INTERCROPPING GRASSES AND LEGUMES FOR PASTURE DIVERSIFICATION AND SUSTAINABLE INTENSIFICATION OF LIVESTOCK IN THE AMAZON

Judson Ferreira Valentim[1]; Carlos Mauricio Soares de Andrade[1]; Maykel Franklin Lima Sales[1]; Giselle Mariano Lessa de Assis[1]; Claudenor Pinho de Sá[1]; Falberni de Souza Costa[1]

1 Empresa Brasileira de Pesquisa Agropecuária – Acre

Brazil has 112 million hectares of cultivated pastures (IBGE, 2017), of which 52% are degraded and 25% in degradation (DIAS-FILHO, 2014), according to estimates. Livestock intensification is the main strategy for reconciling increased productivity with reduced environmental impacts (STRASSBURG et al,, 2014).

The intensification of livestock is associated with the reform or recovery of pastures, which includes the supply of nutrients through fertilizers, mainly nitrogen (N), However, high costs limit Brazilian farmers from adopting pasture fertilization especially in the Amazon (ANDRADE, 2010; 2012), In this scenario, using grass pastures intercropped with legumes with biological N fixation capacity (FBN) becomes a practice of great interest.

This Embrapa initiative received financial support from Banco da Amazônia and the Association for the Promotion of Forage Improvement Research (Unipasto), and it aims to promote the sustainable intensification of livestock production systems on pasture in the Amazon biome.

From 1998 onwards, degradation of pastures and restrictions on deforestation led producers to seek alternatives to recover degraded pastures and intensify production systems in the Amazon, Since 1980, usingthe leguminous Pueraria phaseoloides had been promoted for pastures intercropped with Panicum and Brachiaria grasses and was adopted in 480,000 ha in Acre, However, livestock showed little compatibility with some of the grasses that farmers began using, such as African star grass (Cynodon nlemfuensis), It also did not persist in pastures managed under rotational grazing system, with stocking rates above 1,5 animal unit/ha (VALENTIM; ANDRADE, 2005a).

In 2000, producers in Acre demanded legumes adapted for use in intensive production systems, On occasion, using forage peanut (*Arachis pintoi cv, Belomonte*) was being validated in 20 properties, in association with African star grass, in the process of recovering degraded pastures in soils with low permeability, where Cv, Marandu had died. The success of these innovators promoted rapid dissemination of the technology among other producers facing similar problems (Table 1), In 2001, the Belomonte cultivar was recommended for supporting diversification of pastures in Acre, Forage peanut is also intercropped with cultivars of B, brizantha, B, decumbens, B, humidicola and P, maximum (VALENTIM; ANDRADE, 2005b) (Figure 1).

RESULTS

- Main advantages of grass pastures intercropped with forage peanuts:
    - Increased animal weight gain;
    - Increased pasture carrying capacity;
    - Good tolerance to waterlogged soils;
    - High resistance to grazing; and
    - Cost reduction with fertilization and animal protein supplementation.
- The Belomonte cultivar is adopted in 79.555 ha in Acre. with an annual benefit of R$ 82.3 million (EMBRAPA. 2019); and
- Pastures of grasses intercropped with forage peanuts provide an annual productivity of 13@ live weight (LW)/ha in the breeding. rearing and fattening cycle and 16@ LW/ha in the rearing and fattening cycle. These pastures have the potential productivity of up to 35@ PV/ha/ year.

NEXT STEPS AND RECOMMENDATIONS

Figure 1: Pasture of Brachiaria brizantha intercropped with forage peanut cv. BRS Mandobi. in Rio Branco-AC

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- The challenge is to support the adoption of intercropping grasses with forage peanuts in the 48 million hectares of pastures cultivated in the Amazon biome (INPE; EMBRAPA. 2016). This has been restricted by the low supply and the high cost of imported seeds;
- To overcome this challenge. Embrapa launched the BRS Mandobi cultivar in 2019. which is propagated by seeds to be used in pastures intercropped with grasses in the Amazon and Atlantic Forest biomes;
- This cultivar can potentially be used in other biomes. However. the technology still must be validated in these regions;
- The limitation for expanding the adoption of BRS Mandobi is the development of a seed harvester. Embrapa – Instrumentação and Embrapa – Acre are developing equipment that makes mechanized harvesting feasible. maintains quality and reduces the cost of seeds (PORTIOLI et al.. 2019); and
- The next step requires resources and partnerships with the private sector to validate the prototype under field conditions for the production of forage peanut seeds.

REFERENCES:

ANDRADE. C. M. S. de. Importância das leguminosas forrageiras para a sustentabilidade dos sistemas de produção de ruminantes. In: SIMPÓSIO BRASILEIRO DE PRODUÇÃO DE RUMINANTES NO CERRADO. 1.. 2012. Uberlândia. Anais [...]. Uberlândia: UFU. 2012. p. 47-96.

ANDRADE. C. M. S. de. Produção de ruminantes em pastos consorciados. In: SIMPÓSIO SOBRE MANEJO ESTRATÉGICO DA PASTAGEM. 5.; SIMPÓSIO INTERNACIONAL SOBRE PRODUÇÃO ANIMAL EM PASTEJO. 3.. 2010. Viçosa-MG. Anais [...]. Viçosa: UFV. 2010. p. 171-214.

DIAS-FILHO. M. B. Diagnóstico das pastagens no Brasil. Belém: Embrapa Amazônia Oriental. 2014. (Documentos 402).

Continued in Annex

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EMBRAPA. Balanço Social 2018. Brasília: Embrapa – Secretaria de Desenvolvimento Institucional (SDI); Secretaria Geral da Embrapa (SGE). 2019. Disponível em: https://bs.sede.embrapa.br/2018/index.html. Acesso em: 8 jan. 2020.

ERMGASSEN. E. K. H. J. zu; ALCÂNTARA. M. P. de; BALMFORD. A.; BARIONI. L. G.; BEDUSCHI NETO. F.; BETTARELLO. M. M. F.; BRITO. G. de; CARRERO. G. C.; FLORENCE. E. da A. S.; GARCIA. E.; GONÇALVES. E. T.; LUZ. C. T. da; MALLMAN. G. M.; STRASSBURG. B. B. N.; VALENTIM. J. F.; LATAWIEC. A. Results from on-the-ground efforts to promote sustainable cattle ranching in the Brazilian Amazon. Sustainability. Switzerland. v. 10. n. 4. p. 65-90. Apr. 2018.

SHELTON. H. M.; FRANZEL. S.; PETERS. M. Adoption of tropical legume technology around the world: analysis of success. In: McGILLOWAY. D. A (ed.). Grassland: a global resource. Netherlands: Wageningen Academic Publishers. 2005. p. 149-[169?].

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Table 1: Key factors for the successful adoption of pastures intercropped with forage peanuts in Acre

Degree of Importance	Key factors in adopting technology
1º	Technology must appropriate to the socioeconomic and environmental conditions of producers.
2º	Farmer's socioeconomic situation should be favorable to the adoption of technology.
3º	Embrapa long-term commitment - Acre researchers to the promotion and adoption of technology.
4º	Research process and participatory extension. market access and strong financial and environmental benefits for producers adopting technologies.
5º	Strategic partnership between researchers and producers and local institutions with the capacity to support the program.
6º	Using innovative producers as instructors and their farms as Technological Reference Properties.

Source: VALENTIM; ANDRADE. 2005b.

PROJECT COORDINATOR

Dr. Judson Ferreira Valentim

Empresa Brasileira de Pesquisa Agropecuária – Acre

e-mail: judson.valentim@embrapa.br