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SUSCEPTIBILITY OF THE SELECTED CROPS IN STORAGE TO *SITOPHILUS ZEAMAIS* MOTSCHULSKY IN SOUTHWESTERN NIGERIA

Samuel Adelani Babarinde, Adebola Sosina, Ezekiel Iyiola Oyeyiola*

Department of Agronomy, Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, P.M.B. 4000, Ogbomoso, Nigeria

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Abstract: Susceptibility of the selected Nigerian cultivars of twelve crops to *Sitophilus zeamais* Motschulsky was evaluated in the laboratory (28 ± 2°C temperature and 69 ± 5% relative humidity). The crops were: maize (*Zea mays* L.), millet [*Pennisetum glaucum* (L.) X R. Br.], sorghum [*Sorghum bicolor* (L.) Moench], rice (*Oryza sativa* L.), and yam (*Dioscorea rotundata* Poir). Others were cassava (*Manihot esculenta* Crantz), pepper (*Capsicum annuum* L.), cowpea [*Vigna unguiculata* (L.) Walp], groundnut (*Arachis hypogaea* L.), melon [*Citrullus lanatus* (Thunb.)], soybean [*Glycine max* (L.) Merr.] and bambara groundnut [*Vigna subterranea* (L.) Verdc]. The result of antixenosis prescreen shows that *S. zeamais* preferred cereals and tubers to legumes and oil crops. *S. zeamais* preference for maize was highest at 1, 24 and 48 hours after infestation (HAI) and was not significantly different from its preference for pepper, millet, sorghum and yam. At 48 HAI, *S. zeamais* preference for cereals, tubers and pepper was not significantly different. Soybean and bambara groundnut were the least preferred species. The highest level of damage was observed in cereals and tubers. Millet suffered significantly greater damage than maize at 2–8 weeks after infestation (WAI). Damage done to maize was not significantly different from damage done to tubers at 6 and 8 WAI. Pepper, legumes and oil crops suffered significantly lower levels of damage than maize throughout the experimental period. Cumulative number of adult was significantly higher in small-seeded cereals than maize and was of the order: sorghum>millet>rice. Cowpea, soybean and pepper did not support reproduction and longevity of *S. zeamais*. Longevity was best supported by cassava. The results show that in storage, cereals and tubers were more susceptible to *S. zeamais* infestation than legumes, spices and oil crops.

Key words: Antixenosis prescreen, cultivars, cumulative adult, damage, *Sitophilus zeamais*

*Corresponding address:
samdelani@yahoo.com; Tel: +2348054765393

INTRODUCTION

Cultivation of varieties of crops is a common practice in many developing countries, although cropping systems involved differ from place to place. Even when the traditional men lacked the nutritional basis for handling varieties, it has been their idea, at least to change taste. It is therefore common in most African countries, that varieties of agricultural produce are obtained in the same market. The major groups are the protein-giving legumes, the energy-giving cereals, tubers and oil crops, the vitamin-giving fruits and vegetables and the spices used as condiments (Kordylas 1990).

A large percentage of these peasant farmers produce slightly above the levels of the immediate needs of their families. The option that readily comes handy is to store the excess till when it is needed for family consumption or for sales at a more economic period. Many of them also store their produce, especially the grains, as seed lots for the next planting season; since hybrids are either not available or unaffordable (Adesuyi 1997). Because of the several advantages obtainable in storage, some of them even subject the produce to some degree of post-harvest processing to extend their storability (Kordylas 1990; Gwinner *et al.* 1996). The type and levels of processing usually depend on available technology, cost implications, intended storage duration and intended uses to which the produce would be put.

