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Improving the productivity of the sorghum-cowpea intercropping systems through varietal diversity in Sudano-Sahelian zone of Burkina Faso

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Abstract

Cereal-legume intercropping systems are one of the most commonly practised cropping systems in Sub-Saharan Africa. Despite their multiple agroecological, crop yields remain low in the Sudano-sahelian zone of Burkina Faso. Our study aims to improve the productivity of this intercropping system through the use of varietal diversity. Specifically, it aims to (i) characterise the type of sorghum-cowpea intercropping most commonly practised by farmers, (ii) identify the most productive sorghum and cowpea varieties, and (iii) identify the agro-morphological traits of varieties that influence productivity in this system. Surveys of 170 farmers and monitoring of 80 farmers' plots were carried out in the Centre-Nord region of Burkina Faso. Sorghum (13) and cowpea (11) varieties, selected in a participatory manner, were evaluated in intercropping systems during the 2018 and 2019 seasons, at Saria research station. The results showed that intercropping in the same seed hole is the most practised cropping system with 98 % of respondents. It is mainly practised with local varieties (92 % for sorghum and 67 % for cowpea). Yields measured on farmer' fields were highly variable (CV 40 %) and low (average 500 kg.ha⁻¹) for both crops. Intercrops were relatively more productive than the corresponding sole crops for all varieties with land equivalent ratios (LER) ranged between 1.00 and 1.79. Optimal productivity combinations were obtained with the sorghum varieties CSM 63E, Pisinou and PSE08 G1/21-1G1, and the cowpea varieties Kvx396-4-5-2D, Yiisyande, Niizwe and Tiligré. Sorghum cycle duration ($r=-0.49$), plant height ($r=+0.60$), and chlorophyll content in sorghum leaves ($r=+0.66$) were traits that most influenced grain yields of sorghum when intercropped. Cowpea cycle duration ($r=-0.25$), branching length ($r=+0.30$), and competitiveness ratio ($r=-0.31$) were the most influential cowpea traits on sorghum grain yield. The varieties identified could be proposed to farmers for improved productivity.

Keywords: Agro-morphological traits, grain yield, intercropping, land productivity