GLOBAL JOURNAL OF AGRICULTURAL SCIENCES VOL. 5, NO. 1, 2006: 11 - 12
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FUNGI ASSOCIATED WITH SPOILAGE OF STORED AND MARKETED WHITE YAM TUBERS (DIOSCOREA ROTUNDATA POIR) IN UMUNEDE, NIGERIA

F. U. NWEKE and E. C. ENUJEKE

(Received 9August, 2005; Revision Accepted 21 November, 2005)

ABSTRACT

A study based on isolation and pathogenicity test was conducted to determine the fungi associated with spoilage of stored and marketed white yam tubers (*Dioscorea rotundata*) in Umunede for effective control. Fungi isolated were *Aspergillus niger, Penicillium sp., Fusarium* sp. and *Rhizopus nigricans. A niger* and *R. nigricans* were the common fungi associated with the dry and wet rots respectively of the yam tubers. All the fungi were pathogenic on the white yam tubers cultivars in this study. *Penicilium* sp was more pathogenic than the rest isolates.

KEYWORDS: Fungi, Spoilage, *Dioscorea rotundata*, Umunede, Nigeria.

INTRODUCTION

Yams (*Dioscorea* spp) constitute one of the staple carbohydrate food in the tropics (Han *et al.*,1987). In most parts of the humid tropics, yam is often prepared in many different ways, which include boiled, roasted, fried, pounded, and yam flour, which is reconstituted into yam fufu. Yam in Nigeria is also processed into various staple intermediate and product forms (Okaka *et al.*, 1991 Okaka and Anajekwu, 1990) which are used for direct consumption by animals, and as basic ingredient for snacks or made into flour used for making instant puree (Coursey, 1983; Okaka and Okechukwu, 1987).

Out of the world production of over 30 million tonne per annum, Nigeria alone produces 22 million tonne of yam (FAC,1998). However, it has been estimated that an average of over 25% of the yield of yam is lost annually to diseases and pests (Ezen, 1998; FAO, 1998). Onayemi (1983) also reported that over 50% of the yam tubers produced and harvested in Nigeria are lost in storage. The disease causing agents not only reduce the quantity of yam produced, but also reduce the quality by making them unappealing to the consumers.

Previous studies showed that postharvest rot is a major disease of yam tubers in Nigeria (Ogundana, 1971; Ikotun; 1983). This study determined the fungi associated with the spoilage of stored and marketed white yam tubers in Umunede in order that appropriate control measure can be applied.

MATERIALS AND METHODS

Fifty infected white yam tubers (*Dioscorea rotundata*) showing typical rot disease were purchased from a local market in Umunede. They were taken to the laboratory for isolation.

Isolation of the Fungi

The method of isolation was a modification of that reported by Adeniji (1970). Potato dextrose agar(PDA)incorporated with streptomycin to discourage bacteria growth was used. Infected portions were first surface sterilized with cotton swabs dipped in 90% ethanol and then with swabs dipped in sterile distilled water. With a sterile scapel, portions were taken from the advanced edge of decay and dropped asceptically into sterile Petri dishes over which molten agar was poured. This was replicated four times and the plates were incubated at 28°C for 72hours. The isolates were subcultured to obtain pure cultures and stored in McCartney bottles until when needed. Identification of the fungi was by cultural and morphological characteristics of the spores observed under the microscope and reference to standard mycological manual (Barnett and Hunter,1972).

Pathogenicity test

Healthy tubers of white yam, cultivars Obiatorugo and Abii were surface sterilized and wounded with sterile scapel. Spore suspension of each fungal isolates was inoculated into the tuber. The control was the same as the treatments, except that distilled water was used instead of the organisms.

