

Experiences with establishing legumes as part of a ley pasture in a low-input farming system of the Eastern Amazon, Brazil

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Introduction In the Eastern Amazon extensive pasture management by smallholders can result in degradation of grassland, leading to unproductive and abandoned agricultural areas (Dias-Filho, 2003). To avoid long and costly restoration of those areas, ley-systems with alternating cropping and pasture phases might offer a promising solution. The inclusion of N-fixing legumes is seen as a suitable method to improve soil fertility during the pasture phase. As mono-cultures seem not to be appropriate, given the phytodiverse climax vegetation in the humid tropics, a combination of various shrub and herbaceous legume species is proposed. Thus, this paper tests a grass-legume mixture to replace the fallow phase in the slash-and-burn agriculture practised by smallholders.

Materials and methods A researcher-managed on-farm experiment was set up at Igarapé-Açu (47°30'W/1°2'S). Alternating 5 m broad strips of herbaceous *Arachis pintoi* Krapov. & W.C. Gregory cv. Amarillo and the grass *Brachiaria humidicola* (Rendle) Schweick. were planted on three 0.3 ha plots. Rows of the shrub *Cratylia argentea* (Desv.) Kuntze cv. Veraniaga were planted in the centre of the *A. pintoi* strips and rows of the shrub *Chamaecrista rotundifolia* (Pers.) Greene var. *grandiflora* in the respective grass strips. After an establishment phase of one year the plots were grazed in a rotational system with average stocking rates of 1.48 LU/ha per year¹ in the 1st year and 1.23 LU/ha per year in the 2nd year. Legume nodulation, population dynamics, and growth were evaluated during the first two years of the grazing phase.

Results The results indicate unsatisfactory performance of the grass-legume pasture. All legume species had poor nodule production. In the first three grazing months, *A. pintoi* developed well but nearly disappeared during the dry season (08/00-12/00) and stabilised at a low level in the second year (figure 1). *C. argentea* was heavily grazed at a much earlier stage than expected. Neither legume provided much forage biomass and the strips were heavily invaded by the grass in 2000. *C. rotundifolia* established well and the bushes grew rapidly, as they were hardly consumed (data not shown). However, the chosen accession died off after two years, but due to prolific seeding seedlings invaded all over the pasture plots, entering the *A. pintoi/C. argentea* strips and even suppressing the grass (Figure 1), which therefore dropped to a low level in 2001.

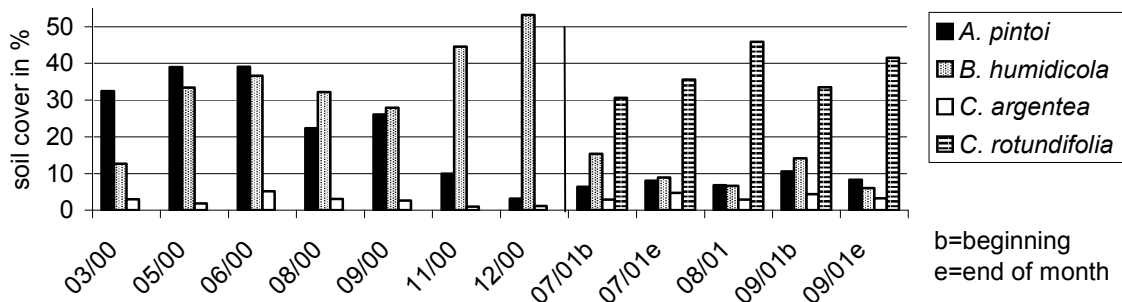


Figure 1 Soil cover percentages in the *Arachis pintoi/Cratylia argentea* strips during the two grazing phases, showing the invasion by *B. humidicola* (2000/2001) and *C. rotundifolia* (2001), respectively (n=1336)

Conclusions The tested grass-legume mixtures cannot successfully fulfil their function in a ley system and have yet to be improved regarding species choice and speed and length of establishment phase (Hohnwald, 2002).

References

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