

EFFICACY OF *OGIRI* PRODUCED FROM MESQUITE SEED AS BAIT IN TRAPPING OF INSECTS IN A FALLOW PLOT IN AWKA, ANAMBRA STATE, NIGERIA

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ABSTRACT

An investigation was made on the insect fauna in a fallow plot at the temporary site of Nnamdi Azikiwe University, Awka using pitfall traps. The study was carried out for a period of seven weeks in the months of June and July 2013. The pitfall traps were baited using Ogiri (food condiment) made from mesquite seed. A total of 193 adult insects were captured. The results showed that out of the six insect orders captured, Hymenoptera recorded the highest number of insects (142) while Dermaptera had the least number of insects (5). Twelve families and fourteen species were found to be associated with the pitfall traps baited with Ogiri from mesquite seed. The bait attracted the highest number of insects from the family Formicidae (120) followed by the family Eurytomidae (16), while the family Calliphoridae (1) had the least number of insect.

Keywords: Efficacy, *Ogiri*, Mesquite seed, Pitfall trap, Insects

INTRODUCTION

Fermented foods are essential parts of diets in all parts of the world, particularly in Africa (Odunfa, 1985). Fruits, vegetable, cereals, root crops, legumes and oil seeds are used in the production of fermented foods. In Africa, many proteinaceous oily seeds such as cotton seed (*Gossypium hirsutum*), African locust bean (*Parkia biglobosa*) and melon seed (*Citrullus vulgaris*) are fermented to produce soup condiments (Odunfa, 1981) which give pleasant aroma to soups and sauces. *Ogiri* is one of these fermented foods and is a condiment consumed in the Eastern and Western parts of Nigeria (David and Aderibigbe, 2010).

Mesquite seed (*Prosopis africana*) is one of the lesser-known legume seed-crop growing wild in Nigeria. The use of the dry seed as human food is limited due to its poor cooking quality. However, they are consumed as condiment (Obeta and Ugwuanyi, 1996). *Okpeye* is prepared from the seeds of *Prosopis africana* (Achi, 1992; Odibo *et al.*, 1992; Sanni,

1993). *Prosopis africana* is a perennial leguminous tree of the subfamily Mimosidae (Keay *et al.*, 1964) and is mostly found growing in the savanna regions of Western Africa. In many areas, its fermented seeds are used as food condiments (Agboola, 2005) and its young leaves and shoots are fodder that is highly sought for towards the end of the dry season.

Contamination of foods by insects' organisms remains one of the major public health problems worldwide (Nester *et al.*, 1998). Food-borne diseases are endemic in many developing countries and constitute a major cause of mortality in these areas.

Mader (2001) stated that insects are so numerous and so diverse. They are by far the largest group of arthropods, whether measured in terms of numbers of species or number of individuals (Johnson, 2003). Insects are food pests, in that they compete for or damage food resources, decreasing the amount available and/or acceptable for human consumption. Jordan and Verma (2010) opined that compared with beneficial insects, injurious insects are very

numerous. According to Gorham (1979) these insects can infest our food through; physical attack, mechanical transmission, and production of toxins and allergens by the insects themselves, leading to conditions such as nausea, intestinal trauma and allergic reactions.

Information documented on *ogiri* include: microbiology of *ogiri* production (Barber *et al.*, 1988), microbiology and proximate composition of *ogiri* (David and Aderibigbe, 2010) and comparative soluble nutrient value of *ogiri* (Oluwabukola *et al.*, 2012) among many others. However, literatures are scarce on insects associated with *ogiri*. Hence, the need to use pitfall traps in the investigation of insects associated *ogiri* produced from mesquite seed (*Prosopis africana*) as bait. The objectives of the study were to trap insects using *ogiri* as bait in pitfall traps, identify the insect taxa that were attracted and estimate the insect species diversity in pitfall traps baited with *ogiri*.

MATERIALS AND METHODS

Study Area

The study was carried out in a fallow plot in Awka located at the temporary site of the Nnamdi Azikiwe University, Awka. Awka is the capital of Anambra State with an estimated population of 301,657 inhabitants as of 2006 Nigeria census. Awka lies within coordinates 6°12_N and 7°04_E in the tropical zone of Nigeria (Onyido *et al.*, 2011). The fallow plot is located between latitude 6.2295°N and longitude 7.0612°E, position accuracy; 184m, altitude; 73m, altitude accuracy; 230.46m. The plot is characterized with varieties of leaf litters. The tree species dominated in this area include the *Diallum guineensis*, *Elaeis guineensis* and *Combretum molle*.