RESULTS AND DISCUSSION

Four fungal pathogens were isolated from diseased white yam tubers. They were *Aspergillus niger*, *Fusarium* sp., *Rhizopus nigricans* and *Penicillium* sp. *A. niger* and *R. nigricans* were the common fungi associated with the dry and wet rots of *Dioscorea rotundata* respectively (Table 1) .Most of these fungi were reported to be important soil-borne pathogens of yam (Simons , 1997). Here their possibility of being

Table 1: Percentage frequency of occurrence of fungal isolates on the tubers.

Fungi isolated	Number of tuber sampled	Number positive for infection	% Occurrence
Aspergillus niger	50	38	76.00
***Penicillium* sp**		21	42.00
***Fusarium* sp**	50	15	30.00
Rhizopus nigricans		32	66.00
	50		
	50		

Carried over from the field to storage and market cannot be overruled .All the fungi were pathogenic on the test white yam tubers cultivars (Obiatorugo and Abii) in this study. *Penicillium* sp was highly pathogenic while the rest isolates were moderately pathogenic (Table 2). The importance of yam tubers as a staple food in the tropics demand that awareness should be created on the type and nature of spoilage

F. U. Nweke, Faculty of Agriculture, Delta State University, Asaba Campus, Asaba, Nigeria.
E. C. Enujeke, Faculty of Agriculture, Delta State University, Asaba Campus, Asaba, Nigeria.

Table 2: Pathogenicity test of inoculated fungal pathogens on white yam tubers

Fungi isolated	Symptoms of infection	Pathogenicity test
Aspergillus niger	Dry rot	+
Penicillium sp	"	++
Fusarium sp	"	+
Rhizopus nigricans	Wet rot	+

Key: + + highly pathogenic + moderately pathogenic

organisms for effective control. The information provided is therefore very relevant to those who are working or intend to work on this crop.

REFERENCES

Adeniji, M.O., 1970. Fungi associated with storage decay on yam in Nigeria. Phytopathol. 60:590-592.

Barnett, H.L. and Hunter, B., 1972. Illustrated Genera of Imperfect Fungi: Third Editions, Burgess Pub. Comp. Minneapolis, U.S.A.

Coursey, D.G., 1983. Potential utilization of major root crops with special, emphasis on human, animal and industrial uses. Proceedings of the 2nd triennial symposium of the ISTRC Cameroon, pp.25-35.

Ezeh, N.O., 1998. Economics of production and post-harvest technology In: Orkwor, G.C. Asiedu, R. and Ekanayake, I.J. (eds) Food yam; Advances in research IITA and NRCRI, Nigeria, pp. 187-214.

FAO, 1998. Food and Agriculture Organization Production Year Book FAO Rome

Han, S. K., Osiru, D.S.O., Akoroda, M. O. and Oto, J. A., 1987. Yam production and its future prospects. Outlook on Agriculture16:109-118.

Ikotun, T., 1983. Post-harvest microbial rot of yam in Nigeria. Fito. Pathologia Bras.8:1-7.

Ogundana, S. K., 1971. The post-harvest decay of yam tubers in Nigeria. Proc. 2nd Int. Biodeter. Sympos. Netherlands, pp. 481-492.

Okaka, J.C. and Anajakwu, B., 1990. Preliminary studies on the production and quality evaluation of dry yam snaks.Trop.Sci.30:67-72.

Okaka, J.C., Okorie, P.A. and Ozon, O.N., 1991.Quality Evaluation of sundried yam chips. Trop. Sci. 30:265-275.

Okaka, J. C. and Okechukwu, P. E., 1987. Yam processing problems and prospects in: Quality Evaluation of sundried yam chips.Trop. Sci. 30: 265-275.

Onayemi, O., 1983. Observation on the dehydration characteristic of different varieties of yam and cocoyam. Abstract 6th symposium of the Int. Soc. for Trops. Peru Februar, 1983.

Simons, S. A., 1997. Root and Tuber Crops In: Hillocks, R. J. and Waller, J. M (eds) Soil borne Diseases of Tropical Crops. CAB International, Wallilgford, UK pp 109 – 149.