

Original Research Article

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## Evaluation of the Varieties of Indian Gooseberry for Resistance against *Penicillium islandicum*

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### ABSTRACT

#### Keywords

Penicillium islandicum, Indian gooseberry, Resistance, Susceptibility, Varieties

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Present investigations were undertaken at Chaudhary Charan Singh Haryana Agricultural University, Hisar. Aonla or Indian gooseberry, *Emblica officinalis* Garten, is an important horticulture crop of India. It is a rich source of vitamin C and used in various ayurvedic medicines. *Penicillium islandicum*, which was, earlier, a minor disease, but now become a major disease of Indian gooseberry. The present study revealed that resistance and susceptibility against the blue mould rot (*Penicillium islandicum*) disease can be observed among the varieties of *E. officinalis* suggesting that the resistant ones should be preferred for further plantation activities to avoid the frequent damage and losses caused by the disease. Nine commercial varieties (Desi, Hathizool, Kanchan, Krishna, Chakaiya, Banarsi, NA-7, NA-9, NA-10) were also tested for their comparative resistance against *Penicillium islandicum*. In varietal screening against blue mould rot, least disease intensity was recorded in Desi (2.67%) and Kanchan (3.33%) while maximum disease intensity was observed in Chakaiya (50.00%) and Banarsi (49.33%).

### Introduction

Indian gooseberry is an important indigenous crop of Indian subcontinent which is used as alternative medicine, health foods and in herbal products (Nayak *et al.*, 2012). Indian gooseberry fruit contains different essential nutrients viz., carbohydrates, proteins, phenol, calcium, phosphorus, zinc, and vitamin B etc. It is a rich source of vitamin C ranging from 400-1300 mg/100 gm pulp and vitamin B 300

mg/100 gm pulp (Singh, 2006; Kore *et al.*, 2013). Its constituents serve as important source of food and medicine (Kumar and Singh, 2002). Banarasi, Chakaiya, Krishna, Francis (Hathijhul), Kanchan, NA-6, NA-7, Anand-1, 2, 3 are some of the commercially cultivated varieties of aonla in India. (Goyal *et al.*, 2008; Singh *et al.*, 2009).

Tiwari *et al.*, (2008) reported field screening of aonla varieties against *Deudorix isocrates*

(Fabr.). The maximum 43.70% fruit damage was observed in NA-7 (Narendra-7) and the minimum 33.60% was observed in Chakaiya. The order of susceptibility of different varieties was NA-7 (43.70%), Kanchan (41.25%), NA-6 (40.80%), NA-10 (38.40%) and Chakaiya (33.60%). Similar observations were also reported by Padmavati *et al.*, (2002). Meshram and Soni (2011) screened certain varieties for resistance to insect pests and diseases in central India. They reported that ten varieties of *Emblica officinalis* Gaertn. including Kanchan, Chakaiya, Francis, NA-7, NA-10 (Narendra 10), Anand-1, Anand-2, Krishna, Hatizola (Local) and Local-wild were screened against insect pests {gall forming insect (*Betousa stylophora* Swinhoe), leaf roller (*Garcillaria acidula* Forster), bark eating caterpillar (*Indrabela quadrinotata* walker)} and diseases that is vascular wilt (*Fusarium oxysporum* f.sp., *albedinis* Killian and Maire), fruit disease (*Alternaria* sp.). The results revealed that variety NA-10 followed by Kanchan was found to be least preferred by *B. stylophora*, *G. acidula*, *I. quadrinotata* and *Alternaria* spp. in clonal seed orchards, whereas variety Hatizola (Local) followed by Francis showed less incidence of *Fusarium oxysporum* in nursery stage.

## Materials and Methods

Nine commercial varieties (Desi, Hathizool, Kanchan, Krishna, Chakaiya, Banarsi, NA-7, NA-9, NA – 10) were tested for their comparative susceptibility to *Penicillium islandicum*. The fruits were inoculated with the pathogen by well method (Granger and Horne, 1924). The fruit was punctured with cork borer up to a depth 0.5 mm and then inoculated with disc of inoculums and plugging back with the removed portion of fruit. All treatments were replicated thrice and each replication had ten fruits. The disease intensity was determined by calculating the per cent of rotted tissue in the test fruit. Every

fruit was weighed after storage period. The rotten portion of the fruits was removed with the help of a knife and the remaining part of the fruit was again weighed. The loss of weight of each fruit was determined by subtracting the final weight from initial weight. The percentage of rot (disease intensity) was calculated with formula suggested by Srivastava and Tandon (1968).

$$\begin{aligned} &\text{Percentage of rot} \\ &\text{(Disease intensity)} \\ &\quad (W-w) \\ &= \frac{\text{-----}}{W} \times 100 \end{aligned}$$

Where, W is the weight of the fruit without removing the rotten portion and w represent the weight of the fruit after removal of the diseased portion.

