

RESEARCH ARTICLE

Roving survey on panama disease (*Fusarium oxysporum* f. sp. *cubense*) in banana growing areas of Karnataka

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ABSTRACT

Roving survey was conducted in major banana growing regions of Karnataka during 2011-12 and it revealed that the disease incidence ranged from zero to hundred per cent. Maximum incidence was recorded on Kadali variety in Bangalore followed by Mysore (Devarasanahalli) (51.0%), Nanjanagudu (48.0%) and Mandya (Bukanakere) (44.0%) on Rasthali and Ney Poovan cultivars. The disease was not observed in Belgaum area. Pseudostem vascular infection was maximum (6.0) in cultivars of Rasthali and Ney Poovan in Nanjanagudu, Devarasanahalli and Bukanakere.

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INTRODUCTION

Banana (*Musa* spp.) is one of the most important fruit crops in international trade and is commonly cultivated in all the tropical and sub-tropical regions of the world. Banana often plays a vital role in human nutrition and is a staple food in many African countries (Nayar, 1962). It is also the fourth important food crop in terms of gross value after paddy, wheat and milk products and forms an important crop for subsistence farmers. Banana is also called 'poor man's apple' as it is the cheapest among fruits grown in the country with rich energy and nutritive values. It is also popular on account of its year round availability as compared to seasonal availability of other fruits.

In the year 2010-11 banana ranked first in area and production among the fruit crops grown in India with production of 35.9 million metric tons from an area of 8.30

million hectares and productivity 35.9 metric tons per hectare. Of this, Karnataka state alone had 111.8 thousand hectares of area and production of 22.81 million metric tons with productivity of 20.4 metric tons per hectare (Anonymous, 2011). The demand for the banana is increasing due to increase in population and a demand of 25 million tonnes by 2020 is estimated. The main hurdle in increasing the productivity is the threat posed by pest and diseases. Panama wilt of banana caused by *Fusarium oxysporum* f. sp. *cubense* (E. F. Smith) Snyd. and Hans. is considered as the major constraint to banana production especially in Southern parts of Karnataka.

The *Fusarium* wilt pathogen lives in soil and penetrates into the roots, from where it slowly spreads until the corm is reached. From then on the disease develops very rapidly. Purplish stains appear in the xylem vessels which are blocked, outer leaves turn yellow and collapse. Soon, only a few of the

Table 1 : Roving survey for incidence of Panama disease (*Fusarium wilt*) of banana caused by *Fusarium oxysporum* f. sp. *cubense* during 2011-2012

Place	Variety/ cultivar	Soil type	Planting material used	Incidence of disease (%)	Pseudostem vascular infection	Stage of the crop (months)
Bangalore						
Hessaraghata	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	10.00	3	6
Hessaraghata	Kadali (AA) (Nivedyakadali)	Red loamy soil	Sucker	100.00	4	5
Shivakote	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	8.00	2	6
Mathikere	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	6.00	2	6
Chanapatna taluka (Ramanagara district)						
Tagachagere	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	24.00	3	5
Chikkanahalli	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	32.00	5	7
Abbur	Ney Poovan (AB) (Yalakkibale)	Red loamy soil	Sucker	19.00	3	8
Maddur taluka (Mandya district)						
Koppa	Ney Poovan (AB) (Yalakkibale)	Medium black soil	Sucker	12.00	2	7
Kowdle	Ney Poovan (AB) (Yalakkibale)	Medium black soil	Sucker	16.00	2	7
Krishna Raj Pet taluka (Mandya district)						
Hoshaholalu	Ney Poovan (AB) (Yalakkibale)	Medium black soil	Sucker	13.00	2	8
Kotigere	Ney Poovan (AB) (Yalakkibale)	Medium black soil	Sucker	10.00	5	8
Bukanakere	Ney Poovan (AB) (Yalakkibale)	Medium black soil	Sucker	44.00	6	6
Pandavapura taluka (Mandya district)						
Pandavapura	Ney Poovan (AB) (Yalakkibale)	Red clay loamy soil	Sucker	0.00	0	10
Mysore						
Nanjanagudu	Rasthali (AAB) (Rasabale)	Red sandy loamy soil	Sucker	48.00	6	8
Konnur	Rasthali (AAB) (Rasabale)	Red sandy loamy soil	Sucker	33.00	5	7
Devarasanahalli	Rasthali (AAB) (Rasabale)	Red sandy loamy soil	Sucker	51.00	6	7
Thandavapura	Rasthali (AAB) (Rasabale)	Red sandy loamy soil	Sucker	21.00	4	6
Belgaum						
Gokak	Rajapuri (AAB)	Medium black soil	Sucker	0.00	0	8
	Grand Naine (AAA)	Sandy loam soil	Sucker	0.00	0	7
Kaitnal	Rajapuri (AAB)	Sandy loam soil	Sucker	0.00	0	8
Suldhal	Rajapuri (AAB)	Sandy loam soil	Sucker	0.00	0	7
	Grand Naine (AAA)	Sandy loam soil	Sucker	0.00	0	9
Yaraganavi	Grand Naine (AAA)	Red soil	Tissue cultured	0.00	0	9
Yaragatti	Grand Naine (AAA)	Medium black soil	Tissue cultured	0.00	0	8
	Rajapuri (AAB)	Medium black soil	Sucker	0.00	0	8
Munavalli	Grand Naine (AAA)	Medium black soil	Sucker	0.00	0	8
	Ney Poovan (AB)	Medium black soil	Sucker	0.00	0	9
Savadatti	Rajapuri (AAB)	Medium black soil	Sucker	0.00	0	10
	Grand Naine (AAA)	Medium black soil	Sucker	0.00	0	10

