Journal of Applied Biosciences 163: 16846 – 168461
ISSN 1997-5902

Potential of endogenous arbuscular mycorrhizae fungi to improve soybean (*Glycine max* L.) production in northern regions of Cameroon

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Submitted on 3rd May 2021. Published online at www.m.elewa.org/journals/ on 31st July 2021
https://doi.org/10.35759/JABs.163.4

ABSTRACT

Background and objective: Soybean production can be increased through mycorrhizal biofertilizers application. Endogenous mycorrhiza species play a key role in this process. But in northern regions of Cameroon, most of the studies carried out in this domain have focused on exotic commercialized strains. This work aims to evaluate the performance of endogenous mycorrhiza on the promotion of growth and yield of soybean in northern regions of Cameroon.

*Methodology and Results***:** Mycorrhizal spores were trapped and isolated from soil samples collected in 9 localities per northern region. The extracted spores was massively multiply in pot to be use as biofertilizer and four treatments were formulated : T1: consortium of spores isolated from the soybean rhizosphere cultivated on soil samples from the Far North region, T2: consortium of spores isolated from the soybean rhizosphere cultivated on soil samples from the North region, T3: consortium of isolated spores from the soybean rhizosphere cultivated on the soils of Adamawa, T4: Mixture consortium of isolated spores from the soybean rhizosphere cultivated on the soils of this three regions. Tests in field conditions have been implemented in three different localities: Dang in Adamawa region, Touboro in the North region and Bitcharé in the Far North. The access parameters were: size, biomass, pods number, pod weight, seed number, seed weight, and yield per hectare. The results analysis after 90 days of growth revealed that all treatments boosted soybean growth and yield under field conditions. For all the tests carried out in the three localities, the best improvements in growth and yield were obtained with the T1 treatment: Size (+47.32 cm), biomass (+ 241.05g), pods number (+285.71), pods weight (+154.2g), seeds number (+500), seeds weight (+ 314.28g) and yield per hectare (+ 870kg). The results obtained with the T2 and T4 treatments were weaker (size: +5.5 cm, biomass: + 1.5g, pods number: +5, pods weight: + 2.5g, seeds number: +50, seed weight: + 10.6g, yield per hectare: + 38kg). The localities (environmental factors) significantly influenced the effect of treatments on the growth and yield parameters of the legume under investigation. However, the four treatments showed a similar

global adaptability in the study area. T1 and T3 showed the best performances for a sustainable production of soybeans in the northern regions of Cameroon. Our results indicate that the endogenous arbuscular mycorrhiza from soybean rhizosphere, especially the mixture of native spores of the three northern regions (T4) or those isolated on Adamawa region (T1) soils can effectively boost growth and yield of soybean plant. Thus, this technology can be popularized in Cameroon to market bio-fertilizers, less expensive, efficient and ecological.

Key words: Soybean, arbuscular mycorrhizae, endogenous, northern, growth, biomass, pod, seeds, yield.