

# A Preliminary Note on the Root Nodule Bacteria of *Indigofera teysmannida*

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The plant *Indigofera teysmannida* belonging to the family *Leguminosae* was introduced to Kerala in 1958 from Madras. It is supposed to have been brought to Madras a few years back from Ceylon. The seedlings are easily established and the plants grow luxuriantly in Kerala soils. Analysis of the plant collected from the Agricultural College Farm area showed an unusually high content of nitrogen and other plant nutrients as compared with other leguminous plants, as is evident from Table I.

TABLE I\*

Plant	N <sup>o</sup> %	P <sub>2</sub> O <sub>5</sub> %	K <sub>2</sub> O <sup>b</sup> %
<i>Indigofera teysmannida</i> .	4.7	0.8	2.1
<i>Glyricidia maculata</i> .	3.7	0.5	1.7
<i>Tephrosea purpurea</i> .	3.5	0.1	1.1
<i>Crotalaria juncea</i> .	2.3	0.5	1.5
<i>Crotalaria striata</i> .	3.1	0.7	1.2

\* on oven dry material

To ascertain whether this high nitrogen content is maintained under different climatic

and soil conditions too, samples of leaves were obtained from many parts of the State, namely *Tellicherry*, *Nileswar* and *Pattambi*, and analysed. The analysts showed that the nitrogen content is invariably high in all samples.

The root system of the plant is very well developed and contains big clusters of comparatively large nodules. It was also observed that nodulation was high even in aged *Indigofera* plants, while other leguminous plants like *glyricidia* etc. of the same age had only a meagre number of nodules

The root nodule bacteria were isolated and reinoculated into pots of sterile soil where *Indigofera* seedlings raised from sterilised seeds were grown. The plants nodulated and gave the usual analysis for nitrogen and other plant nutrients.

The character of the isolate was studied. Bacteria when examined afresh from the nodules were small, rod-like in form, and briskly motile. Upon artificial culture media they commonly changed to bacterioid forms



**Indigofera** plant grown with and without the supply of nitrogen in the nutrient solution.

**Left:-** Plant supplied with nitrogen-free nutrient solution.

**Right:-** Plant supplied with complete nutrient solution.

and **motility** was **observed** only in very young cultures. They were aerobic, gram negative and **heterotrophic**, growing best with extracts of yeast, **malt** and plant materials. **Mannitol**, Sucrose, Glucose and Peptone were also used **up**; but growth was only slow and scanty. **Maximum** growth was observed at or towards neutral reaction, but they were capable of tolerating **fairly** acid reaction up to pH. 5.4.

On **Lochhead's** media for root nodule bacteria, they formed **perfectly** round, small, smooth, transparent colonies with a raised surface and turned opaque in a few **days**. Capsulated cells were seen in old cultures but no **endospores** were formed. Inoculation into litmus **milk** showed that it was slightly acid producing. No pigment formation was observed.

To find out how much **nitrogen** the plant can fix in sandy nitrogen **free** soils, seedlings

were grown in **pots** of acid washed sand with and without supply of nitrogen. **Nodulation** was observed in both cases. The plants were analysed after six months' **growth**. The results of analysis are given in table II.

TABLE II \*

Materials	N%
Indigofera plant grown with supply of nitrogen.	4.1
Indigofera plant grown without supply of nitrogen.	3.8

\* on oven dry material

It is evident that Indigofera plant possesses **actively** nitrogen fixing organisms and it is possible that these can be economically used for cross **inoculation**. Cross inoculation studies with Indigofera bacteria are in progress.