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## Multi-locational nursery disease spectra and their symptoms of *Syzygium cumini* (L.)

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### Abstract

Seedling diseases of *Syzygium cumini* pose a major threat in meeting demands of quality seedling stock for large scale plantation. To generate data on disease induced seedlings growth impairments, disease and pathogenic spectra and to develop effective management, the present investigations was done among three bioclimatic zones of Canara circle, two foliar diseases were recorded. Leaf spot was highest (incidence-56.27%, PDI-36.6%) in all nurseries and leaf blight was minimum and limited to few nurseries (incidence-25.80% PDI-10.27%) and hilly zone ranked first. Disease symptoms were identified in different zones of nurseries in Canara circle.

**Keywords:** Disease incidence, disease severity, symptom, leaf spot, bio-climate

### Introduction

Jamun (*Syzygium cumini* L.) is a multipurpose large, evergreen native tree species belonging to the family Myrtaceae. Commonly known by Indian black berry or java plum or black plum, and locally by 'Nerale'. It is widely distributed in the tropical to subtropical regions and is native to India, Burma and Andaman Islands. India stands second at the global level in fruits production with a contribution of 15.4 per cent out total 13.5 MT (Mishra *et al.*, 2018) [7]. Genus has nearly 1100 species with adapt to variety of soils and is best suited to agro-forestry, greening wasteland, avenue planting (Komal *et al.*, 2019; Kanchan Bhatt *et al.*, 2020) [5, 4]. Therapeutic value of *Syzygium* and is well known in Ayurveda and Unani systems of medication (Arvind *et al.*, 2015) [1]. Seeds are capable to reduce blood sugar level and in treating diabetes (Bopp *et al.* 2009). Likewise leaves have usage value in treating diarrhoea and roots in treating epilepsy (Gopinath and Karthikeyan, 2015) [3]. Wood is durable in water and termite resistant. Role in boat building, sleepers, furniture, musical instruments and in building bridges (Kanchan Bhatt *et al.*, 2020) [4].

In the recent past biotic traumas are exceedingly escalating on *Syzygium* seedlings in the nurseries in multiple localities due to the major factors accountable for failure is either insect pest or disease attack (Nagarjun and Suryanarayana, 2016) [16]. Disease vulnerability bound to the open nursery condition. But, till date except for disease documentation, no systematic studies are figuring in the literature. So, the present study was carried with the moto of assessment of disease estimates and symptomology of *Syzygium cumini* seedlings in different bio-climatic zones of Canara circle

### Material and Methods

The investigation entitled "Studies on nursery diseases of *Syzygium cumini* (L.) and their management" was carried out at the College of Forestry, Sirsi during 2018 to 2020. The work details of material used and methods adopted are furnished in the following headings. Survey to assess seedling disease was conducted in nine nurseries under nine different forest ranges of three bio-climatic zones of Uttara Kannada district, Karnataka (Fig. 1 and Table 1). Documentation of diseases done in all nurseries under three bioclimatic zones of Canara forest circle as cited under study site. It represents percentage of disease affected plants in a population indicating the prevalence of disease in a given area or host population. Survey was conducted between 2018-19. Foliar disease (Leaf spot/blight) incidence was estimated by counting number of diseased seedlings out of total number of seedlings raised in lot and expressed in percentage. Disease severity was assessed using 0-5 severity scale (Siddaraju, 2006) [9] with little modifications as scale 0 (No symptom), scale 1 (Up to 1% leaf area affected), scale 2 (1-10% leaf area affected), scale 3 (11- 25% leaf area affected), scale 4 (26-

