EFFECT OF SOME CULTURAL PRACTICES ON PRODUCTION OF COWPEA-SUDANGRASS MIXTURE IN CALCAREOUS SOIL

By

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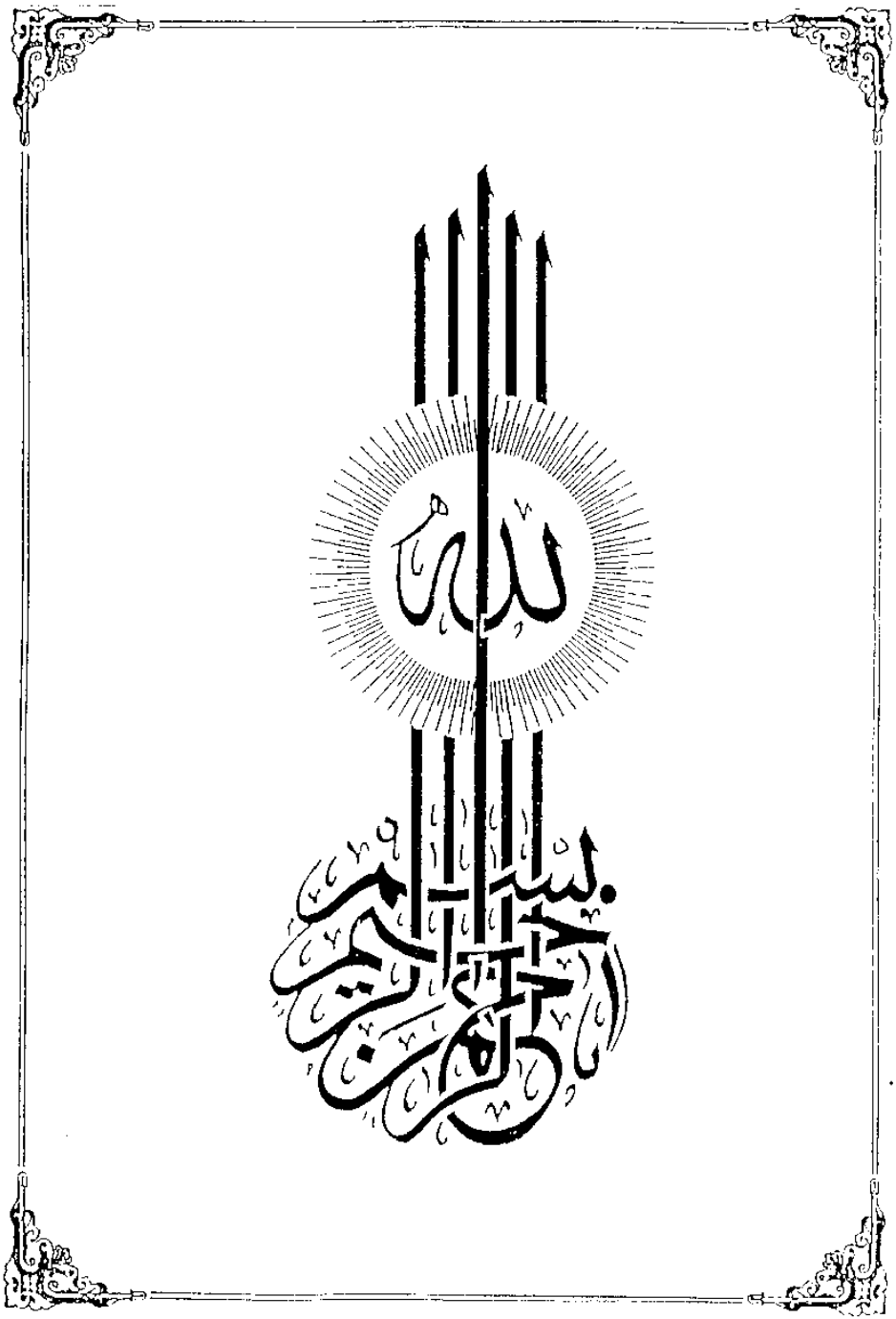

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ABSTRACT

Two field experiments were carried out in Agricultural Research Station at Maryout. D.R.C., during 1988 and 1989 growing seasons, to study the effect of organic manure, nitrogen fertilization and different intercropping patterns of cowpea and sudangrass plants on fresh and dry forage yields, some growth characters, competitive relationships and the chemical composition.

