive phenological stages to a grassing is a prerequisite, to develop any weeding strategy. Indeed, this work facilitates the planning of crop weeding programs (Adkins *et al*., 2010). In practice, this work is to identify the appropriate periods of weeding, that is to say the periods outside of which planting plants does not lead to a significant decline in yield. The oilseed cucurbit *Citrulluslanatus* is a plant highly prized in African societies for these seeds very rich in protein and lipid (Zoro Bi *et al*., 2003). It is a source of income for producers who are essentially women. In the peasant environment, its production is confronted with the harmful action of weeds(Zoro Bi *et al*., 2006). The weed control strategy for weeds is manual weeding. Such an approach remains very harmful and time consuming producers. In order to alleviate the task to farmers while improving the production of this cucurbit, the result of the work of Gore bi (2012)advocated the weeding of plant during creeping stages of stems, male flowers and female flowers. Despite these advances, the production of oilseed cucurbit remains low. This drop in yield would be related to weeding done during the female flowering stage. Indeed, previous work done on other cucurbit such as *Beta vulgarus* and *Cucumusmelo* indicated the limitation of weeding during the vegetative phase of plants(Schultheis and Dufault, 1994; Stall, 2007). Thus to confirm or refute this hypothesis the present study was undertaken.

MATERIALS AND METHODS

Study site

On-farm experiments were conducted in 2006 and 2007 in the village of Manfla (latitude 6° 49'34.38" N and longitude 5°43'47.68" W) 400 km north of Abidjan (Côte d'Ivoire). There are two rainy seasons separated by a short dry period (July-August) and a long dry season (December-February) at the experimental site. Annual rainfall varies from 800 to 1400 mm with a long-term mean of 1200 mm and an annual mean temperature of 27°C. The vegetation is a woodland savannah. The study site is a natural fallow plot with vegetation mainly composed of *Chromoleanaodorata* (L.) R. M. King & Robins,

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Panicum maximum Jacq, *Ageratum conyzoïdes* (L.) and *Imperatacylindrica* (L.) Beauv. Soils in the study area were deep, friable, and sandy-silt. Initial soil analysis at soil depth of 20 cm before cropping gave the following results: pH 6.45, 57% sand, 36% silt, 7% clay, 6% organic matter, 3.5 g/kg of total N, 24.4 g/Kg of available P, and 0.45 g/ kg of K. In the study area, the oilseed *C. lanatus* is usually produced during two cropping seasons in a year.

Plant material and experimental design

The planting material was constituted of 450 plants of oilseed *C. lanatus*. The seeds of those plants were obtained from the cucurbit germplasm of the University of NanguiAbrogoua (Abidjan, Côte d'Ivoire). A medium seed size cultivar (NI119) of the indigenous oilseed *C. lanatus* widely cultivated in Côte d'Ivoire was selected.. Experimental design was constitued of three blocks. Those blocks were determined in an area of 0.8 hectares. Each block measured 102 m x 26 m with five plots. The plot was 16 m x 20 m containing 30 holes at depth of 3 cm. The holes were arranged in rows at spacing of 4 m between and within rows. In order to improve the growth and production of fruits five periods of weeding interruption were performed: (1) Negatif control: non weeding;(2) Treatment 1: weeding of plots started from sowing and was interrupted when a plant have a first female flower; (3) Treatment 2: weeding of the plots started from sowing and was interrupted when a half of plants have female flower; (4) Treatment 3 : weeding of plots started from sowing and was interrupted when all plants have a female flower; (5) Positif control : plots were regulary weeded from sowing to harvest. To ensure proper stand, five seeds per hole were sown directly and thinned to one plant per hole at the two-leaf stage. All plants per treatment including control were investigated. Any fertilizer or irrigation was applied during the trials. Weeds were manually controlled and the crop was sprayed with insecticide (Cypercal EC 50) to protect the crop against cucumber beetle, *Zonocerusvariegatus* and lady beetle identified in study site.

Data collection and statistical analysis

Yield (seeds dry weight ha) and 7agronomical traits identified as yield components in oilseed cucurbits *C. lanatu s*(Koffi *et al*., 2009)were collected. The yield components measured included: plant vine length (measured on main vine from the basis to plant extremity); number of fruits per plant scored at maturity on each -1individual plant per treatment; fruit weight;4) number of seeds per fruit; seeds weight per fruit; and 100-seeds weight per fruit and seeds weighed at 5% moisture content. Significant effect of time of weeding interruption, year and their interaction were tested with MANOVA. When a significant effect is found for a factor, each parameter was examined by using the software SAS statistical package. In case of a significant difference the Least Significant Difference (LSD) multiple range-tests were used to identify the means those differ.

RESULTS

Results MANOVA analyzing the effect of weeding period interruption, year and their interactions on seven agronomic parameters of oilseed Citrulluslanatus.

The table 1 indicates that weeding period interruption times and year and their interaction had significant effects on the seven parameters. No significant effect was observed for the year and their interactions. Thus for the following statistical analysis we will put together the data of both years.

