1352

PROSPECTS FOR RUBBER CULTIVATION AND IMPROVEMENT IN THE KARNATAKA AND KANYAKUMARI REGIONS

M.A. NAZEER
RUBBER RESEARCH INSTITUTE OF INDIA, HEVEA BREEDING SUB-STATION, NETTANA, D.K., KARNATAKA.

India stands fifth in production among the world's natural rubber producing countries. The natural rubber produced in India is from 4,15000 ha of rubber plantations distributed in traditional areas like Kerala and Tamil Nadu and non-traditional regions such as Karnataka, Goa, Andamans and Nicobar Islands, North Eastern states like Tripura, Assam, Meghalaya etc. (1). Towards the end of 1989, the mature area under production extended over 64 percent of the total area, i.e. 2,60000 ha. Seventy five percent of the total area under production in our country falls in the category of small holdings and about 80 percent of the rubber produced is consumed internally. During 1989-90, the total production of natural rubber was 2,97300 tonnes with a national average of 1030 kg/ha while consumption was 3,41840 tonnes (2). Inorder to bridge the gap between production and consumption, 44,871 tonnes of natural rubber was imported (3). The growth rate for production, consumption and import of natural rubber for the past decade is presented in Fig.1. The projected demand for natural rubber during 2000 A.D. in our country is around 5,75000 tonnes, which is almost double of what is produced today.

Due to limited land resources in the traditional rubber growing regions along the south west coast of India, there is no further scope for expansion of area under rubber cultivation. Inorder to achieve self sufficiency, it has become essential to expand rubber cultivation to the non-traditional zones where different types of environmental constraints affect growth and productivity. In the eighth five year plan, it is expected to plant rubber in 80,000 ha, of which 65,000 ha will be in the non-traditional region(2). Replanting old and unproductive plantations with high yielding planting materials is also essential to boost production. An attempt is made here to examine the problems and prospects for rubber cultivation and improvement in the Karnataka and Kanyakumari regions.

KARNATAKA REGION

Karnataka is one of the non-traditional areas where rubber cultivation could be expanded. Traditionally, rubber cultivation is limited to the humid tropics within 10° north and south of the equator where, total rainfall, distribution of rainfall and ambient temperature are suited for growth of rubber. The area under rubber in the Karnataka region falls between latitudes 12.06°N to 15.16°N and elevation ranges from 27 meters to 1182 meters above MSL. Table 1 depicts the districtwise distribution of rubber plantations with other details like elevation, rainfall etc. The taluk wise distribution of rubber in the Karnataka is depicted in Fig.2. Total area under rubber as on 1990, is around 13,350 ha, of which 78 percent of the area is located in the Dakshina Kannada district alone, with 50 percent of the area belonging to large estates. The area is characterised by severe summer which affects the growth of rubber and annual rainfall varying from 1100 mm to 5600 mm (Table 1). South west monsoon contributes the major part of the rainfall with july as the wettest month having nearly 1000 mm or more rainfall (4). North east monsoons are very weak. Incidence of pink disease and Phytophthora leaf fall is very high due to continuous heavy rain. However, powdery mildew is of very low frequency which may be due to high summer temperatures and low relative humidity. Soils are highly weathered, acidic and poor in available nutrients except magnesium (4). Per hectare yield of rubber in this region is only 818 kg (5), which is below the national

average. This could be mainly due to planting of a few selected old clones and also unselected seedlings in most of the area. interest among people to expand rubber cultivation to high elevation areas also, though there is general reduction in growth mainly due to high incidence of leaf diseases like powdery mildew. During the eighth five year plan, it is proposed to plant rubber in 5000 ha. in the Karnataka region.

