

## Exploring Yellow Leaf Disease Patterns in Areca Plantations in Chikkamagaluru District of Karnataka

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DOI: [10.36348/sjpm.2024.v09i03.002](https://doi.org/10.36348/sjpm.2024.v09i03.002)

| Received: 28.01.2024 | Accepted: 05.03.2024 | Published: 14.03.2024

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### Abstract

Yellow Leaf Disease (YLD) poses a significant threat to arecanut cultivation, particularly in the South Indian states of Karnataka and Kerala. This study aimed to assess the incidence and intensity of YLD in the Malnad regions of Karnataka during 2021-22. Intensive roving surveys were conducted in major arecanut-growing areas, namely Sringeri, Koppa, and Narasimharajapura taluks of Chikkamagaluru district. The assessment was made through selecting five fields per location and calculating the percent disease incidence and intensity based on observed symptoms following established scoring systems. Results revealed varying levels of disease incidence and intensity across surveyed taluks and villages. In Chikkamagaluru district, Koppa, Narasimharajapura, Sringeri, and Kalasa taluks exhibited incidence ranging from 0 per cent to 100 per cent and intensity from 80 per cent to 100 per cent, while Narasimharajapura and Mudigere taluks showed incidence from 0 per cent to 60 per cent and intensity from 0 per cent to 30 per cent. The study underscores the endemic nature of YLD in these regions, likely influenced by soil and environmental factors, particularly in hilly areas with high rainfall.

**Keywords:** Areca catechu, yellow leaf disease, incidence, intensity.

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## INTRODUCTION

Arecanut (*Areca catechu* L.) is an important commercial crop grown in India and commonly referred as betelnut or supari. Native of Malayan-Archipelago, Philippines and other East Indian Islands. It is extensively grown in South East Asian countries viz., Bangladesh, Indonesia, Malaysia, India and Sri Lanka. In India, it is largely cultivated in humid tropics and foot hills of Western Ghats and North Eastern regions of India which includes Karnataka, Kerala, Maharashtra, Assam, Andhra Pradesh, Odisha, Tripura, West Bengal and in East Coast tracts of Tamil Nadu (Chowdappa *et al.*, 1995). Areca palms were grown in many countries for their kernel and is chewed alone or in the form of quids, a mixture of tobacco, powdered or sliced areca nut and

slaked lime wrapped in the leaf of “betel” vine (*Piper betel*). The seed contains certain alkaloids such as arecaidine and arecoline, which has intoxicating capacity upon chewing and slightly addictive possessing ayurvedic and veterinary medicinal value. Nuts of areca palm are being used for the treatment of wounds for many years. Almost all parts of this plant, including its nuts, leaves, roots, and stem, exhibit analgesic, anti-inflammatory and wound healing properties. Its growing tracts are located in an area of high rainfall and is cultivated over a wide range of temperature, from a minimum of 4 °C (as in places like Mohitnagar and West Bengal) to a maximum of about 40 °C (Vittal in Karnataka and Kannuru in Kerala) though the palm flourishes well within a temperature range of 14-36 °C

with an average annual rainfall of about 750 mm (Nambiar, 1949).

India is the largest producer and consumer of arecanut in the world, with a total area of 730.82 thousand ha and production of 1208.93 thousand tonnes and productivity of 1654 kg/ha. In Karnataka, 500 thousand ha of area is under arecanut cultivation and production of 950 thousand tonnes with productivity of 1900 kg/ha of nuts were produced during 2020-21 (DASD, 2021). Though, Karnataka state has recorded maximum area under the crop in India, its share to the national production is found to be decreasing, as it is highly affected by both biotic and abiotic factors, which limits the productivity of the crop. Cultivation of arecanut is threatened by many diseases caused by fungi, bacteria, virus and phytoplasma. Major diseases affecting the crop loss and yield are koleroga (*Phytophthora meadii*), basal stem rot (*Ganoderma* spp.), leaf spot (*Phyllosticta arecae*, *Colletotrichum gloeosporioides* and *Pestalotiopsis arecae*) and inflorescence die back (*Colletotrichum gloeosporioides*), bacterial leaf stripe or rot (*Xanthomonas vasicola* pv. *arecae*), crown chocking (*Candidatus Phytoplasma australiense*) and yellow leaf disease (*Candidatus Phytoplasma*).