Pseudostem Vascular Infection scaled range from 1-6, 0 - No disease, 1- Corm completely clean, no vascular discoloration, 2 - Isolated points of discoloration in vascular tissue, 3 - Discoloration of upto 1/3rd of vascular tissue, 4 - Discoloration of between 1/3rd and 2/3rd of vascular tissue, 5 - Discoloration greater than 2/3rd of vascular tissue, 6 - Total discoloration of vascular tissue

youngest leaves remain functional. Later, the pseudostem splits and rots. The symptoms become evident after 5-6 months of planting and are expressed both externally and internally.

Hence, the present investigation was undertaken to know the disease status in different places of banana growing areas of Karnataka.

MATERIALS AND METHODS

Roving survey was conducted during 2011-2012 at different places of Bangalore, Ramanagara, Mandya, Mysore, and Belgaum districts. Observations were recorded with respect to incidence of panama disease, soil type, cultivar, planting material used and pseudostem vascular infection and also samples were collected for isolation of pathogen. In each plot random samples were made, from which the number of plant affected over the total number of plants were counted and expressed as per cent disease incidence.

$$\text{Per cent disease incidence} = \frac{\text{No. of plants showing wilting symptom}}{\text{Total number of plants}} \times 100$$

RESULTS AND DISCUSSION

Roving survey was conducted during 2011-2012 in major banana growing regions of Karnataka viz., Bangalore, Ramanagara, Mandya, Mysore and Belgaum districts to assess the incidence of Panama disease on different varieties of banana and the data are presented in Table 1.

In Bangalore district, the incidence of panama disease was highest (100 %) in Hessaraghatta on cv. KADALI followed by Shivakote (8.0%) and Mathikere (6.0%) on Ney Poovan, pseudostem vascular infection scale ranged from 2-4. The maximum (4.0) pseudostem vascular infection was recorded in Hessaraghatta on Kadali cultivar followed by Hessaraghatta on Ney Poovan cultivar. In Ramanagara district, the highest incidence of wilt was 32.0 per cent in Chikkanahalli followed by Tagachagere (24.0%) and Abbur (19.0%) on Ney Poovan cultivar, pseudostem vascular infection scale was ranged from 3-5. The pseudostem vascular infection was maximum (5.0) in Chikkanahalli on Ney Poovan cultivar. While in Maddur taluka, the incidence of wilt was highest (16.0 %) in Kowdle followed by Koppa (12.0 %) on cv. NEY POOVAN, pseudostem vascular infection scale was 2. In Krishnarajpet taluka, the highest incidence (44.0%) of wilt was noticed in Bukanakere followed by Hoshaholalu (13.0%) and Kotigere (10.0%) on cv. NEY POOVAN, pseudostem vascular infection scale ranged from 2-6. The pseudostem vascular infection was maximum (6.0) was noticed in the cultivar Ney Poovan in Bukanakere followed by Kotigere (5.0) and Hoshaholalu. In Pandavapura taluka no wilt incidence was observed. In Mysore, the disease incidence ranged from 33.0-51.0 per cent on cv. RASTHALI, severe incidence was noticed in

Devarasanahalli (51.0%) followed by Nanjanagudu (48.0%), Konnur (33.0%) and Thandavapura (21.0%), pseudostem vascular infection scale was ranged from 4-6. The pseudostem vascular infection was maximum (6.0) in Rasthali cultivar in Nanjanagudu and Devarasanahalli. No wilt disease was found in Belgaum district in the places surveyed.

The incidence of Panama disease of banana varied from zero to hundred per cent as evident from the survey conducted during 2011 and 2012 in major banana growing regions of Karnataka. In Ramanagara and Mysore district Panama wilt disease was more severe when compared to other places surveyed. Similar observation was made by Sivamani and Gnanamanickam (1987) who reported the incidence of 2-10 per cent in Tamil Nadu. Sowmya (1993) surveyed banana plantations in Karnataka and reported the disease incidence of 0-100 per cent. Further the incidence was recorded at various levels on Kadali (100 %) in Bangalore and Nanjanagudu Rasabale (51 %). Prasadji (2006) also observed considerable disease in Pisang Awak group cultivar, Karpuravalli (3-18 %) in Nellore district and cooking cultivars, Kovvur Bontha (2-5%) of the Bluggoe sub-group. Sanjeevkumar *et al.* (2010) also reported that *Fusarium* wilt was highest (37-41 %) in Vallampadugai, Vadakkumangudi and Eyyalore of Cuddalore district. Panama wilt was recorded only in Rashtali (AAB) and its incidence was very severe in districts. With respect to stage of the crop, the disease was noticed from five months to eight months crop. The highest incidence was recorded in five months old crop on Rashtali and eight months old crop on Rasthali. It clearly indicated that, the crop is affected from five months old onwards (Table 1).

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