INTERNATIONAL JOURNAL OF ADVANCED BIOLOGICAL RESEARCH

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PERFORMANCE OF SWEET PEPPER (*CAPSICUM ANNUUM* L.) AS INFLUENCED BY WEEDING FREQUENCY

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ABSTRACT
A study was conducted in 2009 at the Teaching and Research Farm of the Department of Agronomy, Delta State A study was conducted in 2009 at the Teaching and Research Farm of the Department of Agronomy, Delta State University, Asaba Campus to evaluate the performance of sweet pepper (*Capsicum annuum)* as influenced by weeding frequency with a view to recommending the best type to farmers in the area and its environs. Weeding frequencies of 3, 6, 9 weeks intervals and unweeded plot before harvest constituted the treatments. The experiment was arranged in a randomized complete block design and replicated three times. The results showed that the performance of *C. annuum* in terms of plant height, number of leaves, total leaf area, number of branches, number of fruits per plant (yield productivity) and weight of pepper fruits per plant differed significantly ($p \leq 0.05$), the longer the time or period of weed infestation before removal, the greater the reduction in yield production. This shows that the performance of *C. annuum* was best when weeding frequency was at 3 weeks intervals compared to C. *annuum* plants that had weeding frequencies of 6 and 9 weeks interval as well as those without weeding till harvest. This study has demonstrated that weed infestation has a significant effect of reducing the performance of *C. annuum* with plants weeded 3 weeks intervals producing highest values hence weeding at 3 weeks interval as against weeding at 6 and 9 weeks intervals is recommended to farmer growing *Capsicum annuum* in Asaba agro-ecological area.

KEYWORDS: *Capsicum annuum,* growth indices, yield, weeding frequency.

INTRODUCTION

Capsicum annuum commonly known as sweet pepper or Missippe sport pepper originated from Southern North America. It is grown throughout tropical Africa. It can be fried, stutter, baked or added to stews. It is best eaten fresh, added to salad or used as a garnish. It belongs to the family Solanaceae and very common in Nigeria and Ivory Coast (Hill, 1995). It is used as food in Africa. It has aesthetic value as it is ornamental. It is rich in vitamins A and C (Bosland and Dewith, 1993). It is among the most commonly grown crops throughout Africa because of its utilization in soap, stews and salads (Harlen, 1995; Heiser, 1995; Hill, 1995). *C. annuum is* also used as colouring, condiments and flavours. The leaves and fruits are antiseptic, diaphoretic, irritant, rubacacient, tonic, sialagogue and anti-rheumatic. It is used externally in the treatment of sprains, unbroken Chilblains, neuralgia and pleurisy (Schery, 1999). Pepper according to Erinle (1989), is regarded as the third most important vegetable after .onions and tomatoes and Nigeria has been the largest producer of the crop in Africa (Fawusi, 1978; Hill, 1995). One of the limiting factors in the production of sweet pepper is weed infestation (Adigun, 1984; Boatwright and McKssick, 2003). Weed is any wild plant growing where it is not wanted especially among crops in the garden (Lucier and Plummer, 2003). Effective weed management is one of the many critical components of successful production of pepper. Weeds are of great concern to peasant farmers because they compete with pepper for light, nutrients, water, and space and interfere with harvesting practices which may cause labour inefficiencies (Boatwright and McKssick, 2003). Severe weed infestations can reduce yield at least between 50 and 87 percent. Besides, some weeds may act as alternate hosts of insects, pests and diseases (Boatwright and McKssick, 2003). It is against this background that a study as this has been conducted to evaluate the performance of sweet pepper as influenced by weeding frequency with a view to recommending the best weeding frequency to farmers in Asaba agro-ecological zone.

MATERIALS AND METHODS

The study was carried out in 2010 at latitude 6^{o} 14^{1} N and longitude $6^{o}49^{1}$E at the Teaching and Research Farm of Department of Agronomy, Delta State University, Asaba Campus (Asaba Meteorological Station, 2009). A composite soil sample (0 – 15 cm) was collected from the experimental area prior to treatment application and analyzed using the standard laboratory methods. Seeds of sweet pepper were procured as a single batch from the Delta State Agricultural Procurement Agency (DAPA), Ibusa. They were sown on nursery using polypots for intensive care to produce strong, healthy and viable seedlings before transplanted to the field and basic nursery techniques were observed for 3 weeks after planting (WAP). Weeding frequencies constituted the treatments. They included weeding at 3, 6 and 9 weeks intervals and unweeded plots throughout the experimental period. Pods were harvested at 15, 18 and 21 weeks after planting. The plot area was 2m x 2m, experimental area was 8m x 11m and a plot had 16 plants. The experimental area had 16 x 12 plots a total 192 plants. The land was cleared, burnt,

ploughed and harrowed and beds were pegged and constructed according to specification (80 x50cm). Utmost care and precaution were taken during transplanting to avoid damage/injury done to the seedlings. The treatments were administered, the experiment was arranged in a randomized complete block design and replicated three times Data collected were plant height; number of leaves, total leaf area, number of branches, number of fruits per plant and fresh weight of fruits per plant. Data collected were subjected to analysis of variance while significant means were separated with the Duncan's multiple range Tests (DMRT) using SAS (2005).

