Productivity of cotton and sorghum in an agroforestry system of shea trees (Vitellaria paradoxa Gaertn) in northern Benin

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Résumé

This study evaluates the productivity of cotton and sorghum in a shea-based agroforestry system in northern Benin. Tomboutou and Gounarou villages were respectively selected in the shea parklands of Bembèrèkè and Kandi. Within each parkland and village, three classes of tree crown diameter for Shea trees (4-8 m, 8-10 m and $<$ 10 m), were defined after the inventory phase. In each class of crown diameter, three trees intercropped with cotton and sorghum were randomly selected among the 18 to 21 farms in each of the two village territories. The crops were planted in accordance with the technical procedures recommended by the national agricultural extension service. The following data was collected for sorghum and cotton on $1m^2$ area under the crown and outside the crown, in the four cardinal directions of each sample tree: crop height, fresh biomass per crop and buds per cotton plant. Data analysis revealed a very significant difference in the variables (height of sorghum and cotton, biomass of cotton and sorghum, number cotton buds) between the areas under the crown and those outside the crown ($P < 0.01$). The productivity variables for sorghum, i.e., average plant height and average biomass, dropped by 9.75% and 29.31%, respectively, when planted under the crown. Cotton under the crown was 6.58% shorter compared to plants outside the crown. Average bud production and average fresh biomass for cotton plants was 13.06% and 36.06% less, respectively, when planted under the crown of shea trees.

Mots-Clés: Ecophysiology, productivity, agrosystem, cotton, sorghum, shea tree, shade, tree management, Benin

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