KANYAKUMARI REGION

The traditional area of Kanyakumari region presents a different picture in respect of weather conditions and rubber production. Rainfall is moderate and more or less evenly distributed with an average rainfall of 1900 mm, which does not exceed 350 mm in any month (4). Both south west and north east monsoons are equally important for this region. The temperature variation is not marked. Laterite or lateritic red soils are encountered in this region. These soils are generally deep, less weathered and comparatively more fertile. This area occasionally has very mild incidence of abnormal leaf fall, which is considered to be the most damaging disease prevalent in the rubber growing areas of our country. However, the incidence of powdery mildew disease is severe here. The total area under rubber planting as in 1990 is 17,085 ha which falls in three taluks (Table 2). This region gets the highest yield per hectare (1071 kg) (5), which is above the national average. During the eighth plan period, it is envisaged to plant 1500 ha in this region, which includes both replanting (one third area) and new planting.

HEVEA BREEDING SUB-STATIONS (H.B.S.S.)

The Rubber Research Institute of India has established two Hevea breeding sub-stations during 1986, one in Nettana (Dakshina Kannada District of Karnataka) which is 94 km away from Mangalore and the other in Paraliar (Kanyakumari district of Tamil Nadu) which is 35 km away from Nagercoil, with an aim to conduct breeding research in these regions and evolve new Hevea clones suited to the localities. HBSS Karnataka lies in the latitude of 12.45°N and longitude of 75.32°, at an elevation of 110 meters above MSL. The station has an area of 50ha. The substation Nettana lays emphasis on evolving new rubber clones suited for the area by adopting various plant breeding methods and also field testing existing modern cultivars. It is proposed to study various breeding problems of Hevea.

Analysis of soil samples from representative areas of the station has shown that the soil is deficient in phosphorous and a modified fertilizer recommendation suggested by the Rubber Research Institute of India was adopted. The station is equipped with an agrometeorological observatory for regular recording of weather date. The mean annual rainfall is 4633 mm, the wettest months being July (1141.85 mm) and August (1213 mm) (Fig.3). The mean maximum temperature ranged from 26.72°C to 36.07°C (Fig.3). The minimum temperature ranged from 15.25°C to 23.37°C. At the HBSS Nettana, there are six ongoing field trials which cover the study of clonal performance in the region, evaluation of ortet clones, estimation of genetic parameters and study on exploitation systems in relation to various clones.

The Hevea breeding sub-station Paraliar is located in the traditional belt, in the Paraliar Division of the Tamil Nadu government rubber plantation and has an area of 23.1 ha. This region is ideally suited for rubber cultivation, with distributed rains and high per hectare yield of dry rubber. Figure 4 shows rainfall pattern and maximum and minimum temperature for one year. The maximum temperature ranged from 17.9°C to 23.66°C. Table 3 shows per hectare dry rubber production from commercial plantings. At the HBSS Paraliar, two breeding orchards comprising 51 clones and a large scale clone trial have been established.

FUTURE PROSPECTS FOR HEVEA BREEDING

In the Karnataka region, till date the planting materials used by the plantation sector are a few old clones like RRIM 600, GT1, PB 86 etc. It is only in recent years that high yielding clones like RRII 105 have been popularised. Clone evaluation in different agroclimatic situations is one of the major areas to be given importance. In this connection, newly evolved indigenous clones as well as imported clones in the pipe line have been established as source bush plants at the HBSS Nettana and selected clones have been vegetatively multiplied for distribution among progressive planters for block planting. It is intended to evaluate the clones under d/2 and d/3 systems of tapping for obtaining information on susceptibility to tapping panel dryness and also for identifying the most suitable tapping system. A similar programme of clone

TABLE - 1

Details of area under rubber, elevation, rainfall etc. in various districts of Karnataka

