

ABSTRACT**Effect of moisture, carbon and nitrogen on the
microbial mediated nitrogen cycle in some Trinidad soils****Yudhishtir Seemungal**

Investigative work was done to determine the effect of carbon, nitrogen and moisture on nitrogen fixation, nitrification and denitrification in various soils in Trinidad.

It was found that non-symbiotic fixation for both Piarco (fine sand) and Bejucal (heavy clay) soils was more efficient under water saturated, anaerobic conditions and the application of 1% - 3% glucose and 0.5% N.

Symbiotic nitrogen fixation in root nodules of *Macropitium atropurpureum* was highest in Piarco and Bejucal soils under 75% WHC moisture. The Piarco soil showed activity only when treated with carbon and nitrogen in the ratio of 10:1.

The denitrification rates in both Piarco and Bejucal soils were highest at saturation (100% WHC) and carbon level of 100 mg gm⁻¹ soil. The nitrogen rates of 5 mg gm⁻¹ soil in Piarco and 10 mg gm⁻¹ soil in Bejucal resulted in the highest denitrifier populations.

Nitrification studies indicated that 50% WHC moisture in Piarco and Montserrat was the best whereas 100% WHC moisture was the best in

the Bejucal and Princes Town soils. The best carbon levels were determined to be of the order of 187 mg gm^{-1} of soil for the *Nitrobacter* population in Piarco and 125 mg gm^{-1} of soil in Bejucal and 250 mg gm^{-1} of soil for both Princes Town and Montserrat. The carbon levels that were determined to be optimum for *Nitrosomonas* in the Piarco soil, Princes Town and Montserrat soil were 250 mg gm^{-1} of soil.

The *Nitrobacter* organisms were found to be the greatest at nitrogen levels of 4.7 mg gm^{-1} soil in Piarco and 12.5 mg gm^{-1} soil in the Bejucal, Princes Town and Montserrat. The optimum nitrogen levels were 12.5 mg gm^{-1} and 8.3 mg gm^{-1} soil in Princes Town and Montserrat respectively for the *Nitrosomonas* organisms.

It is imperative that greater care needs to be taken in terms of soil management to increase the efficiency of nitrogen fertilizers.

Mulching with organic matter, maintaining adequate moisture levels and mineral nitrogen in various soil types such as sand or clay ultimately serves to increase the efficiency of nitrogen fertilizers.