RESULTS AND DISCUSSION

The initial soil properties are given in Table1. The results showed that no significant differences ($P \geq 0.05$) were observed in the plant height of pepper plants that received weeding every three weeks and every six weeks (Table 2). Significant differences ($P \leq 0.05$) in the plant height of *C. annuum* were however, observed the longer the period of weed infestation before removal. Hence the plant height of *C. annuum* subjected to 9 weeks before weeding and that not weeded at all were 23.33cm and 15.38cm respectively as against 36.67cm and 35.31cm recorded for plants that received weeding at 3WAP and 6 WAP respectively (Table1). In the same vein, the number of leaves, total leaf area, number of branches, fruits per plant and weight of pepper fruits per plant followed the same trend where the growth indices measured showed significant differences ($p \leq 0.05$) the longer the length time or period of weed infestation before removal (Tables 3,4, 5, 6 and 7) respectively. The finding of this study is in accordance with earlier reports of Adigun (1984) who reported that the critical period of weed competition with crop plants including pepper was 6 and 9 weeks after planting. Boatwright and McKissick (2003) had earlier reported that weeds have significant effect of reducing growth, development and yield of pepper. This is not unconnected to the fact that weeds compete favourably with crop plants for vital nutrients in the soil. Some weeds could be so specialized physiologically, morphologically and anatomically that they out compete and negatively affect crops. This observation is similar to the reports of Boatwright and McKissick (2004) that severe weed infestation can reduce yield by 50% even when pepper are produced on plasticulture so long the weeds are left uncontrolled. The study has indicated that when pepper is properly managed with adequate weed control, there could be an increase in the performance including its yields.

CONCLUSION

This study evaluated the performance *C. annuum* as influenced by weeding frequency in Asaba, Delta State, Nigeria. The study demonstrated that weed infestation has a significant effect of reducing the growth, development and yield of *C. annuum* with the plots weeded at 3 weeks weeding intervals producing highest values followed by plots weeded at 6 weeks interval. Plots left for 9 weeks before weeding also performed significantly better when compared with plots without weeding. Weeding at 3 weeks interval is thereby recommended to farmers growing *Capsicum annuum* in Asaba, agro-ecological zone.

TABLE 1. Physico-chemical properties of soil before experimentation

Parameters	Values
Sand (%)	94.5
Silt (%)	2.1
Clay (%)	3.4
Soil pH	5.60
Textural class	Sandy loam
Organic carbon (%)	0.91
Organic matter (gkg^{-1})	2.64
Total N (%)	0.06
Available P (mg/kg)	30.00
Ca^{2+} (cmol/kg)	1.31
Mg^{2+} (cmol/kg)	0.16
Na^{+} (cmol/kg)	0.25
K^{+} (cmol/kg)	0.17
H^{+} (cmol/kg)	0.45
$Al3^{+}$ (cmol/kg)	0.08
ECEC (cmol/kg)	2.42
Base saturation (%)	78.10

TABLE 2. Plant height (cm) of *Capsicum annuum* as influenced by weeding frequency

	Weeks after planting/plant height		
Weed Frequency	6	9	12
3 weeks interval	20.67a	36.67a	39.00a
6 weeks interval	19.33a	35.31a	36.00a
9 weeks interval	15.33b	23.33b	23.33b
Not weeded	15.26b	15.38c	15.28c

Means with different letter (s) are significantly different at ($P \leq 0.05$) using the Duncan's multiple range tests

TABLE 3. Number of leaves of *Capsicum annum* as affected by weeding frequency

	Weeks after planting/Number of leaves		
Weeding frequency	6	9	12
3	60.00a	111.00a	190.00a
6	48.00b	72.33b	95.33b
9	20.11c	47.00c	57.00c
Not weeded plot	9.00d	16.67d	18.6d

Means in the same column with different letters are significantly different ($p \leq 0.05$) using Duncan's multiple range Tests.

TABLE 4. Leaf area (cm^2) of *Capsicum annum* as affected by weeding frequency

	WAP/Leaf area		
Weeding frequency	6	9	12
3	1164.44a	5487.1a	6615.0a
6	500.11b	2573.76	3754.36
9	214.44c	1199.4c	1458.6c
Not weeded	150.62d	296.9d	345.7d

Means in the same column with different letters are significantly different ($p \leq 0.05$) using Duncan's multiple range tests

TABLE 5. Number of branches of *Capsicum annum* as influenced by weeding frequency

	WAP/No of branches		
	6	9	12
Weeding frequency			
3	2.16a	12.43a	16.03a
6	1.40b	6.08b	8.30b
9	0.67c	4.00c	4.33c
Not weeded	0.00d	0.62d	0.67d

Means in the same column with different letters are significantly different ($p \leq 0.05$) using Duncan's multiple range test

TABLE 6. Number of fruits per plant of *Capsicum annum* as influenced by weeding frequency

	WAP/No of fruits		
Weeding frequency	15	18	21
3	17.67	24.33	35.00
6	7.33	14.33	21.33
9	3.33	9.67	12.33
Not weeded	2.91	1.35	1.08

Means in the same column with different letters are significantly different ($p \leq 0.05$) using Duncan's multiple range tests

TABLE 7. Weight of pepper fruits/plant (gm)

	WAP/weight
Weeding frequency	
3	12.67a
6	7.15b
9	2.23c
Not weeded	0.78d

Means in the same column with different letters are significantly different ($p \leq 0.05$) using Duncan's multiple range Tests.

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