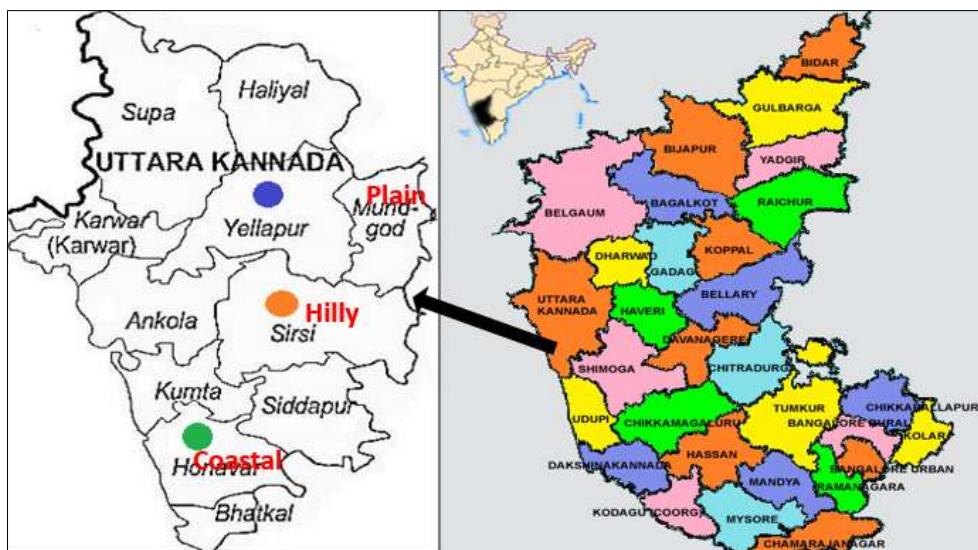
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50% leaf area affected), scale 5 (>50% leaf area affected). Based on severity values Per cent Disease index was estimated for each of the nine nurseries using the formula

described by Wheeler (1969) [10]. Characteristic symptoms of leaf spot of *S. cumini* and disease progression wise symptoms were recorded and photographed.



**Fig 1:** Study areas of present investigation in Uttara Kannada district, Karnataka

**Results and Discussion**

The diseases documented in nine nurseries distributed under three bio-climatic zones are presented in Table 2. *Pestalotiopsis* leaf spot was found in all the nurseries and *Neo Pestalotiopsis* leaf blight was recorded in four nurseries, two each in Hill (Kalave, Kengre) and Plain zone (Chinnapur and Kalankoppa). Disease incidence and severity of *Syzygium cumini* in 3 bio-climatic zones of Canara circle are presented in Table 3 and 4. Mean leaf spot incidence was high in hilly zone (56.27%) followed by coastal zones (41.56%) and the least was in plains (27.10%). Nursery wise, Kalve had highest incidence (61.20%) followed by Kengre (58.24%) in hilly zone. Sabageri nursery in the plains showed least leaf spot incidence (22.12%). However, incidence range was also high in hills (49.36 to 61.20%). Whereas Blight confined Highest mean incidence in hilly zone (25.87%) followed by Plains (12.45) with no incidence in coastal zone. Unlike leaf spot, incidence range of blight among nurseries was less and the highest incidence was in Kalave nursery (41.35%) followed by Kengre nursery (36.26%) in hilly zone. Least was in Kalankoppa (13.2%) of Plains with no incidence in the nurseries of coastal and Sabageri nursery in the plains. The Per cent Disease Index (PDI) of *S. cumini* seedlings recorded and presented in Table 4. Hilly zone had maximum mean PDI for leaf spot (36.60%) followed by coastal (32.19%) and plains (22.47%). Among nurseries the highest

leaf spot severity (PDI) was in Kalave nursery of hill zone (59.20%) followed by Kasarkod of Coastal area (47.12%) and least one in Bellangi nursery of coastal zone (11.25%). Maximum leaf blight severity (PDI) occurred in Kalave nursery of hill zone (18.54%) followed by Chinnapur of plains (14.14). Least was in Kalankoppa nursery of plains (10.20%). Hilly zone had highest mean PDI for leaf blight (10.27%) followed by plains (8.11%) and nil in coastal zone. Probably, in Kalave nursery poor management and un-disposed stock of infected seedlings and plant debris might have contributed for this. Restricted location and less leaf blight incidence might be due to location variations in weather factors favoring disease promotion, sources of infection and inoculums load. In similar line, Mehrotra and Mukasir (2000) [6] who claimed that high moisture develops seedling diseases. Symptomatology of leaf spot disease of *Syzygium cumini*, initial appearance of small dark reddish-brown tinges on both young and matured leaves, later developed as circular to oblong spots with light brown surrounded area and outer yellow halo. Spots gradually turned deep brown with ash gray center surrounded by light brown margins. Leaf blight is irregular light brown to deep brown small specks to necrotic brown areas on leaf lamina of moderately matured to old leaves either partially or completely. Later light brown centered irregular purplish to brownish areas with deep brown margins (Plate 1).