Yellow leaf disease (YLD) of arecanut is a major production constraint faced by arecanut farmers in south India, especially in the states of Kerala and Karnataka. It was first time reported in India by Raghavan and Baruah (1958) from Moovattupuzha, Meenachil and Chalakkudy areas of central Kerala (Nambiar, 1949). It is known as 'Kattuveezhcha' in Malayalam and 'Chandiroga' in Kannada. In 1960, the disease incidence was as high as 90 per cent in Quilon district of Kerala. However, recent survey conducted by Naik *et al.*, (2021) revealed that the disease was more

severe in Sringeri, Koppa and Narasimharajapura (N.R pura) of Chikkamagaluru with the mean incidence of 100, 100 and 60 per cent respectively. In 1976, a survey was conducted in 210 YLD affected villages of Idukki and Kottayam districts in Kerala and Koppa and Sringeri taluks of Chikkamagaluru district in Karnataka which revealed that, 35.8 per cent out of the 92.6 per cent of areca growing area in Kerala and 24.4 per cent of areca palm growing area in Karnataka was affected by the disease. Reduction in yield was upto 50 per cent and leaf fall of upto 4 per cent was recorded over a period of three years following the disease (CPCRI, 1977). The disease is only debilitating in nature and later becomes lethal. The diseased palm can only be identified by the symptoms and shows seasonal variation in yellowing of the leaves.

So, to know their incidence and intensity of yellowing of yellow leaf disease of arecanut during 2021-22, the study was carried out in the malnad regions of Karnataka. Through previous studies, the incidence was proposed to be maximum in different taluks of Chikkamagaluru. With the objective, to know severity of disease the study was made.

## MATERIAL AND METHODS

Intensive roving survey was carried out during 2021-22 to assess the incidence and intensity of yellow leaf disease in major arecanut growing regions of Karnataka viz., Sringeri, Koppa and Narasimharajapura taluks of Chikkamagaluru district. At each location five fields were selected randomly and per cent disease incidence was calculated by observing twenty five plants per garden and the intensity was calculated by selecting five plants at each garden by following scoring system (Table 1) given by George *et al.*, (1980).

**Table 1: Intensity of yellow leaf disease of arecanut**

Scoring for yellowing (Y)		
Sl. No	Features	Scoring
1	Healthy	0
2	Tip yellowing upto 25 % of leaflets	1
3	Tip yellowing upto 50 % of leaflets	2
4	Tip yellowing more than 50 % + marginal yellowing upto 25 %	3
5	Tip yellowing in full + marginal yellowing upto 50 % + Complete yellowing upto 25 %	4
6	Tip yellowing in full + marginal yellowing upto more than 50 % + Complete yellowing upto 50 %	5
7	Tip yellowing in full + marginal yellowing upto more than 50 % + Complete yellowing in full(mild)	6
8	Complete yellowing in full(severe)	7

Scoring for Necrosis (N)		
Sl. No	Features	Scoring
1	Healthy	0
2	Necrosis upto 50 % of the leaflets	1
3	Necrosis in more than 50 % of the leaflets	2

Scoring for crown size reduction (R)		
Sl. No	Features	Scoring
1	Healthy	0
2	Reduction in size of younger leaves	0.5
3	Reduction in size of younger leaves and stem tapering	1

### Estimation of per cent disease incidence

The per cent disease incidence was assessed by recording the number of plants showing disease symptoms, out of the total number of plants examined.

Symptoms: Rawther (1976) recorded the characteristic symptoms of the disease as:

- 1 Inter-venial foliar yellowing starting from the tips of leaflets in two to three leaves of the outermost whorl (Y).
- 2 Necrosis of the leaflets and eventually dry up (N).

- 3 In advanced stage, leaves are reduced in size, become stiff and pointed, closely bunched and abnormally puckered (R).

Based on the standard symptoms observed during survey, per cent disease incidence and intensity was calculated.