Insects are major post-harvest pest of crops both at the farmers' and consumers' levels in the tropics (Lale and Ofuya 2001; Adedire 2003). The maize weevil, *Sitophilus zeamais* Motschulsky, a primary, field to store pest (Adedire 2001), starts to infest the ripening maize crop in the field when the grain moisture content is still 50–55%. Thus, when the farmers harvest the maize crop 6–8 weeks later, the weevil has already completed one generation, and laid eggs for the second generation (De Lima 1979). Reports from Africa (Hill and Waller 1990) also confirm the field-to-store infestation of *S. zeamais.*

The wickerwork hut type of storage facility which has a thatched roof and floor raised off the ground to about 1 meter or less (Appert 1987; Compton *et al.* 1993; Lale 2002) supports cross-infestation of pests. So there are other outdoor facilities (Kordylas 1990) common in the developing countries. In practice, majority of Nigerian peasant farmers rarely construct separate facilities for the varieties of their produce. Rather, they allocate different sections of the facility to the crops as they are harvested. This can also lead to cross infestation. A third possible source of cross-infestation is the open market.

In 2001, a strain of *S. zeamais* was found in Ife Brown, a Nigerian cultivar of cowpea (*Vigna unguiculata*) and was taken to the laboratory for observations (Babarinde, unpublished data). Although its population dynamics was not studied, it was noticed that the strain utilized the cowpea cultivars as its food with the evidence of leftover powdery materials in the kilner jars. Gupta *et al.* (1985) reported that a species of *Sitophilus, S. rugicollis,* infested seeds of sal (*Shorea robusta*), an oil crop, and damaged it. These cases were parts of our motivations for the present study, since several authors (Appert 1987; Gwmner *et al.*1996; Lale and Ofuya 2001; Lale 2002; Obeng-Ofori and Amiteye 2005) list *S. zeamais* as a major pest of cereals. Although, NRI (1996) lists a few non-cereals attacked by *S. zeamais,* works on their comparative susceptibility in Nigeria are scarce. The aspect that has received major attentions is susceptibility of different varieties of cereal crops to *Sitophilus* species (Dobie 1974; Gupta *et al.* 1999; Jha *et aI.* 1999; Ashamo 2005). The objective of this study is, therefore, to elucidate the host range of *S. zeamais* amidst the selected local cultivars in Nigeria and compare the damage levels with that of maize.

MATERIALS AND METHODS

a. *Sitophilus* culture

The initial stock of *S. zeamais* used for the experiment was obtained from the Entomology Unit of Agronomy Laboratory, Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, Nigeria. The weevils were reared on clean uninfested local white cultivar (Pajo) of maize (*Z. mays*) seeds in six 0.51 jars capped with muslin cloth under fluctuating ambient temperature and relative humidity of 28± 2°C and 69 ± 5% respectively. The jars were kept in a wire-netted and gauzed shelf to prevent attack from other pests and promote a stable condition for reproduction.

b. Cultivars used

The cultivars used were obtained from Sabo Market in Ogbomoso, in the forms at which farmers, suppliers and consumers usually handle them after minimum post-harvest processing. Table 1 gives a summary of the identities and the traditional minimum post-harvest processing of the cultivars.

Table 1. Crops studied with their traditional post-harvest processing

Botanical name	Common name	Post harvest processing
Zea mays	maize	threshing and winnowing
Pennisetum glaucum	millet	threshing and winnowing
Sorghum bicolor	sorghum	threshing and winnowing
Oryza sativa	rice	threshing and winnowing
Dioscorea rotundata	yam chips	parboiling and drying
Manihot esculenta	cassava chips	fermentation and drying
Capsicum annuum	pepper	parboiling and drying
Vigna unguiculata	cowpea	threshing and winnowing
Arachis hypogaea	groundnut	drying and decortication
Citrullus lanatus	melon	decortication and drying
Glycine max	soybean	threshing and winnowing
Vigna subterranean	bambara groundnut	decortication and drying

c. Antixenosis prescreen

A cardboard paper was cut into a circular shape of 12 cm radius. A 5 cm-radius circle was drawn with a pencil at the center of the cardboard. The ring between the two circles was then divided into 12 equal parts to form approximately 30 cm^2 area each (Fig. 1). The cardboard was then placed in a large plastic container of 12 cm radius (301 volume), and glued to the floor of the container to prevent the escape of insects to the underside of the cardboard at the base of the container. Twelve crops weighing 20 g each were randomly allocated to each 30 cm^2 subdivision. Forty insects were introduced into the 5 cm-radius inner circle. The plastic container was sealed at the top with a transparent polythene sheet which prevented insects' escape and allowed data collection. The experiment was replicated four times. Data on insect distribution were taken at 1, 24 and 48 h after infestation (HAI) in the free-choice chamber, and expressed as percentage of the initial population (40 insects) introduced.

