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Assessing the Traditional Practices for Pest Management in Farmers Cropping Systems in Oyo State, Nigeria.

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ABSTRACT

The objective of this study was to assess the traditional practices used in controlling crop pests in Oyo state, Nigeria. The traditional practices underline the use of non-synthetic pesticides to safeguard the environment and human safety to alleviate the problem of negative effects associated with the use of synthetic pesticides. The study was conducted using a multistage sampling technique to select 320 farmers and imploring semi-structured interviews as data collection method. Data were described using descriptive statistics such as frequency counts, percentages, mean and standard deviation while, Pearson Product Moment Correlation (PPMC) was used to test the relationships among variables. The prominent traditional practices used for crop pest control identified by this study were mixture of cow dung and urine; garlic and ginger mixed with cow urine, fermented water of locust bean seeds and indigenous traps. It is really obvious from this study that farmers in the survey area were utilizing available natural resources to control crop pests within their cropping systems. The study, therefore recommends that the researchers or the environmental scientists should take a critical look at some of these practices through empirical experiments to ensure their safe use as well as maintaining a healthy environment.

Key words: Traditional practices, crop pests, environment, cropping systems

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INTRODUCTION

In many developing countries of the world, crop farmers are faced with the enormous production challenges associated with pests among others and thus resulting to the use of synthetic pesticides. In spite of the higher yield attributed to the use of these chemicals, it had been observed that pesticide use do affect negatively the environment and human health along with the economic losses [6].The attendant problems of pesticide usage include pest resistance to the chemicals, outbreak secondary pest, pesticide residue, environmental pollution and health hazards resulting from chemical application.. Crop pests include insects, weeds, birds, rodents and other vertebrates that have harmful effects on crops' growth and development, both in the field and during storage. The tremendous damage caused by these pests had posed great challenges to numerous farmers in the country. As a result of these negative effects associated with chemical use, there is a great need to develop an interest in the application of non-synthetic pesticides to control pests and thus safeguarding the environmental and human safety. It has been established that cropping diversity in agro-ecosystems can reduce the impact of pests and diseases [10]. The control of pests using traditional practices had been found to be a remarkable system of managing several pests [7]. Although many studies have reported the use of both chemical pesticides and non-pesticides methods in controlling crop pests, only a few had been able to document traditional practices in pest management within the various cropping systems in Nigeria. Therefore, in this study, an attempt was made to collect information on the traditional practices in use by farmers to control crop pests in the study area.

METHODOLOGY

The study was conducted in Oyo state, Nigeria. The state lies between latitudes 7^{0} 3′ and 9^{0} 12′ north of the equator and longitudes 2^{0}47′ and 4^{0}23′ east of the Meridian, with a land mass area of about 27, 249 square kilometres. it is bounded on the south by Ogun State, in the north by Kwara State, in the west it is partly bounded by Ogun State and partly by the Republic of Benin, while in the East by Osun State Oyo State has an equatorial climate with bimodal rainfall and relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. A multi-stage sampling procedure was used to select respondents for this study. The first stage include the random selection of two Local Government Areas (LGAs) from each of the four agricultural zones in the state. The LGAs

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included Ido and Akinyele in Ibadan/Ibarapa zone; Orire and Surulere in Ogbomoso zone; Saki east and Olorunsogo in Saki zone and Itesiwaju and Afijio in Oyo zone. The second stage included the random selection of two (2) villages from each of the selected LGAs and finally twenty (20) farmers were selected from each village to arrive at 320 respondents used for this study. Data were collected through the use of structured interview schedule and subjected to descriptive statistics such as mean, standard deviation, frequency count and percentages. The traditional practices considered in this study were: mixture of cow dung + cow urine, use of raw blood of the cow, a mixture of garlic and ginger, use of household ash, indigenous traps and the use of water from fermented locust bean seeds. The extent of use of traditional practices in pest control was measured as 'Always', 'Sometimes' 'Rarely' and 'Never' with assigned values of 3, 2, 1, and 0 respectively. Scores were weighted and farmers placed in three categories of users (High, Medium and Low).

RESULTS AND DISCUSSION

The information on personal characteristics of the respondents Table 1 shows that more than half of them fell within the age distribution of between 26 – 55 years with the mean age of 49.8 ± 8.12 years. This implies that most of the farmers were still in their active age and likely to make them more responsive to innovative methods of pest control. Farming activities were dominated by male farmers (75.3%) in the study area. The table further reveals that about two-thirds of the farmers had formal education and this high literacy level is likely to enhance their responsiveness to innovation adoption. More than half (60.3%) of the farmers had farm size within the range of 3 – 4 hectares with a mean farm size of 3.5 ± 1.4. This is an indication that they were smallholders. The finding is consistent with of that of Adeola [2] in his study on the farmers' perception of the locust bean tree in Oyo state. Table 1 further shows that the majority (84.1%) of the farmers had been farming for 10 years and above with the minority (5.9%) engaged in farming for less than 10 years and the mean farming experience was 24.1±11.5 years.