District	Taluk	Latitude ON	Elevation from MSL (metres)	Rainfall(mm) 5 years mean	Area under Rubber (ha)	District total
Dakshina	Bantwal	12.52	26.80	4614.28	196.82	
Kannada	Belthangady	12.59	106.68	4966.72	1362.18	
	Coondapur	13.38	NA	3648.28	913.89	
	Karkala	13.13	73.45	5671.92	221.68	
	Mangalore	12.53	114.00	4429.16	66.05	
	Puttur	12.42	106.68	4410.62	2957.14	
	Sullia	NA	NA	3925.97	4110.79	
	Udipi	NA	NA	3806.33	30.45	
	add 5% of the district total for unregistered area being given permit.				492.95	10351.95
Uttara	Karwar	NA	NA	3350.46	4.80	
Kannada	Kumta	14.26	30.50	3412.30	1.80	
	Supa	15.16	508.10	2251.13	34.60	41.20
Chigmagalur	Mudigeri	13.38	932.00	2348.21	2.00	
	N.R.Pura	13.25	693.11	1524.08	302.36	
	Koppa	13.33	805.81	2981.12	37.07	
	Sringeri	13.25	634.28	3801.96	30.02	371.45
Kodagu	Coorg	12.29	750.00	4445.35	550.12	
	Mercara	12.25	1182.72	3287.92	861.08	
	Virajpet	12.10	750.00	2737.74	603.21	
	Somavarpet	12.36	1131.00	2199.20	61.20	2075.61
Shimoga	Sagar	14.10	596.79	1846.22	182.51	
	Sorab	14.25	571.10	1296.70	87.70	
	Tirthahalli	13.41	600.00	2867.84	67.61	
	Hosanagara	NA	NA	NA	149.69	487.51
Mysore	H.D.kotte	12.05	NA	1170.00	10.45	
	Piriapattana	12.06	848.40	785.00	0.74	11.19
Bangalore	Nelamangala	13.06	883.92	1111.75	11.64	11.64
				State Total :		13350.55

Data source : Rubber Board Regional Office, Mangalore.

TABLE - 2

Area under rubber in the Kanyakumari region

Sl.No.	Taluk	Registered area(ha)	Unregistered area (ha)	Total (ha)
1.	Kalkulam	7483.00	1500.00	8983.00
2.	Vilavancode	5193.00	1000.00	6193.00
3.	Thovala	1409.00	500.00	1909.00
4.	Agasteswaram	NA	NA	NA
	Total	14085.00	3000.00	17085.00

TABLE - 3

Per hectare yield of dry rubber in the Kanyakumari region

Sl.No.	Year	Yield(Kg/ha)
1.	1980-81	1910.40
2.	1981-82	1195.70
3.	1982-83	836.20
4.	1983-84	1613.80
5.	1984-85	1064.00
6.	1985-86	719.70
7.	1986-87	855.40
8.	1987-88	1008.30
9.	1988-89	1122.00
10.	1989-90	1251.10

Data source : Table 2 - Rubber Board Regional Office, Nagercoil.
Table 3 - Arasu Rubber Corporation Ltd., Paraliar Dn.

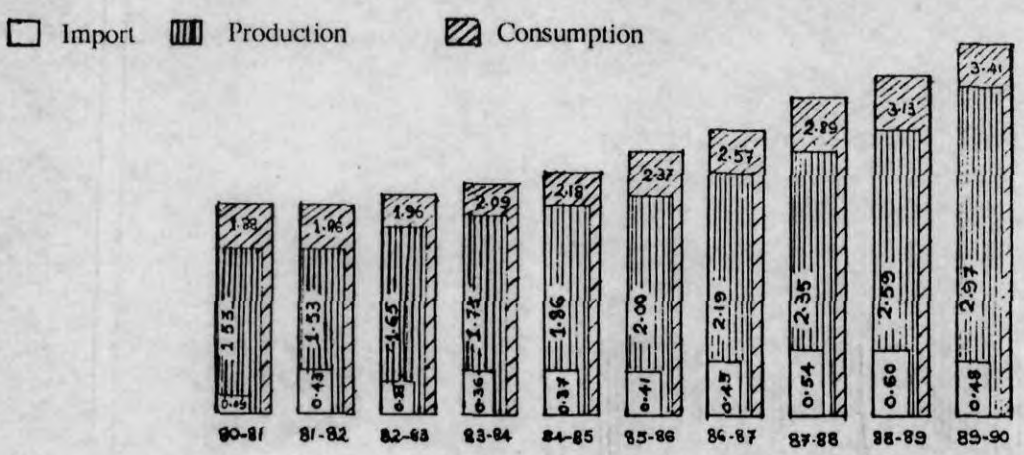


Fig. 1
Production, consumption and import of natural rubber in India
(in lakh tonnes)

