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Survey the Prevalence of Market Diseases of Banana

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Abstract: Market diseases of banana were surveyed in three markets of Mymensingh town. Anthracnose and botryodiplodia rots were detected as the main cause of market rots of banana fruits. About 2.04-4.90% fruits were rotted during April-September due to anthracnose and 2.96-4.74% owing to botryodiplodia rots. Both the diseases clearly correlated positive with temperature. The causes of anthracnose and botryodiplodia rots were identified as ***Colletotrichum musae*** and ***Botryodiplodia theobromae***, respectively.

Key words: Survey, prevalence, anthracnose, botryodiplodia rot, banana

Introduction

Bananas (*Musa* spp.) are tropical sub-tropical fruit crop grown in many countries of the world. This quick growing fruit crops are widely grown in Bangladesh commercially as well as homestead fruit (Ahmed, 1984). Bananas are grown commercially in the districts such as Barisal, Rangamati, Jessore, Patuakhali, Rangpur, Narsingdi, Munsiganj, Bogra, Tangail, Mymensingh and Gaibandha areas in Bangladesh (BBS, 2001). Harvested banana fruits are marketed in different district towns. Banana ranks first among the fruits in respect of acreage and per hectare production in Bangladesh. Recently 561770 tons of bananas were produced in Bangladesh from an area of about 97465 acres of land with an average yield of 0.58 tons/acre (BBS, 2001). It covers 42% of the total fruits production in Bangladesh (Haque, 1988). In Bangladesh yield of banana, in fact, is far below compared to other countries of the world. Ripen banana suffers from various post-harvest diseases all over the world. Among different varieties of bananas sabri is the most important one. In Bangladesh sabri bananas suffer from various post-harvest diseases, but there is no record of it. And there is no information about the post-harvest losses owing to these diseases. Due to post-harvest diseases, banana (var. sabri) is severely rotted. Therefore the traders increase the fruit price and thus market price goes out of reach of most of the buyers. Banana undergoes a series of handling operations immediately after harvesting. During this period (harvesting to marketing) they receive various treatments (field hygiene, grading, packaging, storage etc.). Post-harvest handling if not properly done, brings losses to these perishable fruits. These losses are caused partly by rotting due to external agents (fungi, bacteria etc.) and partly due to endogenous factors (respiration, senescence etc). Post-harvest diseases of fruits are the

results of combined effect of uncared handling and uncontrolled endogenous factors (Meah, 1995). These diseases account for causing 10-15% post-harvest loss of fruits like banana (BARI, 1985). As per some research findings 5-10% bananas are damaged due to post-harvest diseases in Bangladesh. It is approximately 44941.60 tons of bananas. The value stands at 35.95 core taka at the rate of 8000 Tk. per ton (BBS, 2001). So, post-harvest fruit loss should be prevented. For this, it is necessary to know the cause of post-harvest fruit rots and the extent of loss. Therefore, the present study was undertaken I) to survey the market diseases, ii) to estimate the loss and severity and iii) to identify the causal organisms.

Materials and Methods

Survey was made during the period of April to September 2001. Survey on the post-harvest diseases of banana was done in the market of Mymensingh town. Three sites were selected in Mesua bazar, Natun bazar and some selected shops of BAU campus markets of Mymensingh. Four shops were selected from each market. Each of the selected areas was inspected four times in each month. Banana var. Sabri was selected for the survey. Anthracnose and fruit rot symptoms were surface sterilized with cotton swab (70% alcohol). Small pieces (2-3 cm) of fruit tissues at the junction of diseased and healthy portion were cut out aseptically. Inocula thus prepared were transferred to Potato Dextrose Agar (PDA) plates following Tissue Plating Method and kept there for incubation at 25-28°C for 7 days. Daily observation was made for the fungal growth. The fungi were transferred to fresh culture plates from sub-cultures for purification. The fungi were studied and identified by observing colony characters, linear growth, color and sporulation. The pathogenicity of the isolated fungi ***Colletotrichum musae*** and ***Botryodiplodia theobromae*** were tested on banana fruits. The experiment was designed in Completely Randomized Design. All the treatments were replicated three times.

Diseases were recorded on ripe fruits of banana in the market. During survey in the market, fungal diseases were identified by visual symptoms. Again fungal diseases were categorized according to different symptoms. At the time of disease recording, the following points were considered carefully spot/lesion, size of the spot, number of lesion, area diseased, color of the spot/lesions. Data were collected after the untreated fruits expressed symptoms. Percent fruits infected were calculated on the basis of totality of healthy and diseased fruits. Total surface area of an individual fruit was considered as 100%. The diseased portion of an individual fruit was recorded.

Results and Discussion

Two diseases in the form of fruit rots were recorded during survey. The post-harvest diseases were identified as anthracnose caused by ***Colletotrichum musae*** and botryodiplodia fruit rot caused by ***Botryodiplodia theobromae***, which were treated as market diseases. In the three selected areas more or less same kinds of diseases were observed. Anthracnose and Botryodiplodia were found extensively in this variety.

