FIELD RESPONSE OF BAMBARA GROUNDNUT (Voandzeia subterranea (L.) Thouars) TO INOCULATION WITH RHIZOBIUM STRAINS IN SENEGAL

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SUMMARY

Field response of bambara groundnut (Voandzeia subterranea (L.)Thouars) to inoculation with Rhizobium strains was assessed. In spite the presence of indigenous infective Rhizobium strains in soil, inoculation with strains BAM 618 and MAO 11 was found to increase shoot and nodule dry weights.

INTRODUCTION

Bambara groundnut (Voandzeia subterranea (L.) Thouars) is an underexploited legume. Bambara groundnut is cultivated in small traditional farms in parts or as an intercrops of cereals.

Taking into account the fact that legume inoculation might serve as an economical means of increasing yields even in the case of small farms, research on the Rhizobium technology for legume is needed in West Africa. However, very few studies have been done on nodulation and nitrogen fixation by bambara groundnut (DENARIE et al.,1968; DOKU,1969; THOMPSON and DENIS,1977).

This paper reports preliminary observations on the response of field-grown bambara groundnut in Bambey (Senegal) to inoculation with Rhizobium strains or to nitrogen fertilization.

MATERIALS AND METHODS

The experiment was carried out in 1985 at Bambey cxperimental station (rainfall: 376.9 mm). Soil characteristics are shown in Table 1. The indigenous rhizobial population in the field selected for this work is 10 cowpea rhizobia/g of soil as determined by plant infection test using *Macroptilium atropurpureum*. The cultivar V2 obtained from Togo was used. Applied treatments were: uninoculated, no N (urea); uninoculated + 50 kg N (urea)/ha; inoculated with 10 g of six different peat-base *Rhizobium* inocula. Four of the inocula were supplied by the University of Maryland Eastern St~ore: Mungo, BAM 618, PAL 1380 and AH 169; two of them were supplied by the West Afr ica MIRCEN: MAO 11 and MAO 26. Randomized block design with four replicates was used. The size of each plot was 3 and 2.1 m and the plants were spaced by 15 and 30 cm. Application of fertilizers was 60 kg P205/ha and 120 kg KCl/ha. Sixty days after planting, plants were sampled for nodulation, dry weioght and nitrogen content determination.

RESULTS AND DISCUSSION

Response of bambara groundnut to inoculation with selected *Rhizobium* strainsis shown in Table 2. In most tropical soils, very effective and/or competitive strains may be the major constituents of the native rhizobial population. In Dior soil used for our trial, the native rhizobial population is lacking and the introduction of other strains had resulted in increase of nitrogen fixation. However, *Rhizobium* strains used as inocula varied markedly in ability to promote plant growth, in shoot nitrogen content and in nodule development. Appreciable responses to inoculation were obtained in shoot dry weight with strain BAM 618

(increase of 144%), in nodule dry weight with strains Mungo, BAM 618 and MAO 26 (increase of 95%, 100%, 73% respectively) and in nitrogen content with strains BAM 618, TAL 1380, MAO 11 and MAO 26 increase of 27%, 39%, 24% and 17% respectively). Increase in total shoot nitrogen was obtained with strains BAM 618 (+ 209%) and MAO 11 (+135%).

Fromù these results, it is apparent that bambara groundnut cv. V2 requiores an inoculation with suitable Rhizobium strain for adequate nodulation and nitrogen fixation in Dior soil used.

In conclusion, bambara groundnut may be nodulated with indigenous Rhizobium strains contained in Senegal soils. But in some cases, inoculayion with effective Rhizobium strain may contribute to a better nodulation. Additional experiments wilf have to be carried out for an assessment of the need for inoculation in many areas.

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Table 1. Characteristics of at Bambey experimental station

Total C	2970.00	ppm
Total N	290.00	ppm
Available P	122.00	ppm
Clay	4.00	%
Loam	2.00	%
Sand	94.00	%
pH	7.8	

Table 2. Shoot and nodule dry weights, shoot nitrogen content and total shoot nitrogen of Voandzeia subterranea (cv. V2 cultivated at Bambey in field and inoculated with Rhizobium strains Mungo, Bam 618, TAL 1380, AH 169, MAO 1[illegible] an

Treatments	Shoot dry weight (g/10 plants)	Nodule dry weight (mg/10 plants)	Shoot nitrogen content (N %)	Total shoot nitrogen (g/10 plants)
[illegible]ir [illegible]ulated	10.75 d	55.00 bc	1.81 g	1.95 e
[illegible]inoculated + [illegible] N (urea)/ha	13.25 cd	40.00 c	1.88 f	2.50 de
[illegible]	15.50 bcd	107.50 a	1.92 e	[illegible] cde
[illegible]	26.25 a	110.00 a	2.30 b	[illegible] a
[illegible]	15.75 bcd	30.00 c	2.51 a	[illegible] b
[illegible]	20.00 b	77.50 ab	1.87 f	[illegible]
[illegible]	20.50 ab	30.00 [illegible]	2.24 c	[illegible]
[illegible]	18.50 bc	95.00 a	2.12 d	[illegible] b

-Values are averages of 10 plants.

-Values followed by the same letter in each column do not differ significantly at the 0.05 level by DUNCAN's multiple [illegible]