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EVALUATION OF FUNGAL PATHOGENS OF *PIPER GUINEENSE* SEEDS AND THEIR EFFECTS ON GERMINATION.

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ABSTRACT

Fungal pathogens associated with the seeds of *Piper guineense* harvested from five different forests in five different locations in Southeastern Nigeria were evaluated. Two major pathogens (*Rhizopus stolonifer* and *Trichoderma*) were found to associate with the seeds. *R. stolonifer* being the most common inhibited germination while *Trichoderma* prolonged the germination period of the seeds.

INTRODUCTION

Piper guineense is one of the local spices that are used by many households in Southeastern (S.E) part of Nigeria. The leaves are used in making palatable soups while the seeds as seasoning for foods meant for nursing mothers in many areas of the Country. *P. guineense* belongs to the family Piperaceae. It is characterized by pendant, catin-like dense spikes of small flowers with the absence of a perianth but the presence of a subtending floral bract (Cobley and Steele, 1986). The ovary contains one ovule which produces a small, indehiscent dry on flush drupe while the inflorescence are borne opposite the leaves on fruiting branch (Alu, 1993). The crop is commonly propagated through stem cuttings taken near the top of actively growing young shoot. Propagation by seeds is rarely practiced due to difficulties encountered by the local farmers.

The propagation of this crop by seed is challenged by the activities of some fungal pathogens which have led to the endangering of the crop. This research is geared towards the identification of those fungal pathogens that are militating against the propagation of the crop through seeds.

MATERIALS AND METHODS Seeds of *P. guineense* were harvested from forests in five different location representing the five states of S.E. Nigeria. The locations include Isuochi (Abia State), Ishiagu (Ebonyi State), Awgu (Enugu State), Umulolo (Imo State) and Umunze (Anambra State).

400 seeds were selected randomly from seed lots from each location and surface-sterilized using 0.1% sodium hypochlorite. The seeds were placed in sterilized petridishes lined with blotter paper according to Iloba (1980). Ten seeds were placed in each sterilized petridish. The design was Completely Randomized Design (CRD) with each block containing ten plates replicated four times for each location (Obi, 2002). The seeds were incubated at 280c for 14 days during which the micro-organisms

developed.

The developed micro-organisms were isolated and inoculated into plates containing sterilized Potato Dextrose Agar (PDA) already prepared to enhance more growth for proper identification under the microscope. The identified microbes are as recorded in Table I. The plates containing the PDA and the microbes each smeared with 10ml of sterile distilled water and decanted into sterilized containers. The decanted liquids contained the spores of various fungi. Uncontaminated seeds were then inoculated with the spores by placing the seeds in sterilized plates and pouring the liquid into various plates according to the different pathogens being investigated. The plates were then incubated at 28^{oc} for six for proper inoculation. The inoculated seeds were again subjected to blotter test method described above to isolate the inoculated micro-organisms. The inoculated seeds were further left in the petridishes for 28 days at room temperature. This was done to allow germination of the seeds to occur and the effects of the various fungi on the germination of the seeds were monitored and recorded in Table 1.

RESULTS AND DISCUSSIONS

The Table below shows that all the seeds from various locations except Ishiagu (Ebonyi State) were infected with *Rhizopus stolonifer.* Seeds from Ebonyi State were infected with *Trichoderma.* On the germination test carried out, it was observed that the seeds infected with *R. stolonifer* were rendered unviable while the presence of *Trichoderma* prolonged the germination period of the infected seeds in the laboratory as also shown in Table I. The seeds, when bisected and examined under the light microscope, showed the mycelia of these fungi on the ovary walls. The seeds infected with *Trichoderma* could not germinate until after three weeks (21 days) in lieu of the normal five to six days (Personal Communication)..

TABLE I: Micro-Organisms from Different Locations and Effects on Germination.

Location	Associated Microbes	Effects on Germination
Awgu	*Rhizopus stolonifer*	Zero germination (Z-G)
Ishiagu	*Trichoderma*	Delayed (21 days)
Umulolo	*R. stolonifer*	Z-G
Umunze	*R. stolonifer*	Z-G
Isuochi	*R. stolonifer*	Z-G

From the results above, it was observed that the micro-organisms isolated from the seeds of *P.guineense* may have different effects on the seeds. The effects on the germination may be due to their feeding on the endosperm of the seeds as indicated by the microscopic examinations above. This further indicates that *R. stolonifer* adversely affects the seeds more than the *Trichoderma* which was exhibited in their germinabilities. The results also indicated that *R. stolonifer* is a common fungus which may have infected the seeds during maturity or may have been seed-borne. It is pertinent therefore, to get the seeds treated to ensure the planting of disease-free seeds as the importance of this spice is enormous.

CONCLUSION/RECOMMENDATIONS

The experiment indicated that the seeds of *P. guineense* are being attacked by the pathogens being isolated.

It is therefore pertinent that the seeds of *P. guineense* meant for propagation should be well treated with appropriate fungicide to ensure the availability of this important spice in many areas of the tropics.

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