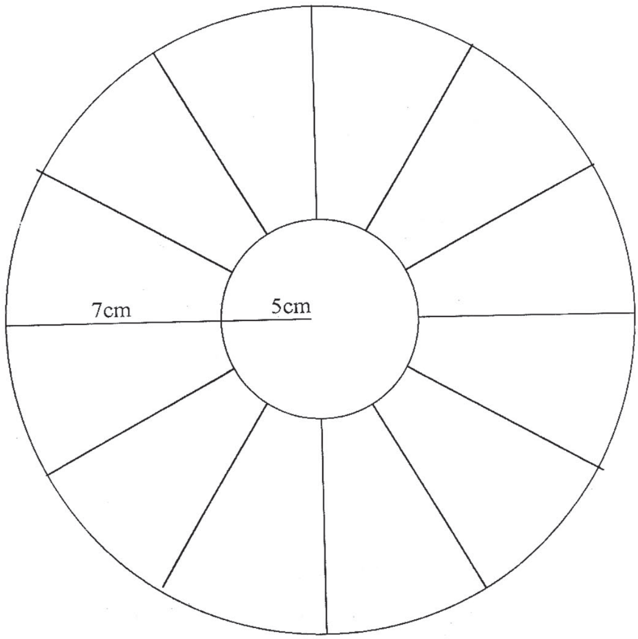

Fig. 1. Sketch of experimental design for antixenosis prescreen Forty S. *zeamais* adults were introduced into 5 cm-radius inner circle

d. Evaluation of damage potentials

Twenty five grammes of each crop was put in a non-choice chamber which was a 150 ml glass jar with lid to allow aeration and prevent insects' escape. Unlike the antixenosis prescreen, the insects were subjected to only one crop regardless of its preference. Ten unsexed, 5–10 day old *S. zeamais* adults were introduced into each jar. The treatments were replicated six times. At 2, 4, 6, 8 and 10 weeks after infestation (WAI), the insects and intact crop were separated from the powdered form. Data on percentage weight loss were taken with the aid of a sensitive electronic balance (Gibertini TM 1600, Italy) and the intact crop and the insects were returned into the jars.

e. Evaluation of breeding potentials

Twenty five grammes of each crop was put in glass jars similar in all respects to those used for the first experiment. Ten unsexed, 5–10 day old *S. zeamais* adults were introduced into the jars as parental generation (PI). There were six replicates. The introduced PI insects were not removed because some had bored into the crops. At 49 days after infestation (DAI), the cumulative number of insects was sorted into live and dead adults, and the data were recorded.

f. Experimental design and statistical analysis

Antixenosis prescreen and evaluation of breeding potentials were carried out using completely randomized design, while evaluation of damage potentials was carried using randomized complete block design. Percentage data were transformed to arcsine values while number of insects was log-transformed; after which data obtained were subjected to analysis of variance (ANOVA). Significant differences between means were determined by Least Significant difference (LSD) at 5% probability level (SAS Institute 1985).

RESULTS

a. Antixenosis prescreen

The result of antixenosis prescreen shows that *S. zeamais* preference for maize was highest at 1, 24 and 48 h after infestation (HAl), which was not significantly different from its preference for pepper, millet, sorghum and yam. Generally, at 1, 24 and 48 HAl, *S. zeamais* preferred cereals and tubers to legumes and oil crops. Among the cereals studied, rice (*Oryza sativa*) was least preferred in the free-choice chamber and the number of insects attracted to it was significantly lower than the number attracted to maize at 24 and 48 HAl. Of the legumes and oil crops, soybean (*Glycine max*) and bambara groundnut (*Vigna subterranea*) were the least preferred crops in all the antixenosis experiments (Table 2).

