Mycopath (2017) 15(1): 51-53 **Brief Article**

Fungi associated with spoiled vanilla bean

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Abstract

Vanilla bean is a major natural flavoring agent. It is a perennial fleshy climbing orchid cultivated in several tropical countries, is susceptible to a number of fungal diseases which cause considerable damage to the beans. *Penicillium* sp. was isolated and identified from infected dried vanilla bean samples during 2016. The infected consignment of 500 kg imported from Madagascar to southern India was incinerated and non-conformity reported to the competent authority.

Key words: Fungal complex, interception, plant quarantine, vanilla bean.

Introduction

Vanilla (*Vanilla planifolia* L.) is the second most expensive spice in the world market after saffron and a valuable source of foreign exchange for several countries (Kumaran *et al.*, 2014). Vanilla beans originated in Mexico, and in some Central American countries like Costa Rica and Honduras. However, today vanilla beans are cultivated in many areas of the world and the main producing countries are Madagascar, Indonesia, China, Comoros and in a lesser extent Tonga, Reunion, Turkey and Guadeloupe. Vanilla is one of the primary sources for vanilla flavoring, due to its high vanillin content. *V. planifolia* or flat-leafed vanilla is also referred to as the vanilla vine, vanilla orchid or simply and most commonly as vanilla. The two main species of *Vanilla* used for cultivation of fruits are *V. planifolia* and *V. pompona*.

Vanilla is susceptible to a number of fungal and a few viral diseases which cause considerable damage to the beans or to the whole plant resulting in heavy crop losses (Joseph and Bhai, 2000). Spoliation with mildew growth on vanilla dried bean pods was observed on consignment of 500 kg imported from Madagascar as air cargo through Chennai port to southern India during 2016 (Fig. 1A-C). In the present work, a fungal pathogen associated with spoilage of dry bean was isolated and identified. Later consignment of infected sample was incinerated and non-conformity report sent to the competent authority.

Materials and Methods

The Infected consignment of dry beans was observed for appearance of symptoms after infection. The infection was initiated from the bean tips and advanced towards the stalk regions. The infected bunch was covered with a thick white feathery mycelial mat of the fungus especially on the distal portions of the beans (Fig. 1C). The infected beans showed rotting symptoms with deep sunken wound like areas, which appeared yellowish brown in colour. Some of the beans were completely rotten. Running threads of fungal mat were also seen on the leaves and beans and rarely on stern also. These beans were taken in to laboratory for isolation and identification of associated of pathogen.

Green colour mycelial mat was observed on vanilla bean and it was surface sterilized and plated on Potato dextrose agar (PDA) Medium. The fungal growth on the infected specimens was further plated in PDA for isolation of the fungus in pure culture (Fig. 2A). Further the infected sample was sent to Indian Type Culture Collection (ITCC), Division of Plant Pathology, Indian Agricultural Research Institute (IARI), New Delhi for confirmation and identification of pathogen.

Results and Discussion

Culture characteristics and identification

Green-colored fungal growth was obtained which was very similar to the feathery white fungal strands observed on the infected beans (Fig. 1B & 1C). In culture media, the colonies were fast growing, reaching about 9 cm diameter within 5-7 days after incubation at 26±2 °C. The mycelium was greenish black and thick with many hyphal strands arising along the sides of the culture flasks or Petri plates (Fig. 2A). The presence of fungal infection (*Penicillium* sp.) was confirmed by Plant Pathology laboratory, Regional Plant Quarantine station, Meenambakkam, Chennai and further authenticated by Indian Agricultural Research Institute (IARI), PUSA (Devi, 2016).

On confirmation of fungal species (*Penicillium* sp.) on imported vanilla dried bean pods, a joint team of officials of Deputy Director, Assistant Director's of Regional Plant Quarantine Station, Chennai in front of customs officials, a total of 500 kg vanilla consignment showing symptoms of fungal infection was incinerated and non-conformity report sent to the competent authority.

Species belonging to the genera *Aspergillus*, *Penicillium*, and *Fusarium* are common

contaminants of agricultural commodities, and some of the mycotoxins produced by these species are produced by fungi common in house dust (Tobin *et al.*, 1987). *Penicillium* species are common causes of spoilage of fruits, cheese, cold meats, old sandwiches, cereals and cereal products and a host of other agricultural and animal products. For example, *P. italicum* and *P. digitatum* are common causes of rot of citrus fruits, while *P. expansum* is known to spoil apples. *Penicillium* species are common causes of spoilage of fruits, cheese, cold meats, old sandwiches, cereals and cereal products and a host of other agricultural and animal products. In addition, some toxigenic fungi produce many different mycotoxins. For example, the *Penicillium verrucosum* complex (*P. verrucosum, P. aurantiogriseum, P. viridicatum, P. crustosum, and P. solitum*) produce nearly 20 different mycotoxins (Frisvad *et al.*, 1989). Sudharshan *et al.* (2006) reported that vanilla beans are susceptible to infection by storage moulds like *Penicillium* and *Aspergillus* due to harvesting of immature beans, improper killing and drying and high relative moisture content in beans.

Conclusion

Packing of vanilla beans with high moisture content will increase the growth of *Penicillium* sp. causes decay which leads to significant postharvest losses. Its main entry point is injury or mechanical damages, hence proper care should be taken during harvesting, sorting and packing of vanilla beans.

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Fig. 1 (A-C): Imported vanilla bean cargo (A & B); spoiled vanilla bean entirely covered by fungal mycelial mat (C).

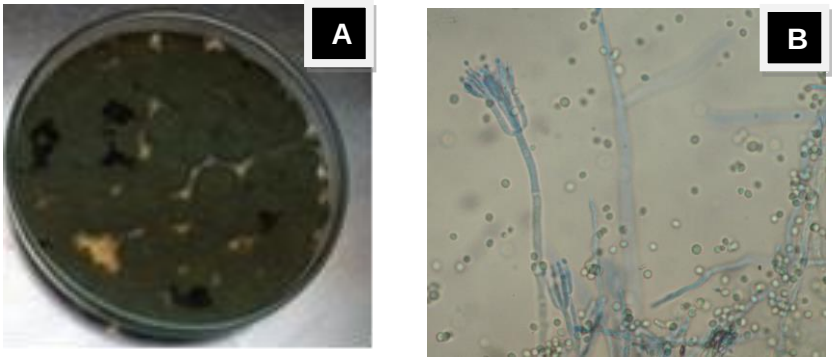

Fig: 2 (A & B): Pure culture of *Penicillium* sp. and microscopic view of *Penicillium* sp.

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