Tropentag, October 11-13, 2006, Bonn

"Prosperity and Poverty in a Globalised World—
Challenges for Agricultural Research"

Performance of Bushy Forage Legumes in Dynamic Smallholder Pasture Systems of Northeastern Amazon, Brazil

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Abstract

In northeastern Pará, smallholders often use cattle just as a financial instrument on their diversified farms: e.g. they buy cattle if cash flows in from crop harvest, and sell them if cash is needed for investment. Thus, animal production systems become dynamic, and inappropriate stocking rates lead to early pasture degradation. Further on, many promising woody tropical forage legume species show development problems if directly grazed on small-scale grass-legume pastures because management, for instance, has also to be adapted to grass availability. Thus, the legumes' need for sufficient recuperation time is often neglected. However, experience shows hat even overgrazed bushes easily recuperate if enough recuperation time is given. Thus, we hypothesise that in the flexible smallholder pasture system, with both long-term overgrazing and recuperation time, the performance of woody forage legumes is higher than on an intensively used pasture. An on-farm experiment is conducted in the municipality of Igarapé-Açu (47°36´W/1°08´S) to test this hypothesis: two dynamic pasture systems with extraordinary high stocking rates (2 and 3 $^{AU}/_{ha}$, respectively) and long restoration times (38 and 83 days, respectively) are tested against an intensively used grass-legume pasture. Stocking rates are increased until 3 $^{AU}/_{ha}$ after crop harvest and dropped to 0.5 $^{AU}/_{ha}$ during smallholders´ investment times. The investment and harvesting times of the following crops will be considered: maize, cassava, beans, passion fruit, pepper, and fruit trees. Each treatment are planted with alternating lines of totally 300 *Cratylia argentea* and *Flemingia macrophylla* bushes, each, on 0.5 ha *Brachiaria brizantha* pastures. The experiment is replicated three times. Three crossbred steers, with an average liveweight of 185 kg graze the plots according to different smallholding scenarios. Legume establishment and development are evaluated by measuring bush heights, relative growing performance, diameters, biomass, consumption ratio, and nodule production during the three years of experimental time. The study will show if bushy forage legumes contribute more on hardly managed smallholder or on well-managed pastures.

Keywords: Animal production, *Cratylia*, *Flemingia*, N-fixation, pasture management, smallholding

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