Table 2. Mean percentage of *S. zeamais* attracted by local cultivars of twelve crops

Crop type	Insects attracted to crop after		
	1 hr	24 hrs	48 hrs
Maize	16.9 (24.2)[a]	15.3 (23.0)	16.6 (24.0)
Millet	11.9 (20.1)	10.1(18.5)	12.7(20.8)
Sorghum	11.8 (20.0)	12.6 (20.9)	14.0 (219)
Rice	11.3 (19.6)	7.5 (15.9)	7.0 (15.3)
Yam chips	10.8 (19.0)	12.9 (20.2)	13.3 (21.5)
Cassava chips	7.3 (15.7)	10.5 (18.5)	10.0 (18.3)
Pepper	14.4 (22.3)	15.2 (22.9)	15.0 (22.7)
Cowpea	2.2 (8.5)	4.5 (12.1)	1.9 (8.0)
Groundnut	4.8 (12.7)	3.2 (10.2)	1.2 (5.8)
Melon	4.2 (11.8)	6.0 (14.2)	3.9 (11.3)
Soybean	1.8 (7.7)	0.4 (2.3)	0.9 (4.8)
Bambara groundnut	0.4 (2.3)	0.8 (4.6)	0.4 (2.4)
LSD (0.05)	5.2	5.1	7.0
SED	2.6	2.6	3.5

[a] Figures in parentheses are arcsine values to which SED and LSD are applicable. Each value is a mean of 4 replicates

b. Evaluation of damage potentials

Table 3 shows that in the non-choice chamber, storage duration had a significant effect on level of damage. Damage done to cereals and tubers was significantly higher than damage done to oil crops and legumes. At 2, 4, 6 and 8 weeks after infestation (WAI), damage done to millet was significantly higher than damage done to maize. Damage done to maize was not significantly different from damage done to tubers at 6 and 8 WAI. Damage done to pepper was significantly lower than damage done to tubers and cereals but was not significantly different from damage done to groundnut (*Arachis hypogaea*). Cowpea, soybean and bambara groundnut had significantly least level of damage.

Table 3. Percentage weight loss due to *S. zeamais* feeding on local cultivars of twelve crops

Crop type	Weight loss [g] after				
	2 weeks	4 weeks	6 weeks	8 weeks	10 weeks
Maize	1.3 (6.9)	3.3 (10.5)	4.0 (11.5)	5.5 (13.8)	8.0 (16.4)
Millet	3.8 (11.0)	4.8 (12.7)	6.0 (14.1)	7.1 (15.5)	8.5 (170)
Sorghum	0.8 (4.5)	1.8 (7.9)	3.0 (10.1)	4.9 (12.7)	8.3 (16.7)
Rice	3.9 (11.2)	4.5 (12.2)	5. 2 (13.5)	6.2 (14.6)	7.0 (15.4)
Yam Chips	3.8 (11.0)	4.8 (12.6)	5.1 (13.3)	5.7 (13.9)	6.5 (14.8)
Cassava Chips	1.5 (7.6)	2.5 (9.1)	3.9 (11.3)	5.7 (13.9)	8.8 (17 3)
Pepper	0.4 (2.6)	0.5 (3.9)	0.9 (4.9)	1.2 (6.3)	1.5 (7.6)
Cowpea	0.0 (0.0)	0.1 (0.4)	0.1 (0.4)	0.1(0.4)	0.1(0.4)
Groundnut	0.6 (4.2)	0.7 (4.8)	1.0 (5.7)	1.0 (5.6)	1.0 (5.6)
Melon	1.2 (6.2)	1.3 (7.0)	1.4 (7.3)	1.4 (7.4)	1.4 (7.4)
Soybean	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.1)	0.0 (0.1)
Bambara groundnut	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.1)	0.0(0.1)
LSD (0.05)	1.8	1.9	1.7	1.6	1.4
SED	0.9	0.9	0.8	0.8	0.7

[a] Figures in parentheses are arcsine values to which SED and LSD are applicable. Each value is a mean of 6 replicates

c. Evaluation of breeding potentials

In the non-choice chamber, cumulative number of adult was significantly higher in small-seeded cereals than maize and followed the order: sorghum>millet>rice (Table 4). Cowpea, soybean and pepper did not support reproduction and longevity of *S. zeamais* and all P1 adults that were introduced into the rearing chambers died. Cassava gave the greatest support to *S. zeamais* longevity and no adult died on this medium.

