

# Survey and screening of different castor genotypes against leaf spot of castor caused by *Alternaria ricini* (Yoshii) Hansf

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The results of the survey indicated that, the maximum disease severity was recorded at Hiriyur taluk of Chitradurga district followed by Koratageri (19.88%) of Tumkur district and least disease severity was observed at Doddabelavanagal (8.22%) of Bangalore district. Among the twelve varieties, none of the entries were immune and highly resistant. Only one entry was resistant, six were moderately resistant and five were susceptible. None of the entries showed highly susceptible reaction. Among the 13 hybrids, only one was highly resistant (CK-09 IHT-51), seven entries were resistant, four were moderately resistant and only one entry was susceptible. None of the entries showed immune and highly susceptible reaction.

**Key words** : Survey, Disease severity, Screening, Genotype, *Alternaria ricini*

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## INTRODUCTION

Castor (*Ricinus communis* L.) belonging to the family Euphorbiaceae is an important non-edible, export oriented industrial oilseed crop in India, which has been known to mankind from time immemorial. It has a prominent place in dry lands due to its drought resistance because of its quick growth, deep root system and wax coating on shoots. India is the leading producer of castor. In India the crop occupies 7.87 lakh ha with an annual production of 10.54 lakh tones and a productivity of 1339 kg ha<sup>-1</sup>. In Karnataka the area under this crop was 23.0 thousand hectares with an annual production of 16.00 thousand tonnes and productivity of 696 kg ha<sup>-1</sup> (Anonymous, 2007). Castor oil and its derivatives are used in several industries like perfumery, cosmetics, textile, paints, printing inks, adhesives, plastics, rubber, lubricants, paper, chemicals and pharmaceuticals etc. (Singhal, 1995). The oil also finds a place in domestic medicine as purgative. Oil cake of castor forms valuable manure for many commercial crops.

Castor plants are attacked by numerous diseases under

high relative humidity conditions, but only a few occur in the high plains. Some of the diseases are seedling blight caused by *Phytophthora colocasiae*, leaf spot caused by *Alternaria ricini* and *Cercospora ricinella*, wilt caused by *Fusarium oxysporum*, grey mold rot caused by *Botrytis cinerea*, root rot caused by *Macrophomina phaseolina* and rust caused by *Melampsora ricini*, etc. In recent years, leaf spot caused by *Alternaria ricini* is assuming serious proportions in major castor growing areas, causing losses in yield and oil content. The earliest reports of *Alternaria* leaf spot on castor in India were made by Dastur (1913), Chibber (1914), Dey (1945) and Singh (1955). But these studies were confined to morphology of the pathogen. Hence, present investigation included the survey to know the disease severity and screening of castor genotypes against leaf spot disease caused by *Alternaria ricini* under natural conditions.

## RESEARCH METHODOLOGY

Survey was conducted for severity of leaf spot of castor caused by *Alternaria ricini* during the cropping season (2009-2010) in major castor growing regions of southern Karnataka

Grade	Per cent of leaf area infected	Reaction
0	No Symptoms	Immune
1	Up to 1	Highly resistant
3	1-10	Resistant
5	11-25	Moderate resistant
7	26-50	Susceptible
9	>50	Highly susceptible

viz., Bangalore, Tumkur and Chitradurga, randomly ten plants were selected from each location for taking the observations and disease severity was assessed by using the 0-9 scale (Anonymous, 2009).

The different genotypes of castor grown under natural conditions were screened (Plate 3 and 4) to identify the resistant source against *Alternaria* leaf spot of castor. The genotypes screened were grown under Initial Varietal Trial and initial hybrid trial by oil seeds section, GKVK, UAS, Bangalore. The disease scoring was done and per cent disease severity was recorded from each genotype by using 0-9 scale (Anonymous, 2009) as given above. The per cent disease severity was calculated by using the formula as shown below:

$$\text{Severity (\%)} = \frac{\text{No. of leaves infected} \times \text{disease grade}}{\text{Total no. of leaves observed} \times \text{Max grade}} \times 100$$

