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INHIBITORY EFFECT OF SOME CROP RESIDUE WATER EXTR[illegible] GERMINATION AND SEEDLING GROWTH OF SICKLE POD ([illegible] *OBTUSIFOLIA (L.)* IRWIN AND BARNEBY

***E. Daniya and A.U. Musa**
Department of Crop Production, Federal University of Technology, PMB 65, Minna, Niger State, [illegible]
*Correspondence author

ABSTRACT
One major interest of modern agriculture is to reduce the use of herbicide by [illegible] developing safe alternative to herbicide for weed control. Water extracts (at conc[illegible] and 10%) of 'egusi' melon, rice and maize husk were used to determine their inhi[illegible] the germination and seedling growth of sickle pod (Senna obtusifolia (L.). It was [illegible] maize husk water extracts had more inhibitory effects than 'egusi' melon and ri[illegible] extracts on germination, root and shoot growth as well as seedling dry weight. Maize [illegible] at 10% reduced the germination of sickle pod by 81.2%. It also significan[illegible] suppressed root and shoot length as well as seedling dry weight of sickle pod by 83.[illegible] as well as 85.7% respectively. All the seedling growth parameters includ[illegible] percentage decreased significantly (P > 0.05) with increasing level of maize extract [illegible] compared with the other extracts and control. Shoot length (r = 0.835), root length [illegible] seedling dry weight (r = 0.833) positively correlated with germination percenta[illegible] exhibited the strongest morphological character for allelopathic assessment of sick[illegible]

Keywords: Allelopathy, crop residue, water extracts, sickle pod.

INTRODUCTION

Sennna obtusifolia (L.) Irwin and Barneby is commonly known as a weed of wasteland, natural bush fallow, roadside in West Africa; and the number one weed of crops like soyabeans, peanuts, cotton, lima bean as noted by Awodoyin and Ogunyemi, (2005), corn and grain sorghum as indicated by Shaw *et al.*,(1997). It is also reported by Hall *et al.*, (2008), to be a very difficult weed to control; and once introduced and established a farmer is faced with the potential for a severe weed problem for several years as noted by Oliver and Barapour (1998). Its growth habit, physiological structure, inherent ability to resist herbicide treatments are attributed to the success of this weed interfering with crops Shaw *et al.*,(1997). Sickle pod is difficult to control by slashing, which delays seeding but does not kill the plant, but rather causes it to perennate Mackey *et al.*, (1997). These authors also reported that ploughing increases the plant numbers as the seeds are sacrificed during the practice. In the same vein, there is no known biological control method available Mackey *et al.*, (1997), and the increase and continuous use of herbicide has been a source of environmental and public health concern Gannon *et al.*, (2006) and Javaid *et al.*, (2006). In this regard, exploring natural weed control method for managing weeds in a sustainable manner has been suggested by Singh *et al.*, (2003) and Batish *et al.*, (2007). Natural weed control approach through allelopathy has also been recognized and suggested by Randhawa *et al.*, (2002). These authors also recognized and reported that different crops posses' allelochemicals, which could be use for weed suppression. Marwat *et al.*, (2008) also noted that the suppre[illegible] plants derived compounds could be [illegible] environmentally safe alternative herbici[illegible] control. For examples, husk extracts [illegible] varieties inhibited the growth of [illegible] (*Echinochloa crusgallis*); while water [illegible] different *Brassica spp.* adversely [illegible] germination and growth of cherry [illegible] *angulata*) and *Prosopsis juliflora* [illegible] germination of pearl millet as [illegible] Sundramoothy *et al* (1995) and Urem[illegible] Keeping in view the recognition [illegible] competition cannot be separated from [illegible] under field conditions, but can be o[illegible] laboratory screening techniques for [illegible] allelopathy as noted by Macais, ([illegible] Moyer and Haung (1997). The prese[illegible] conceived and initiated under the labor[illegible] to investigate the allelopathic effects of [illegible] rice and maize husks on the germination [illegible] growth of Sickle pod.

