INFLUENCE OF *FAIDHERBIA ALBIDA* ON UPLAND RICE PRODUCTIVITY

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Introduction: In semi-arid regions of West Africa, most farmers consider the trees as an integral part of the cropping system. They have maintained over the centuries the traditional system of "parklands" where trees are scattered in cultivated fields (Boffa, 2000, Dan Guimbo et *al.,* 2010). In lower Casamance, *Faidherbia albida (Del.) Chev.* has always been associated with upland rice. This species is characterized by its inverted phenological rhythm: it loses its leaves during the rainy season and remains leafy during the dry season, reducing light competition with the crop. Furthermore, this tree is able to fix nitrogen, improving soil fertility, and its taproot system reduces water competition with the crops. The general objective of this study is to contribute to the understanding of the influence of *Faidherbia albida* park on the productivity of rainfed rice, testing the hypothesis "*Faidherbia albida* has a positive impact on the productivity of rainfed rice."

Material and methods: Rice yields were measured in eight 0.25 x 0.25m squares around 5 trees: four in the area under the influence of the tree (below the tree crown, at a distance R/2 from the tree trunk with R the radius of the crown) and four outside (at a distance of 2R), on the East, South, West and North side of the tree. We measured the total biomass weight, straw and grain weight, number of tillers with panicles and plant height (from crown to the base of the panicle, measured on 5 randomly chosen tillers). Analysis of variance (1-way ANOVA: effect of sample location inside vs outside of the tree influence) on these variables was performed with the statistical software STATISTICA 7.

Photo 1: *Faidherbia albida* in rice fields during the rainy season
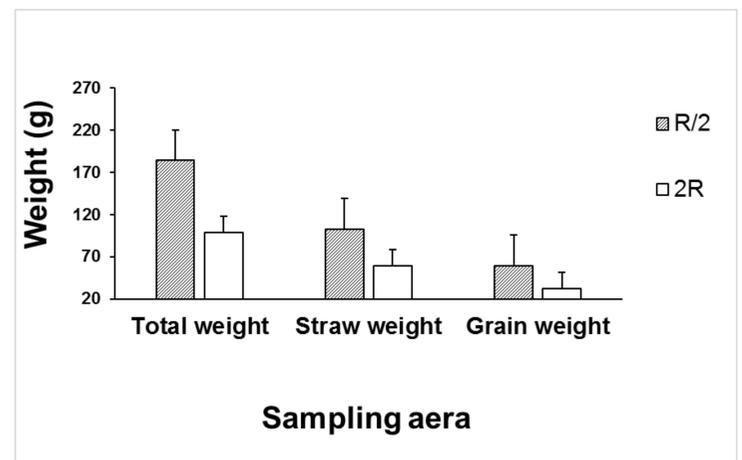

Figure 1: Variation of rice total weight, the straw weight and the grain weight at two positions (R/2 = under the crown of the tree, 2R= at twice the radius of the crown).

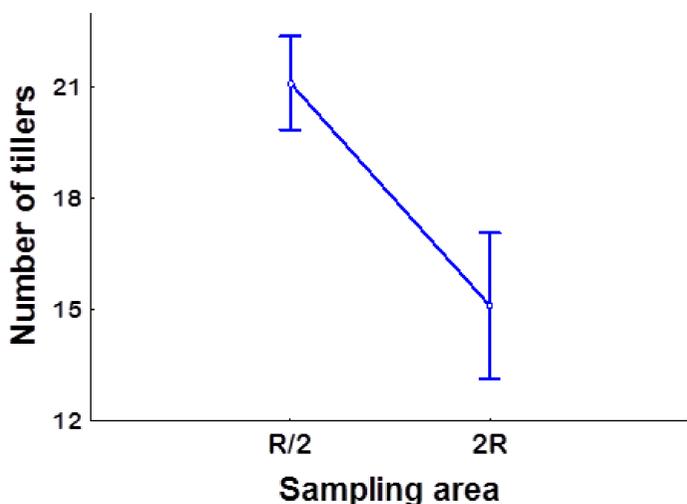**Photo 2:** *Faidherbia albida* in mature rice fields

Figure 3: Influence of *Faidherbia albida* on rice tillering. (R/2 = under the crown of the tree, 2R= at a distance equal to twice the radius of the crown). Vertical bars denote 0.95 confidence intervals.
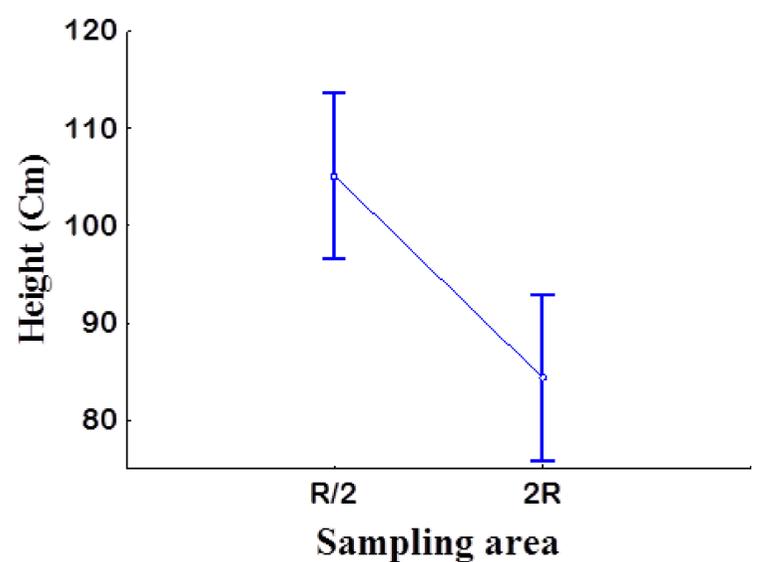

Figure 2: Variation of the height of the stems as a function of the sampling location (R/2 = under the crown of the tree, 2R= at a distance equal to twice the radius of the crown). Vertical bars denote 0,95 confidence intervals.

Conclusion: This study shows that the presence of *Faidherbia albida* in rice fields is of great importance because it creates a favorable environment for the production of upland rice. Under the trees, rice grows better than outside. All measured variables (total biomass, straw and grain weight, stem height and tillering) are more important in the area under the influence of the tree, thanks to the intrinsic characteristics of the species, i.e. reverse phenology, pivoting root system and nitrogen-fixing ability. This is the reason why *Faidherbia albida* parklands have been maintained in these secular systems.

Références: Boffa, J.M. 2000. -Les parcs agroforestiers en Afrique subsaharienne. *Cahier FAO 34. Rome: FAO. 258 p.*
Dan Guimbo I., Mahamane A. et. Ambouta K. J. M. 2010. -Peuplement des parcs à *Neocarya macrophylla* (Sabine) Prance et à *Vitellaria paradoxa* (Gaertn. C.F.) dans le Sud-ouest nigérien : diversité, structure et régénération *Int. J. Biol. Chem. Sci.* 4(5): 1706-1720