Table 1. Personal characteristics of farmers n = 320

Characteristics	Frequency	Percentage
Age (Years)		
26 – 35	17	5.2

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36 – 45	86	26.9
46 – 55	143	44.8
> 55	74	23.1
Mean = 49.8; SD = 8.12		
Sex		
Male	241	75.3
Female	79	24.7
Educational level		
No formal education	109	34.1
Primary education	147	45.9
Secondary education	44	13.8
Tertiary education	20	6.2
Mean year of formal Education = 6.2; SD = 5.9		
Farm size (Ha)		
1 – 2	63	19.7
3 – 4	193	60.3
5 – 6	53	16.6
> 6	11	3.4
Mean = 3.5; SD = 1.4		
Farming experience (Years)		
< 10	19	5.9
10 – 19	90	28.1
20 – 29	110	34.4
30 – 39	68	21.3
40 and above	33	10.3
Mean = 24.1; SD = 11.5		

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Source: Field survey, 2014.

Table 2 shows the cropping pattern of the farmers in the study area with the majority being maize based. The most practiced pattern was cassava –maize-yam (8 9.2%) followed by yam-maize-vegetable (86.7%) and cassava-cowpea-maize cropping pattern was least practiced by about one third (37.5%) of the farmers. The cropping system is expected to offer numerous advantages such as control of pest and disease; diversification of income source, soil and biodiversity conservation [4].

Table 2. Distribution of farmers by cropping pattern n = 320

Cropping pattern	***Frequency**	**Percentage**
Maize/cowpea/yam	253	79.2
Pepper/maize/melon	213	66.7
Cassava /maize/yam/	285	89.2
Yam/maize/vegetable	277	86.7
Maize/cowpea	123	38.3
Cassava/cowpea/maize	120	37.5

Source: Field survey, 2014. * Multiple Response recorded.

As shown in Table 3, insect pests constitute the major pest identified in the study area. Among the insect pests listed by the respondents were grasshoppers (92.3%), soldier ants (76.7%), stem borer (86.9%), cricket (53.2%) and termites (89.4%).The rodents mentioned by the respondents were rats (81.4%), grass cutters (50.8%) and squirrel (44.2%). Weed was also regarded as a pest by most (95.7%) of the farmers in the study area. This information on the common pests

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provided by the farmers could be based on their observation of these species' population, which might have reached a level that cause significant damage to the crops [3].

Table 3. Distribution of farmers by observed crop pests n = 320

Observed crop pests	*Frequency	Percentage
Rats	260	81.4
Grasshopper	295	92.3
Soldier ant	245	76.7
Grass cutter	163	50.8
Squirrel	141	44.2
Stem borer	278	86.9
Cricket	170	53.2
Weed	306	95.7
Termites	286	89.4

Source: Field survey, 2014. * Multiple Response recorded.

Data in Table 4 show the traditional practices employed by farmers to control crop pests in the study area. More than half (58.3%) of the farmers used mixture of cow dung + cow urine and mixture of garlic and ginger + cow urine (65.4%) to control pests on their farms. The decomposed mixture is usually spread on the terraces of the farms and it acts as repellent to insect pests. Use of household ash was a common pest control traditional practice adopted by most (92.3%) of the farmers. The ash is sprinkled on crop leaves (mostly vegetables) to act as corrosive materials and helps in desiccating water from insect body. Another popular traditional practice in the study area was indigenous traps used by majority (94.5%) of the farmers to control rodents on their farms. Other traditional practices identified with the farmers in the study area were fermented water from locust bean seeds (73.8%) and raw blood of the cow (13.4%)

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that act as repellent to birds. This is an indication that farmers in the study area made use of locally available natural resources that is economically viable and sustainable.

Table 4. Distribution of farmers according to traditional practices n = 320

Traditional practice	Frequency	Percentage
Mixture of cow dung + cow urine	186	58.3
Use of raw blood of cow	43	13.4
A mixture of garlic and ginger + cow urine	209	65.4
Use of household ash	295	92.2
Indigenous traps	302	94.5
Use of water from fermented locust bean seeds.	236	73.8

Source: Field survey, 2014.

Result in Table 5 shows that household ash was the traditional practice frequently used among farmer s in the study are with a mean of 2.8 ± 0.46 ($p < 0.01$) while raw cow blood was rarely used as a traditional practice in pest control with a mean of 1.4 ± 0.58 ($p < 0.01$). Household ash was observed to be widely used by the respondents probably due to availability throughout the cropping season.

Table 5. Distribution of farmers by the extent of use of traditional practices

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Practice	Always	Often	Rarely	Never	Mean	SD	Rank
Mixture of cow dung + cow urine	84 (26.3)	78 (24.4)	24 (7.5)	134 (41.9)	2.4	0.44	4th
Use of raw blood of cow	-	34 (10.6)	9 (2.8)	277 (86.6)	1.4	0.58	6th
Mixture of garlic and ginger + cow urine	102 (31.9)	95 (29.7)	12 (3.8)	111 (34.7)	2.5	0.58	3rd
Use of household ash	226 (70.6)	66 (20.6)	3 (0.9)	25 (7.8)	2.8	0.46	1st
Indigenous traps	102 (31.8)	194 (60.6)	6 (1.9)	18 (5.6)	2.3	0.48	5th
Use of water from fermented locust bean seeds.	109 (34.1)	85 (26.6)	42 (13.1)	84 (26.3)	2.6	0.66	2nd

Kendall's $W^a = 0.418$; $p < 0.01$; Figures in parenthesis are percentages.