Table 1 Results MANOVA analyzing the effects of weeding period interruption, year and their interactions on seven agronomic parameters of oilseed *Citrulluslanatus*

Factors	Statistics	
	F	*P*
Weeding period interruption	8.516	<0.001
year	2.56	0.0789
interaction	3.56	0.687

Influence of weeding period interruption vegetatifs and fruits parameters of oilseed Citrulluslanatus

The results of ANOVA show that the five periods of weeding had significant effect at $P = 0.05$ on yield and its components. The highest value of vine length was obtained with the positif control. On the same plot, plants had produced more fruits. But a similar number of fruits was recorded with the treatment 1, 2, and 3. Concerning the weight of fruit the highest values come from the treatment 1, 2 and 3 (Table 2).

Table 2 Influence of weeding period interruption vegetatifs and fruits parameters of oilseed *Citrulluslanatus*

Weeding periodinterruption	Parameters		
	Plant vine length	Number of fruits	Fruit weight
Negatif control	$3.09{\pm}0.76^c$	$2.40{\pm}2.00^b$	$620.83{\pm}27.59^c$
Treatment 1	$3.95{\pm}0.83^b$	$7.96{\pm}3.76^a$	$958.80{\pm}302.76^a$
Treatment 2	$4.03{\pm}1.31^b$	$7.59{\pm}3.04^a$	$970.26{\pm}368.00^a$
Treatment 3	$3.90{\pm}1.17^b$	$7.94{\pm}3.23^a$	$986.31{\pm}301.92^a$
Positif control	$5.52{\pm}0.92^a$	$7.86{\pm}3.06^a$	$925.30{\pm}327.73^b$
F	5.48	16.47	15.34
P	0.003	<0.001	<0.001

*Mean values within column by parameter followed by the same letter(s)were not significantly different at *P*=0.05 level, on the basis of the Least Significant Difference (LSD) test

Influence of weeding period interruption on seeds parameters and yield of oilseed Citrulluslanatus

Statistical analysis shows that the weeding period times interruption had influenced all the parameters tested. Statistically similar value of yield, number of seeds and seeds weight was obtained with treatment 1, treatment 2, treatment 3 and positif control. Concerning, 100-seeds weight the highest value have been recorded with positif control.

Table 3 Influence of weeding period interruption on seeds parameters and yield of oilseed *Citrulluslanatus*

Weeding periodinterruptions	Parameters			
	Yield	Number of seeds	Seedsweight	100-seeds weight
Negatif control	$0.03{\pm}0.03^b$	$166.90{\pm}120.35^c$	$7.48{\pm}5.95^c$	$3.08{\pm}1.19^d$
Treatment 1	$0.48{\pm}0.16^a$	$274.19{\pm}15.69^b$	$14.54{\pm}8.71^b$	$3.67{\pm}1.07^c$
Treatment 2	$0.50{\pm}0.23^a$	$335.78{\pm}198.26^a$	$16.45{\pm}10.62^a$	$4.83{\pm}0.86^{bc}$
Treatment 3	$0.53{\pm}0.10^a$	$335.04{\pm}152.69^a$	$16.51{\pm}8.40^a$	$4.87{\pm}0.96^b$
Positif control	$0.49{\pm}0.06^a$	$347.70{\pm}181.64^a$	$17.00{\pm}10.15^a$	$6.14{\pm}0.87^a$
F	6.69	14.17	5.49	14.09
P	0.007	<0.001	0.009	<0.001

*Mean values within column by parameter followed by the same letter(s) were not significantly different at *P*=0.05 level, on the basis of the Least Significant Difference (LSD) test

DISCUSSION

The success of any weed control program requires the prior identification of the sensitive phase of the crop to a grassing

(Adenawoola *et al*., 2005). The present study indicated that the best value of yields were obtained with the treatment 1, treatment 2, treatment 3 and positif control. This result clearly indicates that the reproductive phase of this cucurbit is not influenced by weed. In other words, the limitation of weeding to the vegetative phase is necessary and sufficient to ensure a good yield. These results are similar to those of Adkins (2010). This author has shown that *C. lanatus* plants remain competitive with weeds while maintaining a good level of production when weeding occurs during the first month after sowing. Also, Terry and Stall(1992)recommend weeding plots of *C. melo* for three weeks after emergence to avoid a significant reduction in the yield of this species. In addition, some authors working on others crops, mainly *Colocasiaesculenta* and *Vignaradiata* also indicated that the sensitive phase of adventitious crops is located during the vegetative phase of plants(Ponce and Santini, 2004; Sangakkara *et al*., 2008).

We also noted that the yields remain the same regardless of the duration of grassing considered (treatment 1, treatment 2 and treatment 3). Such a result could be explained by the similar number of fruits per plant recorded with the three treatments. Indeed, this parameter is involved in crop yield calculations, in general, and cucurbit in particular (Nerson, 2007). It is also likely that the importance of vegetal cover at the female flowering stage would also have contributed to obtaining such a result (Croster and Witt, 2000).

A positif control did not show significantly higher yields than the three weeding times interruption. This result implies that it is not necessary to weed the plots during the whole plant development cycle. However, if special attention is not given to female flowers and young fruits during the weeding operation, as is often the case in a farmer's environment, it is possible to observe a decrease in yield on plots regularly weeded. Indeed, falls of female flowers and immature fruits are caused during repetitive weeding (Ojo, 1997). This author has indicated the decline in yield of amaranth grains by the fall of female flowers and fruits.