Table 1: Incidence of Anthracnose rot in banana fruits at three markets of Mymensingh town during April to September, 2001

	Natun Bazar		Mesua Bazar		BAU campus	
Month	No. of fruits inspected	% diseased fruits	No. of fruits inspected	% diseased fruits	No. of fruits inspected	% diseased fruits
April	3788	2.00	13300	1.80	2180	2.40
May	4450	3.60	12750	3.25	1628	4.00
June	5444	4.75	12800	4.50	1568	5.25
July	4780	5.00	12830	4.70	1812	5.25
August	4492	5.00	12600	4.35	2092	5.00
September	5019	4.00	12949	3.00	2028	4.90

Table 2: Disease severity of Anthracnose rot in banana fruits at three markets of Mymensingh town during April-September, 2001

Month	No. of fruits inspected	Diseased fruits (%)	Fruit surface area diseased (%)
April	19268	2.04	24.68
May	18828	3.66	36.68
June	19812	4.87	48.81
July	19422	4.99	49.89
August	19184	4.88	45.52
September	19996	3.91	32.60

Table 3: Incidence of Botryodiplodia rot in banana fruits at three markets of Mymensingh town during April to September, 2001

	Natun Bazar		Mesua Bazar		BAU campus	
Month	No. of fruits inspected	% diseased fruits	No. of fruits inspected	% diseased fruits	No. of fruits inspected	% diseased fruits
April	3788	2.95	13300	2.50	2180	3.50
May	4450	3.00	12750	3.00	1628	3.50
June	5444	3.75	12800	3.25	1568	4.50
July	4780	4.50	12830	4.25	1812	5.50
August	4492	4.00	12600	3.50	2092	4.45
September	5019	3.00	12949	2.70	2028	3.50

Table 4: Disease severity of Botryodiplodia rot in banana fruits at three markets of Mymensingh town during April-September, 2001

Month	No. of fruits inspected	Diseased fruits (%)	Fruit surface area diseased (%)
April	19268	2.96	15.58
May	18828	3.13	20.94
June	19812	3.83	27.29
July	19422	4.74	28.85
August	19184	3.99	25.93
September	19996	3.02	19.47

Anthracnose rots

A total of 1,16, 506 banana fruits were inspected in the three markets (Natun Bazar, Mesua Bazar and BAU Campus) of Mymensingh town during the six months survey period. In the three markets, higher anthracnose incidence (% diseased fruits) of banana was observed in June, July and August (Table 1). The range of anthracnose rotted fruits was 2.04-4.99% among the six months as well as the three markets. The highest incidence of anthracnose was recorded in July and the lowest was in April (Table 2). Disease severity as estimated as per cent fruit surface area diseased varied from 24.68-49.89%. The highest fruit surface area diseased was observed in July and the lowest was recorded in April (Table 2). During the six-month observation percent anthracnose fruits rot were increased with increasing time from April to July and again decreased. This trend was observed in all the three markets.

Botryodiplodia rots

Botryodiplodia rots in those banana fruits were more or less similar to anthracnose rots at the three markets. In the three markets, higher Botryodiplodia rots (% diseased fruits) of banana were observed in June, July and August (Table 3). About 2.96-4.74% fruits were affected with Botryodiplodia rots. The highest incidence of Botryodiplodia rot was recorded in July followed by June and August and the lowest was in April (Table 4). Fruit surface area diseased varied from 15.58-28.85%. The highest fruit surface area diseased was observed in July followed by June and August and the lowest was recorded in April (Table 4). The fruit infection increased from April, attained the highest scale in July and again decreased in all the locations.

The market diseases of banana (var. Sabri) were surveyed in the markets of Mymensingh town. The diseases were identified as anthracnose fruit rots and botryodiplodia fruit rots. Reports of occurrence of the two diseases in Bangladesh are available (Meah and Khan, 1987). The same diseases have been reported by Lutchmeah and Santchurn (1991), Chillet ***et al.*** (1996), Lapeyre ***et al.*** (1997), Ploetze and Galan (1998), Khan ***et al.*** (1999) on different varieties of ripe banana fruits. Symptoms of the two diseases as recorded during the study period are similar to these described by Meah and Khan (1987). Similar opinion has been expressed by Khan ***et al.*** (1999) for anthracnose. Anthracnose rots and botryodiplodia rots were detected in the markets of Mymensingh town. The wholesalers and retail-salers shops were inspected. Oknonkwo ***et al.*** (1990), were isolated and identified some bacterial and fungal disease in markets in Lagos, Nigeria. Lutchmeah and Santchurn (1991) reported same diseases at post-harvest period in Mauritius. Chillet ***et al.*** (1996), described anthracnose is the most storage disease. However Lapeyre ***et al.*** (1997), Ploetz and Galan (1998) reported same diseases as post-harvest and market condition.

