

**B 029**

**Root competition of rubber [*Hevea bresiliencis*] and cardamom [*Elettaria cardamomum* (Maton)] intercropping system at low elevation**

Several cardamom selections were identified as suitable cultivars for wet zone low lands of Sri Lanka with rubber canopy as shade. In this rubber x cardamom intercropping system, reduction in yield and growth of cardamom was observed after 5 to 6 years. Root competition was suspected as one of the factors for this. To investigate the above problem an experiment was planned and samples were collected from two rubber-cardamom field experimental sites at Kegalle and Avissawella. Uniform cardamom bushes were selected while they were 2.5, 4 and 5.5 m away from the rubber row. Slope of the site also considered (flat and 40% slope) and 1/8 part of the cardamom root cylinder was excavated in segment basis. Depth layers were 0-10 (surface), 10-20 (2<sup>nd</sup>), 20-30 cm (3<sup>rd</sup>) and distance classes were 0-20, 20-40, 40-60, 60-80 cm from the perimeter of the base of the cardamom bush. Separated rubber and cardamom roots were measured using Newman's interaction method (1977) while root length density (LV) in mm/cm<sup>3</sup> was calculated on segmental basis. In the surface layer, rubber feeder roots were (<2mm) were greater in flat land (51%) than in the sloping land (44%). The cardamom plant while they were not significantly different in 2.5, 4, 5.5 m distance from the rubber row, both in flat and sloping land. Lesser rubber root LV were found in 2<sup>nd</sup> and 3<sup>rd</sup> layers (<2MM) were greater in flat land (51%) than in the sloping land (44%). The highest rubber feeder root LV (2.13-3.14 mm/cm<sup>3</sup>) was at 0-40 cm distance from the cardamom plant while they were not significantly different in 2.5, 4, 5.5 m distance from the rubber row, both in flat and sloping land. Lesser rubber root LV were found in 2<sup>nd</sup> and 3<sup>rd</sup> layers (<2 mm/cm<sup>3</sup>) most of the cardamom roots (39.4%) were in the 60 cm radius in the surface layer, 40 cm radius (23.2%) in the 2<sup>nd</sup> layer and 20 cm radius (11.1%) in the 3<sup>rd</sup> layer. The maximum cardamom root LV of 3.32 mm/cm<sup>3</sup> was observed at 0-20 cm distance while 2.86, 2.23 and 1.65 mm/cm<sup>3</sup> were at 20-40, 40-60 and 60-80 cm distance respectively in the surface layer of the sloping land. In the second layer, first two segments had LV of 2.5 mm/cm<sup>3</sup> while 2.02 and 0.008 mm/cm<sup>3</sup> LV were others have less than <1.8 mm/cm<sup>3</sup>.

Therefore, it is evident that, rubber feeder roots are encroaching the shallow cardamom root zone the cardamom roots are concentrated resulting competition for moisture and nutrients. Rubber root completion is less in sloping land than a flat land.