The percentage of disease incidence was calculated by using the following formula.

$$\text{Disease Incidence (DI \%)} = \frac{\text{Number of infected plants}}{\text{Total number of plants examined}} \times 100$$

### Assessment for the intensity of yellow leaf disease of arecanut

Mean of twenty-five plants were used to determine the intensity scoring by using formula given below by George *et al.*, (1980).

Scoring system to assess intensity in yellow leaf affected gardens:

$$\text{Intensity} = ((Y+N)/L + R) \times 10$$

Where

- Y = Total scoring for yellowing of the leaves (0-7)
- N = Scoring for the necrosis of the leaves (0-2)
- R = Scoring for reduction in size of the crown (0-1)
- L = Half the number of leaves in the crown

### Intensity value (I) of YLD affected gardens

Grouping of taluks was carried out based on the intensity (I) value and the palms showing yellowing(Y), necrosis (N) and reduction of the crown region(R) during survey. Only maximum intensity observed in each taluk was considered for indicating I value.

If I value is

Sl. No	Score	Features
1	0	Healthy
2	<20	Mildly affected
3	20-50	Moderate affected
4	>50	Severely affected

However, conspicuous symptoms of YLD were well pronounced immediately after the onset of South-West monsoon rains specially during August-November where, its cessation and maintaining of the green colour by the younger leaves is commonly observed in majority of gardens. Characteristics of yellowing starts from the tip of the leaflets of second or third fronds of the outer most whorls of the palm. Later on yellowing gradually extends to the middle of the lamina showing typical demarcation of yellow and green parallel bands on both sides of the midrib of the leaflets. The leaves becomes stiff and pointed, closely bunched and abnormally puckered. As the disease progresses, yellowing extends to the whole lamina and leaf tips become necrotic and dries up during summer leaving the leaf stalk green. Subsequently, symptoms appeared on both mature and immature nuts wherein, kernel size gets reduced, discoloration and rotting of kernels and non production of inflorescence and if produced, drying up of the entire inflorescence was also observed. At the advanced stage, crown size reduction, reduction in the internodal length and tapering of the stem followed by decapitation of the entire crown leaving a bare trunk were conspicuous. Affected plant roots also exhibit brown to black colour discoloration (Fig 1).

By observing these symptoms, incidence and intensity of palms were calculated.

### Survey for the incidence and intensity of yellow leaf disease of arecanut in Chikkamagaluru district

A total of five taluks from Chikkamagaluru district was surveyed. During the survey observations on DI (%), intensity, age of the crop, acreage, variety, other

## RESULTS AND DISCUSSION

### Symptomology of the yellow leaf disease of arecanut

Symptom appearance and its presence on the plant can be seen across all the three seasons in a year.

diseases and pests observed along with latitude and longitude of the gardens were recorded (Table 2, Fig 2).

Among five taluks surveyed in Chikkamagaluru district, in Koppa taluk, incidence of disease varied from 0 to 100.00 per cent and intensity varied from 0 to 98.33 per cent. Among different villages surveyed, highest incidence of disease was recorded at Kuppli village (100.00%) followed by Bikkali and Melubilre (98.00%) and whereas, zero incidence was observed in Belagola village (0.00%). However, maximum disease intensity was observed in Hirebailu village (98.33%) whereas, in Belagola village disease intensity was found to be zero.

In Narasimharajapura taluk, incidence of disease varied from 0 to 54.00 per cent and intensity of disease varied from 0 to 60.00 per cent. Among the villages surveyed, highest incidence of disease recorded at Davana, Kolale and Seegodu villages with 54.00 per cent followed by Yadagere (39.00%). However, zero per cent incidence observed at Gunduwani, Kankale, Hemmuru, Shimshe, Gubbiga and Jamballi. Consequently maximum disease intensity was observed in Muttinakoppa village with 60 per cent of disease intensity.

