EFFECT OF GROWING EXTRA-SHORT DURATION PIGEONPEAS ON THE PERFORMANCE OF POSTRAINY SEASON SORGHUMS

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In Vertisol regions of India receiving rainfall $\geq$ 700 mm yr^{-1}, sorghum can be grown during the postrainy season with residual soil moisture following an extra short duration (ESD) rainy season legume. High-yielding sorghums resistant to terminal drought stress, and suitable ESD legume cultivars are required for developing such a double-cropping system. The suitability of postrainy season sorghum hybrids SPH280 [A296 x A16054] and ICSH86646 [ICSA70 x ICSR161] for double-cropping following ESD pigeonpeas was investigated. A 1.2-ha uniform Vertisol field was divided into four large strips: 1) fallow during rainy season, 2) maize, 3) ESD pigeonpea cultivars ICPL85014 and ICPL84023, 4) 5 sorghum genotypes sown immediately after harvest of the rainy season crops on all 5 strips.

Late start of the monsoon season followed by heavy rains resulted in low pigeonpea stands, poor insect control, and grain yields (mean = 0.67 t ha^{-1}); maize yields, 3.20 t ha^{-1}; postrainy sorghum yield was highest in the rainy season fallow treatment (mean, all genotypes = 2.85 t ha^{-1}). Maize grown in the rainy season reduced postrainy sorghum yield by 25%. Growing ICPL 85014 pigeonpea during the preceding rainy season did not significantly reduce the mean grain yield of postrainy sorghums. The test sorghum entries, especially the 2 hybrids, yielded significantly more grain than the control cultivar M35-1 in each strip. The mean yield of SPH280 was 3.27 t ha^{-1}, which was 62% higher than the check cultivar M35-1; ICSH86646 ranked second (mean = 3.03 t ha^{-1}; 51% higher). Stover yield of SPH280 was 64% higher than that of M35-1.

Sorghums grown in rainy season fallow plots flowered about 5 days earlier than those following maize. The soil NO_3N^- in the top 0.9 m layer was lower under maize (4.6 µg/g) compared to either fallow (6.1 µg/g) or pigeonpea plots (6.5 ± 0.34 µg/g). Stalk rot incidence was highest in sorghums following the rainy season fallow. M35-1 and SPH280 showed negligible percentage of stalk rot (< 3.0%), while the incidence in SPV783 and SPV86 was high (30 and 100%, respectively). Sorghums grown in plots following pigeonpeas had low stalk rot incidence compared to those following fallow. However, the incidence was very low in all genotypes following rainy season maize. The initial low soil N, and subsequent low sorghum grain yields may be responsible for low incidence of rots in this strip (Jordan et al. 1984).

ESD pigeonpea cultivar ICPL84023 grown during the rainy season in combination with SPH280 during postrainy season produced higher gross monitory returns (Rs 22,120 ha^{-1}) than the maize-based cropping systems. If the value of pigeonpea stalks is included, these estimates will increase by Rs 3221 for ICPL85014, and Rs 1796 for ICPL84023 [@ Rs 1000 t^{-1}; rates at Hisar and Gwalior; O.P. Rupela, ICRISAT Center: personal communication]. With proper management, (especially pest control), grain yields of pigeonpeas can be easily doubled. Recently, several ESD progenies have yielded $\geq$ 2.0 t ha^{-1}, which can substantially boost the economic returns from double-cropping. Suitable combinations of ESD pigeonpea and postrainy sorghum genotypes should be tested further in representative postrainy test locations with appropriate management practices.

REFERENCES

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