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Development of a culture collection of indigenous Rhizobia in Sri Lanka; Isolation and authentication of certain strains

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This study was conducted to isolate, characterize, authenticate and develop a culture collection of indigenous Rhizobia in Sri Lanka which serve as potential inoculants for legume crop improvement programmes. Root nodules were collected from host legume species growing in different locations in Sri Lanka. From 27 host legume species 122 potential rhizobial strains were isolated. Nodules were surface sterilized, crushed and rhizobia were isolated on half Lupin Agar medium. Authentication and screening with 25 selected isolates were conducted in a naturally lit glass house under semi aseptic conditions using *Macroptilium sp.* Three replicates were used for each isolate with Nitrogen positive and negative controls. Plants were harvested after eight weeks. Nodule counts and visual ratings for growth were given to the plants. Rhizobia were re-isolated from effective nodules using half Lupin Agar medium. Total dry weights of the plants were taken. Isolates were screened and the selected ones were stored for further studies using the ultra low temperature method.

Screening of 25 selected isolates, showed variation in their ability to nodulate the plants. AP1, AP2, C1, D1, D2, D3, O1 and S4 did not form any nodules and the Average Visual Rates and the average total dry weights of their hosts were also low. Among the strains that formed nodules, CN1, DS1, DS2,LL1, M1. P1, S1. S2, S3, VD2, VD3 AND VT1 produced a few nodules and gave significantly low plant dry weights comparable with the N-control. The P2 isolate had high infectivity but, low effectivity because it produced a high number of nodules but AVR as well as the total dry weights were low. The T1 isolate showed a low number of nodules but, the total dry weight was high. This has a low infectivity but, high effectivity. VD1, VW1 and VW2 isolates showed significantly higher number of nodules, higher AVR and higher dry weights. These isolates have high infectivity and effectivity and may be suitable as inocula for a wide range of legumes. Among the 25 isolates tested, eight failed to nodulate and can be discarded. Twelve were low in both infectivity and effectivity, one was highly infective but ineffective (P2) while another was low in infectivity but highly effective (T1) and three were highly infective as well as effective. The last 3 (VD1, VW1 and VW2) are therefore suitable to be examined as inoculants for edible grain legumes. The others can be retained in the germplasm collection because they could carry genes responsible for other desirable attributes such as resistance to adverse conditions, predators, pesticides etc.

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