In Sringeri taluk, incidence of disease varied from 0 to 100.00 per cent and intensity of disease ranged from 0 to 97.50 per cent. Highest incidence of YLD in Sringeri taluk recorded at Honnavalli, Belendur and Bandlapura village of 100.00 per cent followed by Menase (97.50%) and Kanadamane (97.00%). However, maximum intensity of the disease observed at Belanduru and Bandlapura (97.50%) followed by Honnavalli (93.80%).

In Mudigere taluk, per cent disease incidence varied from 0 to 15.00 per cent and maximum intensity recorded up to 15.00 per cent. Among 28 villages surveyed, highest incidence of the disease observed at G Hosahalli (15.00%) followed by G Agrahara (10.00%) and Darshana (8.00%). However, the highest intensity of the disease observed in Darshana (15.00%) followed by G Agrahara (12.00%), Uduse (10.00%) and Bettagere (10.00%).

In Kalasa taluk, incidence of disease varied from 10.00 to 90.00 per cent and intensity of disease varied from 10.00 to 82.50 per cent. Highest incidence of YLD in Kalasa taluk recorded at Marasanige (90.00 %) followed by Samse (85.00 %), whereas, lowest incidence observed at Horanadu and Ambinakodige (10.00 %) whereas, maximum intensity of the disease observed at Marasanige (92.00 %) followed by Thotaduru (82.50 %) and minimum observed at Horanadu (17.50 %).

#### Intensity value (I) of YLD affected gardens

Based on intensity value (I) of surveyed taluks, areca palms were categorized into four groups i.e., healthy, mildly, moderately and severely affected palms (Table 2). The results from the surveyed observations revealed that the I value of more than 50 was observed in Koppa, Narasimharajapura, Sringeri and Kalasa taluks of Chikkamagaluru district, whereas, Puttur and

The results indicates the probable association of various soil and environmental factors contributing for highest disease incidence in these districts. As the arecanut crop is cultivated from centuries its extensive cultivation especially in hilly tracts which receives an average annual rainfall of 3573 mm during South-West monsoon hastens the intensity of the disease to be endemic in nature. These results were in accordance with the results obtained by Krishnamurthy and Vajranabhaiah (2000) who reported the 24.4 to 40.00 per cent disease incidence in Sringeri and coastal zones (Sampaje belt) of Karnataka. Similarly, Hiremata *et al.*, (2020) who reported that the incidence and intensity (index) of YLD of arecanut in Chikkamagaluru district were ranged from 86.59 to 96.20 per cent. Among different villages surveyed, highest disease incidence and intensity was observed in Muruvinakombe village (96.20%) followed by Talamakki (94.89%). Similar findings were reported from Naik *et al.*, (2021) who conducted extensive survey to know the incidence of yellow leaf disease in three taluks of Chikkamagaluru district and revealed the presence of YLD in all the taluks surveyed. However, among the taluks surveyed highest disease incidence was observed in Kasaba hobli (100.00%) of Sringeri taluk followed by Hariharapura hobli (60.00%) of Koppa taluk whereas, the least incidence of 10.50 percent was recorded in Kasaba hobli of Narasimharajapura taluk.

**Table 2: Survey for occurrence of yellow leaf disease of arecanut in Chikkamagaluru districts**

District	Taluk	Village	Latitude	Longitude	Variety	Age of the crop	Area cultivated (ha)	Other Pests, diseases	Per cent Disease Incidence	Intensity (%)
Chikkamagaluru	Koppa	Kuppli	13.5978	75.3130	Sringeri local	56	0.24	CC	100.00	95.00
		Asagodu	13.4876	75.2906	Thirthahalli local	45	0.46	RG	92.00	62.00

