

**Short Communication****The Occurrence and Severity of Infestation of Three Foliage Pests on *Jatropha curcas***¹* Alamu OT, ²Omoayena BO and ¹Amao AO¹Forestry Research Institute of Nigeria, Ibadan, Nigeria; ²Savanna Forestry Research Station, Samaru-Zaria, Nigeria

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Article History: Received: January 12, 2016 Revised: April 04, 2016 Accepted: April 08, 2016**ABSTRACT**

The occurrence and severity of three foliage pests were investigated on *Jatropha curcas* in Samaru - Zaria, Northwestern Nigeria. Visual observation, identification and counting of foliage pest organism were made on ten *Jatropha* plants each along the two diagonals in a *Jatropha* plantation. Three major pest organisms, Mealybug, *Paracoccus marginatus* (Homoptera: Pseudococcidae) Williams, mite, *Tetranychus* sp (Acharina: Tetranychidae) and blister leaf miner, *Stomphastis thraustica* (Lepidoptera: Gracillariidae) were identified on *Jatropha* foliage. Ninety five percent of *Jatropha* plants sampled were infested with either one or two of the pest organisms while 5% were not infested. Only 5.26% of the attacked plants showed single infestation while the remaining 89.74% showed multiple infestations. The highest number of *Jatropha* leaves infested per plant was caused by *S. thraustica* followed by *P. marginatus* and the least was recorded in *Tetranychus* sp. It was concluded that the three pest organisms identified on *Jatropha* in the study area could be a great threat to *Jatropha* production if they are left unchecked.

Key words: *Jatropha curcas*, pest organism, infestation, production constraints**INTRODUCTION**

Jatropha curcas L., a member of the family Euphorbiaceae, is a large drought-resistant multipurpose shrub. It has been noted for its environmental and economic purposes; and has evoked interest all over the tropics as a potential bio-fuel crop (Takeda, 1982; Martin and Mayeux, 1985; Jones and Miller, 1991; Openshaw, 2000). The seeds of *Jatropha* contain viscous oil, which can be used to manufacture candles, soap and as a diesel/paraffin substitute or extender. The latter use has important implications for meeting the demand for rural energy services and also exploring practical substitutes for fossil fuels to counter greenhouse gas accumulation in the atmosphere. *Jatropha* also provides a meal that serves as a highly nutritious and economic protein supplement in animal feed, if the toxins are removed (Becker and Makkar, 1998). The plant can be used to prevent soil erosion, to reclaim land, grown as a live fence, especially to exclude farm animals and also planted as a commercial crop (Heller, 1996). Various parts of the plant are of medicinal value, its bark contains tannin and the flowers are sources of pollen and nectar to honey bees. These characteristics along with its versatility make it of vital

importance to developing countries (Foidl and Kashyap, 1999).

One of the major constraints of *Jatropha* production is pest organisms. *Jatropha* is infested by many insect pests and often shows symptoms of fungal attacks. Significant losses have been reported, following damage caused by insects, fungi or viruses (Grimm, 1999; Narayana *et al.*, 2006; Gao *et al.*, 2010; Rao *et al.*, 2011; Rodrigues *et al.*, 2011). Grimm (1999) reported two scutellarid bug, *Scutellera nobilis* and *Chrysocoris purpureus*, grapevine thrips, *Rhipiphorothrips cruentatus* and *Jatropha* leaf webber, *Pempelia morosalis* as *Jatropha* pests. In East Africa, thrips, blue bug, mealybugs, whiteflies, cotton stainer bug and golden beetles were found to be devastating *Jatropha* plantation. The objective of this study is to examine the occurrence and severity of infestation of three foliage pests of *Jatropha curcas* in Zaria, northwestern Nigeria.

MATERIALS AND METHODS

Samaru, Zaria is located on latitude 12° 12" N and longitude 07° 37" E, at an altitude of 550-700 meters above sea level. It possesses a tropical continental climate

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with a pronounced dry season, lasting up to seven months (October - May). The rainy season lasts from May to September/October with long-term annual rainfall of 1040mm in about 90 rain days. The relatively deep tropical ferruginous soils and climate conditions of Zaria are suitable for and sustain a good cover of savanna woodland (Northern Guinea Savanna) with a variety of grasses, woody shrubs and short trees.

The study was conducted in 2012 in a 0.5 ha *Jatropha* plantation established in the premises of Savanna Forestry Research Station, Samaru- Zaria in 2009. The planting distance was 2 x 2 m along and within the rows respectively. The weed in plantation was managed by slashing using cutlass twice a year. At the onset of the rainy season in May, 2012 when the plants produced new leaves, ten *Jatropha* plants each were tagged along the two diagonals of the plantation at 6 m interval. Visual inspections of the foliage were made during the month of June, 2012 for the presence of foliage insect pests. Sampled pest organisms were preserved in glass vials containing 70% ethanol for identification. The number of plants infested with insects, number of leaves infested/plant and the number of insects on 10 leaves/plant were counted and recorded.