MATERIALS AND METHODS

(a) Plant sampling and prepara[illegible]

Sickle pod seeds were collected from [illegible] field at Minna, Niger State, Nigeria in the [illegible] of 2008 and stored in envelopes in a [illegible] Freshly-removed husks of 'egusi' melo[illegible] maize were obtained from a mill at [illegible] The husks were each air dried after [illegible] pounded into fine powder with a pestle [illegible] Portion of 50g and 100g were measure[illegible] 'egusi' melon, rice and maize husks.

... was soaked in 1000 ml of distilled water, ...ttently and left over for 24 hours under ...ature. The water extracts were then ... sieving through a four layer of cheese ... filtrates were used as fresh, while some ... were kept in the refrigerator for subsequent

...bioassay

... seeds were acid scarified in (H_2SO_4) for ... to obtain uniform seed germination and ... establishment. The seeds were rinsed ... with distilled water, then air – dried on ... paper. In the same vein, petri dishes were ... washed with detergent and hot water ...ogens and pollutants. Ten seeds of sickle ... then placed in each petri dish of 9 cm lined ... Whatman No.1 filter paper. To avoid ..., 0.3g of Forcelet (a.i Carbendazim) was ... each Petri dish. Ten millimeters of extract ... each filtrate concentration was added to ...ective Petri dish, and distilled water was ... control. The Petri dishes were kept ... moist by applying the different extracts ... concentrations, while the control received ... water whenever needed. The petri dishes ... on laboratory bench under room ... Germination was determined by ... number of germinated seeds at 2 days ... a period of 10 days. Root and shoot lengths were recorded with a measuring tape. Thereafter, the seedling was oven dried at 70^{0}C for 24 hours to obtain the dry weight.

(c) Experimental design and statistical analysis

Germination and seedling bioassay was conducted in a Complete Randomized Design (CRD) in four replications. The experiment was repeated twice and the combined mean values were subjected to analysis of variance. Data on percent germination was arcsin transformed to improve homogeneity of variance prior to analysis of variance. Untransformed means are presented for clarity of presentation. Means were separated using the Duncan Multiple Range Test (DMRT) at $P \leq 0.05$. The DMRT values derived from analysis of transformed data were applied to the untransformed treatments means.

RESULTS AND DISCUSSION

The allelopathic effects of water extracts derived from 'egusi' melon, rice and maize husks on the germination of sickle pod is shown in Table 1. The germination of sickle pod was influenced differently by various concentrations of the crop residues. The degree of inhibition depended on the concentration as the proportion of inhibition increased with an increase in the concentration of extracts. The highest concentration of maize husk (10%) significantly suppressed the germination of sickle pod compared to other concentration and the control.

...fluence of various concentrations of different aqueous extracts of crop residues on ...ation, shoot length, and root length and seedling weight of sickle pod after 10 days of ...

[illegible]	Germination (%)	Shoot length (cm)	Root length (cm)	Seedling weight (g)
[illegible]				
[illegible]	91.3ab (7.6)	6.4a (4.5)	4.7a (2.1)	0.12a (14.3)
[illegible]	73.8b (25.3)	5.2 ab(22.4)	3.7 ab (22.9)	0.12a (14.3)
[illegible]	96.3a (2.5)	6.6 a (1.5)	4.1 a (14.6)	0.12a (14.3)
[illegible]	85.0 ab (14.0)	5.5 ab (17.9)	3.4 ab (29.2)	0.09ab (35.7)
[illegible]	73.8b (25.3)	3.4 bc (49.3)	2.0 bc (58.3)	0.06bc (57.10
[illegible]	17.5c (82.2)	1.2 c (82.1)	0.8 c (83.3)	0.02c (85.7)
[illegible]	98.8a (0.0)	7.7a (0.0)	4.8a (0.0)	0.14a (0.0)
[illegible]	7.5	0.9	0.6	0.02

... the same letter are not significantly different at P≤ 0.05
... parenthesis are inhibition percentage over control.