**Table 1:** Bioclimatic zone wise study nurseries in different forest divisions of Canara circle selected for assessment of diseases of *Syzygium cumini*

Bio-climatic Zone	Avg. rain fall per yr. (mm)	Division	Forest range	Forest nursery
Hilly area	2543	Sirsi	Sirsi	Kalave
			Hulekal	Kengre
			Janmane	Amminalli
Coastal area	3675	Honnavar	Katagal	Bellangi
			Honnavar	Central Kasarkod
			Gerusoppa	Sharavati
Plain area	2723	Yellapur	Idagundi	Chinnapur
			Mundagod	Kalankoppa
			Yellapur	Sabageri

**Table 2:** Documentation of bio-climatic zone wise seedling diseases of *Syzygium cumini* in different nurseries of Canara circle

Bio-climatic zone	Division	Name of nursery	Forest range	<i>Pestalotiopsis</i> leaf spot	<i>Neo Pestalotiopsis</i> leaf blight
Hilly	Sirsi	Kalave	Sirsi	+	+
		Kengre	Hulekal	+	+
		Amminalli	Janmane	+	-
Coastal	Honnavar	Bellangi	Katagal	+	-
		Kasarkod	Honnavar	+	-
		Sharavati	Gerusoppa	+	-
Plains	Yellapur	Chinnapur	Idagundi	+	+
		Kalankoppa	Mundagod	+	+
		Sabageri	Yellapur	+	-

+ = Presence of diseases - =Absence of disease

**Table 3:** Nursery wise incidence of diseases of *Syzygium cumini* in Canara circle

Bio-climatic zones	Division	Forest nursery	Disease incidence (%)	
			<i>Pestalotiopsis</i> leaf spot	<i>Neo Pestalotiopsis</i> leaf blight
Hilly	Sirsi	Kalave	61.20	41.35
		Kengre	58.24	36.26
		Amminalli	49.36	-
		Mean ± SD	56.27 ± 5.03	25.87± 18.41
Coastal	Honnavar	Bellangi	33.15	-
		Central Kasarkod	53.32	-
		Sharavathi	38.21	-
		Mean ± SD	41.56 ± 8.57	-
Plain	Yellapur	Chinnapur	32.29	24.14
		Kalankoppa	26.82	13.20
		Sabageri	22.12	-
		Mean ± SD	27.1 ± 4.16	12.45± 9.87
Overall mean			41.64	12.77

- = No disease found in forest nursery

**Table 4:** Nursery wise seedling diseases severity in *Syzygium cumini* of different bio-climatic zones of Canara circle

Bio-climatic zones	Division	Forest nursery	Disease severity (PDI)	
			<i>Pestalotiopsis</i> leaf spot	<i>Neo Pestalotiopsis</i> leaf blight
Hilly	Sirsi	Kulave	59.20	18.54
		Kengre	38.24	12.26
		Amminalli	12.36	-
		Mean ± SD	36.6± 19.16	10.27± 7.70
Coastal	Honnavar	Bellangi	11.25	-
		Central Kasarkod	47.12	-
		Sharavathi	38.21	-
		Mean ± SD	32.19± 15.25	-
Plain	Yellapur	Chinnapur	18.69	14.14
		Kalankoppa	26.60	10.20
		Sabageri	22.12	-
		Mean ± SD	22.47± 3.24	8.11± 5.96
Overall mean			30.42	12.25

- = No disease in forest nursery





**Plate 1:** Symptoms of leaf spot and leaf blight of *Syzygium cumini*, a) Symptoms progression of leaf spot disease in *Syzygium cumini*, b) Symptoms progression of leaf blight disease in *Syzygium cumini*

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