

Evaluation of Coconut Hybrid ECT x BSR tolerant ECT in Basal Stem Rot Endemic Area

Abstract

The coconut cultivar East Coast Tall (ECT) was crossed with ECT tolerant to basal stem rot (*Ganoderma*) disease collected from disease endemic area of Thambikkottai village of Thanjavur District, Tamil Nadu to evaluate their performance in basal stem rot endemic area. The progeny, BSR tolerant ECT hybrid recorded higher percentage of survival, growth characters and nut yield in the basal stem rot (BSR) sick soil of disease endemic area.

Introduction

Coconut is an important oilseed as well as plantation crop in India with an area of 19.18 lakh hectares and an annual production of 12159.6 million nuts. Coconut palm is affected by more than 50 diseases in different parts of the world. In India, basal stem rot (BSR) disease caused by *Ganoderma lucidum* (Leys) Karst is a major limiting factor in coconut production in Tamil Nadu as well as coconut growing states of India. Basal stem rot of coconut can be contained by management practices if the disease is detected in the early stages. Few chemical methods like EDTA method, orthophenanthroline test, colorimetric method and physiological methods like transpiration rate, electrical conductivity and growing of indicator plants in coconut groves have been reported to be useful to identify the diseased palms even before expression of external symptoms, though the methods are non-specific for BSR (Natarajan *et al.*, 1986; Vijayaraghavan *et al.*, 1987 and Samiyappan *et al.*, 1996). Integrated management of BSR include cultural, chemical and biological methods as developed by Bhaskaran *et al.* (1989 and 1994). Early detection and integrated disease

management practices is used to reduce the disease intensity and to prolong the life span of diseased coconut palms for a few more years on the basis of



Plate 1. ECT x BSR tolerant ECT palms in BSR sick soil

disease intensity. Hence, an attempt was made to develop BSR resistant/ tolerant coconut cultivar for better management of BSR and enhancement of

coconut production.

Materials and Methods

The experiment was conducted at Thambikkottai village of Thanjavur district, Tamil Nadu, which is an endemic area for BSR of coconut with a heavy incidence of 46 per cent. Twenty palms out of 978 East Coast Tall palms were found to be completely free from BSR infection in a coconut garden at Thambikkottai village. These BSR tolerant palms were selected as pollen parent and were crossed with ECT palms at Coconut Research Station, Veppankulam. Seedlings obtained from this cross combination were evaluated against BSR disease along with other nine coconut cultivars *viz.*, San Ramon, Lakshadweep Ordinary, British Solomon Islands, Java Giant, Straight Settlement Green,

WCT X COD, COD X WCT, VHC-1 (ECT X DG) and East Coast Tall (ECT) in the disease endemic area of the same village. The experiment was laid

Table 1. Performance of coconut cultivars in basal stem rot sick soil

Cultivar (s)	No. of palms planted	No. of palms surviving	Per cent survival	No. of palms infected*	Per cent infection*	No. of functional leaves	Disease index** (March 2004)
San Ramon Lakshadweep Ordinary British Soloman Islands	15	3	20.0	3	100	26.0	36.71
Java Giant Straight Settlement Green	15	0	0	-	-	-	-
WCT X COD	12	1	8.3	0	0	34.0	-
COD X WCT	15	2	13.3	0	0	41.5	-
VHC 1	15	4	26.7	2	50	31.5	39.86
East Coast Tall	15	2	13.3	0	0	30.0	-
ECT X BSR tolerant	15	3	20.0	1	33.3	25.3	37.16
ECT	10	0	0	-	-	-	-
	10	4	40.0	1	25.0	32.0	51.34
	18	12	66.7	2	16.7	33.5	32.02

* Among surviving palms

** Mean of infected palms

out during August, 1989. After fifteen years of planting, observations on the survival percentage, disease intensity, number of functional leaves and nut yield were recorded in all the cultivars for comparison.

Results and Discussion

Results revealed that



Plate 2. Devastated cultivars in BSR sick soil

Table 2. Nut yield of coconut cultivars in basal stem rot sick soil

Cultivar (s)	Nut yield / palm	
	2003 - 2004	Cumulative mean (1995 - 2004) of nine years
San Ramon	57.3	57.37
Lakshadweep Ordinary	-	-
British Soloman Islands	60.0	99.22
Java Giant	65.5	84.17
Straight Settlement Green	63.5	80.37
WCT X COD	68.5	94.87
COD X WCT	59.7	121.86
VHC 1	-	-
East Coast Tall	70.7	98.52
ECT X BSR tolerant	74.0	125.67

the hybrid, ECT X BSR tolerant ECT registered a higher rate of survival (66.7 per cent) as compared to other cultivars (Table 1) after fifteen years of planting in BSR sick soil (Plate 1). The other cultivars recorded 0 - 40 per cent of survival. The cultivars Lakshadweep Ordinary and VHC 1 were totally devastated due to BSR incidence (Plate 2), whereas the cultivar ECT had 40 per cent of survival. At present only two palms out of twelve surviving palms of ECT X BSR tolerant ECT hybrid are found to be infected with BSR (16.7 per cent). The mean disease index was also low in ECT X BSR tolerant ECT (32.02) as compared to ECT (51.34). The hybrid

ECT X BSR tolerant ECT recorded a higher mean nut yield of 74 nuts / palm during the year 2003 - 2004 (Table 2), which also recorded a higher cumulative mean nut yield of 125.67 nuts / palm when compared to other cultivars.

