Insect species associated with the Physic nut *Jatropha curcas* L. (Euphorbiaceae) in Ilorin, Nigeria.

Uddin II, R.O., Liadi, M.T. and Ojoba E.M.

Department of Crop Protection, University of Ilorin, Ilorin, Nigeria.

e-mail of corresponding author: - ruddinll@yahoo.com

Abstract

A survey was conducted at the *Jatropha curcas* plantation of the University of Ilorin for both the harmattan and rainy season of 2010 to determine the different insects associated with the Physic nut, *Jatropha curcas* (Euphorbiaceae). There were five (5) species belonging to the Order Coleoptera, two (2) species belonging to the Order Hemiptera, three (3) species belonging to the Order Heteroptera, one (1) specie each, belonging to the Orders Hymenoptera and Lepidoptera, with two (2) species belonging to the Order Orthoptera. *Aphtona* sp. (Coleoptera: Chrysomelidae) was the most abundant insect for both the harmattan and rainy seasons and it caused the most damage on the field.

Keywords: Insects species, *Jatropha curcas* Survey

Introduction

The damage to the environment by oil and the imminent demise of this fossil fuel has forced many countries including Nigeria to carry out research on alternative sources such as oleaginous plants (Alfonso, 2007). *Jatropha curcas* (an important source of biodiesel) has been documented as a traditional medicinal plant in many countries (Nath and Dutta, 1992) and because of its insecticidal and molluscicidal effect; the oil can be used as a natural crop pesticide (Solsoloy, 1993). The energetic use of *J. Curcas* oil has increased in importance in recent years and has in some cases, replaced the use of fossil fuels (Henning, 1996). The use of Physic nut seed oil in car engines is reported in literature (Ishii and Takeuchi, 1987). Economic analyses have demonstrated that *J. curcas* fuel can compete with diesel fuel in villages in Mali (Demant and Gajo, 1992; Henning and von Mitzlaff, 1995).

Contrary to popular belief that the toxicity and insecticidal properties of *J. curcas* are sufficient deterrent for insects that cause economic damage in plantations, several groups of insects have overcome this barrier. The key pest in Nicaragua is identified as *Pachycoris klugii* Burmeister (Scutelleridae: Heteroptera) (Grimm and Maes, 1997). The yellow or golden beetle, *Aphtona* sp. Alticinae (Coleoptera: Chrysomelidae) is the main insect pest of *J. curcas* in Mozambique. Two insect pests that devastate *J. curcas* in plantation are the inflorescence and capsule-borer, *Pempelia morosalis* (Saalm Uller) and the scutellerid bug *Scutellera nobilis* Fabr., which causes flower fall and malformation of seeds (Chitra and Dhyani, 2006). A global list of phytophagous insects consisting of 60 species in 21 families and

4 Orders has been compiled in Australia, where *J. curcas* is considered as a weed (Smith and Heard, 2003).

This study is a preliminary survey to establish the insects associated with *J. curcas* in Ilorin, Nigeria, in order to understand better, the nature of relationship and the damage caused by these insects.

Materials and Methods

The survey was conducted at the *Jatropha curcas* plantation of the University of Ilorin in 2010 rainy season (July-November) and dry season (September, 2010 –February, 2011). The plantation was three (3) years old and had a total area of 45 acres. Two hundred (200) stands of the plant were randomly selected and sampled for insect pests of *J. curcas*. All insects found on the sampled stands were collected for identification. Crawling and resting insects were handpicked while larvae were collected using a Carmel hair brush and reared in the laboratory until the adult stage emerged. A 36 cm sweep net was used to catch insects flying over the sampled stands.

Counting of the insects was done early in the morning when the insects were not active. This was carried out thrice a week for the duration of the study. The collected insects were identified at the Insect Reference Museum of the Department of Crop Protection and Environmental Biology, University of Ibadan, Nigeria.

Results and Discussion

A total of 22 insect species were collected during the study but only 14 species were identified (Table 1). There were 9 species of defoliators belonging to the Orders Coleoptera, Hemiptera, Orthoptera and suborder Heteroptera. Two (2) species of insects belonging to the Orders Coleoptera and Hemiptera were associated with the stem. Three (3) species of insects in the Orders Coleoptera, Hymenoptera and Lepidoptera were associated with the flowers. One species in the Order Hymenoptera was found visiting the flower while one species in the suborder Heteroptera was found associated with the fruit.

Table 1. Insect pest species associated with *Jatropha curcas* in Ilorin, Nigeria

Order/Family	Insect species	Part attacked	No. in rainy season	No. in dry season	Total
COLEOPTERA					
Chrysomelidae	*Aphtona* sp. Chevrolat	Leaf/Flower	346	57	403
Lagridae	*Chrysolagria nairobena*	Leaf	24	4	28
	Lagria villosa (Fabricius)	Leaf	60	8	68
Scarabaeidae	*Cetoniinae polystalalatica* (Stellata Harold)	Flower/Leaf	45	10	55
	Melolonthinae trochalus verticilineatus (Branke)	Leaf/Stem	29	4	33
HEMIPTERA					
Coriedae	*Anoplocnemis curvipes* (Fabricius)	Leaf/Stem	0	2	2
	Clavigralla tomentosicollis (Stal.)	Leaf	0	2	2
HETEROPTERA					
Pentatomidae	*Acrosternum millierrei* Say	Leaf	6	7	13
	Halydicoris sp.	Leaf/Fruit	11	11	22
	Calidea nana (Herrich Schaffer)	Fruit	3	4	7
HYMENOPTERA					
Apidae	*Apis mellifera andansoni* Latreille	Flower	115	5	120
	Dactylurina standingeri	Flower	130	10	140
LEPIDOPTERA					
Gracillariidae	*Stomphastis* sp. Meyrick	Leaf	70	2	72
Pieridae	*Coliadinae* Swainson	Flower	1	0	1
Pyralidae	*Pempelia morosalis* Saalm Uller	Flower/Pod	250	98	348
ORTHOPTERA					
Pyrgomoorphidae	*Zonocerus variegatus* (Linnaeus)	Leaf	169	39	208
Tettigonidae	*Phaneroptera nana sparsa* (Stal.)	Leaf	24	14	38

Discussion

The results indicate that though different insects are associated with *J. curcas*, most of them are minor pests of the leaf. The golden flea beetle *Aphtona* sp. belonging to the Order Coleoptera appeared to be the major insect pest of the plant. Its population was high for both the dry and rainy seasons. It was found on both upper and lower leaf surfaces of young and mature leaves and causing holes of different sizes to occur. It has been recorded in Mozambique as the main pest of *J. curcas* (Grimm and Maes, 1997). *Apis mellifera* L., one of the insect's recorded on *J. curcas* is of economic importance. It help's in the production of honey and is now reared in commercial honey farms (Uddin ll and Adesiyun, 2011). *Clavigralla tomentosicollis* Stal and *Anoplocnemis curvipes* are pests of pigeon pea and cowpea.

Zonocerus variegatus L. (Elegant grasshopper) found on both the upper and lower leaf surfaces was seen feeding on the leaves of the plant. It recorded the second highest insect population after *Aphtona* sp. Overall the rainy season had a higher insect pest population than the dry season for the duration of the survey.

Stomphastis sp. feeds on leaves which cause mines to form in the leaves. These later dry out to form spots. While *P*

. morosalis the inflorescens and capsule borer webs and feeds on the inflorescens

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