...germination at lower concentration of maize ... and higher concentration of 'egusi' melon, ... were not significantly different, but were ... with the control. The suppression in ... of sickle pod at higher concentration ... maize husk which was by 81.3% is an ... of the inhibiting effects of certain ...cals of maize on this weed. This finding is in agreement with Kayode and Ayeni (2009) who observed similar decrease in germination of cowpea with an increase in concentration of water extracts of sorghum. Similarly, Randhawa *et al*, (2002) noted that sorghum water extract at higher concentration (100%) reduced the germination of *Trianthema portulacastrum* (horse purslane) by 15 to 20%.

Furthermore, root length of sickle pod was markedly reduced by maize water extract (Table 1). The effect was pronounced in the 10% concentration, which was not significantly different with the 5% concentration. The statistical analysis also revealed that there were no significant difference in the root growth reduction by the other husk extracts (egusi', melon and rice) in the varying concentrations as well as those of the control. The pronounced root growth reduction of sickle pod by maize husk could be attributed to the presence of allelopathic substances in the extract. Khanh *et al.*, (2005) noted that the potential allelochemical found in maize is 2, 4, dihydroxy-7-methoxy-1, 4-benzoxazin-3- one (DIMBOA). The results of this study further adds support to earlier findings by Turk *et al.*, (2005) that water extracts of allelopathic plants have more pronounced effects on root growth than seed germination or shoot growth. Similarly, previous assertion by Turk and Tawaha (2002) and Turk *et al* (2005) had revealed that such an outcome might be expected since the roots are usually the first to absorb an allelochemical from the environment.

Shoot length of sickle pod was also significantly influenced by the crop residue water extracts (Table 1). Maximum inhibition growth was found in 10% and 5% conc maize husk. The other extracts and the concentrations promoted the shoot length at par with the control. The results are in findings of Randhawa *et al.*, (2002) who shoot length of the weed horse pu significantly suppressed by sorghum water higher concentration (75 and 100%) concentration (25%) of the extracts pr shoot length. Maize husk water extracts pod seedling dry weight significantly extracts from other crop residue husk and the control (Table 1). Sickle pod weight decreased as the extract increased.

Table 2 shows that germination was highly significant and positively corre the growth indices studied. The correlation of root length, shoot length, seedling germination percentage were about magnitude (0.812**, 0.835** and respectively).

Table 2: Correlation coefficient (r) between different pairs of parameters as affected by extracts of crops residues

Seedling parameters	Germination (%)	Shoot length (cm)	Root length (cm)	Seedli (g)
Germination (%)	-			
Shoot length (cm)	0.835 **	-		
Root length (cm)	0.812**	0.947**		
Seedling weight (g)	0.833**	0.936**	0.919**	-

*** indicates significant correlation between two variables at 1% level of probability*

The result also showed that the correlation between each seedling growth character was positive and highly significant. The correlation existing for root length and germination percentage was lowest than any other attribute. This may imply that root length appeared to be the strongest morphological character for allelopathic interference assessment than any other character in sickle pod. This finding emphasizes the role of root length in assessing allelopathic effect, as was indicated by the correlation studies. Previous assertion by Kayode and Ayeni (2009) revealed that allelochemicals caused a significant reduction in the growth of plumule and radical of various crops. It was also obvious that the roots were the first organs to come in contacts with allelochemicals as reported by Rahimi *et al* (2006).

This study reveals that water maize husk inhibited seed germination, growth; and reduced seedling dry weight in proportion to the concentration of Maize husk water extract at 10% was more Germination percentage, shoot length, seedling weight of sickle pod showed morphological characteristics for interference assessment. Root length the strongest morphological character assessment of sickle pod seedling. It suggested, that maize husk be tested conditions for its effect on germination growth of sickle pod.

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