

Original Article

Agricultural
ScienceThe Use of Wood Ash for Insect Pests
Management by Paw-Paw Farmers in
Samaru and Shika, NigeriaPatrick Chiweta OKUTU ^{1,*}, Edna UYOBISERE ², Yohana Dawda DOWTIRO ³

ABSTRACT [ENGLISH/ANGLAIS]

A survey of insect pest management practices by paw-paw (*Carica papaya* L.) farmers was conducted in Samaru and Shika areas of Sabon-geri Local Government of Kaduna state, Nigeria in the Northern Guinea Savanna agro-ecological zone, in October and November 2013. The survey technique involved the selection of twelve farmers' fields at random at each site. Both paw-paw foliage and pods were observed for the presence of insect pests and parasites. Paw-paw pods were used for pod damage assessment. At Samaru, many paw-paw farmers did not spray agro-chemicals while few sprayed minimal agro-chemicals at peak period of flowering and others dusted their crops with wood ash. At Shika, the practice of pest management on paw-paw was similar to that of Samaru. The use of dusting with wood ash was observed to keep the incidence of pest attack on paw-paw in check and improved paw-paw pod quality as pod damage by insect pests was minimal. Thus, dusting paw-paw with wood ash should be recommended for farmers growing paw-paw in Northern Guinea Savanna agro-ecological zone of Nigeria.

Keywords: Paw-paw, wood ash, parasite, farmers' fields, survey technique, agro-ecological zone

RÉSUMÉ [FRANÇAIS/FRENCH]

Une enquête sur les pratiques de lutte contre les insectes par papaye (*Carica papaya* L.), les agriculteurs a été réalisée en Samaru et Shika domaines de Sabon -geri gouvernement local de l'Etat de Kaduna, au Nigeria dans la zone agro-écologique du Nord Guinée Savanna, en Octobre et Novembre 2013. La technique d'enquête a consisté à la sélection des champs de douze agriculteurs au hasard sur chaque site. Le feuillage papaye et les gousses ont été observés pour la présence d'insectes nuisibles et les parasites. Gousses de patte - patte ont été utilisés pour l'évaluation des dommages de la gousse. Au Samaru, de nombreux agriculteurs patte - patte ne pas vaporiser de produits agrochimiques alors que peu pulvérisé produits agro-chimiques minimales à la période de pointe de la floraison et d'autres dépoussiéré leurs cultures avec de la cendre de bois. À Shika, la pratique de la lutte antiparasitaire sur papaye était semblable à celle de Samaru. L'utilisation de dépoussiérage avec de la cendre de bois a été observée à maintenir l'incidence des attaques de ravageurs sur la patte - patte dans le contrôle et l'amélioration de la qualité papaye pod pod dommages par les insectes nuisibles a été minime. Ainsi, épousseter papaye avec de la cendre de bois doit être recommandé pour les agriculteurs papaye croissance dans le Nord de Guinée Savanna zone agro-écologique du Nigeria.

Mots-clés: Papaye, la cendre de bois, parasite, les champs des agriculteurs, la technique de l'enquête, la zone agro-écologique

Affiliations:

¹ Department of Agronomy, Institute for Agricultural Research, Ahmadu Bello University, P.M.B 1044, Samaru, Zaria, NIGERIA

² National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Samaru, Zaria, NIGERIA

³ Kabba College of Agriculture, Division of Agricultural Colleges, Ahmadu Bello University, Zaria, NIGERIA

Address for Correspondence/ Adresse pour la Correspondance: ddowntiro@yahoo.com

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INTRODUCTION

Paw-paw is an important crop in Nigeria and several Asian and African countries where it is both grown as a cash crop for domestic market and subsistence crop consumed as fresh fruit [2]. It is widely believed that farmers in Africa do not use agro-chemicals on their paw-paw crop relative to other crops and pesticides use in other regions of the world. Insect pests such as aphids which are vectors of viral diseases and mites which take

shelter in the foliage under the leaves induce lesions similar to the symptoms of virus infection in crop plants [2]. Parasites of foliage and pods such as leaf hoppers, white flies and thrips cause major losses to paw-paw as reported by Poulter [1]. Since there is little or no information available about farmer's pest management practices in Samaru and Shika areas of Kaduna state, Nigeria, a series of surveys were conducted in farmers' fields in October and November 2013 to collect

information about farmer’s perception of insect pests’ management on their paw-paw crop and the control practices which they commonly use.

MATERIALS AND METHODS

The survey technique involved the selection of twelve paw-paw fields at random at Samaru and Shika respectively depending on their accessibility from the roads. Both towns are located within the same agro-ecological zone i.e. Northern Guinea Savanna, Nigeria where the survey was conducted. Paw-paw plant foliage on the plant canopy were observed for the presence of foliage pests and damage, while 4 pod samples were collected per plant from the fields respectively. The pods were used for pod damage assessment. All farmers surveyed were interviewed about their perception of

insect pests’ crop damage levels and their pest management practices. Records on pests, natural enemies and cropping practices were made.