District	Taluk	Village	Latitude	Longitude	Variety	Age of the crop	Area cultivated (ha)	Other Pests, diseases	Per cent Disease Incidence	Intensity (%)
	Narasimharajapura	Makodu	13.3585	75.6500	Sringeri local	45	0.81	CC, RG	56.00	47.50
		Bikkali	13.5228	75.2566	Sringeri local	38	0.06	LS, RR, RG	98.00	96.67
		Melubilre	13.4996	75.2770	Thirthahalli local	48	0.73	LS, RG	98.00	92.32
		Niluvagilu	13.5224	75.2568	Sringeri local	50	0.50	CC, QW	16.00	46.67
		Shanuvalli	13.5101	75.2361	Sringeri local	55	1.36	CC	10.00	35.00
		Hariharapura	13.5174	75.2994	Sringeri local	38	0.08	LS, CC	86.00	75.00
		Balaga	13.9709	75.6898	Sringeri local	40	0.54	CC, RG	72.00	57.50
		Ardikoppa	13.9652	75.6909	Sringeri local	39	1.21	RG, LS	64.00	41.00
		Narve grama	13.4792	75.3342	Sringeri local	55	0.40	RG, LS	14.00	32.50
		Hulugaru	13.9083	75.1567	Sringeri local	46	0.51	RG	24.00	26.00
		Jayanagar	13.5307	75.3628	Sringeri local	29	0.40	LS, BR	92.00	74.00
		Tanudi	13.9074	75.1572	Sringeri local	25	0.08	BR, LS	30.00	27.50
		Belagola	13.4829	75.3496	Sringeri local	45	0.08	RG, LS	0.00	0.00
		Grama	13.4859	75.3519	Sringeri local	23	1.74	BR	6.00	12.00
		Hosur	14.3829	76.2977	Sringeri local	23	4.53	RG, LS	26.00	76.67
		Dasanakodige	13.4959	75.2778	Sringeri local	47	2.92	RG, LS	34.00	50.00
		Hosahalli	13.6595	75.3835	Sringeri local	65	0.07	RG	42.00	58.33
		Devaramane	13.4920	75.2547	Sringeri local	45	2.55	LS, CC	54.00	47.00
		Andagaru	13.5100	75.2946	Sringeri local	56	0.95	LS, CC	32.00	30.00
		Hirebailu	13.5013	75.3605	Sringeri local	50	0.89	LS	64.00	98.33
		Maritottilu	13.5884	75.3173	Thirthahalli local	45	0.08	LS, CC	8.00	17.50
		Davana	13.2973	75.2761	Thirthahalli local	45	0.57	LS, RG, BR	54.00	56.66
		Herooru	13.2072	75.2610	Thirthahalli local	55	0.12	BR, LS	19.00	50.00
		Bannuru	13.2080	75.2869	Thirthahalli local	35	2.91	ND, Cross nodes	38.00	45.00
		Magundi	13.3243	75.2807	Thirthahalli local	28	0.11	LS, CC	24.00	55.00
		B. Kanburu	13.2157	75.2774	Thirthahalli local	30	0.69	CC	17.00	35.00
		Chikka agrahara	13.2781	75.2804	Thirthahalli local	58	15.02	LS, CC	35.00	55.00
		Gadigeswara	13.2719	75.2847	Thirthahalli local	34	0.40	LS, RG	5.00	10.00
		Aragi	13.2960	75.2904	Thirthahalli local	30	0.11	RG, LS	25.00	55.00
		Yadagere	13.3546	75.2455	Thirthahalli local	25	0.24	RG	39.00	43.33
		Guddehalla	13.3313	75.2629	Thirthahalli local	20	1.21	LS	10.00	20.00
		Ramanahadlu	13.3121	75.2684	Thirthahalli local	23	0.06	Monkey menace, LS, RG	8.00	10.00
		Muduguni	13.2209	75.2800	Thirthahalli local	34	2.35	LS	16.00	55.00
	Gunduwani	13.3284	75.2680	Thirthahalli local	36	2.02	LS, CC	0.00	0.00	
	Kankale	13.3896	75.2556	Thirthahalli local	56	1.82	RG, CC, LS	0.00	0.00	
	Hemmuru	13.3600	75.2593	Thirthahalli local	45	0.14	LS	0.00	0.00	
	Shimshe	13.3675	75.2827	Thirthahalli local	34	0.04	LS, RG	0.00	0.00	
	Balehitlu	13.3209	75.2577	Thirthahalli local	30	0.08	LS, CC, RG	5.00	10.00	
	Kolale	13.2541	75.2925	Thirthahalli local	45	1.36	LS, CC	54.00	46.66	
	Gubbiga	13.3567	75.2711	Thirthahalli local	50	1.46	CC, LS	0.00	0.00	
	Bangawani	13.3245	75.2807	Thirthahalli local	40	1.77	KR, RG	32.00	50.00	
	Malagodu	13.3243	75.2807	Thirthahalli local	34	0.48	RG	12.00	20.00	
	Jamballi	13.7216	75.4442	Thirthahalli local	23	2.09	RG	0.00	0.00	
	Gairubailu	13.3108	75.2595	Thirthahalli local	28	0.55	LS	5.00	20.00	
	Muttinakoppa	13.3260	75.2538	Thirthahalli local	43	0.08	RG, LS	36.00	60.00	
Seegodu	13.2099	75.2558	Thirthahalli local	23	0.08	LS, ND, split nuts	54.00	56.66		
Sringeri	Kanadamane	13.4146	75.2447	Sringeri Local	56	1.42	LS	97.00	91.66	
	Kanugodu	13.4196	75.2262	Sringeri Local	45	11.08	LS, CC	0.00	0.00	
	Aalugodu	13.2731	75.4424	Sringeri Local	50	15.02	CC, LS	92.33	82.50	
	Melkoppa	13.5039	75.2473	Sringeri Local	54	0.40	KR, LS	20.00	22.00	
	Honnnavalli	14.2338	75.6469	Sringeri Local	55	0.11	LS, ND	100.00	93.80	
		Kalkatte	13.3994	75.2942	Sringeri Local	28	1.21	LS, ND, CC	30.00	18.00
		Menase	13.4171	75.2601	Sringeri Local	30	0.06	LS, ND	97.50	82.55



