Determination of repellence potentials of some aqueous plant extracts against okra flea beetles *Podagrica uniforma*

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ABSTRACT

Laboratory experiment was conducted to ascertain the repellence potentials of some aqueous Plant extracts against okra flea beetles (*Podagrica uniforma*). Six treatments namely: Ten percent aqueous extracts of *Piper guinneense* (schum and Thonn), *Azadirachta indica* A Juss, *Xylopia aethiopica* (Dunal) A. Rich, *Garcinia kola* (Heckel), *Aframomum Melegueta* (Rosch) K.schum and control (Distilled water) were assessed using a completely Randomized Design (CRD) replicated three times. The results showed that 10% aqueous extract of *Piper guineense* and Azadirachta *indica* had the highest percentage repellence values (100%) while control (Distilled water) had the least value (0%). Hence, 10% aqueous extracts of *Piper guineense* and *Azadirachta indica* could be used as repellents in the control of okra flea beetles.

Keywords: Plant Extracts, *Podagrica*, Okra, Repellence Potentials.

INTRODUCTION

Okra, (*Abelmoschus esulentus* (L) Moench is an important Vegetable crop grown and used widely in Nigeria. However, a number of insects are known to attack both the leaves and fruits. The most important ones include *Podagrica* spp, (Jacoby), *Sylepta derogata* (Fab), *Bemisia tabaci* Genn, *Aphis gossypii* Glov, and *Aneplecnemis* C*urvipes* Fab (Taylor, 1974, Egwuatu, 1982). The use of insecticides in the control of insect pests on crops has increased problems of pollution, contamination, the development of insecticide resistance by pests, the emergence of secondary pests, and has necessitated the search for alternative means of insect control such as the use of botanicals and resistant varieties. Botanicals are reported to be safer than synthetic insecticides, easily biodegradable, environmentally safe, broad spectrum in action, non-persistent and easily processed (Talukder and Howse, 1995; Solsoloy and sol soloy, 1995). Hence, this research was aimed at ascertaing the use of some aqueous plant extracts as repellents in the control of okra flea beetles.

MATERIALS AND METHODS

Laboratory experiment was conducted at the department of Crop science and Technology, FUTO using a completely Randomized Design (CRD) replicated three times. Six treatments were used and these included: 10% aqueous extracts of *Piper guineense, Azadirachta indica, Xylopia Aethiopica, Garcinia kola, Aframomum Melegueta* and the control (distilled water). The aqueous plant extracts were prepared by sun drying the plant materials and ground using micro hammer mill. Ten percent aqueous extracts was prepared by soaking 100g of plant powder in one litre of distilled water for 24 hours and later filtered using muslin cloth.Additional water was added to make it up to one litre of the filtrate (Emosairue and Ukeh, 1996). Repellency bioassay was conducted under ambient laboratory temperature and relative humidity using the area presence method as reported by (Iyang, 2004). In this study, the test area includes a filter paper cut into two halves. One halve was treated with 10% aqueous extracts of the plant materials used and the other half was treated with distilled water (control). After air drying, the halves were remade by attaching them with selotape and placed in a petri-dish. Five insects *(Podagrica* species), which were collected from already estabilished Okra farm were placed at the centre of the filter paper. The petridish was covered with a perforated lid lined with cotton mesh to prevent the escape of the insects. The bioassay lasted for 12 hours (6am-6pm). The number of okra flea beetle observed on the extract treated portions of the filter paper and the control were counted and recorded. Percentage repellence (PR) values were determined using the formular.

$$PR = \frac{NC-NT}{NC+NT} \times 100$$

Where PR= Percentage Repellency, NC= Number of *Podagrica* on control portion, NT= Number of *Podagrica* on treated portion. Data collected were analysed using analysis of variance and significant means separated using least significant difference (LSD 0.05)

RESULTS

The results are presented in Tables 1 and 2. Data presented in Table 1 showed that there were significant differences

($P \leq 0.05$) in the mean number of *Podagrica* species as influenced by various treatments used. Ten percent aqueous extracts of *Piper guineense* and *Azadirachta indica* had the least values (0) while control had the highest value (4) (Table1). Ten percent (10%) aqueous extracts of *Piper guineense* and *Azadirachta indica* were significantly different from other treatments. However, 10% aqueous extr acts of *Xylopia aethiopica*, *Garcinia kola* and *Aframomum melegueta* did not differ significantly among themselves but were significantly (P= 0.05) different from control.

Similarly, 10% aqueous extract of *Piper guineense* and *Azadirachta indica* had the highest percentage repellency values (100%)(Table2).The percentage repellence potentials of the treatments is in the following order: 10% aqueous extracts of *p. guineense* = 10% aqueous extract of *A. indica*, > 10% aqueous extract of *X. aethopica* > 10% aqueous extract of *G. kola* > 10% aqueous extract of *A. melegueta* > control (Table 2).

Table 1. Mean number of *Podagrica* species as influenced by aqueous extracts (in 10%) of plants.

Treatments	Number of Podagrica species
P.guineense	0.0
A. indica	0.0
X. aethiopica	1.3
G.kola	1.7
A .melegueta	2.0
Control (Distilled water)	4.0
LSD 0.05	0.49

Table 2. Percentage Repellency of aqueous extracts (in 10%) of plants.

Treatments	Percentage Repellency
P. guineense	100
A. indica	100
X. aethiopica	45.6
G. kola	33.3
A. melegueta	20.0
Control (Distilled water)	0.0

DISCUSSIONS

The result of this study on the repellence potentials of some aqueous plant extracts against okra flea beetle (*Podagrica* species) showed that 10% aqueous extracts of *P. guineense* and *A. indica* gave 100% repellency against *podagrica* species. This may be due to the presence of piperine –type amid, guineesene 3 and piperine 4 in *Piper guineense* fruits and Azadirachtin in *Azadrachta indica* leaves (Okogun and Ekong, 1974). This corroborated the report of Lale and Alaga (1998) Who explored the insecticidal, larvicidal and repellent properties of *P. guineense* oil for the control of major rust –red beetle(*Tribolium castenum* Herbst in stored pear millet (*Pennisetum glauecum*) and reported that *Piper guineense* seed oil was strongly repellant to *T. Castenum* adults (80.1- 100%) repellence. Similarly, Anaso and Lale (1998) reported that neem seed oil was as effective as a synthetic insecticide (Deltamethrin) in reducing fruits damage to below 10% by spraying at three weekly intervals. Also the report from (Lewis, 1992) and Ivbijaro (1990) showed that *P. guineense* possess insecticidal, antifeedant and growth inhibitory properties. Hence 10% aqueous extracts of *P. guineense* and *A. indica* have been shown to possess high repellency potentials against *Podagrica* species and could be recommended to resource poor farmers in the control of Okra flea beetles (*Podagrica* species).

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