Sampling

The sampling technique used was pitfall trap. The study was carried out at one week interval for a period of seven weeks in the months of June and July, 2013. Six pitfall traps made of plastic containers; with mouth diameters of 11.3 cm and depth of 14.6 cm were used.

The traps were buried after excavating the soil such that the rims of the containers flushed with the surface of the soil. The traps were placed at random (about 1m apart) with the baits hanged on the plastics with a stick. The traps were filled to about one-third of the volume with water. The traps were examined daily and the insects caught recovered and sorted into species with the help of a dissecting microscope and preserved with 4% formalin. The insects were identified to species level (Boorman, 1981) and authenticated by an insect taxonomist in the Department of Crop Protection, Institute of Agricultural Research, Ahmadu Bello University, Zaria, Nigeria, where voucher specimens were kept as reference materials for further studies.

Analysis

The data collected was analyzed in percentages and presented as relative abundance.

RESULTS AND DISCUSSION

One hundred and ninety three (193) insect species belonging to six insect orders, twelve families and fourteen species were found to be associated with pitfall traps baited with *ogiri*. One hundred and forty two (142) insects with highest relative abundance (73.58%) belonged to Hymenoptera, followed by Orthoptera having a single species of 16 insects with relative abundance of 8.29%. The order Dermaptera had the least number of insects (5) with relative abundance of 2.59% (Table 1).

This study revealed that variation existed among the different insect orders attracted by *ogiri* from mesquite used as bait in the trapping of insects in a fallow plot in Awka.

The results showed that the family Formicidae had the highest number of insects (120) captured using *ogiri* from mesquite seed which comprised of *Dorylus afinis*, *Pheidole* sp., *Camponotus maculatus*, *Oecophylla longinoda* and *Camponotus perrisi* followed by the family Eurytomidae with 16 insects (both families are in the order Hymenoptera), while Calliphoridae had the least number of insects with one species.

Table 1: Insects trapped in pitfall traps baited with *ogiri* produced from mesquite seed in a fallow plot in Awka, Anambra State, South Eastern Nigeria

Order	Family	Species	Total number of insects trapped	Relative abundance (%)
Coleoptera	Tenebrionidae	<i>Peltioides</i> sp.	3.00	5.70
	Carabidae	<i>Metagonum subvitescens</i>	2.00	
	Scarabaedae	<i>Onthophagus gazelle</i>	6.00	
Collembola	Entomobryomopha		9.00	4.66
Dermaptera	Carcinophoridae	<i>Anisolabis</i> sp.	5.00	2.59
Dictyoptera	Blattidae	<i>Blatella</i> sp.	2.00	5.18
	Calliphoridae	<i>Chrysomyia albiceps</i>	1.00	
	Therevidae	<i>Schoutedenomyia</i> sp.	7.00	
Hymenoptera	Formicidae	<i>Dorylus afinis</i>	29.00	73.58
		<i>Pheidole</i> sp.	75.00	
		<i>Camponotus maculatus</i>	1.00	
		<i>Oecophylla longinoda</i>	6.00	
		<i>Camponotus perrisi</i> .	9.00	
	Eurytomidae	<i>Eurytoma</i> sp.	16.00	
	Braconidae	<i>Microdus</i> sp.	6.00	
Orthoptera	Gryllidae	<i>Acheta lefevrei</i>	16.00	8.29
Total			193	100

The Hymenopterans had relative abundance of 73.58%. The high trapping of the large number of the family Formicidae, was in line with the previous findings of Ewuim (1997), which indicated that the abundance of these ant species were as a result of their nesting foraging activities favoured by the vegetation on the fallow land. The order Orthoptera ranked second in the number of insects captured with relative abundance of 8.29%. The findings of this study agreed with the results of Boorman (1981) who reported that that high number of insect orders captured might be connected with their habitat and the nature of the environment since the Gryllids not only hide among vegetations, under stones or burrow in the ground, but are also omnivorous in feeding.

The present research linked the high number of captured insect species to the foraging activities on the bait, accidental dropping into the water trap, use of the baits as food and oviposition resources, olfactory response of species and pestiferous activities of species.

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