Soil is one of the most precious natural resources on earth for survival of the natural habitat and human civilization. A soil suitable for optimum growth of any plant is one which encourages vigorous root development ensuring a firm anchorage and also provides an adequate store house for water and plant nutrients. The suitability of a soil for a crop is therefore very much dependent on physical and chemical making of the soil. Improvement of soil fertility is a critical component of soil health management which also plays a key role in sustainable agricultural production.

Soil acidity inhibits plant growth and this result from variety of specific factors and interactions between these factors. Low nutrient status and the presence of toxic elements particularly Al are major constraints to intensive crop production in acid soils (Adams, 1981). In general, acid soils are deficient in P, K, Ca, Mg, S, B and Mo. Under heavy rainfall conditions all the exchangeable bases (Ca, Mg and K) and salts are leached from the soil profile leaving behind materials rich in Al and Fe oxides which render the soil acidic and infertile. Aluminium toxicity become very severe at pH <5.0 and can be a problem even at pH 5.5 for soils dominated by kaolinite mineral (Foy, 1984). Aluminium toxicity inhibits root growth and in turn reduces the uptake of nutrients and water. The toxic action of Al results in stubby root because of inhibition of elongation of the main axis and lateral roots (Klotz and Horst, 1988). With increasing soil acidification root penetration into the subsoil is inhibited leading to a more shallow root system (Marschner, 1991a), with lower utilization of mineral nutrients and water from subsoil.
According to Dijikman (1951) rubber trees grow on majority of the soils of the tropics with good soil depth and pH range from 4.0 – 6.5. Later on, it was reported that the growth of *Hevea* is greatly influenced by physical, chemical and minerological properties of the soil (Eshett and Omueti, 1989; Krishnakumar (1989).

In India the cultivation of rubber traditionally was confined to a narrow tract in the western side of Western Ghats mainly in Kerala State and Kanayakumari district in Tamil Nadu and south Kannada and Coorg district in Karnataka. Earlier, most of the rubber plantations were raised in freshly cleared forests where the soil fertility conditions were good in comparison to the cultivated areas of the same agro climatic zones. The economic life span of rubber tree is about 30-32 years and after this period the trees are cut down and removed for replanting. This continuous relay cropping which involves considerable recycling of nutrients and import/export of biomass may have significant influence on soil health and nutrient status. After each cycle biomass of about 400 to 450 tonnes per hectare is removed. In kerala most of the plantations are in the 3\textsuperscript{rd} cycle of replanting.

Soils in the rubber growing tract are mostly laterite, lateritic, red and alluvial and are reported to be deficient in available P and K (Karthikakuttyamma et al., 2000). Soils are acidic in reaction and in the surface layer the pH values range from 4.5-5.5. Extremely acid soils (pH 4.5) occur in some parts of Kanyakumari, Thiruvanathapram, Kollam, Kottayam and Ernakulam districts covering 9.0 per cent of the area. (NBSS and LUP,1999; Karthikakuttyamma et al., 2000). In most of these soils acidity is expressed due to the presence of exchangeable Al along with the loss of cations through erosion, leaching and also by crop removal. Norhayti and Lau (1990) reported a decrease in pH in the surface and subsurface soils due to the cultivation of rubber. Similar results from Nigeria were reported by Asawlam et al., (1991). Significant
reduction in soil pH up to a depth of 60 cm due to continuous cultivation of rubber was reported by Karthikakuttyamma (1997). In one cultivation cycle of *Hevea* the highest depletion was noticed for Ca (1260 kg/ha) followed by Mg and continuous cultivation of rubber for over 70 – 80 years, Ca to the tune of 2900 kg was reported to be lost from 0 – 60 cm layer of the soil. Sanchez *et al.*, (1985) reported loss of 56.0 per cent Ca in rain forests upon replanting of pinus and attributed this to the differential uptake by the trees due to the spatial variation in soil augmented by the degree of leaching. Rubber trees appear to have a fair degree of adaptability to low Ca environment (Bolton, 1960). The ratio of Ca to the total cations should be around 0.15 for roots to grow freely and for penetration of roots to the subsoil (Howard and Adam, 1965). Al/Ca molar ratio influence root development in acid soils. A ratio of 0.02 is considered to be the upper limit beyond which growth will be affected (Marschner, 1986).

Subsoil acidity retards root growth resulting in drought stress and is reported to be one of the major yield-limiting factors in acid soils (Saigusa *et al.*, 1980; 1985; Shoji *et al.*, 1985). Suresh *et al.*, (1994) reported the contribution of exchangeable Al to subsoil acidity in rubber growing tract. No study has yet been done in rubber growing soils to understand the nature of acidity and associated factors and its influence on rubber growth. Hence the present investigation was carried out with the following objectives

1. Characterize the nature of acidity in rubber growing soils
2. Estimate the lime requirement of rubber growing soils
3. Study the effect of liming on nutrient availability
4. Study the effect of liming on growth of rubber seedlings.
5. Assess the uptake and translocation of Ca in different plant parts upon liming
6. Compare the effectiveness of different liming materials on growth of rubber seedlings