

SURVEY OF THE INCIDENCES OF STORAGE FUNGAL PATHOGENS OF MONODORAMYRISTICA AND XYLOPIAAETHIOPICA SEEDS ACROSS SOUTH-EASTERN NIGERIA.

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ABSTRACT

The incidences and type of fungal organisms in the seeds of Monodoramyristica and Xylopiiathethiopia from five locations in South-eastern Nigeria, Aba, Ishiagu, Isuochi, Owerri, and Umuahia were surveyed for storage fungal pathogens in 2014 and 2015. Percentile evaluation and comparism was used to evaluate the percentage incidence of the fungal micro-organism in each area. The sampled states were Abia, Ebonyi and Imo. Monodoramyristicaseeds were attacked by Rhizopusstolonifer, Aspergillusflavus, Fusarium spp. and Penicillium spp. with higher incidence in Umuahia (70.79%), Owerri (70.45%) and Ishiagu (70.23%). Seeds of Xylopiiathethiopia were attacked by Nigrospora, R. stolonifer, Septoria spp., Fusariumspp, and Cyindrosporium with higher incidence in Umuahia (50.25%), Owerri (50.17%), Aba (50.12%). The results of the survey indicate that proper storage methods should be adopted by those who deal on these essential crops

Key words: Incidence, type, fungal pathogens, store.

INTRODUCTION

Southeastern Nigeria is endowed with

spices of nutritional importance. These include Piper guineense, Monodoramyristica, Xylopiiathethiopia amongst others. These spices are used for many purposes, ranging from food seasoning to medicine (Ogwulumba, 2005). Burkill (1985), reported that the fruits of X. aethiopia remain an important item of local trade throughout the region as a spice and flavouring for food and for medicine. The seeds and leaves of X. aethiopia and M. myristica can be blended into composite seasoning with export potentials.

X. aethiopia belongs to the family Annonaceae and it is a tree that grows to a height of 20m with the fruit as the most important part (Burkill, 1985). Seed powder of X. aethiopia. at 15g and actellic dust offered complete protection against Callosobrochusmaculatus on stored cowpea (Mba, 2005).X. aethiopia (Dunal) A. Rich (Annonaceae) is a valuable medicinal plant widely distributed in the West African rainforest from Senegal and to Sudan in Eastern Africa, and down to Angola in Southern Africa (Irvine, 1961). Essential oils or their constituents are odoriferous substances from plants and are extensively used as medicinal products, in the food industry as flavours and in the cosmetic industry as fragrances (Evans, 2003). Many of

these oils have been shown to exert broad spectrum antimicrobial activity (Schelz et al., 2006; Hammer et al., 1999)

M. myristica also belongs to the same family as the above. It is a tree that grows to a height of 16m with the fruit containing 12 to 30 seeds at maturity (Ogwulumba, 1997). Obiora (1980) reported that the seeds contain volatile oil and screening of it showed anti-inflammatory properties. The seeds of *M. myristica* are roasted, ground, mixed with calculated amount of water and given to infants for cough treatment. It is used as a seasoning in the preparation of kola-nut sauce in many parts of South-eastern Nigeria. Banso (2009) reported that the seeds of *M. myristica* are used as remedy for constipation when mixed with palm oil. Gill (1992) stated the seeds are used in curing headache when they are rubbed in the forehead.

The seeds of these spices are always attacked by some fungal organisms in store. The objective of this research is to evaluate the myco-pathogens of these spices and their infection levels in store.

MATERIALS AND METHODS

This work was carried out in the plant pathology laboratory of the Federal College of Agriculture Ishiagu, South-Eastern Nigeria. The seeds of the spices were selected from five different locations Ishiagu, Isuochi, Umuahia, Aba, and Owerri.

The seeds were harvested from their trees in the different locations in 2012 and stored traditionally in jute bags at room temperature of 23 2oC for six months.

400 seeds each from the locations were

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randomly selected from the seed lots, surface-sterilized with sodium hypochlorite solution diluted with distilled water for five minutes. The seeds were plated in sterilized Petri dishes lined with filter papers soaked in distilled water to provide absorbent medium.

Each plate (12.0cm) was placed 10 seeds equidistantly giving a total of forty plates and arranged in a Completely Randomized Design (CRD) with four replications of ten plates per replicate for each location. The plates were incubated at 25 2^oC for 14 days.

The developed microbes were isolated and inoculated into Petri dishes containing freshly prepared sterile Potato Dextrose Agar (PDA) and further incubated for six days at same temperature to aid proper growth and identification under the microscope.

The microbes from each location were identified and characterized and their incidences were evaluated using percentile evaluation and comparison:

$$\frac{\text{Number of infected seeds}}{\text{Total number of seeds plated}} \times 100$$

RESULTS AND DISCUSSION

The results indicated various degrees of attack (incidence) by the fungal pathogens on the seeds of *Monodora myristica* and *Xylopiiaethiopica* in the different locations being assessed. The infected seeds were grouped together and percentage infections were determined as a bulk for each location whilst the individual myco-pathogens were also identified from the bulks.