RESULTS AND DISCUSSION

In Samaru, farmers indicated that they did use some agro-chemicals for insect pests’ management on paw-paw in their farms. Few of these farmers indicated that they often use emulsifiable concentrate of an organo-phosphorus insecticide (perfekthion ®) to spray their crop at peak period of rainy season when the pods are just beginning to form; while most farmers do not use pesticides spray at all but others dust wood ash on their crop as ripening commences October and harvest is November through the incoming year.

Table 1: This Table shows Pesticide use and paw-paw pod damage in farmer’s fields in Samaru and Shika for October and November 2013

Farmers practice	Number of farmers	Pod damage (%) in October		Av No of farmers	Pod damage (%) in November	
		Range	Mean ± SD		Range	Mean ± SD
No spray	12	8.4-19.8,	13.4 ±3.8	17	12.3-15.8,	22.3 ± 12.6
Wood ash	11	5.8-15.7,	13.2 ± 3.7	15	11.5-25.4,	24.6 ± 13.2
One spray	4	8.6-16.8,	13.2 ± 4.3	5	7.3-14.6,	20.7 ± 15.3
Two spray	3	5.6-14.5,	11.3 ± 5.3	7	19.4-14.2,	21.4 ± 12.5

In Shika on the other hand, the survey showed that many of the farmers’ dusted wood ash often time and use very minimal agro-chemical sprays on their land race long-duration tall paw-paw crop mostly at the first fruiting of the plant after which they do not spray pesticides again in subsequent years due to the increased height of the plant. (35.4% of farmers surveyed in October and 54.3% of farmers surveyed in November 2013 indicated that they dusted wood ash both at Samaru and Shika). Dusting wood ash on the foliage and pods was particularly widespread in the subsistence crop growing areas of Samaru and Shika areas. The use of wood ash was observed to keep the incidence of pod damage by white flies and thrips low and also improved pod quality of paw-paw as this kept insect pest attack in check. The insecticides which were always in use were inappropriately used on cash crops such as cowpeas and cotton. The frequent use of pesticides in the cash crop growing areas is due to availability of such agro-chemicals through the pesticide vendors that hawk these chemicals from one village to another. Once any

pesticide was available on credit from the vendors for use on cash crops, it was also used frequently on other crops, paw-paw inclusive. However, high frequency of pesticide usage (more than 16% of farmers sprayed three times or less per season) was also associated with availability of such pesticides, but because farmers used the wrong chemicals, wrong doses/concentration and at the wrong time, foliage and pod damage levels were high in frequently sprayed fields compared to no spray and dusting with wood ash (table 1). Farmers in Samaru and Shika had used fungicides recommended for use on tomatoes to spray on paw-paw to check insect pest complex on this crop. This indicates farmer’s lack of knowledge in differentiating between insecticides and fungicides.

Farmers in Samaru paw-paw growing area had timed their insecticide spraying wrongly by spraying their crops before or after major insect pest infestations. Some farmers in this area had sprayed once with a synthetic pyrethroid Ambush® (permethrine) at flowering period thereby destroying natural enemies of pests and

previously innocuous or minor species now become major pests; while other farmers sprayed the same fungicide and insecticide once after podding.

Farmers in Shika had sprayed Ambush® on cotton which flowered earlier than the long-duration land race tall paw-paw plants and have expected the same insecticide spray to destroy insect pests on paw-paw a month later. This indicates lack of knowledge on the persistence of specific pesticides and the incidence of pests on different crop species in relation to their phenology. All the farmers surveyed were spraying their paw-paw crop using pesticide doses and spraying frequencies recommended for their priority cash crops i.e. cow peas, cotton and tomatoes. They claimed to have had no formal advice on paw-paw production technologies. In areas where farmers did not use conventional pesticides on their paw-paw crop, some of them dusted wood ash and they indicated that it was the traditional practice and that there was limited availability of the chemicals, which were highly priced, and they lacked spraying equipment, water and skill in the use of pesticides and spraying equipment.

CONCLUSION

The pest management problem by the surveys revealed the need to train farmers in Samaru and Shika and environ where pesticides are already in use on the proper use of spraying equipment and agricultural pesticides and on when it is more appropriate to use agro-chemicals on paw-paw and other arable crops. It also highlights the importance of scouting for pests and proper timing of insecticides applications especially on paw-paw to safeguard the health of farm families, farm animals and the environment. Moreover, there is need to screen pesticides and spraying equipment that are available within the local government area to identify the most effective and safest means of pesticide use on paw-paw.

The extension service in the state has to be involved in the training of farmers to enable them address the inappropriate use of agro-chemicals and timing of application of these chemicals. The use of synthetic chemicals on disease and pest control in crop plants is eliciting much concern owing to the undesirable side effects emanating from their use [4]. Residual effects of some of the pesticides sometimes pose problems to humans and his environment. Emphasis in recent times has been laid on non-chemical strategies to protect agricultural crops and human environment. The use of wood ash was observed to keep the incidence of pod damage low in paw-paw production and also improved pod quality of paw-paw as this kept insect pest attack in check. This is rekindling a renewed interest in the use of natural products from higher plants in the pest and disease management scheme in agriculture [3].

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CONFLICT OF INTEREST

No conflicts of interests were declared by authors.

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