In the present study, the resistance against BSR in the crossed progeny may be due to the presence of phenolic polymers such as lignin. Lignin act as a physical barrier to infection by the pathogen. Lignification occurs at the site of fungal penetration and this barrier is resistant to cellulolytic and macerating enzymes of the pathogens. The similar results were reported by Karthikeyan *et al.* (2000) as the higher level of total phenols, O.D. phenols, lignin and aminonitrogen contents in ECT X BSR tolerant ECT coconut cultivar might be responsible for the resistance against basal stem rot disease.

References

Bhaskaran, R., Rethinam, P. and Nambiar, K. K .N. 1989. Thanjavur wilt of coconut. *J. Plant. Crops*, 17 : 69 -79.

Bhaskaran, R., Rethinam, P. and Nambiar, K. K .N. 1994. *Ganoderma* wilt disease of coconut. *Advances in Horticulture - Plantation and Spice Crops - Part 210* : 899 - 920.

Karthikeyan, A., Bhaskaran, R. and Karthikeyan, M. 2000. Development and performance of Basal Stem Rot (*Ganoderma*) disease resistant coconut genotype in endemic area. *CORD, XVI* (1) : 50 - 55.

Natarajan, S., Bhaskaran, R. and Shanmugam, N. 1986. Preliminary studies to develop techniques for early detection of Thanjavur wilt in coconut. *Indian Coconut J.*, 17 (3) : 3 - 6.

Samiyappan, R., Bhaskaran, R. and Rethinam, P. 1996. Diagnosis for early detection of *Ganoderma* diseases in

perennial crops: approaches and prospects. *J. Plant Diseases & Protection*, 103 : 85 - 93.

Vijayaraghavan, H., Ramadoss, N., Ramanathan, T. and Rethinam, P. 1987. Effect of toddy tapping on Thanjavur wilt disease of coconut. *Indian Coconut J.* 17 (12) : 305.

G. Karthikeyan, S. Karpagavalli, C. Natarajan¹ and S. Arulraj²

¹Coconut Research Station, Veppankulam - 614 906, Thanjavur District.

²Central Plantation Crops Research Institute, Kasaragod - 671 124, Kerala



VULCAN TRADING COMPANY

CENTRIFUGAL SEPARATOR FOR PURIFICATION OF COCONUT MILK AND CLARIFICATION OF COCONUT OIL.

VULCAN HOUSE

13F, GOBINDA MONDAL ROAD, KOLKATA - 700002

PHONE : 2557-9578/4094, Telefax : 91-33-2556-9394

E-MAIL : vulcantrading@vsnl.net

50% Discount in Advertisement Tariff

The Board has decided to reduce the advertisement tariff by 50% of the previous rate.

This will provide opportunities to manufacturers, processors, distributors, planters and producers and research institutes to avail more cost effective means of publicity through Board's publications. All are requested to take the advantage of their bumper offer. *Indian Coconut Journal* (English monthly), *Indian Naliker Journal* (Malayala monthly), *Bharatiya Nariyal Patrika* (Hindi quarterly), *Bharatiya Thengu Patrike* (Kannada quarterly) and *Indhia Thennai Idazh* (Tamil quarterly) are the periodicals of the Coconut Development Board. These journals regularly feature popular articles on scientific cultivation and other aspects of coconut industry. The journals are subscribed by farmers, researchers, policy makers, industrialists, traders, libraries, etc.

Revised Tariff

(Rate in Rs. per one insertion in one journal)

Position	Indian Coconut Journal (English monthly)	Indian Naliker Journal (Malayalam monthly)	Indhia Thennai Idhazh (Tamil quarterly)	Bharatiya Thengu Patrike (Kannada quarterly)	Bharatiya Nariyal Patrika (Hindi Quarterly)
Full page - B & W	2500	1500	2500	1500	1000
Full page - Colour	5000	4000	5000	4000	2500
Half page - B & W	1500	1000	1500	1000	500
Quarter page - B & W	1000	500	1000	500	300
Back inner cover - B&W	4000	2500	4000	2500	2500
Back inner cover - Colour	6000	4000	6000	4000	4000
Back cover - (Colour)	7500	5000	7500	5000	5000

A rebate of 10% will be allowed on advertisements inserted in any two editions of the journal at a time and 12% discount if inserted in three or more editions at a time. 15% discount will be given to bonafide advertising agents.