RESULTS AND DISCUSSION

The result showed that 95% of *Jatropha* plants sampled were infested with pest organisms (Figure 1). The presence of three pest organisms which include two insects and one mite was noted on *J. curcas* leaves. These insects were Mealybug, *Paracoccus marginatus* (Homoptera: Pseudococcidae) Williams, a mite, *Tetranychus* sp (Achari: Tetranychidae) and blister leaf miner, *Stomphastis thraustica* (Lepidoptera: Gracillariidae). It has been reported that the presence of leaf miner can be seen in the increasingly large brown patches on *Jatropha* leaves (Teren *et al.*, 2012). These patches are caused by the tiny insect larvae, which eat away at the leaf blades, by digging tunnels into them. Pupation takes place on the leaf surface, where pupae enclose themselves in a characteristic small white web, which give the foliage a speckled appearance (Teren *et al.*, 2012). Study has shown that blister miners under epidemics can cause severe loss to the chlorophyll thereby indirectly influencing the yield (Ranga *et al.*, 2010). Attacks by leaf miner have also been reported on *Jatropha* in India (Arif *et al.*, 2007; Shanker and Dhyani, 2006), Kenya (Otieno and Mwangi, 2009), Malaysia (Sajap, 2010), Mozambique (Gagnaux, 2009) and China (Xiao *et al.*, 2009; Xiao *et al.*, 2010).

Mites are non insect pests (acarina) on *Jatropha*. They possess piercing and sucking mouth parts with polyphagous feeding habit. They withdraw plant sap and cause the mesophyll tissues to collapse. Each feeding by mites led to the formation of chlorotic spot on the leaf which eventually cause leaf distortion and complete defoliation. The mealy bugs feed on leaves and fruits which results in chlorosis, yellowing, stunting, deformation, early leaf and fruit drop, and buildup of honeydew. Sooty mold growing on honeydew excreted by the mealy bugs interferes with photosynthesis.

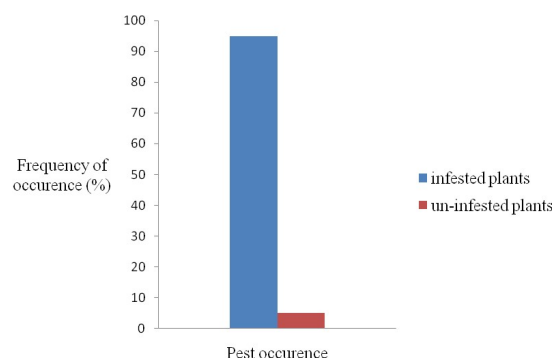


Fig. 1: Frequency distribution of infested and uninfested *Jatropha curcas* plants

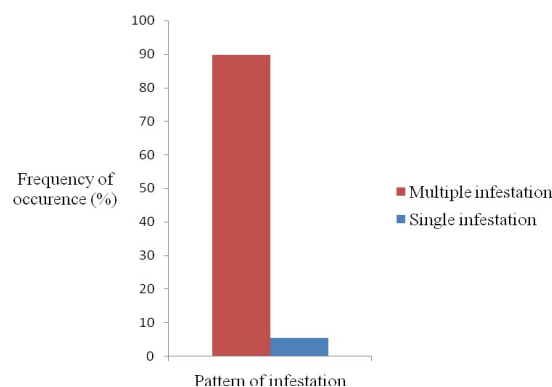


Fig. 2: Frequency distribution pattern of pest infestation on *Jatropha curcas* plant

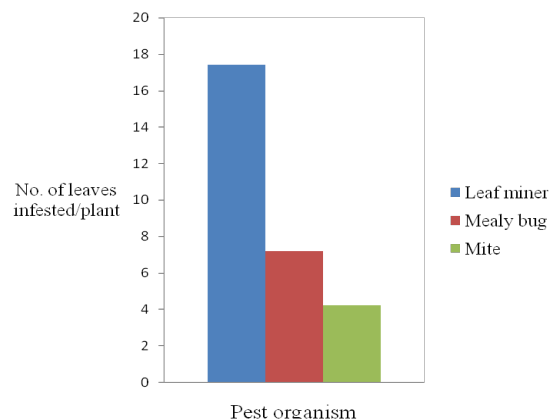


Fig. 3: Number of *Jatropha* leaves/plant infested by different pest organism

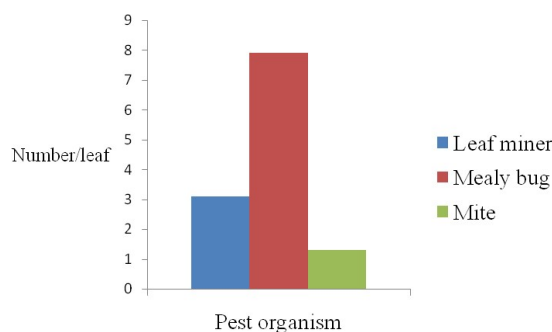


Fig. 4: Population of pest organism on *Jatropha* leaf

Multiple infestations were recorded on 89.74 % of *Jatropha* plants that were infested while 5.26% of the infested plants showed single infestation (Figure 2). An average of 4.2, 7.2 and 17.4 leaves per plant were infested by *Tetranychus* sp., *P. marginatus* and *S. thraustica* respectively (Figure 3). It has also been reported in Senegal that an average of 22 -32 % leaves/plant suffered damage from *S. thraustica* infestation (Teren *et al.*, 2012). The population of leaf miner/leaf was 3.1, while those of mealy bug and mite were 7.9 and 1.3 respectively (Figure 4).

These pest organisms if left unchecked may cause a severe damage and loss of yield to *Jatropha*. However, more studies are needed especially in Nigeria to determine the distribution, population dynamics and severity of damage caused by these pest organisms. These will go a long way to develop a pest management programme for these pests that pose threats to *Jatropha* production.

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