Diseases of Taro: A Comprehensive Summary

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Taro (*Colocasia esculenta*), from the family Araceae (Chauhan et al., 2024) is a tall, perennial herbaceous plant (Parmar et al., 2024). Taro is commonly known as Arvi (Tejasvi et al., 2024). Global production of taro is 10.54 million as per the reports taken in 2019 (Boahemaa et al., 2024) and in India the crop is commercially cultivated in Uttar Pradesh, Andhra Pradesh, Madhya Pradesh, Odisha, West Bengal, Kerala and North-Eastern regions. *Colocasia esculenta* is cultivated for its corms, leaves and petioles which is rich in nutrients like starch (80g), fibre (0.8%), ash (1.2%), protein (1.5%), fat (0.2%), thiamine, riboflavin, vitamin B6, vitamin C, niacin, iron, phosphorous, zinc, potassium, copper and manganese (Chauhan et al., 2024), nitrogen content (0.33 to 1.35%), phosphate monoester derivatives (0.017 to 0.025%) (Parmar et al, 2024). There are two types of α-glucanspolymers, amylopectin and amylose in taro (Gupta et al., 2024). Taro leaves when cooked and consumed are known to prevent anemia due to its high β-carotene content, iron content and folic acid content (Parmar et al., 2024).

Presence of 600 mg of anthocyanin makes the plant not only nutritionally rich but also rich in medicinal values (Jiang et.al, 2024). The plant has wide range of medicinal properties, which include the presence of lectin. Lectin is a compound with cell clumping ability which will make taro pharmacologically useful against autoimmune diseases (Desmiaty et.al, 2024). Leaves of the plant contain high fibre content which aid digestion and regulates bowel movements and also helps in fighting parasite (Naik et al., 2024). *C. esculenta* is used as traditional medicine for fever, pain, sores, stomach swelling, infection and snake bites. Taro leaf juice is used as against internal otalgia, adenitis, haemorrhages and buboes (Chauhan et al., 2024). Other than the mentioned medicinal uses the plant is known to have antifungal, antimicrobial, anti-diabetic, anti-oxidant, antimetastatic, anti-inflammatory, antimelanogesnic, hepatoprotective, anticancerestrogenic and neuropharmacological properties. Besides all these medicinal and nutritional values the plant is underutilized and one of the reasons is presence of high moisture content. Presence of high moisture content makes the plant susceptible to a wide range of diseases (Boahemaa et al., 2024). The major diseases of taro are discussed here.

Taro Leaf Blight

Butler and Kulkarni (1913) were the first to report TLB in India (Ravi et al., 2021). Taro leaf blight, caused by the pathogen *Phytophthora colocasiae,* presents symptoms that begin with small, water-soaked spots that spread and develop into lesions expanding to 3-5 mm wide. The fungus thrives at temperatures of 28-30ºC and humidity levels of 85-90%, often leading to complete destruction of the leaves within just a few days (Das and Pattanayak, 2020).

In its second stage, petiole rot can occur within 10-20 days, with lesions displaying amber, bright-orange, or reddish-brown colour. In dry weather or with certain resistant cultivars, the centers of lesions can become papery and drop out, resulting in a 'shot-hole' appearance (Shilpa et.al, 2021). This disease results in annual losses exceeding 10%. Cultivating leaf blight-resistant taro varieties is the most effective strategy for managing Taro Leaf Blight (TLB).

However, farmers may prefer susceptible varieties due to their shorter duration, higher yield, and better culinary qualities.

Recommended control measures include using healthy planting material, wider spacing, intercropping with barrier crops like maize, removing infected leaves during the endemic phase, and adjusting planting time to avoid disease-prone conditions. Mulching with

materials like Eupatorium or straw can delay disease onset and improve yields. Integrated cultural practices are necessary for optimal disease control, and further studies on intercropping and crop rotation are needed (Ravi et al., 2021). Chemical control using fungicide sprays with co-formulation can manage the disease. Many protective (Mancozeb, Copper oxychloride) and systemic (Metalaxyl, Phosphorous acid) fungicides and organic products have been recommended for the successful management of TLB disease. Products like Callomil Plus 72WP (containing Metalaxyl and copper oxide) and Mancoxyl Plus 720 WP (containing Metalaxyl and Mancozeb) have shown 100% effectiveness in controlling the disease (Mbi et al., 2021). Mancozeb and copper are commonly used to protect taro from fungal infections (Patel et al., 2023).

In addition to chemical treatments, exploring biocontrol agents offers promising alternatives for managing taro diseases and promoting sustainable agriculture. *Trichoderma harzianum* (Edtm) and *T. aureoviride* have been shown to suppress taro leaf blight (Taylor et al., 2023). Foliar application of *Azadirachta indica* (neem) leaf extracts has also proven effective in managing taro leaf blight (Shakywaret al., 2014). Additionally, nine different fungal organisms have been observed to exhibit antagonism against the pathogen (Patel et al., 2024).

Dasheen Mosaic Diseases

Dasheen mosaic disease is caused by the Dasheen mosaic virus which is also known as Dasheen mosaic potyvirus and it is a positive sense single-stranded RNA virus. This disease is characterized by an incidence of less than 2%. The disease is widely spreading and presents symptoms such as interveinal yellowing along the major veins and veinlets.

In severe cases, it can lead to leaf distortion, cupping, curling, and a shortened appearance of the leaves (Shilpa et al., 2021). Dasheen mosaic disease infects both edible and ornamental plants, particularly members of the *Araceae* family. It has been reported to adversely affect both the quality and quantity of corms (Kidanemariam et al., 2022).

Corm Rot in Taro

P. colocasiae Raciborski was first reported on taro plants in Java in 1900 by Raciborski. This pathogen is known to significantly impact corm and leaf yields, causing reductions of up to 50% and 95%, respectively, in susceptible varieties. Notably, the disease can develop rapidly after harvest, with entire corms showing signs of decay within just 7 to 10 days, leading to substantial losses during storage. The infection can occur on any part of the corm, further complicating management and exacerbating economic losses for farmers. In the early stages of infection, the affected tissue appears light brown and firm, often presenting a distinct margin that can make recognition difficult.

As the disease progresses, a downy, whitish growth emerges on the surface of the corms. When infected corms are sliced, they reveal a tan-colored, rubber-like texture accompanied by a soft appearance. Subsequently, an expanding brown discolored area forms, characterized by a diffuse and indistinct border, indicating further deterioration of the tissue (Nirmala et al., 2024).

Ghost leaf spot

Ghost spot has probably the widest distribution, and is likely to be present wherever the crop is grown. Since not causing severe damage, it is considered as minor disease. The disease is caused by the fungus, *Cladosporium colocasiae*.

Leaves show irregular reddish-brown with light brown centres coalesce and seen as patches, not penetrating to the under surface. Since it is a minor disease and the symptoms are superficial, management practices are not needed.

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