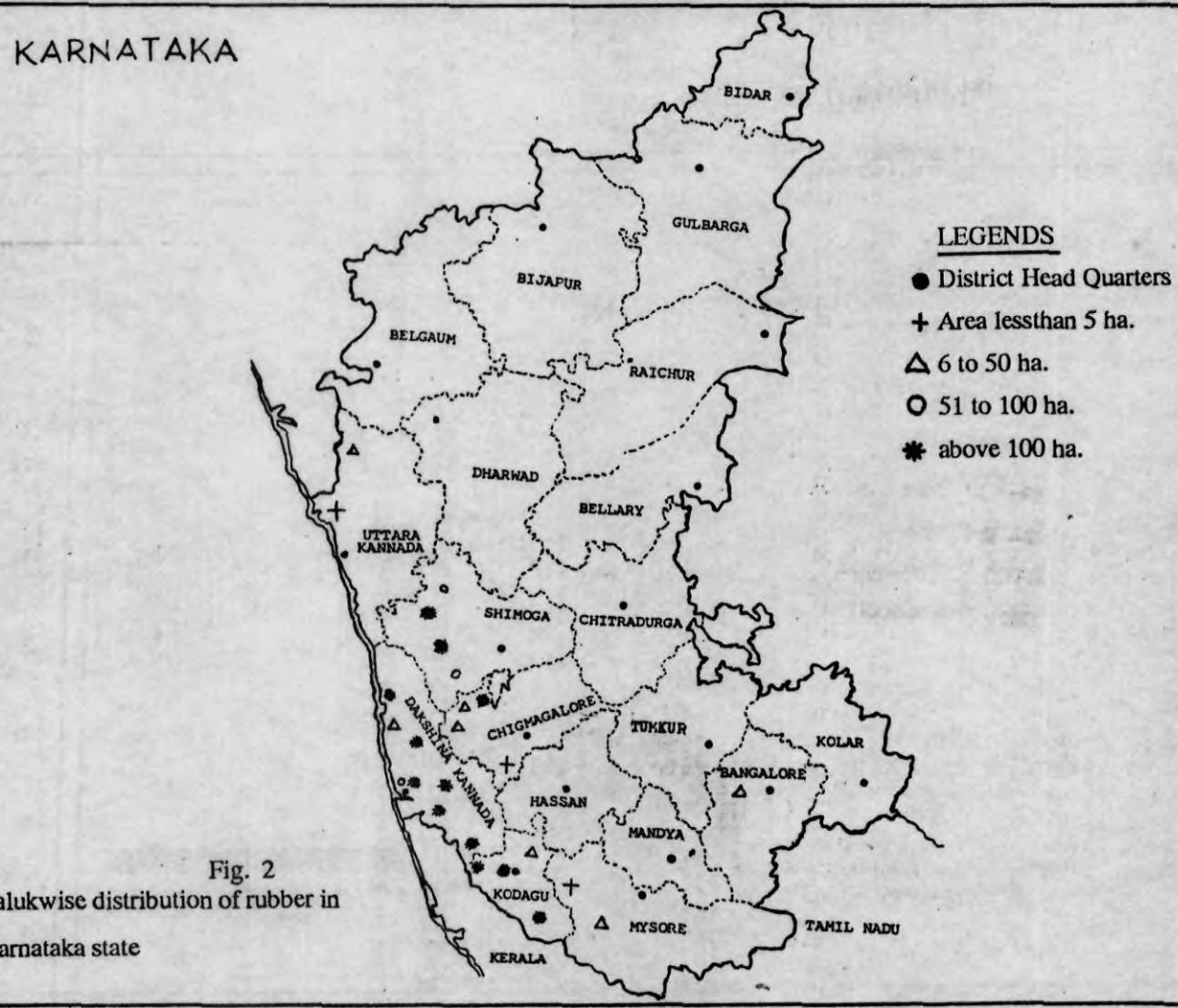
