



Deutscher Tropentag, October 8-10, 2003, Göttingen

“Technological and Institutional Innovations
for Sustainable Rural Development”

Contributions of Trees Dispersed in Pastures to Livestock Farms in Costa Rica

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Abstract

Livestock production systems and the tree component within them were characterised in La Fortuna, San Carlos, Costa Rica. Three types of production systems were observed: mixed (dairy and agriculture), dairy, and dual purpose (milk and meat). Milk productivity (kg ha^{-1}) was highest for dairy farms. The area of pasture with trees was greater in dual purpose systems (74 % of total area), predominantly timber trees. The timber tree species laurel (*Cordia alliodora*) was predominant in the pastures, although its density was low (11 trees ha^{-1}). In specialised milk systems, a significantly high density of shade trees was found compared to the other systems, protecting exotic animal breeds from direct sun. No significant differences were observed between the systems in live fence tree species and the fence lengths covered per ha of pasture. The dual purpose system presented the greatest abundance of laurel with small diameters, assuring a sustainable natural regeneration of this species, and the greatest merchantable volume of laurel ($2.21 \text{ m}^3 \text{ ha}^{-1}$). The greater abundance of laurel in the dual purpose system may be related to the fact that these livestock farmers try to reduce risk by diversifying farm production. The highest net present value (US\$ 256.18 ha^{-1}) was found in the dual purpose systems. The average income from milk production in all three systems contributed the most to the total gross income (49.8 %), while the average income from wood only made a small contribution (1.02 %). In the future the tree component could play a more important role in the cattle production systems of the region.

Keywords: Cattle farms, *Cordia alliodora*, financial viability, La Fortuna, San Carlos, shade trees, timber trees