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Short communication

Stem-end blackening: A new physiological disorder in mango from Bihar

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ABSTRACT

A new physiological disorder named 'stem-end blackening' has been observed in an Indian mango cv. Zarda at the Experimental Farm of the Bihar Agricultural University, Sabour, Bhagalpur, Bihar. The initial symptom appears just before the onset of maturity, as light brown area surrounding the stem-end of fruit, which, as the fruit ripens become more prominent and increase in size, thus reducing the consumer acceptance. The symptom of the disorder is easily confused with the stem-end rot caused by *Lasiodiplodia theobromae*, *Phomopsis mangiferae* and other fungi. However, unlike stem-end rot, this disorder does not spread downward or form watery soft pulp. Our study revealed that the incidence of stem-end blackening was about 40-45% in 'Zarda' besides some other cultivars also showed varying levels of this disorder.

Key words: Mango, physiological disorder, stem-end blackening.

Mango is acknowledged as the 'King of fruits' in India as it is deemed to be the choicest of all indigenous fruits. India is the largest producer of mango in the world, contributing more than 50% of the total world production. In the country, this fruit crop accounts about 20.3% of the total fruit production. Mango is commercially grown in almost all the states among which, Bihar ranks fourth in the country. This crop occupies about 48.5% of total fruit area in the state. The share of mango to the national production is nearly 12% for cultivars like Maldah, Gulabkhas, Krishnbhog, Zardalu, Chausa etc. which are having very high demand in the market. Mango growers face several challenges from the production to post-harvest management. Among them, biennial bearing and malformation are referred as the most important problems of international significance that leads to mango production less remunerative (Singh, 3). Furthermore, the fruit also suffers from several physiological disorders like spongy tissue, jelly seed, soft nose, black tip etc.

Very recently, a new physiological disorder has been observed in an Indian (Eastern) mango cultivar Zarda, which is otherwise famous for its unique aroma, taste and attractive colour. We report this disorder in mango. Where, a brownish-black spot appears surrounding the stem-end of the fruit. The symptoms become more prominent as the colour of the fruit changes from green to yellow during onset of ripening. Development of such spots near the stem-end renders the fruit unhealthy, which drastically reduces its consumer acceptability. It was recorded that nearly 40-45% of the fruits are affected with this disorder. Considering the importance of this malady, in this article, we report some preliminary information regarding symptomology of this disorder to draw the attention of people working in mango industry.

The initial symptom is manifested by the appearance of a very light brown area on the peel surrounding the stem-end of the fruit. The first sign of the disorder appears just before the onset of maturity, when the fruit is still green. On the later stages, as the fruit matures and progressively ripens, the light brown area increases in size, become more prominent and black in colour (Fig. 1). The affected area surrounding the stem end of the fruit appears slight spongy in nature when gentle pressure is applied. At harvest these fruits, they do not exude spurt sap which is normally noted when fruits are detached within first 10-15 seconds (Fig. 2). In the fruits with this disorder,

Fig. 1. Fruits with symptoms of 'Stem-end blackening' at maturity on mango cv. Zarda.

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sap is exuded in very minute quantity compared to that of normal healthy fruits. The appearance of disorder does not affect the maturity and ripening of fruits.

The fruits affected by this disorder when cut open, show tissue breakdown and discolouration of the pulp adjacent to the stem-end (Fig. 2b). The pulp surrounding the stem end have different texture than rest portions. The damaged tissue is confined only to the stem-end of the fruit, however, at a later stage it reaches up to endocarp. The affected portion did not have any off-odour or sour smell, except that of ripen mango.

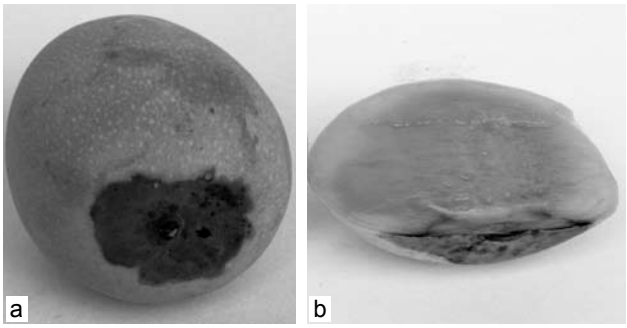

Fig. 2. Internal (b) and external (a) symptoms of 'Stem-end blackening' disorder on ripened mango fruits.

This disorder can be easily confused with the stem-end rot of mango, which is caused due to invasion of *Lasiodiplodia theobromae*, *Phomopsis mangiferae* and other fungi (Johnson *et al*., 1). This disease is characterised by the appearance of dark brown circular spot at the pedicel-fruit attachment juncture or stem-end of the ripening fruit. The peel of the infected area soon turns from dark brown to purplish-black with soft and watery flesh. Thereafter, the infected area spreads downward affecting the entire fruit within next 3-4 days (Lim and Khoo, 2). Furthermore, the fruit when is cut open emits off-odour or sour smell showing infection of the pathogen in the pulp.

Analysis of fruit quality parameters of both healthy and affected fruits revealed that the later had lower total soluble solids (TSS) content on the whole fruit basis. While, the healthy fruit had higher TSS content when pulp samples were taken from three different parts, *viz*. stem-end, middle and lower portion of the fruit. The titratable acidity in both stem-end and pulp portion of normal fruits had lower titratable acidity, compared to healthy fruits (Fig. 3a & b).

This is the first hand report which suggest that 'Stem-end blackening' is a new physiological disorder appearing on over 45% fruits in mango cv. Zarda at maturity, which is not similar to that of stem-end rot caused by fungus.

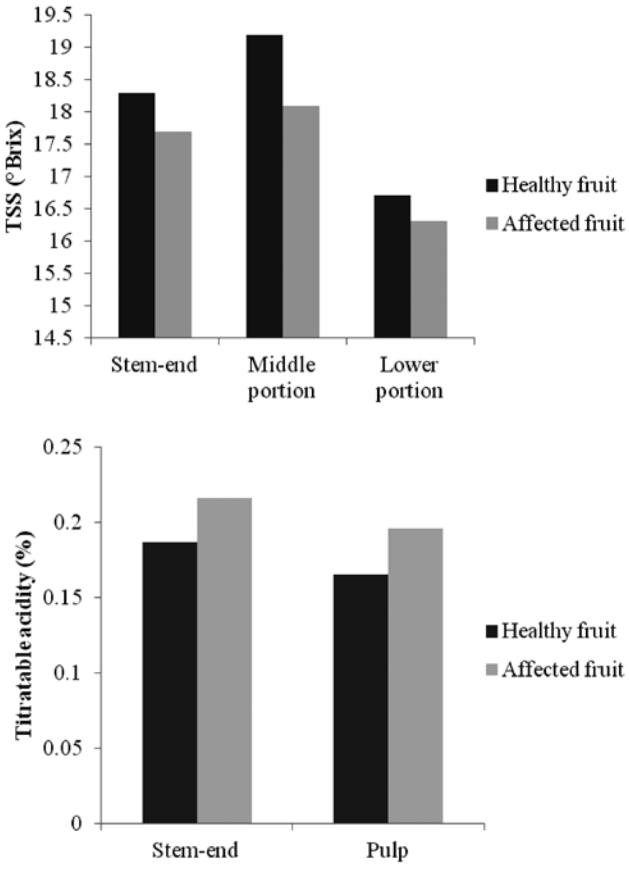

Fig. 3. Fruit quality parameters of healthy and affected fruits.

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