Table 4. Influence of crop type on reproduction and longevity of *S. zeamais*

Crop type	Number of	
	live insect	dead insect
Maize	10.6 (3.3)[a]	1.9 (1.4)
Millet	42.2 (6.5)	0.4 (0.6)
Sorghum	57.1 (7.6)	8.0 (2.8)
Rice	17.6 (4.2)	2.9 (1.7)
Yam Chips	17.5 (4.2)	1.5 (1.3)
Cassava Chips	11.6 (3.4)	0.0 (0.0)
Pepper	0.0 (0.0)	10.0 (3.2)
Cowpea	0.0 (0.0)	10.0 (3.2)
Groundnut	0.5 (0.7)	8.9 (3.0)
Melon	0.5 (0.7)	8.9 (3.0)
Soybean	0.0 (0.0)	10.0 (3.2)
Bambara groundnut	3.3 (1.8)	6.3 (2.5)
LSD (0.05)	0.7	0.5
SED	0.4	0.2

[a] Figures in parentheses are log transformation to which SED and LSD are applicable. Each value is a mean of 6 replicates

DISCUSSION

The results indicate that *S. zeamais* posed greater risks to cereals and tubers than legumes, spices and oil crops at post harvest in southwestern Nigeria. This finding is of great economic significance especially to the tropical peasant farmers who store varieties of their produce in storage facilities which can support cross-infestation of pests. A high percentage of *S. zeamais* attracted to maize was not a new finding. Several authors (Haines 1991; Adedire 2001; Lale 2002; Obeng-Ofori and Amiteye 2005) reported it as a major cosmopolitan pest of maize. However, its preference for pepper in the free-choice chamber was a new disclosure. The preference of *S. zeamais* for pepper possibly indicated that certain odoriferous compounds in the pepper cultivar that was studied evoked strong smell which attracted and kept the insect for a period. This also suggests the tendency of encountering *S. zeamais* in stored pepper. The poor preference of *S. zeamais* for oil crops and legumes indicated lack of attractant odoriferous compounds in the studied cultivars. This reduces the tendency of *S. zeamais* in oil crops and legumes in storage. In a survey conducted in 1980–1981 in some states of Nigeria, *S. zeamais* was not encountered in cowpea and groundnut samples (Williams *et al.* 1982).

S. zeamais caused significant damage on carbohydrate-rich cereals and tubers. Apart from the presence of *S. zeamais*-preferred nutrients in yam and cassava, their lack of protective seed coat predisposed them to damage by the insect's feeding. The failure of *S. zeamais* to feed on oil crops and legumes could be due to physical and biochemical characteristics of the studied cultivars. The studied bambara groundnut and soybean have slippery seed coats which prevented *S. zeamais'* feeding. Trypsin and chemotrypsin inhibitors, hytohemagglutinin, cysteine proteinase inhibitor and even tannic acids, have been proposed as possible factors, which could be responsible for resistance to bruchid infestation in pulses (Lale 2002). Groundnut and soybean have fatty acids which affected *S. zeamais* feeding and reproduction. Several authors (Ivbijaro *et al*. 1985; Singal and Singh 1990; Cockfeild 1992; Obeng-Ofori and Amiteye 2005) have reported the potency of groundnut and/or soybean oils in controlling stored product insect pests. Though, pepper attracted *S. zeamais,* the insect did not feed on it because it contained capsaicin (Ayensu 1981) which had toxic or antinutritonal properties against *S. zeamais.* When compared with maize, the less-vitreous endosperm of the small-seeded cereals (especially sorghum and millet) supported higher numbers of *S. zeamais* adults. This implies that the early instars of *S. zeamais* encountered fewer problems in their feeding which eventually increased their survivability. Adults that were initially introduced into pepper and cowpea died of starvation after a few days because the crops did not supply appropriate nutrients to the insect. Longevity of *S. zemais* was most supported by cassava. Availability of appropriate nutrients and adequate surface area for insect biological activities were the possible reasons for that finding. It therefore implies that cassava stores have a high risk of cross-infestation and a risk of increase of *S. zeamais* threshold in the ecology.