District	Taluk	Village	Latitude	Longitude	Variety	Age of the crop	Area cultivated (ha)	Other Pests, diseases	Per cent Disease Incidence	Intensity (%)
	Mudigere	Vykunta pura	13.4160	75.2603	Sringeri Local	45	2.35	Cross node, LS	90.00	75.00
		Bettagere	13.4095	75.2633	Sringeri Local	40	2.02	CC, LS	80.00	70.00
		Halanduru	13.3958	75.2626	Sringeri Local	38	1.82	CC, LS	92.00	87.50
		Sulugodu	13.4516	75.2960	Sringeri Local	30	0.14	LS, CC	60.00	55.00
		Makarsu	13.4478	75.3092	Sringeri Local	35	0.53	LS, ND	80.00	77.50
		Belandur	13.4525	75.2346	Sringeri Local	33	0.12	CC, LS	100.00	97.50
		Bettagere	13.4938	75.2484	Sringeri Local	45	0.08	LS, CC, ND	80.00	72.50
		Benkikodige	13.3958	75.2626	Sringeri Local	47	0.06	LS, KR, CC	90.00	87.50
		Tippanamakki	13.4181	75.2401	Sringeri Local	30	0.20	LS, Cross node	20.00	16.00
		Benkikodige	13.3928	75.2418	Sringeri Local	35	0.15	RG, LS, CC	92.00	89.22
		Boolur	13.4025	75.2342	Sringeri Local	28	0.15	LS, Tapering ends, RG	50.00	52.00
		Gundre	13.4889	75.2458	Sringeri Local	20	0.81	RG	50.00	36.00
		Uluvebylu	13.3875	75.2698	Sringeri Local	35	1.38	RG, LS, CC	80.00	67.50
		Ambaluru	13.4812	75.2453	Sringeri Local	30	0.08	LS, RG, ND	90.00	87.50
		Anukodige	13.4545	75.2616	Sringeri Local	36	0.10	RG, LS	80.00	56.00
		Gunithalu	13.4748	75.2872	Sringeri Local	67	0.12	LS, whitefly	92.00	87.50
		Bandlapura	13.4639	75.2411	Sringeri Local	56	0.36	LS	100.00	97.50
		Uduse	13.0565	75.6957	Thirthahalli local	25	0.47	LS, KR	5.00	10.00
		G Agrahara	13.0708	75.7001	Thirthahalli local	35	0.46	LS	10.00	12.00
		Chandrapura	13.1162	75.6993	Thirthahalli local	46	2.19	ND	0.00	0.00
		Anajuru	13.0674	75.6707	Thirthahalli local	45	0.52	LS	5.00	0.00
	G Hosahalli	13.0075	75.7528	Thirthahalli local	45	0.10	LS, RG	15.00	10.00	
	G Hanumanahalli	13.0525	75.7179	Thirthahalli local	20	0.04	LS,CC	0.00	0.00	
	Hireshinagara	13.0512	75.7290	Thirthahalli local	19	0.08	LS, SI	0.00	0.00	
	Kirugunda	13.0465	75.6831	Thirthahalli local	24	0.89	RG	0.00	0.00	
