

RESTRICTED WEED MANAGEMENT: A STRATEGY FOR PROMOTING BIODIVERSITY AND SOIL FERTILITY IN RUBBER PLANTATIONS

Sherin George and N. Ashithraj

Rubber Research Institute of India, Rubber Board, Kottayam - 686 009, Kerala, India

Received: 15 November 2020

Accepted: 06 February 2020

George, S. and Ashithraj, N. (2020). Restricted weed management: A strategy for promoting biodiversity and soil fertility in rubber plantations. *Rubber Science*, 33(1): 33-42.

Retaining natural flora in the interspace instead of cover crops/intercrops is one of the options to meet the challenges of biodiversity conservation in monoculture rubber plantations. A field experiment was initiated during 2012 at the Central Experiment Station of Rubber Research Institute of India to study the possibility of retaining natural flora in rubber plantations as a means for promoting biodiversity. The effect of natural flora and legume covers on growth of rubber, soil moisture and fertility status and biomass turnover were studied. The treatments comprised four weed management options *viz.* rubber + *Pueraria*, rubber + *Mucuna*, rubber + natural cover (maintaining 1 m² around the plant basin weed free) and rubber + natural cover (maintaining rubber with life-saving weeding). Growth of rubber plants was significantly reduced by allowing natural flora with life- saving weeding and the reduction in girth over a period of four years was to the tune of 27 per cent compared to rubber with cover crops whereas there was only a slight reduction (7%) in the growth of rubber plants with 1m² weeding. Biomass turnover was significantly higher for *Mucuna* followed by natural cover. A stable pH was maintained throughout the immaturity period for rubber with natural flora while slight acidification was noticed in the early years of immaturity in plots with legume covers. Comparable organic carbon, available P, K, Ca and Mg were maintained by *Mucuna* and natural flora. The soil moisture status under natural flora and *Mucuna* during summer was also positively influenced. The results indicated that promotion and maintenance of natural understory vegetation in rubber monoculture plantations with minimum weeding around the plant basin was an agronomically and economically feasible and ecologically viable strategy to improve biodiversity and maintain soil fertility in rubber plantations.

Key words: Biodiversity, *Hevea brasiliensis*, Cover crops, Weeds

INTRODUCTION

Natural rubber (*Hevea brasiliensis*), a native of Amazon rain forests is now under extensive cultivation in different agro-climatic regions in India replacing forests and other land use systems. There has been growing concern that switching land use to rubber cultivation can negatively impact the soil health, water availability and

biodiversity (Ahrends *et al.*, 2015). Monoculture rubber plantations harbor only less than half of the species richness in various plant and animal groups compared with natural forest, and many of these species are unable to exist permanently in rubber plantations (Liu *et al.*, 2016).

An ecologically reasonable and economically feasible method to improve