Indian Journal of Natural Rubber Research, 16 (1 & 2) : 66-74, 2003

EFFECT OF LIMING ON SOIL PROPERTIES AND GROWTH OF RUBBER SEEDLINGS

V.K. Syamala, Mercykutty Joseph and K.I. Punnoose

Syamala, V.K., Joseph, M. and Punnoose, K.I. (2003). Effect of liming on soil properties and growth of rubber seedlings. *Indian Journal of Natural Rubber Research*, 16 (1 & 2) : 66-74.

The soils under rubber cultivation in India are mainly acidic. Laboratory incubation and nursery experiments were conducted to study the effect of liming on nutrient availability and growth of rubber seedlings (*Hevea brasiliensis Muell. Arg.*) in such a soil. Liming significantly improved the soil pH. At the highest level of lime application the soil had neutral pH. While liming significantly increased the level of available calcium in the soil, available K, Mg, Mn, Fe and Cu were decreased. Phosphorus availability reduced initially but improved afterwards. Liming also significantly reduced the exchangeable aluminium content of the soil. Fertilizer applied alone or in combination with lime significantly improved the growth of rubber plants in the nursery. Liming in the nursery reduced the available P and K status of the soil. Fertilizer when applied alone was found to reduce the pH of the soil. But addition of lime along with fertilizer significantly improved the available P and K status of the soil and improved the growth of rubber plants.

Key words: Acidic soil, *Hevea brasiliensis*, Liming, Nutrient status.

V.K. Syamala (for correspondence), Mercykutty Joseph and K.I. Punnoose, Rubber Research Institute of India, Kottayam – 686 009, Kerala, India.

INTRODUCTION

In about 30 per cent of the cultivated area in India, the soil is acidic. The soil acidity has been associated with hot humid climate and heavy precipitation. The problems of soil acidity are expressed, when the pH is less than 5.5 and the aluminium saturation is high. Aluminium toxicity is the most common cause of acid soil infertility. High aluminium concentration in the soil solution directly cause harm to the roots and affects translocation of calcium and phosphorus.

The rubber growing tracts of Kerala have laterite soil, which is acidic in nature. The soil pH is often less than 5.2 in the surface horizon (Karthikakuttyamma *et al.*, 1989 and NBSS & LUP, 1999). In most of these soils acidity is developed due to the high levels of exchangeable Al^{3+} and the loss of basic cations due to erosion, leaching and crop removal. Suresh *et al.*, (1994) reported that average value of exchangeable Al in the surface (0 - 25 cm depth) soil ranged from 0.36 to 0.98 cmol(+)/kg. The highest concentration of 0.58 to 2.23 cmol(+)/kg was recorded at a depth of 50 - 75 cm. Liming is recommended in the agronomic management programme of the soil to correct the adverse soil reaction as well as to increase the exchangeable base reserve. Aluminium toxicity can be corrected by liming to a pH of 5.5 to 6.0 for precipitating exchangeable aluminium as aluminium hydroxide.

However no study has been undertaken on the effect of liming in the rubber growing soils of India. Hence the present experiments were conducted to study the effect of liming on soil pH, availability of nutrients and on the growth of rubber seedlings in the nursery.

MATERIALS AND METHODS

Experiment 1

Soil used for the study was collected from the farm of Rubber Research Institute of India, Kottayam in Kerala State. The physico-chemical properties of representative soil samples were determined by the standard procedure (Jackson, 1958). Available P was extracted using Bray – II extractant (0.03 N ammonium fluoride in 0.1N HCl) and available K using Morgan 's re-