	Chikkodige	13.1592	75.5525	Thirthahalli local	56	0.11	ND	0.00	0.00	
	Hesagal	13.1621	75.5738	Thirthahalli local	43	0.08	LS, CC	0.00	0.00	
	Mudigere	13.1397	75.6373	Thirthahalli local	46	0.08	LS	0.00	0.00	
	Daradahalli	13.0794	75.6048	Thirthahalli local	27	0.53	LS, RR	5.00	8.33	
	Banakal	13.1425	75.5513	Thirthahalli local	45	0.08	ND	0.00	0.00	
	Kodahalli	13.1320	75.5569	Thirthahalli local	56	0.45	LS, RR	2.00	8.33	
	B Hosahalli	13.1502	75.5609	Thirthahalli local	67	1.71	RR	0.00	0.00	
	Heggudlu	13.1857	75.5332	Thirthahalli local	45	2.09	LS	0.00	0.00	
	Tharuve	13.1240	75.5276	Thirthahalli local	45	4.05	RG	0.00	0.00	
	Attigere	13.1359	75.7049	Thirthahalli local	20	0.81	LS	0.00	0.00	
	Ganganamakki	13.1413	75.5709	Thirthahalli local	25	0.81	LS, RR	0.00	0.00	
	Baggasagodu	13.1306	75.5650	Thirthahalli local	54	0.40	LS, RR	0.00	0.00	
	Bankenahalli	13.1320	75.5787	Thirthahalli local	35	1.69	ND	0.00	0.00	
	Phalguni	13.1638	75.5749	Thirthahalli local	26	0.40	LS	0.00	0.00	
	Lokkavalli	13.2537	75.3842	Thirthahalli local	27	0.87	LS, CC	0.00	0.00	
	Bettagere	13.1638	75.5749	Thirthahalli local	28	0.04	LS, SI	4.00	10.00	
	Koluru	13.2288	75.5548	Thirthahalli local	56	0.40	LS	0.00	0.00	
	Kunduru	13.1937	75.5348	Thirthahalli local	45	0.45	LS, SI	0.00	0.00	
	Darshana	13.0565	75.6957	Thirthahalli local	34	4.51	LS	8.00	15.00	
	Thripura	13.0708	75.7001	Thirthahalli local	45	0.52	LS	5.00	8.33	
	Kalasa	Mavinakere	13.2333	75.3755	Thirthahalli local	38	0.08	LS, SI	50.00	44.00
		Horanadu	13.2640	75.3433	Thirthahalli local	25	0.45	LS, RG	10.00	17.50
Ambinakodige		13.2344	75.3970	Thirthahalli local	50	1.29	LS	10.00	10.00	
Samse		13.1910	75.3326	Thirthahalli local	45	0.55	LS, CC	85.00	75.00	
Marasanige		13.2024	75.3887	Thirthahalli local	26	0.61	LS, RR	90.00	92.00	
Yeduru		13.2141	75.3950	Thirthahalli local	48	0.61	ND	50.00	47.50	
Edakani		13.2217	75.4434	Thirthahalli local	50	0.81	LS, KR	30.00	30.00	
K Kelaguru		13.1655	75.4609	Thirthahalli local	30	0.97	LS	45.00	47.50	