The results also showed that on negatif control the yield values and its components are low. The decline in yield on these plots could be explained by the limitation of the resources of the environment such as the mineral elements, the light and the space caused by the strong competition between the plants of the cucurbit and the weeds (Meliponwu, 1994; Parish, 1990). This result is similar to that obtained with the work of Melifonwu (1994)on cassava.

CONCLUSION

Knowledge of the sensitive phase of weed crop development is essential to facilitate the implementation of any weed control program. The absence of such information in the peasant environment has very often been at the basis of the decline in the production of cultivated plants. This is particularly the case of the oilseed cucurbit *C. lanatus*. The present study was initiated to evaluate the effect of weeds period interruption on the reproductive phase of this cucurbit to ensure an economically acceptable yield. The results show that the reproductive phase of this species is not influenced by weeds. In clearly, weeding plots for this crop can be limited to the vegetative phase In addition, interventions spanning the entirecrop cycle do not necessarily induce a significant increase in yield.

References

Adenawoola, A. R., Aladesanwa, R. D., and Adenowuro, T. D. (2005). Effects of frequency of weeding on the growth and yield of long-fruited jute (*Corchorus olitorius*) in a rain forest area of southwerstern Nigeria. *Crop Protection* 24, 407-411.

Adkins, J. I., Stall, W. M., Santos, B. M., Olson, S. M., and Ferrell, J. A. (2010). Critical period of interference between american black nightshade and triploid watermelon. *Weed Technology* 24, 400-410.

Croster, M. P., and Witt, W. W. (2000). Effect of *Glycine max* canopy characteristics, *G. max* interference, and weed-free period on *solanum ptycanthum* growth. *Weed Science* 48, 20-26.

Gore Bi, B. N., Koffi, K. K., J-P, B., and Zoro, B., I.A. (2012). Effects of frequency of weeding on oilseed *Citrullus lanatus* production in woodland savanna of Côte d'Ivoire. *Journal of Applied Agricultural Research* 4, 139-146.

Khokhar, K. M., Mehmood, T., and Shakeel, M. (2007). Evaluation of integrated weed management practices for chilies in Parkistan. *Crop Protection* 26, 1135-1139.

Koffi, K. K., Anzara, G. K., Malice, M., Djè, Y., Bertin, P., Baudoin, J. P., and Zoro Bi, I. A. (2009). Morphological and allozyme variation in a collection of *Lagenaria siceraria* (Molina) Standl. from Côte d'Ivoire. *Biotechnology, Agronomy, Society and Environnement* 13, 257-270.

Mandumbu, R., and Karavina, C. (2012). Weed suppression and component crops response in maize/pumpkin intercropping systems in Zimbabwe. *Journal of Agricultural Science* 4, 231-236.

Melifonwu, A. A. (1994). Weeds and their control in cassava. *African Crop Science Journal* 2, 519-530.

Nerson, H. (2007). Seed production and germinability of cucurbit crops. *Seed Science and Biotechnology* 1, 1-10.

Ojo, D. O. (1997). Effect of weeding frequencies on grain amaranth (*Amaranthus cruentus* L.) growth and yield. *Crop Protection* 16, 463-466.

Parish, S. (1990). A review of non-chemical weed control techniques. *Biological Agriculture and Horticulture* 7, 117-137.

Ponce, R. G., and Santini, I. (2004). Effects of early weed infestation on growth, yield, and nitrogen nutrition of pepper. *Journal of Plant Nutrition* 27, 651-661.

Sangakkara, U. R., Meylemans, B., and Damme, P. V. (2008). Impact of different weed types on growth and yield of mungbean (*Vigna radiata* L. Wilczek). *Journal of Agronomy and Crop Science* 175, 1-5.

Schultheis, J. R., and Dufault, R. J. (1994). Watermelon seedling growth, fruit yield, and quality following pretransplant nutritional conditioning. *Hortscience* 29, 1264-1268.

Stall, W. M. (2007). "Weed control in cucurbit crops (Meuskmelon,Cucumber, Squash and Watermelon)." University of Florida, Institute of Food and Agricultural Sciences (IFAS), Florida.

Terry, E. R., and Stall, W. M. (1992). Smooth amaranth interference in muskmelon. *Proceedings of the Florida state Horticultural Society* 105, 319-321.

Zoro Bi, I. A., Djé, Y., Koffi, K. K., Djé, Y., Malice, M., and Baudoin, J. P. (2006). Indigenous cucurbits of Côte d'Ivoire: a review of their genetic resources. *Sciences et Nature* 3, 1-9.

Zoro Bi, I. A., Koffi, K. K., and Djé, Y. (2003). Caracterisation botanique et agronomique de trois espèces de curcubites consommées en sauce en Afrique de l'ouest:*Citrullus sp., Cucumeropsis mannii* Naudinet *Lagenaria siceraria* (Molina) Standl. *Biotechnology, Agronomy, Society and Environnement* 7, 189-199.

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