

**GENETIC DIVERSITY AND NITROGEN FIXING POTENTIAL OF LEGUME
NODULATING BACTERIA FROM DIFFERENT LAND USE SYSTEMS IN
TAITA DISTRICT, KENYA**

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ABSTRACT

Soil fertility is a serious problem especially in tropical and subtropical regions of the developing countries. Available soil nitrogen is one of the most limiting factors to crop production. Lack of nitrogen in soils can be addressed by exploitation of legume-*Rhizobia* symbiosis in agricultural systems. Exploitation of *Rhizobia* requires knowledge of leguminosae nodulating bacteria (LNB) available from different agro-ecological zones and their symbiotic potential. The populations of Leguminosae nodulating bacteria (LNB) were assessed under glasshouse conditions in soils collected from Maize based mixed farming, Fallow land, indigenous forest, agro-forestry and planted forest in Taita district, Kenya. LNB were isolated from root nodules of nodulated siratro inoculated with dilution series of the soils. About 2008 pure isolates obtained from root nodules of siratro from a previous study on most probable number (MPN). The isolates were characterized on yeast extract mannitol mineral salts agar (YEMA) media containing bromothymol blue. The isolates fell into two major growth rate types: fast growers (acid-producing) and slow growers (alkali-producing). Slow- and fast-growing types constituted 21.41 % and 78.59 % of isolates, respectively. Percent symbiotic efficiency of the isolate was also calculated. (shoot dry weight of inoculated plants over shoot dry weight of a nitrogen supplemented plants control). SE of the isolates varied and ranged from 6.7% to 95.4%. RFLP of amplified 16S rRNA genes of isolates with HaeIII and TaqI was used to group the isolates into seven ribotypes, partial sequencing of 16S rRNA genes of representative isolates of the ribotypes further grouped the isolates into six genera namely:-*Sinorhizobium*, *Bradyrhizobium*, *Herbaspirillum*, *Agrobacterium*, *Rhizobium* and *Burkholderia*. Land use type was found to significantly influence the diversity of LNB ($P < 0.05$). The highest LNB total richness of 5 was found in indigenous forest soils. Isolate 6 and MAS from agro-forestry and indigenous forest respectively had the highest symbiotic efficiency.