District	Taluk	Village	Latitude	Longitude	Variety	Age of the crop	Area cultivated (ha)	Other Pests, diseases	Per cent Disease Incidence	Intensity (%)
		Thotaduru	13.2898	75.4057	Thirthahalli local	40	0.81	LS	80.00	82.50
		Tholagodu	13.2567	75.4019	Thirthahalli local	65	0.04	LS, SI	80.00	75.00
		Thanudi	13.2884	75.4250	Thirthahalli local	40	0.40	LS, CC	30.00	32.00
		Hemmakki	13.2307	75.4371	Thirthahalli local	28	0.45	CC	50.00	70.00
		Maidadi	13.1697	75.3914	Thirthahalli local	45	4.51	ND, KR	50.00	62.50

\*CC-Crown chocking, QW-Quick wilt of pepper, LS-Leaf spot, RR-Root rot, RG-Root grub, BR-Bud rot, ND-Nut drop, KR-Kole roga, SI-Sucking insects



Fig 1: Yellowing and drying of leaflets from tips

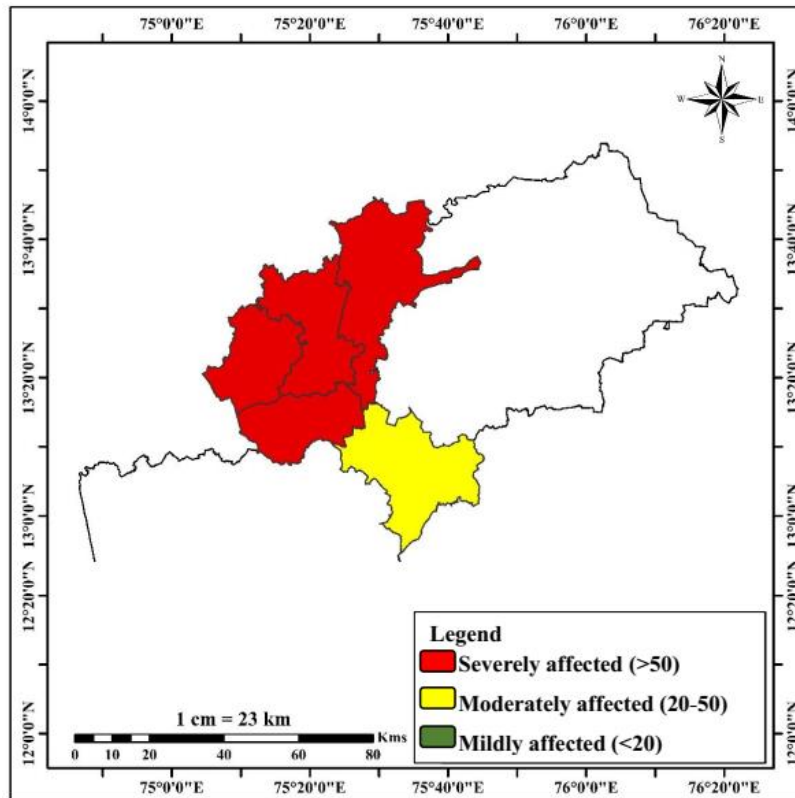


Fig 2: Severity map of yellow leaf affected gardens in Chikkamagaluru districts

## CONCLUSION

Yellow leaf disease normally do not kill the plant, but if the severity is not checked, it may result in debilitation and death of the palm. The roving survey for the assessment of YLD incidence and intensity was conducted in Chikkamagaluru and Dakshina Kannada districts of Karnataka. In Chikkamagaluru, among different taluks surveyed Sringeri, Koppa, Kalasa talukas has showed 0-100 per cent incidence and 80-100 per cent intensity whereas, Narasimharajapura and mudigere taluks showed 0-60 per cent incidence and 0-30 per cent intensity. These findings provide crucial insights for disease management strategies and emphasize the need for continued monitoring and interventions to mitigate the impact of YLD on arecanut cultivation.

**Author's Contribution:** Conceptualization and designing of the research work by Premalatha, K., B. Gangadhara Naik., Execution of the experiment and data collection, Analysis of data and interpretation and preparation of manuscript by Premalatha, K.

### Declaration

**Conflict of interest:** The authors have no conflict of interest.

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