

EVALUATION OF THE NITROGEN FIXING ABILITIES OF THE LOCAL
RHIZOBIUM STRAINS IN COMPARISON TO KNOWN
PRODUCTIVE STRAINS IN GLYCINE MAX AND VIGNA UNGUICULATA

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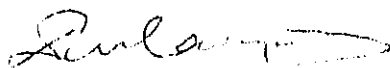
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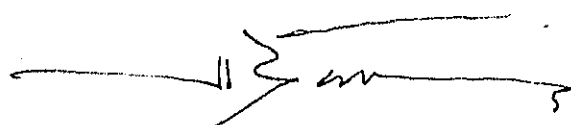
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Abstract

A survey of the nodulation patterns of the principal food grain legumes was conducted. Nodulation of those species nodulated by the cowpea group of rhizobia was effective and profuse in many locations, but nodulation of G. max (soybean) was found to be erratic in many locations where inoculation had not been practised.

One hundred and sixty-three nodule samples were collected from a range of legumes and from these 65 isolates were authenticated as rhizobia.

Strains of R. japonicum and Rhizobium cowpea type were screened on G. max and V. unguiculata respectively. For G. max, 23 locally isolated and 15 foreign strains of R. japonicum were tested; of these, 23 (15 foreign and eight local) produced a significant dry matter yield increase ($p=0.01$) when compared to the uninoculated control. The foreign strains proved to be more effective than the local strains in nitrogen fixation on G. max.

Out of the 50 cowpea type strains (42 local and eight foreign) that were tested on V. unguiculata 32 produced a significantly greater dry matter yield ($p=0.01$) than the uninoculated control; of these 30 were local and two were foreign. Sixteen out of the 18 isolates that did not produce a significant yield difference from the uninoculated control ($p=0.01$) were, however, not statistically different (DMRT, $p=0.05$) from the nitrogen control.

A cross-inoculation study was carried out by inoculating six R. japonicum strains on V. unguiculata and six cowpea type strains on G. max. V. unguiculata was nodulated by two of the strains inoculated and fixed nitrogen effectively with one strain. G. max was nodulated by one

out of the six cowpea strains inoculated, but did not form an effective symbiosis. The relative specificity of G. max in its rhizobia requirement and the promiscuity of V. unguiculata was demonstrated.

Both cowpea type and R. japonicum isolates were exposed to a series of low levels of antibiotics (< 50 mg/l) and their growth resistance patterns (fingerprints) were obtained. The 23 R. japonicum isolates produced 18 different fingerprints, suggesting that they were distinct strains, whereas the 42 cowpea type isolates produced 33 different fingerprints.