The results can be summarized as follows:

1. Organic manure application at a rate of 20 m³/fed. increased significantly fresh and dry forage yield of cowpea and sudangrass and their mixture, SLW at the first cut, leaf/stem ratio at the first and second cuts, solar energy conversion at 2nd cut, crude protein percentage at 1st cut, total carbohydrate % at the 1st and 2nd cuts, crude fiber % at 2nd and 3rd cuts, crude protein, total carbohydrate and ash yields of cowpea. Sudangrass plant height at 1st cut, stem diameter at 3rd cut, leaf area/plant at 2nd cut, leaf/stem ratio at 1st cut, solar energy conversion at all cuts, crude protein % at all cuts, total carbohydate % at 1st and 2rd and crude fiber % at 3rd cut, crude protein, total carbohydrate, crude fiber and ash yields/fed. increased significantly due to organic manuring.

2. Increasing nitrogen fertilization levels increased significantly fresh, dry forage yield of cowpea and sudangrass and their mixture. Cowpea plant height at 1st and 3rd cuts, leaf area/plant in all cuts, solar energy conversion % at 1st and 3rd cuts, crude protein % in all cuts, crude fiber % in 2nd and 3rd cuts, protein,

carbohydrate, crude fiber and ash yields increased significantly by nitrogen fertilization level up to 135 kg/fed. As for sudangrass plant height, stem diameter, leaf area/plant, solar energy conversion %, crude protein percentage at the three cuts as well as crude protein, total carbohydrate, crude fiber and ash/fed.

3. Intercropping patterns generally, caused a significant increase in dry forage yield of cowpea, fresh and dry forage yield of sudangrass, the fresh and dry yield of the mixture. Cowpea plant height at 2nd and 3rd cuts, stem diameter at 3rd cut, leaf area/plant at 2nd and 3rd cuts, SLW at 1st and 2nd cuts, leaf/stem ratio at 3rd cut, solar energy conversion % at 1st and 3rd cuts, crude protein % at 2nd and 3rd cuts, total carbohydrate % at the three cuts, crude fiber % at the three cuts, ash % at 1st cut, crude fiber were increased significantly when cowpea intercropping with sudangrass under different patterns. With regard to sudangrass characters as affected by intercropping patterns. It is noteworthy to mention that fresh and dry forage yield and the fresh and dry yield of the mixture, plant height at the 2nd cut, stem diameter in 2nd and 3rd cuts, leaf area/plant in 2nd and 3rd cuts, SLW at 1st and 3rd cuts, leaf/stem ratio at 2nd and 3rd cuts, solar energy conversion at 2nd and 3rd cuts, crude protein % in the three cuts, total carbohydrate % at 2nd cut, crude fiber % at all cuts, ash % at all cuts, crude protein, total carbohydrate, crude fiber and ash/fed. were increased by intercropping patterns. The best patterns were 2:1 for obtaining the best results for cowpea while 1:2 and 1:3 were suitable for gain the highest result for sudangrass, but for the fresh dry mixture yield, 1:3 pattern surpassed the other intercropping patterns and pure stand of both cowpea and sudangrass.

The data of competitive relationships showed that cowpea and sudangrass alternated dominated and dominat positions in the different patterns. Sudangrass had the highest values of relative crowding coefficient and land equivalent ratio, generally, organic manure and nitrogen fertilization increased land usage by 43% with 1:3 pattern and 12.95% with 2:1 pattern with adding 20 m^3 OM/fed. and 67.5 kg N/fed., respectively.

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INTRODUCTION

INTRODUCTION

To increase the production of forage crops in the summer season to face the animal feed needs no more evidence. However, such increase is more pronounced in the newly reclaimed areas, such as that at Maryout, where the soil is calcareous. Sudangrass thrives well in such conditions where it tolerates the unfavourable physical and chemical soil properties, water stress and dry conditions. One of the most promising agronomic practices to increase the production per unit area of land is to cultivate forage crops in mixtures, also to obtain a balanced nutritive forage to feed animals. Cowpea is considered one of the most promising crops that may be intercropped with sudangrass for better quality and quantity of forage yield.

During decomposition of organic manures, humic acid is formed. It acts as a source of macro and micro-nutrients and also as a soil conditioner, so the productivity of calcareous soil may be improved.

However, this work was conducted to study the effect of organic manure, nitrogen fertilization and different patterns of intercropping cowpea and sudangrass plants under calcareous soil conditions aiming to obtain a high yield of forage quality of the mixture to cover the needs for the summer

fodder plants. Due consideration was given to elucidate the competitive relationship between the intercropped sudangrass and cowpea and the botanical composition of the sward at different cuttings. Also, the efficiency of the mixtures in solar energy conversion to dry matter was considered.