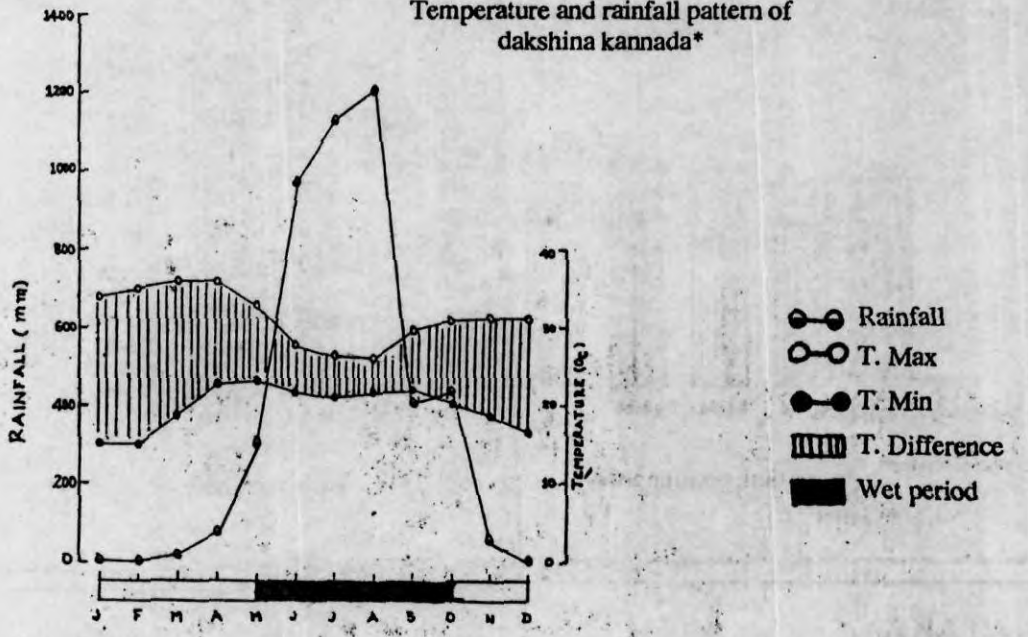