During the survey period April-September, amount of banana fruit rots in the markets due to anthracnose and botryodiplodia infections were found to increase with April onwards and again decreased. This might be due to high humid and warm weather from June onwards continuing up to August. Due to fall in weather the infections decreased in September. Datar and Ghule (1988) found rotting of banana fruits in the markets most rapid at 20-30°C. temperature. Post-harvest loss of banana ranges from 25 to 50% (Amiruzzaman, 1990). In India post-harvest loss is estimated up to 30% (Parpia, 1976). Rubbi ***et al.*** (1986) estimated losses 35-38% due to diseases.

Findings of the present study revealed that about 2.04-4.90% fruits were rotted during April-September due to anthracnose and 2.96-4.74% owing to botryodiplodia rots. Both the diseases positively correlated with temperature. The causes of anthracnose and botryodiplodia rots were identified as ***Colletotrichum musae*** and ***Botryodiplodia theobromae***, respectively.

References

Ahmed, K., 1984. Gardener's Book of Production and Nutrition. 1st Edn., pp: 262.

Amiruzzaman, N., 1990. Post-harvest handling and processing of fruits and vegetables. In: Kitchen Gardening and Homestead Productive Activities. CIRDAP Action Research Series No. 11, pp: 22.

BARI., 1985. Annual Report. Division of Plant Pathology. Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh.

BBS., 2001. Statistical Year Book of Bangladesh. Twentieth edition. Bangladesh Bureau of Statistics, pp: 137.

Chillet, M., L. de L. de Bellaire and L. de L. De Bellaire, 1996. Polybag packaging to control anthracnose of banana. Fruits Paris, 51: 163-172.

Datar, V.V. and K.K. Ghule, 1988. Investigation on some aspects of control of fruit rot of banana (*Musa sepientum* L.). Indian J. Plant Pathol., 6: 133-138.

Haque, M.A., 1988. 'Kalar Bagan'. Banana Research Project, BAU. Mymensingh, Bangladesh, pp: 1.

Khan, S.H., J. Aked and Magan, 1999. The potential for antioxidant chemicals to control *Colletotrichum musae* on banana fruit. Proceedings, 51st international symposium on crop protection, Gent. Belgium. 4 May, 1999. Part II. Mededelingen Faculteit Landbouw tundige-en-Toegepaste Biologische Westens chappen, Universitieit Gent., 64: 531-537.

Lapeyre, de Bellaire L. de, X. Mourichon and de Bellaire L. De Lapeyre, 1997. The pattern of fungal contamination of the banana bunch during its development and potential influence on incidence of crown rot and anthracnose diseases. Plant Pathol., 46: 481-489.

Lutchmeah, R.S. and D. Santchurn, 1991. Chemical control of common post-harvest disease of banana cv. 'Naine' Mauritius. Revue Agricole et Sucriere del'lle Maurice, 70: 8-11.

Lutchmeah, R.S. and D. Santchurn, 1991. Common post-harvest deterioration of banana cv. 'Naine' Mauritius. Revue Agricole et Sucriere del'lle Maurice, 70 : 28-36.

Meah, M.B., 1995. Post-harvest diseases of fruits and vegetables. In: Training Manual on Post-harvest Handling and Marketing. Eds. A.K.M. Giasuddin Milki, K.A. Rahman, DAE. Farm Gate, Dhaka, Bangladesh, pp: 217.

Meah, M.B. and A.A. Khan, 1987. Annual Progress Report (1986-87). Survey of diseases of some important fruit and vegetable crops of Bangladesh. Department of Plant pathology. Bangla. Agril. Univ., Mymensingh, Bangladesh, pp: 12.

Oknonkwo, S.N., O.O. Amund and C.O. Ogunsanya, 1990. Microbial rotting and preservation of banana fruits (*Musa sepientum* L.) in Nigeria. Microbios Letters, 44 : 147-156.

Parpia, H.A.B., 1976. Post-harvest losses-Impact of their prevention on food supplies, nutrition and development. In: Symposium on Nutrition and Agricultural and Economic Development in the Tropics. Eds. N.S. Sarimshaw, M. Behar, Plemum Press, New York, pp: 195-206.

Ploetze, R. and V. Galan Sauco, 1998. Banana diseases in the subtropics: a review of their importance, distribution and management. Proceedings of the first international symposium on banana in the subtropics, Puerto de la Cruz, Tenerife, Spain, 10-14 November 1997. Acta. Hort., 490: 263-276.

Rubbi, S.F., M.A. Rahman and K.Q. Rahman, 1986. Studies on the processing and preservation of mango. Proc. 4th Nat. Symp. Bangla. Soc. Hort. Sci., pp: 138-148.