Monodoramyristicaseeds from the various locations showed that *Rhizopusstolonifer* is a common storage fungal organism of the crop (table 1). The occurrence of *Aspergillus* spp was not as much as *R.stolonifer*. There was comparably little occurrence of *Fusarium* spp, and *Penicillium* spp. these only occurred sparingly in Owerri location. Infection levels varied with locations with the seeds from Umuahia (70.79%), Owerri (70.45%), and Ishiagu (70.23%) being the highest when compared with Aba (60.15%) and Isuochi (40.27%).

Table 2 revealed that *Xylopiiaethiopica* seeds showed varying degrees of infection and associated fungal flora. There was no common microbe as was in the case of *M. myristica*. Seeds from Aba location showed attack by *Nigrospora*, *Rhizopusstolonifer*, Ishiagu by *Septoriaspp*, Isuochi by *Fusarium* spp, *R.stonolifer*, Owerri by *Cylindrosporium*, while Umuahia by both *Cylindrosporium* and *Septoria*. However, there were variations in their levels of infection Umuahia (50.45%), Owerri (50.17%), Aba (60.12%), Isuochi (40.76%) and Ishiagu (40.53%).

This research revealed that the infections could have occurred in the field and continued in the store. This also revealed the vulnerability of these seeds to the isolated fungi. This may be inimical to the viability of the seeds meant for further production of these crops. These pathogens contribute to the decline rate of availability of these important spices in many areas of Nigeria. The potentials of these spices are yet to be fully exploited and their extinctions

due to the attack of these microbes are imminent. The occurrence of these fungal flora in the field as well as the store portends a great danger as their pathogenicity and epidemiology are yet to be fully understood.

CONCLUSION

The results of this experiment indicated the presence of these important fungal pathogens in the seeds of these spices and these will in no small measure contribute to the extinction of these crops in the near future as they will militate against further production of the spices as corroborated by the works of Ogwulumba (2005) on *Piper guineense* seeds.. The need to evolve protective strategies geared towards the protection of these spices in the store is very imperative given their importance.

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Table 1: Isolated fungi and their infection levels from *Monodoramyristica* seeds from various locations

Locations	Identified fungi	Incidence (%)
Aba	<i>Rhizopusstolonifer</i>	30.15
Ishiagu	<i>Aspergillus</i> spp,	17.98
	<i>R.stolonifer</i>	20.23
Isuochi	<i>Aspergillus</i> spp,	20.00
	<i>R.stolonifer</i>	20.27
Owerri	<i>R.stolonifer</i> ,	31.23
	<i>Fusarium</i> spp	22.00
	<i>Penicillum</i> spp.	17.22
Umuahia	<i>R.stolonifer</i> ,	40.20
	<i>Aspergillus</i> spp	30.59

Table 2: Isolated fungi and their infection levels from *Xylopiiiaethiopica* seeds various from locations

Locations	Identified fungi	Incidence (%)
Aba	<i>Nigrospora</i>	33.41,
	<i>R. stolonifer</i>	16.71
Ishiagu	<i>Aspergillus</i> spp	5.72,
	<i>R.stolonifer</i>	10.23
	<i>Septorias</i> spp	40.53
Isuochi	<i>Fusarium</i> spp	15.76,
	<i>R.stolonifer</i>	40.76
Owerri	<i>Penicillum</i> spp.	70.45
	<i>Cylindrosporium</i>	50.17
Umuahia	<i>Septorias</i> spp,	27.00
	<i>Cylindrosporium</i>	23.25

REFERENCES

Banso, A. (2009). Effect of extract of *Monodoramyristica* and *Zingiberofficinale* on the growth of fungi in sweet potato juice. African Journal of Microbiology Research Vol 3(9): 487-490

Burkill, H.M. (1985). *The Useful Plants Of West Tropical Africa*. Vol.1. families A-D

pp130-131

Evans, C. (2003). *Trease and Evans Pharmacognosy*. 13th Edition. W. B. Saunders.

pp. 253-288.

Gill, L.S (1992). Ethnomedical uses of plants in Nigeria. *University of Benin Press*, Benin City, Nigeria. pp165-248.

Hammer, K. A, Carson, C. F, and Riley, T. V. (1999). Antimicrobial activity of essential oils and other plant extracts. *J Appl Microb.*; 86:985.

Irvine, F. (1961). Woody Plants of Ghana. *London: Crown Agents for Overseas Administration*; pp. 23-24

Mba, O.I. (2005). The potency of oil palm bunch ash and seed powder of African Ethiopian pepper (*Xylopiacaethiopica*) against cow pea weevil in storage. *Nigerian Agricultural Journal* 36 pp184-190.

Obiora, B. A. (1980). Sourcing Pharmaceutical Raw Materials from indigenous medicinal plants. *Nig. Journ. Pharm. Pp 152-154.*

Ogwulumba, S.I.(1997). Micro-organisms associated with local spices in Southeastern Nigeria. A B-Agric. Tech. Project submitted to the Department of Crop Production, Federal University of Technology Owerri Imo State, Nigeria. 72p.

Ogwulumba, S.I.(2005). Evaluation of Fungal pathogens of *Piper guineense* seeds and their effects on germination. *Nigerian Agricultural Journal* 36, pp 134-136.

Schelz, Z., Molnar, J. and Hohmann, J. (2006). Antimicrobial and Plasmid activities of essential oils. *Fitoterapia.*;77:279-285.