Fig. 2
Talukwise distribution of rubber in Karnataka state

Fig. 3
Temperature and rainfall pattern of dakshina kannada*



*Mean data over two years

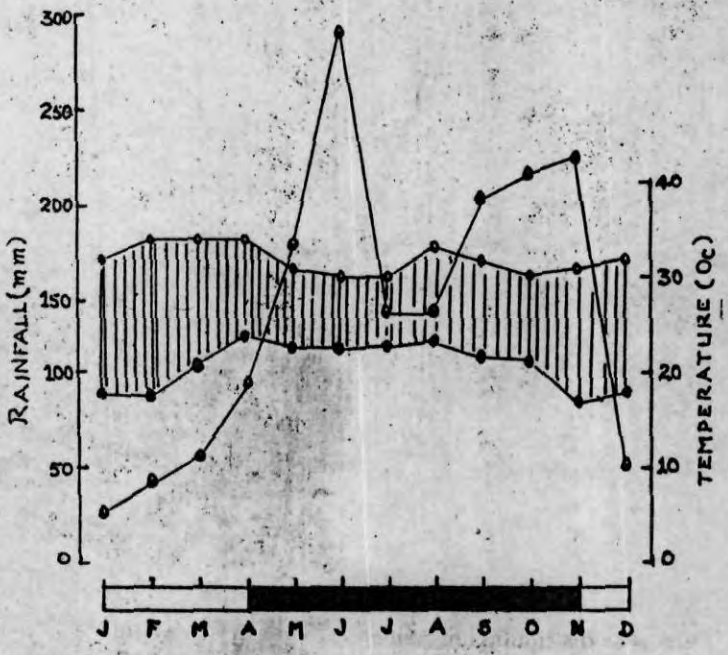


Fig. 4

Temperature and rainfall patter of Kanyakumari region*

*Data for one year

evaluation is envisaged for the Kanyakumari region also. Ortet selection is another priority area in both regions. Since sizable area under mature and yielding seedling populations with immense genetic variability is available and they are being replanted with clonal stands, it is essential that the ortet selection programme be initiated at the earliest. Plus trees having tolerance to drought and diseases like powdery mildew, abnormal leaf fall, pink disease etc. could be selected, cloned and established for incorporation in future breeding programme, in addition to selection of high yielders from seedling populations. Basic studies like floral biology have to be taken up for the utilization of the information in breeding programmes. In the Karnataka region, since the main constrains are drought, leaf and stem diseases like Phytophthora, pink etc. adequate emphasis is being given for these problems in the breeding objectives. The ongoing field trials at the Hevea breeding stations will help in identifying clones tolerant to these maladies. Among the future projects is a germplasm garden at Karnataka for a small scale evaluation of all available clones of exotic and indigenous origin. The breeding orchards established at the HBSS Paraliar, will be utilized for future hybridization programmes to generate hybrid seedlings for clonal selection. In the Karnataka region, rubber cultivation is expanding to high elevation areas also. Hence, evaluation of clones with built in tolerance to cold and other climatic situations in such regions is another priority area.

There is good scope for expansion of rubber cultivation in Karnataka. In Dakshina Kannada district alone, out of the total geographical area of 8.34 lakh ha, forest land is around 2.26 lakh ha and nearly 3.51 lakh ha land is either revenue land or unutilized area(6). In such marginal lands, direct planting or polycross seeds could be attempted. At present, there is no polyclonal seed garden in the Karnataka region. It is intended to establish a polyclonal seed garden in this region, in collaboration with the Karnataka forest development corporation. Superior synthetic populations derived from these gardens could also be used as promising root stock material.

REFERENCES

1. Mukundan Menon, P. 1989. Short term techniques for boosting rubber productivity. Rubber Board Bull. 24(4):3-4.

2. Mukundan Menon.P. and R.G.Unni, 1990. Natural rubber production: Prospects on a long term basis. Rubber Board Bull. 25(4): 7-15.

3. Anonymous, 1990. Seminar on "Modern trends and growth opportunities in rubber industry". Rubber Board Bull. 25(3): 2-3.

4. Pushpadas, M.V. and Karthikakutty Amma, 1980. Agro ecological requirements. In: Handbook of Natural rubber production in India. Edt. P.N. Radhakrishna Pillai, Rubber Research Institute of India. PP: 100-107.

5. Indian Rubber Statistics 1987-88. Compiled by the statistics and planning division, the Rubber Board, Kottayam. PP:8-9

6. Dakshina Kannada at a glance - 1988-89. Government of Karnataka. Compiled by the District statistical officer, D.K. District, Manglore. P-10

HOW PLANTS INFLUENCE TEMPERATURE

Scientists say they have confirmed on step in a chain of events by which microscopic ocean plants may influence the earth's temperature.

The hypothesis suggests that the plants affect the amount of solar energy that warms the Earth by influencing how clouds reflect that energy.

The thermostat hypothesis starts with the fact that the plants, called phytoplankton, produce a gas called dimethyl sulphide. Part of this gas is turned into sulphur-bearing particles in the air. Eventually cloud droplets form around the particles. The number of these droplets in clouds strongly influences how much solar energy the clouds reflect away from the Earth. And that influences how much energy the globe receives.

The series of links may produce an effect like a thermostat. If the Earth cools, dimethyl sulphide production may fall, decreasing the number of cloud droplets and so reducing the reflectivity of clouds, leading to a warming of the Earth.

In a *Nature* article, Australian scientists said that weekly observations over 20 months at Cape Grim, TAsmania, showed that atmospheric concentrations of dimethyl sulphide and sulphurbearing particles rose and fell together. That confirms one connection in the thermostat hypothesis, the scientists wrote. A separate study also found that numbers of cloud condensation nuclei, around which cloud droplets form, rise and fall in step with the same trends.