Though *S. zeamais* could be occasionally encountered in stored pepper, this study reveals that the insect would eventually starve to death. Controlling *S. zeamais* in stored pepper is, therefore, not necessary; if the tendency of cross-infestation is not paramount. However, in areas where cross-infestation of storage pest is imminent, the produce that may be predisposed to *S. zeamais* attacks are the cereals and tubers. Efforts to control the insect should, therefore, be intensified whenever the crops are infested.

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REFERENCES

Adedire C.0. 2001. Biology, ecology and control of insect pest of stored cereals grains. p. 59–94. In: "Pest of Stored Cereals and Pulses in Nigeria – Biology, Ecology and Control" (T.I. Ofuya, N.E.S. Lale, eds.). Dave Collins publications, Akure, Nigeria.

Adedire C.0. 2003. Use of nutmeg *Myristica fragrans* (Houtt.) powder oil for the control of cowpea storage bruchid, *Callosobruchus maculatus* Fabricius. J. Plant Dise. Protect. 109 (2): 1931–199.

Adesuyi S.A. 1997. Preservation of grains in the tropics with special reference to Nigeria. Appl. Trop. Agric. 2: 50–56.

Appert J. 1987. The Storage of Food Grains and Seeds. Macmillan Publishers Ltd, London, 146 pp.

Ashamo M.O. 2005. Integration of varietal résistance and nutmeg, *Myristica fragrans*

(Houtt.) oil in protecting post-harvest infestation by *Sitophilus oryzae* (L.) in rice. J. Entomol. Res. 29 (4): 259–263.

Ayensu E.S. 1981. Medicinal Plants of the West Indies. Michigan, US, Reference Publications.

Cockfeild S.D. 1992. Groundnut oil application and varietal resistance for control of *Callosobruchus maculatus* (F.) in cowpea grain in the Gambia. Trop. Pest Manage. 38 (3): 268–270.

Compton J.A.F., Tyler P.S., Hindmarsh P.S., Golob P., Boxall R.A., Haines C.P. 1993. Reducing losses in small farm grain storage in the tropics. Trop. Sci. 33: 283–318.

De Lima C.P.F. 1979. The conduct of field infestation surveys and the economic use of their results. p. 47–65. In: Proceedings of 1st International Working Conference on Stored Products Entomology, Savannah, USA.

Dobie P. 1974. The laboratory assessment of the inherent susceptibility of maize varieties to post-harvest infestation by *Sitophilus zeamais* Motch. (Coloeptera: Curculionidae). J. Stored Prod. Res. 10: 183–197.

Gwinner J., Harnisch R., Muck C. 1996. Manual on the Prevention of Post-Harvest Grain Losses. Post harvest Project by GTZ, Eschborn, Germany, 294 pp.

Gupta S.S., Ghoshchanduri P., Majundar K.K., Chakrabarty M.M., Raha T.K., Bhattacharyya D.K. 1985. A study of insects and fungal infestation of sal (*Shorea robusta*) seed. J. Oil Tech. Ass. Ind. 17 (3): 56–57.

Gupta A.K., Behal S.R., Awasthi B.K., Verma R.A. 1999. Screening of some maize genotypes against *Sitophilus oryzae.* Ind. J. Entomol. 61 (3): 265–268.

Haines C.P. 1991. Insects and Arachnids of Tropical Stored Products: Their Biology and Identification. A training manual. Natural Resources Institute, Chatham, Kent UK, 246 pp.

Hill D.S., Waller L.M. 1990. Pest and Disease of Tropical Crops. Volume 2: Field handbook. Longman Scientific and Technical, UK, 432 pp.

Ivbijaro M.F., Ligan C., Youdeowei A. 1985. Control of rice weevil, *Sitophilus oryzae* (L.) in stored maize with vegetable oils. Agric., Ecosyst. Environ. 14: 237–242.

Jha A.N., Khanna S.C., Singh S. 1999. Olfactory response of insect pests of stored grains to wheat cultivars. Ind. J. Entomol. 61 (3): 288–290.

Kordylas J.M. 1990. Processing and Preservation of Tropical and Subtropical Foods. Macmillan Ltd, London, 414 pp.

