

# PROMISING INDIAN RUBBER CLONES

C K Saraswathamma, Rubber Research Institute of India



C K Saraswathamma

The para rubber tree, *Hevea brasiliensis* (Willd. ex Adr. de Juss.) Muell. Arg. is the major source of natural rubber having strategic importance in the economy of India. Rubber plantation industry in India has registered commendable growth in production and productivity and occupies the fourth position in terms of production. More significantly, the country has attained the first position in productivity with 1662 kg per hectare per year. The contributions made by research, in particular the genetic improvement programmes, played a key role in achieving this. During the initial stages of plantation industry unselected seedling materials with an annual yield of 200-300 kg per hectare were in use. Now there are clones having a production potential of around 4000 kg per hectare per year.

Any genetic improvement programme in rubber is elaborate, time consuming and requires long term experimentation. In general, a period of 20-25 years is required for evaluation and release of a rubber clone to the grower. The breeding objectives of the Institute have been tailored in tune with the interest of the growers and the plantation industry as a whole. Three methods are being adopted for the crop improvement programme in rubber. They are introduction, ortet selection and hybridization. Many of the present day high yielding clones are evolved by hybridization and clonal selection. Crop improvement programmes were initiated in India during 1954. From the progenies of 1954 hybridization programme, the Rubber Board had short listed a few clones which were released for large scale planting in the late 1970s. Out of these, the clone RR11 105 has proved to be a great success and has become the most popular clone in India. Due to the outstanding yield, this clone now occupies more than 80 per cent of the area under rubber. The

phenomenal increase in productivity of rubber plantation in the country is mainly due to the large scale planting of this clone. The Board had also evolved a large number of other promising clones. They possess desirable secondary attributes like high vigour and drought/ disease tolerance. However, none of these clones have become popular among the planters mainly on account of the fact that yield was not higher than that of RR11 105.

Despite the perennial nature of the crop, prolonged breeding cycle, long gestation period, seasonal nature of flowering and other constraints, concerted efforts by the RR11 for the last 22 years have now resulted in a few promising clones having higher yield than RR11 105. These promising selections are designated as RR11 400 series clones

## Performance of RR11 400 series selections

These clones have been evolved in 1982 by hybridization of the high yielding clone RR11 105 (female parent) with RR11 100, a vigorous and disease tolerant clone of Sri Lankan origin (male parent). A small scale field trial was laid out in 1985

incorporating 12 trees each of 23 hybrid clones of the above combination along with RR11 105 as check adopting a randomized block design with three replications. Based on the performance of these clones, five clones were found to have higher yield ranging from 20 to 42 per cent over RR11 105 during the first ten years of tapping. Yield and secondary characters of these clones are given below.

Due to the encouraging yield in the small scale trial, these clones were included in Category III of approved planting materials of the Rubber Board in 2001. All these clones continue to show encouraging performance in the large scale trial and multilocal trials also. However, high incidence of various diseases and occurrence of tapping panel

Table 1. Performance of RR11 400 series selections in the scale trial

Clone	Girth at opening* (cm)	Mean annual girth increment (cm)	Dry rubber content (DRC, %)	Mean yield over 10 years of tapping** (g/tree/tap)	Yield increase over RR11 105 (%)
RR11 414	57.49	17.02	30.64	74.31	38
RR11 417	54.73	10.76	34.63	70.74	32
RR11 422	52.40	8.71	34.27	65.68	22
RR11 429	62.77	14.33	28.81	76.51	42
RR11 430	53.42	8.44	35.26	64.17	20
RR11 105	49.04	12.41	33.46	53.77	-

\* Circumference of trees measured at 125 cm height from the bud union

\*\* Yield expressed as grams of dry rubber per tree per tap

**Table 2: Comparative performance of the selected clones**

Parameters	RRII 414	RRII 417	RRII 422	RRII 430
Yield*	74.31 gram/tree/tap	70.74 gram/tree/tap	65.68 gram/tree/tap	64.17 gram/tree/tap
Girth at opening	High	Above average	Above average	Above average
Trunk	Tall, straight and cylindrical	Tall and straight, leaf scar present	Crooked and high branching	Tall cylindrical stem with smooth bark
Branching pattern	Balanced branching	Very high heavy	High, balanced with	Moderate heavy
Balanced branching	branches with strong union	moderate to heavy branches	branches with strong union	with strong branch union. Moderate to heavy branches
Canopy	Open, broad with heavy dark green leaves restricted to the top	Broad, open and heavy with semi glossy leaves	Open, narrow and dark green glossy leaves	Open broad and heavy with broad glossy leave
Virgin bark thickness	Above average	Average	Average	Average
Renewed bark thickness	High	High	Above average	High
Number of latex vessel rows	Above average	Above average	Above average	Above average
Incidence of major diseases and pests	Pink – moderate Powdery mildew – moderate to severe Abnormal – moderate leaf fall Leaf spot – mild ( <i>Corynespora</i> )	Pink – moderate Powdery mildew – moderate to severe Abnormal leaf fall – mild Leaf spot – moderate ( <i>Corynespora</i> )	Pink – mild Powdery mildew – moderate to severe Abnormal leaf fall – mild to moderate Leaf spot – moderate ( <i>Corynespora</i> )	Pink – mild Powdery mildew – moderate to severe Abnormal leaf fall – mild Leaf spot – mild ( <i>Corynespora</i> )
Reaction to stresses	Average	Above average	Above average	Above average
Tolerance to wind	Low	Low	Low	Low
Occurrence of TPD				
DRC	Above average	High	High	High
Colour of latex	White	White	White	White
Remarks	38% yield improvement over RRII 105	32% yield improvement over RRII 105	22% yield improvement over RRII 105	20% yield improvement over RRII 105

\* Mean yield over 10 years of tapping in small scale evaluation

dryness (TPD) were observed in the clone RRII 429. This aspect has to be studied in depth before it is

upgraded. Therefore, four of the new clones viz., RRII 414, RRII 417, RRII 422 and RRII 430 were upgraded to Category II of the planting recommendation of the Rubber Board in 2004. This recommendation enables growers to plant these clones up to 50% of the area being planted each year. Comparative performance of these clones are given in Table 2.

As growers are showing considerable interest in these new clones, the Board

has been taking steps to multiply planting materials of these clones in a large scale.

Multilocal large scale trials incorporating these clones at five locations in Tamil Nadu, Orissa, Tripura and West Bengal apart from Kerala are in progress. Most of these trial plantations have started yielding. Simultaneously, on farm evaluation trials at various large estates at Chemvally and Chittar (Pathanamthitta), Kaliyar (Thodupuzha), Shaliacary (Punalur) and Velimalai, New Ambady and Valkundam estates (Kanyakumari) have also been laid out and the trees are in different stages of

growth. At Cheruvally estate, the percentage of trees in these clones, that has attained tappable girth during the 6th year after planting is comparatively more (10-30 percent) than that of RRII 105. Nucleus quantities (bud wood) of these clones have been supplied to 215 enterprising growers for collaborative experiments with the Rubber Research Institute of India. If the encouraging performance in the evaluation trials is realized in the growers' plots also, at least certain clones could be released to the growers for large scale planting in the near future.