## RESEARCH FINDINGS AND ANALYSIS

The results of the survey indicated that, the maximum disease severity recorded at Hiriyur taluk (27.77%) of Chitradurga district followed by Koratagere (19.88%), Madavar (19.70%), Kolal (19.20%), Teetha (18.90%), of Tumkur district. In Bangalore district, the maximum disease severity was observed at Doddaballapur (11.11%) and Gunjur (9.55%). However, least disease severity was observed at Doddabelavangala (8.22%) of Bangalore district. The overall severity of castor leaf spot ranged between 8.22 to 27.77 per cent. The results obtained on per cent disease severity are presented in Table 1, Plate 1 and Fig. 1.

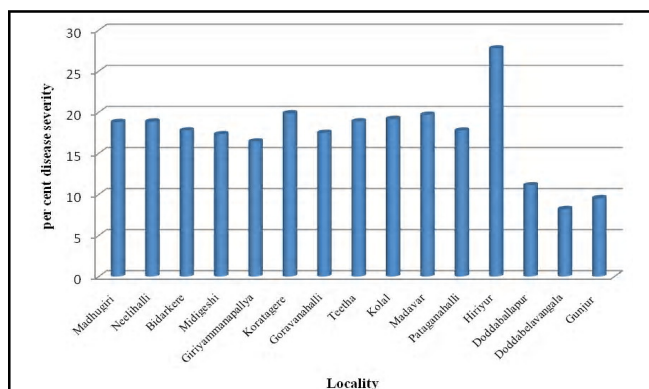


Fig. 1 : Severity of *Alternaria* leaf spot of castor in different locations of Southern Karnataka



Plate 1 : Typical symptoms of leaf spot of *A. ricini*

Table 1 : Severity of *Alternaria* leaf spot in major castor growing areas of southern Karnataka

District name	Location	Per cent disease severity
Tumkur	Madhugiri	18.82
	Neelihalli	18.88
	Bidarkere	17.78
	Midigeshi	17.33
	Giryammanapallya	16.44
	Koratagere	19.88
	Goravanahalli	17.50
	Teetha	18.90
	Kolal	19.20
	Madavar	19.70
	Pataganahalli	17.77
	Chitradurga	Hiriyur
Bangalore	Doddaballapur	11.11
	Doddabelavangala	8.22
	Gunjur	9.55
	Mean	17.25
	Range	8.22 - 27.77

Different castor genotypes (both varieties and hybrids) were screened at field (Plate 2), under natural conditions against *Alternaria ricini* causing leaf spot of castor. The disease severity was calculated based on 0-9 scale. Among the twelve varieties screened, none of the entries were immune and highly resistant. Only one entry was resistant, six were moderately resistant and five were susceptible. None of the entries showed highly susceptible reaction. Among the 13 hybrids, only one was highly resistant (CK-09 IHT-51), seven entries were resistant, four were moderately resistant and only one entry was susceptible. None of the entries showed immune and highly susceptible reaction. The results obtained

Table 2 : Screening of different castor genotypes against <i>A. ricini</i>			
Disease grade	Reaction	Per cent leaf area covered	Genotype number
0	Immune	No symptoms	Nil
1	Highly resistant	< 1	CK-09 IHT-51
3	Resistant	1-10	CK-09 IVT 08, CK-09 IHT-52, 54, 55, 56, 57,58, 59
5	Moderately resistant	11-25	CK-09 IVT-04, 06, 09, 10, 11, 12, CK-09 IHT-60, 61, 62, 63
7	Susceptible	26-50	CK-09 IVT-01, 02, 03, 05, 07, CK-09 IHT-53
9	Highly susceptible	> 50	Nil



Plate 2 : General view of the castor field



Plate 3 & 4 : Castor genotypes screened under natural conditions

screened only one entry was showing grade 1 (CK-09 IHT-51), eight entries were showing grade 3 and none was showing grade 9 *i.e.* highly susceptible reaction to *A. ricini* under field conditions.

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on screening of different castor genotypes under natural conditions are presented in Table 2.

However, in the present study, among the 25 genotypes

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