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SHORT COMMUNICATION

EFFICACY OF BUSH PEPPER (*Piper guineensis*) IN THE CONTROL OF MOLD FUNGUS IN STORED MAIZE (*ZEA MAYS* L.) SEEDS

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Maize (*Zea mays L.*) is one of the world's three most important cereal crops. It is cultivated in a wider range of environments than wheat and rice because of its greater adaptability (Kogbe & Adediran, 2003). Maize is high yielding, easy to process, readily digested, and cheaper than other cereal (Pearson & Wicklow, 2006). Currently, its global production area is about 140 million hectares of which approximately 96 million hectares are in the developing countries (IITA, 2006).

In industrialized countries, maize is largely used as livestock feed and as raw material for industrial products, while in developing countries, it is mainly used for human consumption (IITA, 2006).

An array of diseases Including downy mildew, rust, leaf blight, stalk and ear rots, leaf spot and maize streak virus plagues maize growing areas in sub-Saharan Africa. Insect pests, including stem and ear borers, armyworms, cutworms, grain moths, beetles, weevils, grain borers, rootworms and white grubs are also a great threat profitable production in Africa (IITA, 2006).

In Nigeria and other parts of the world, most indigenous plant materials such as Neem (*Azadirachta indica*), Bush pepper (*Piper guineensis*), scent leaf (*Ocimum viridis*) have been used in different capacities as pesticides (Abila *et al*., 1993; Asalwalam, 2006). *P. guineensis* is used as anti convulsant; extract of *P. guineensis* has been reported to enhance digestion of food by stimulating secretion of digestive enzymes (Platel & Srinivasan, 2000).

Having acknowledged the importance of *P. guineensis* in the control of maize weevil, the present study therefore aimed at investigating the potentials of its seeds powder extract in the control of mold fungus in maize seed storage.

The experiment was conducted in the laboratory of the Department of Crop Science and Biotechnology, Faculty of Agriculture and Veterinary Medicine Imo State University, Owerri, using Completely Randomize Design (CRD) with five treatment levels, replicated four times. The maize (DMRD- yellow) was collected from the Technical Service Department of the Imo state Agricultural Development Programme, (ADP) Owerri while the *P guineensis* seeds were collected from the botanical garden of the Imo University, Owerri.

Both the maize and the *P. guineensis* seeds were sun-dried for 7 days after which, the *P. guineensis* seeds were ground to fine powder. The maize seeds were weighed 0.5 kg each and placed in 20 air-tight plastic containers, while the treatments (*P. guineensis* powder extract) were measured in the following levels; 0 g, 10 g, 20 g, 30 g, and 40 g with the 0g level representing the control.

The experiment was set up and monitored for 30 days and the following observations made and recorded.

- Number of weevil-damaged maize seeds per treatment.
- Number of weevils in the maize seeds per treatment
- Number of discolored maize seeds per treatment

The data generated were subjected to analysis of variance. Treatment means were separated with the Duncan Multiple Range Test as described by Onuh & Igwemma (2001).

Results of this study showed that P. guineensis powder extract had significant effect in the control of the maize weevil (S. zeamiase) in the storage. There was significant difference ($P < 0.05$) in the mean number of live weevils recorded in the different levels of the powder extract and the control experiment. Even though, the result presented in the Table 1 did not indicate significant difference among the different levels of the powder extract, it is pertinent to observe that insecticidal property of the powder extracts increased with the increase in the concentration of the extract. This was evidenced by the low number of live weevils recorded in the 40g level of the powder extract (Table 1). The levels of treatments had no significant difference ($P < 0.05$) in their potential as protectants to the maize seeds.

But a significant difference was observed between the treated maize seeds and the untreated ones. The highest number (11.11) of weevil damaged maize seeds was observed from the seeds treated with 0g of *P. guineensis* seed powder extract, and this was significantly different from the lowest number (0.44) of weevil - damaged seeds observed from maize seeds that received 40 g of *Piper guineensis* seed powder extract (Table 1).

Table 1 also showed that *P. guineensis* seed powder extract had the potentials of protecting maize seed from discolouration caused by mold fugue as the untreated seeds gave the highest mean number (1.80) of discolored seeds which was significantly different from the least mean number (0.0) of discoloured seeds observed from the maize seeds that received 40 g of the powder extract. Table 1 also showed that there was reduction in the mean number of discolored maize seeds as the level of the *P. guineensis* seed powder extract increases.

TABLE 1. EFFECT OF *P. guineensis* ON THE POST HARVEST PHYSIOLOGY OF MAIZE SEEDS.

Level of *P. guineensis* seed powder extracts (treatments)	Mean No of weevil in maize seeds	Mean No of damaged maize seeds	Mean number of discoloured maize seeds
10g	1.0[b]	1.6[b]	0.80[b]
20g	1.56[b]	1.33[b]	0.40[b]
30g	1.33[b]	1.89[b]	0.20[b]
40g	0.11[b]	0.44[b]	0.00[c]
0g	2.33[a]	11.11[a]	1.80[a]

Means with the same letter(s) in the same columns are not significantly different at $p \leq 0.05$

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The results of this experiment supported earlier finding (Asawalam, 2006) that reported the effectiveness of *P. guineensis* seed extract in the control of stored maize weevils. It was observed that higher levels of *P. guineensis* seed powder extract resulted in the reduction in the number of maize weevils in the stored maize seeds. This observation conformed to the report of Oji *et al.,* (1990) who observed that increase in the level of concentration of the active ingredient in the ground *P. guineensis* significantly reduced the population of weevils in stored maize seeds. More seeds were observed to be damaged by the weevils especially in the seeds that did not receive any treatment but fewer numbers of damaged seeds were observed in the treated seeds. This, according to Asawalam (2006) could be due to the effectiveness of the applied powder in hindering oviposition of the weevil.

Maize seed discoloration was minimal in the seeds that received the powdered extract but higher in the untreated maize seeds. Discoloration of the stored maize seeds was an indication of mold fungal infection. According to Halfon & Bakai (1990), change of color of stored maize was an indication of seed infection. The reduced number of discolored maize seeds observed in the *P. guineesis* powdered seeds could be an indication that plant extract has the potential of controlling mold fungus infection in stored maize seeds. Werner (1980) had earlier observed that an increase in the temperature of the storage environment enhances the elimination of moisture from the treated seeds, preventing mold infection, while the condensation of moisture in the untreated seeds encourages mold infection of the seeds.

From the above results it is concluded that *P. guineesis,* earlier reported by Oji *et al.,* (1990) and Asawalam (2006) has the potential of controlling *S. zeamarise* in stored maize seeds. However to achieve better result, concentration of the treatment needs to be increased. The results also gave an indication that *P. guineensis* seed powder extract has the ability to prevent maize seeds from being infected by mold fungus in the storage.

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