



INTRODUCTION

Biological nitrogen fixation by the legume rhizobia symbiosis is a major source of available N for agriculture and may be enhanced by inoculation with rhizobial strains. Obtaining new strains with greater nitrogen fixing potential is fundamental to the inoculant industry and should be based on the evaluation of a large number of strains. This initial screening is time and labor consuming and its efficiency should be maximized.

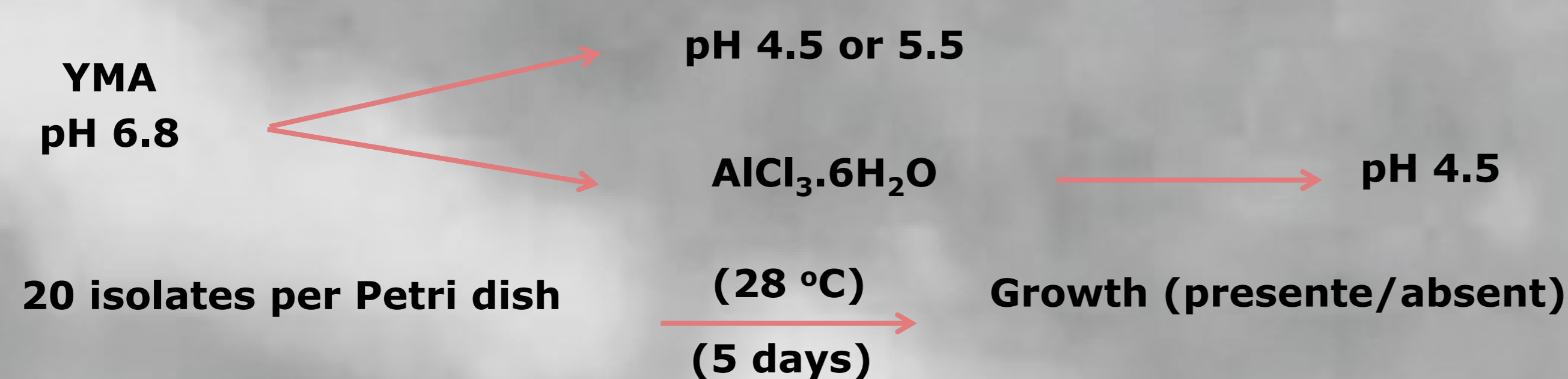
Frequently, only one representative of a given group of morphologically similar strains is used on the evaluation, to reduce the necessary labor.

We evaluated the existence of variability between rhizobial strains from phenotypically identical groups in respect to some physiological traits and nitrogen fixation

METHODOLOGY

Four morphologically identical rhizobial groups isolated from *Calopogonium mucunoides* nodules were studied, with 54, 38, 31 and 14 isolates.

In vitro acidity and aluminum tolerance



In vitro salinity tolerance



Biological nitrogen fixation potential

- 154 strains
- Recommended strain SEMIA 6152 (=BR1602), *Bradyrhizobium japonicum* GenBank access AY904756
- Uninoculated, non-N fertilized
- Uninoculated, 60 kg N.ha⁻¹ equivalente
- Autoclaved sand:vermiculite mixture, Hoagland -N solution *ad limitum*
- Harvest at 45 days
- Shoot, root and nodule dry masses, shoot N content, total shoot N, relative efficiency

RESULTS

- Significant variability for shoot nitrogen content was found between the 154 strains, but only group 4 had significant intragroup differences for root dry mass, nitrogen content, and relative efficiency.
- Intragroup variability was not related to group size, since the smallest group showed the greatest variability.
- It may be acceptable to work with a single representative from each 100% similarity level morphological groups.

Table 1 - Number of resistant (R) and susceptible (S) strains from each morphologically identical groups to *in vitro* salinity, aluminum and salinity

Group	pH 4.5		pH 5.5		Al		15 g L ⁻¹		30 g L ⁻¹		45 g L ⁻¹	
	R	S	R	S	R	S	R	S	R	S	R	S
1	54	0	54	0	54	0	54	0	0	54	0	54
2	38	0	38	0	38	0	38	0	0	38	0	38
3	31	0	31	0	30	1	13	18	0	31	0	31
4	14	0	14	0	14	0	14	0	0	14	0	14

Table 2 - Probability of F test indicating higher than random variation between strains in general (inter-strains) or inside of each morphologically identical group (intra-group).

	Inter-Strains	Intra-group			
		1	2	3	4
Shoot dry mass	0.2213	0.4783	0.3674	0.3877	0.0996
Root dry mass	0.1556	0.4892	0.5587	0.1904	0.0199
Nodule number	0.7593	0.7744	0.6837	0.7448	0.5000
Nodule dry mass	0.5169	0.6285	0.4374	0.6332	0.5000
Nitrogen contente	0.0261	0.2706	0.0840	0.1556	0.0390
Relative efficiency to N control	0.2481	0.4645	0.3551	0.4461	0.0974
Relative efficiency to recommended strains	0.3523	0.7092	0.3659	0.3864	0.0982
Total shoot nitrogen	0.0587	0.2392	0.1728	0.3000	0.0028

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