Source: Field survey, 2014.

As shown in Table 6, more than two thirds (75.3%) of the farmers were medium users indicating they 'often' used traditional practices, while less than one quarter of them used the traditional practices 'always'. Only 7.8% of the farmers fell within the medium users category.

Table 6. Categorisation of farmers based on the extent of use of traditional practices

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Category	**Frequency**	**Percentage**
High	54	16.9%
Medium	241	75.3%
Low	25	7.8%
Total	**320**	**100**

Source: Field survey, 2014.

Available data in Table 6 reveal significant relationship ($p < 0.01$) between selected personal characteristics of the farmers and their extent of use of traditional practices in pest control. Age ($r = 0.400$) and farming experience ($r = 0.755$) were positively related to the extent of use of traditional practices. The positive relationships between the age; experience and the use of traditional practices is an indication that, older and more experienced farmers are likely to use traditional practices more than their younger and less experienced counterparts. The plausible reason for this may be due to the accumulated knowledge and experience of the older and experienced farmers in the farming systems [5], [1]. Years of formal education had negative and significant ($r = - 0.417$) relationship with the use of traditional practices implying that more educated farmers are likely to be less involved in the use of traditional practices for pest control. The high literacy level of farmers with more years of formal education may enable them to be well-versed in chemical pest management. Furthermore, farm size was negative and significantly ($r = 0.307$) related to the use of traditional practices in pest control. This is an indication that farmers with larger farm size will use less traditional practices compare with the farmers of smaller farm sizes. This may be due to certain opinion in some circles that traditional farming does not support or encourage large scale farming [8], [9].

Table 7. PPMC analysis of selected farmers' personal characteristics and extent of use of traditional practices

Variable	r – value	p –value	Remark
Age	0.400**	0.000	Significant
Farming experience	0.755**	0.005	Significant
Years of formal	-0.417**	0.000	Significant

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education			
Farm size	0.307**	0.008	Significant

**Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey, 2014.

Conclusion

It is obvious from this study that farmers in the study area were utilizing available local resources to control crop pests in their cropping systems. However, it is pertinent for the researchers to conduct experiments in order to incorporate some of these practices as essential components of Integrated Pest Management (IPM) concept. The validation of these practices may reveal some characteristics of few practices that may not be eco-friendly or capable of harming the ecosystem.

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References

[1] Adeola, R. G. (2012). Perceptions of Environmental Effects of Pesticides Use in Vegetable Production by Farmers in Ogbomoso, Nigeria. *Global Journal of Science Frontier* 12 (4): , 72 – 78

[2] Adeola, R. G. (2015). Farmers′ Perception *of African* Locust Bean Tree as an Economic tree in Oyo state, Nigeria *American International Journal of Research* 10 (2): 127-130

[3] Allara, A., Kugbei, S., Dusunceli, F. & Gbehounou, G. (2012).Coping with changes in cropping systems: plant pests and seeds FAO-OECD Workshop on Building Resilience for Adaptation to Climate Change in the Agri-culture Sector. Rome, Italy.

[4] Avelino, J., Hoopen, G.M. & DeClerck, A.J.F. (2011). Ecological mechanisms for pest and disease control in coffee and cacao agroecosystems of the neotropics. In Ecosystem services from agriculture and agroforestry: measurement and payment (ed. by

[5] Bonabana- Wabbi, J. (2002). Assessing Factors Affecting Adoption of Agricultural Technologies: The Case of Integrated Pest Management (IPM) in Kumi District, Eastern Uganda. Unpublished M.Sc. Thesis, Virginia Polytechnic Institute and State University.

[6] Ekström, G. & B. Ekbom. (2011). Pest control in agro-ecosystems: An ecological approach.

Critical Reviews in Plant Sciences 30:74-94.

[7] Firake D. M., Lytan, D., Thubru, D. P., Behere, G. T., Firake P. D. & Azad Thakur, N. S. (2013). Traditional Pest Management Practices and Beliefs of Different Ethnic Tribes of Meghalaya, North Eastern Himalaya. *Indian Journal of Hill Farming* 26(1):58-61

ISSN 2278-7763

[8] Kimhi, A. (2003). Plot size and maize productivity in Zambia: the inverse relationship revisited. Discussion Paper No. 10.03, Hebrew University of Jerusalem. Israel

[9] Matchaya, G. C. (2007): Does size of operated area matter? Evidence from Malawi's agricultural production. *International Journal of Agriculture and Rural Development* (2) 10:

114 -125

[10] Ratnadass, A., Fernandes, P., Avelino, J. & Habib, R. (2012). Plant species diversity for sustainable management of crop pests and diseases in agro-ecosystems: A review. *Agronomy for Sustainable Development* 32:273–303.

