# Drought tolerance ranking of soybean genotypes obtained with an automatic phenotyping platform corresponds with those obtained in greenhouse and field experiments

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## Introduction

In order to evaluate the drought tolerance of several genotypes, greenhouse experiment and field trials were carried out in multiple locations in North-West Argentina. Genotypes that yielded more under drought conditions in all environments were identified.

## Objectives

i) to evaluate a group of soybean genotypes under well watered (WW) and water stress (WS) conditions using GlyPh, a low-cost automatic phenotyping platform

ii) ii) to compare these results with the previously experiments.

## Materials y methods

A pot experiment was conducted in an environment-controlled greenhouse using an automatic platform. Seven commercial genotypes were studied, three of which were included in all experiments. We investigated the effects of moderate drought stress on biomass production and other growth parameters during the vegetative period. Drought susceptibility index (DSI) was calculated and compared with those from previous experiments.

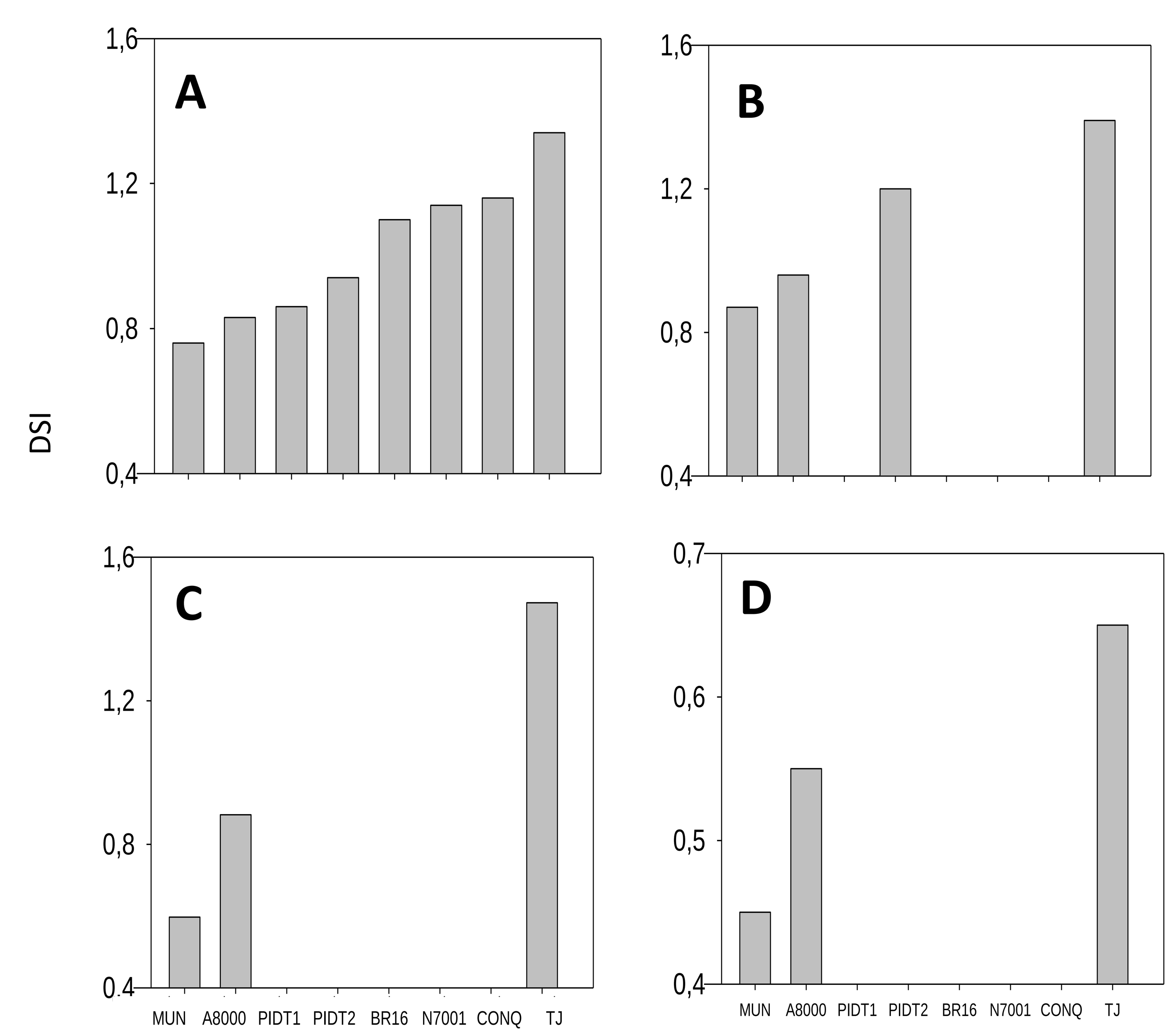
## Results

**Using GlyPh, we were able to detect differences in growth parameters and transpiration efficiency among genotypes under WW and WS conditions ($p<0.05$).**

Table 1. Total dry weight (TDW); shoot dry weight (SDW); leaf dry weight (LDW); transpiration efficiency (TE) of soybean genotypes under well watered and water stress conditions. Values are means for each genotype. When there are differences between genotypes and the interaction is not significant letters on the control values are indicated

| Genotypes | TDW (g) | SDW (g) | LDW (g) | LA (cm²) | TE (g. kg⁻¹) |
|---|---|---|---|---|---|
| well watered | | | | | |
| A8000 | 29.9 b | 7.70 ab | 6.52 b | 3377.01 bc | 4.29 d |
| BR16 | 27.76 ab | 5.95 bc | 6.38 b | 3474.73 bc | 4.06 bc |
| MUNASQA | 26.35 ab | 5.80 c | 7,05 b | 3404.1 c | 3.99 cd |
| N7001 | 26.50ab | 5.79 c | 8.39 b | 2740.66 ab | 3.95 ab |
| PI416937 | 28.64 ab | 5.19 c | 11.23 a | 2956.69 abc | 3.97 abc |
| TJ2049 | 23.92 a | 6.36 abc | 7.87 b | 2463.23 a | 3.75 a |
| XI73535 | 29.29 ab | 7.89 a | 8.15 ab | 3271.45 b | 3.85 ab |
| Water stress | | | | | |
| A8000 | 19.29 | 5.63 | 5.73 d | 1849.56 | 4.63 |
| BR16 | 18.51 | 4.44 | 5.41cd | 1879.01 | 4.34 |
| MUNASQA | 18.69 | 4.38 | 6.32 bcd | 2060.1 | 4.69 |
| N7001 | 17.57 | 4.42 | 6.61 b | 1475.88 | 4.14 |
| PI416937 | 18.57 | 4.92 | 8.04 a | 1690.11 | 4.29 |
| TJ2049 | 13.71 | 4.08 | 5.93 bcd | 1228.73 | 4.11 |
| XI73535 | 18.61 | 5.37 | 6.49bc | 1829.62 | 4.27 |

**The genotypic ranking of drought tolerance based on biomass accumulation during vegetative period agreed with the ranking based on yield in previous experiments.**




A) Greenhouse, potted plants,Yield per plant, B) Greenhouse, potted plants,Yield per plant, C)Field trials network, Yield per ha. D) Phenotyping platform (GlyPh), potted plants biomass per plant during vegetative period

## Conclusions

Similar rankings in biomass during vegetative period, yield per plant or per ha., growing plants in pots or in the field was obteined. A low-cost automatic phenotyping platform can be useful to detect drought tolerant genotypes, as well as to obtain phenotypic data to map genes associated with drought tolerance.