## Results and Discussion

The varietal reaction of nine varieties against blue mould rot was recorded in per cent disease intensity and presented in Table 3 and Fig 1. All the varieties showed different behavior to the disease. The intensity of the disease varied from 2.67 to 50.00 per cent in different varieties. The varieties Chakaiya and Banarsi contracted 50.00 and 49.33 per cent disease respectively, therefore considered highly susceptible. However, the disease severity was 2.67 per cent in Desi (seedling) and 3.33 per cent in Kanchan, hence were termed as resistant for further studies.

Present investigations on the reaction of different varieties of Indian gooseberry to blue mould rot indicated that the per cent disease intensity varied from 2.67 to 50 per cent. Maximum disease intensity was recorded in Chakaiya (50.00 %) and Banarsi (49.33 %) and minimum in Desi (2.67 %) and Kanchan (3.33 %). Meshram and Soni (2011) and Tiwari *et al.*, (2008) also reported that aonla

variety NA-10 (Narendra-10) followed by Kanchan was found to be least preferred by insect pests and diseases. The present study revealed that, resistance and susceptibility against the diseases can be observed among

the varieties of *E. officinalis* suggesting that the resistant ones should be preferred for further plantation activities to avoid the frequent damage and losses caused by the diseases

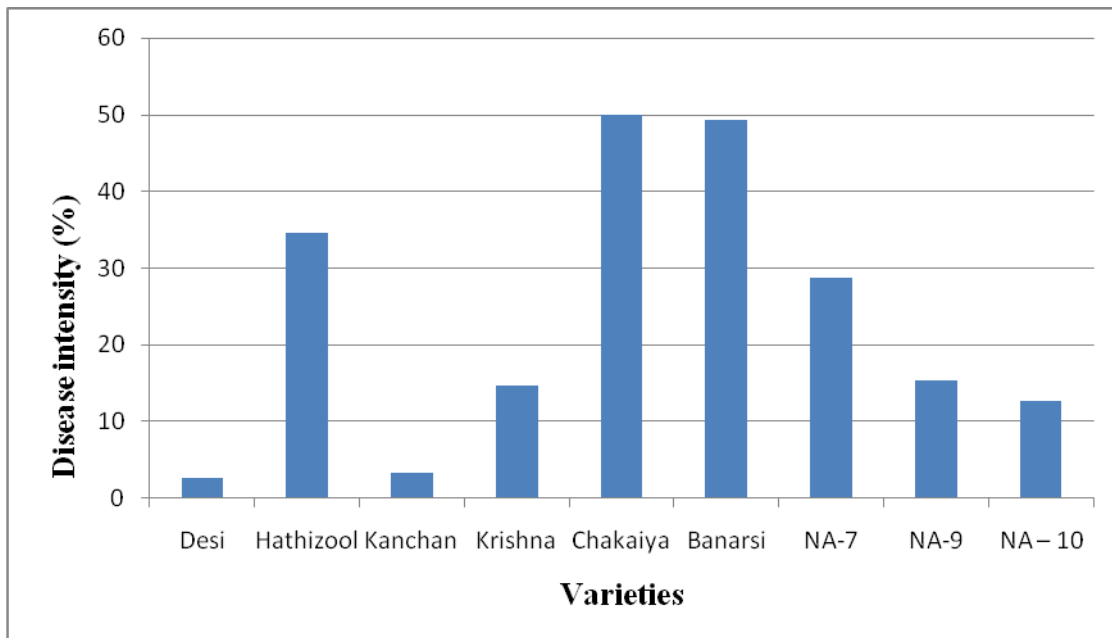
**Table.1** Evaluations of different varieties of Indian gooseberry against blue mould rot

Sr. no.	Varieties	Per cent disease intensity *
1.	Desi	2.67 (9.36)
2.	Hathizool	34.67 (36.05)
3.	Kanchan	3.33 (10.49)
4.	Krishna	14.67 (22.50)
5.	Chakaiya	50.00 (44.98)
6.	Banarsi	49.33 (44.60)
7.	NA-7	28.67 (32.36)
8.	NA-9	15.33 (23.04)
9.	NA – 10	12.67 (20.83)
<b>CD (P=0.05)</b>		1.42

\* Average of three replications

\*\*Figures in parentheses are angular transformed values

**Fig.1** Per cent disease intensity of different Indian gooseberry varieties against blue mould rot



In varietal screening of Indian gooseberry against blue mould rot, least disease intensity was recorded in Desi (2.67%) and Kanchan (3.33%) while maximum disease intensity was observed in Chakaiya (50.00%) and Banarsi (49.33%).

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