

DISEASE MANAGEMENT OF PITAYA

By

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INTRODUCTION

The attractive red pitaya fruit (also known as dragon fruit, buah mata naga or pitahaya) can sometimes be found in supermarkets and occasionally in the wet markets. It is round to oval in shape. There are different species of pitaya, eg. *Hylocereus* spp. and *Stenocereus* spp. The common ones that are found in the markets in Sarawak belong to the *Hylocereus* spp. They have red skins with soft scale-like protusions, giving it a dragon-like skin appearance and hence its common name. They have either white or crimson flesh packed with tiny crispy black seeds. The crimson colour is due to a natural purple red pigment known as betalain, which has antioxidant properties. Betalain is also found in the red beet root. The exotic pitaya is becoming an elite fruit and has recently been used to make wine, cakes (including moon cakes) and other confectioneries.

Pitaya, a member of the cactus family, Cactaceae, originated from the semi-desert, hot tropical regions of Latin America. Many species are found in Mexico, Colombia, Costa Rica and Nicaragua. It was brought over to Vietnam by the French at least a hundred years ago. It is also grown in the desert areas of Israel and the Northern Territory and parts of Queensland in Australia. It was introduced into Peninsular Malaysia in the 1990's and Sarawak after 2000. In Malaysia, disease problems are the constraints to commercial production. The exotic cactus plant from a semi-arid homeland does not have a competitive advantage or inherent disease resistance in a humid and wet environment like ours, when it encounters a barrage of tropical diseases. The incessant artillery of fungal and bacterial spores borne by the wind, rain splashes, farm implements, fauna like flying and crawling insects and snails, and *Homo sapiens* has taken its toll on the exotic pitaya. This is evident in the unfortunate closure of a few pitaya orchards in Peninsular Malaysia and parts of Sarawak.

TYPES OF DISEASES

In Sarawak, research has shown that the young pseudostems are susceptible to both bacterial and fungal diseases. The fruit can be infected by fungal diseases in the field, and post-harvest diseases can also be a problem for commercial growers. The disease organisms (pathogens) are hereby listed:

On pseudostems

- Bacterial disease – *Erwinia* spp.
- Fungal diseases – *Phomopsis*, *Pestalotiopsis*, *Cladosporium*, *Fusarium*, *Colletotrichum*, *Botryosphaeria*, *Curvularia* spp.

On fruits

- Fungal diseases in the field – *Helminthosporium*, *Colletotrichum*, *Curvularia* spp.
- Post-harvest diseases – *Fusarium*, *Colletotrichum*, *Curvularia*, *Helminthosporium* spp. and *Gilbertella persicaria*

DISEASE MANAGEMENT

Research is being carried out by the Agriculture Research Centre on the disease management, using an integrated approach. The current recommended disease management comprises the following:

- Avoid planting in areas with high rainfall or high water table.
- Start with disease-free planting material. The source of disease-free planting material is very important.
- Do not use compound fertilizers with high nitrogen content, as excessive nitrogen increases disease susceptibility. Use straight or organic fertilizers.
- Do not maintain too many pseudostems. This is to reduce the humidity within the plant canopy. A high humidity encourages disease incidence.
- Keep the grass short to reduce the soil moisture.
- Excise/prune off the severely fungal infected or bacterial infected plant parts and clean knife/ pruning shears after each pruning. Remove the debris promptly. Prune during the dry weather, to ensure that the wounds dry properly to reduce infection. Younger pseudostems are more susceptible to disease infection.
- Practice good farm hygiene. Remove all plant debris from the planting site.
- Remove the remains of the dried flowers after fruit set as they harbour the disease organisms.
- Currently, there are no pesticides registered by the Malaysian Pesticide Board for use on dragon fruit plants, and so no pesticides can be used.
- Practise ant and snail control, as they can help to spread the fungal spores and bacteria, by destroying the nest, physical removal or using snail bait.
- Harvest the fruits using clean pruning shears during the dry weather to ensure that the harvest wounds dry up properly to reduce infection.
- Provide partial shade with *Gliricidia* living support to reduce the disease incidence. Proper management of the shade is important to ensure sufficient light for the plant.
- If affordable, use electric lighting in the late evening to induce flowering and fruiting on older stems. Older stems are less susceptible to disease infection.
- To reduce post-harvest problems caused by the soil-borne fungus, *Gilbertella persicaria*, ensure that the harvested fruits are not in contact with soil during harvesting. Harvesting baskets, pruning shears and hands should also be kept soil-free.
- For longer storage of commercial fruits, carry out hot water treatment at 55°C for 15min and store them at 10°C in polyethylene bags.



A few fungal diseases occurring together on pseudostem – *Phomopsis*, *Pestalotiopsis*, *Cladosporium* spp.



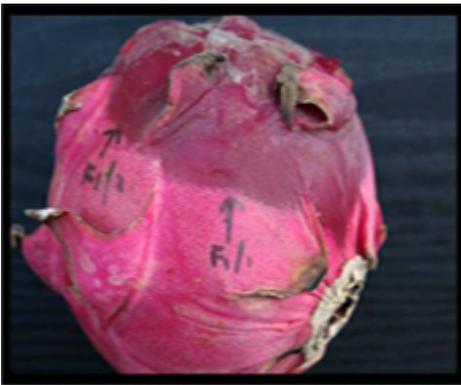
Mixed fungal infection on fruit – *Curvularia*, *Colletotrichum*, *Cladosporium* spp.



Post-harvest diseases – *Colletotrichum*, *Cladosporium* & *Curvularia* spp.



Post-harvest diseases – *Colletotrichum*, *Fusarium* spp.



Post-harvest disease due to soil contamination – *Gilbertella persicaria*



Lighting facility to induce flowering in a private orchard