Lale N.E.S. 2002. Stored Product Entomology and Acarology in Tropical Africa. Mole Publications Ltd, Maiduguri, Nigeria, 204 pp.

Lale N.E.S., Ofuya T.I. 2001. Overview of pest problems and control in the tropical storage environment. p. 1–23. In: "Pest of Stored Cereals and Pulses in Nigeria – Biology, Ecology and Control" (T.I. Ofuya, N.E.S. Lale, eds.). Dave Collins Publications, Akure, Nigeria.

NRI 1996. Insect Pest of Nigerian Crops: Identification, Biology and Control. Natural Resources Institute, Chatham, UK, 253 pp.

Obeng-Ofori D., Amiteye S. 2005. Efficacy of mixing vegetable oils with pirimiphos methyl against the maize weevil, *Sitophilus zeamais* Motschulsky in stored maize. J. Stored Products. Res. 41: 57–66.

SAS Institute 1985. SAS/STAT User's guide. Cary NC.

Singal S.K., Singh Z. 1990. Studies of plant oil as surface protectants beetle, *Callosobruchus chinensis* (L.) in chickpea *Cicer arietinum.* Trop. Pest Manage. 36 (3): 314–316.

Williams J.O., Odeyemi O.O., Mbata G.N. 1982. Survey of insect problems of stored cowpeas and groundnuts from Kwara, Niger, Oyo and Ondo States of Nigeria. Nigeria Stored Product Research Institute. Tech. Rep. 6: 69–75.

POLISH SUMMARY

PODATNOŚĆ NIEKTÓRYCH MAGAZYNOWANYCH PLONÓW NA WOŁKA KUKRYDZOWEGO (*SITOPHILUS ZEAMAIS* MOTSCHULSKY) W POŁUDNIOWO-ZACHODNIEJ NIGERII

W warunkach laboratoryjnych (temp. 28±2°C; względna wilgotność 9±5%) oceniono podatność wybranych nigeryjskich gatunków roślin na wołka kukurydzowego (*Sitophilus zeamais* Motschulsky). Roślinami tymi były: kukurydza (*Zea mays* L.), proso [*Pennisetum glaucum* (L.) X R. Br.], sorgo [*Sorghum bicolor* (L.) Moench], ryż (*Oryza sativa* L.) i słodkie ziemniaki (*Dioscotea rotundata* Poir). Ponadto przetestowano: maniok (*Manihot esculenta* Crantz), pieprz (*Capsicum annuum* L.) fasolę [*Vigna unguiculata* (L.) Walp], orzechy ziemne (*Arachis hypogaea* L.) melony [*Citrullus lanatus* (Thunb.)], soję [*Glycine max* (L.) Merr.] oraz orzechy Bambara [*Vigna subterranea* (L.) Verdc.]. Preferencja wołka w stosunku do kukurydzy była największa 1, 24 i 48 godzin po nalocie i nie różniła się istotnie od jego preferencji w stosunku do pieprzu, prosa, sorgo i słodkich ziemniaków. W 48 godzin po nalocie, preferencja *S. zeamais* w stosunku do zbóż, bulw i pieprzu nie różniła się istotnie. Soja i orzechy Bambara były najmniej preferowanymi gatunkami. Najwięcej szkód zaobserwowano w zbożach i bulwach. Proso ucierpiało znacznie bardziej niż kukurydza. W 2 i 8 tygodni po nalocie szkody w przypadku kukurydzy nie różniły się istotnie od uszkodzeń bulw. W okresie badań, pieprz, strączkowe i rośliny olejowe ucierpiały znacznie mniej niż kukurydza. Liczba dorosłych osobników była istotnie wyższa w przypadku roślin o małych nasionach niż dla kukurydzy i malała następująco: sorgo > proso > ryż. Fasola, soja i pieprz nie powodowały takiej reprodukcji i okresu życia *S. zeamais*. jak kukurydza. Najdłużej osobniki żyły na manioku. Wyniki wskazują, że podczas magazynowania, zboża i bulwy były bardziej podatne na wołka niż nasiona strączkowych i oleistych odmian roślin.