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Evaluation of Dry Matter Yield of Panicum maximum Intercropped with Pigeonpea and Sesbania Sesban

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Abstract : Seasonal shortages of fodder during the dry season is a major constraint to smallholder livestock farmers in South Africa. To mitigate the shortage of fodder, legume trees can be intercropped with pastures which can diversify the sources of feed and increase the amount of protein for grazing animals. The objective was to evaluate dry matter yield of Panicum maximum and land productivity under different fodder production systems during 2016/17-2017/18 seasons at Empangeni (28.6391° S and 31.9400° E). A randomized complete block design, replicated three times was used, the treatments were sole Panicum maximum, Panicum maximum + Sesbania sesban, Panicum maximum + pigeonpea, sole Sesbania sesban, Sole pigeonpea. Three months S.sesbania seedlings were transplanted whilst pigeonpea was direct seeded at spacing of 1m x 1m. P. maximum seeds were drilled at a respective rate of 7.5 kg/ha having an inter-row spacing of 0.25 m apart. In between rows of trees P. maximum seeds were drilled. The dry matter yield harvesting times were separated by six months' timeframe. A 0.25 m^2 quadrant randomly placed on 3 points on the plot was used as sampling area during harvesting P. maximum. There was significant difference $P < 0.05$ across 3 harvests and total dry matter. P. maximum had higher dry matter yield as compared to both intercrops at first harvest and total. The second and third harvest had no significant difference with pigeonpea intercrop. The results was in this order for all 3 harvest: P. maximum (541.2c, 1209.3b and 1557b) kg ha^1 ≥ P. maximum + pigeonpea (157.2b, 926.7b and 1129b) kg ha^1 > P. maximum + S. sesban (36.3a, 282a and 555a) kg ha^1. Total accumulation of dry matter yield of P. maximum (3307c kg ha^1) > P. maximum + pigeonpea (2212 kg ha^1) ≥ P. maximum + S. sesban (874 kg ha^1). There was a significant difference ($P< 0.05$) on seed yield for trees. Pigeonpea (1240.3 kg ha^1) ≥ Pigeonpea + P. maximum (862.7 kg ha^1) > S.sesbania (391.9 kg ha^1) ≥ S.sesbania + P. maximum. The Land Equivalent Ratio (LER) was in the following order P. maximum + pigeonpea (1.37) > P. maximum + S. sesban (0.84) > Pigeonpea (0.59) ≥ S. Sesbania (0.57) > P. maximum (0.26). Results indicates that it is beneficial to have P. maximum intercropped with pigeonpea because of higher land productivity. Planting grass with pigeonpea was more beneficial than S. sesban with grass or sole cropping in terms of saving the shortage of arable land. P. maximum + pigeonpea saves a substantial (37%) land which can be subsequently be used for other crop production. Pigeonpea is recommended as an intercrop with P. maximum due to its higher LER and combined production of livestock feed, human food, and firewood. Panicum grass is low in crude protein though high in carbohydrates, there is a need for intercropping it with legume trees. A farmer who buys concentrates can reduce costs by combining P. maximum with pigeonpea this will provide a balanced diet at low cost.

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