

Introducing water stress tolerance in a public breeding program: criteria and implementation

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Introduction

In maize, the anthesis-silking interval (ASI, in days) has demonstrated to be a useful secondary trait. It is highly correlated with improved grain yield in drought-prone environments, has high heritability and can be fast and accurately measured in the field. The objective of this work is to introduce this secondary trait in an ongoing public maize breeding program with focus on water stress.

Materials and methods

- ✦ Inbred lines of the INTA Pergamino Temperate Maize Breeding Program field grown at high planting density (14 pl.m⁻²) in a randomized complete block design with 2 replicates.
- ✦ 2019-20: 240 genotypes; 2020-21: a subset of 50 genotypes
- ✦ Inbreds were characterized for ASI and defensive traits: root and stalk lodging.

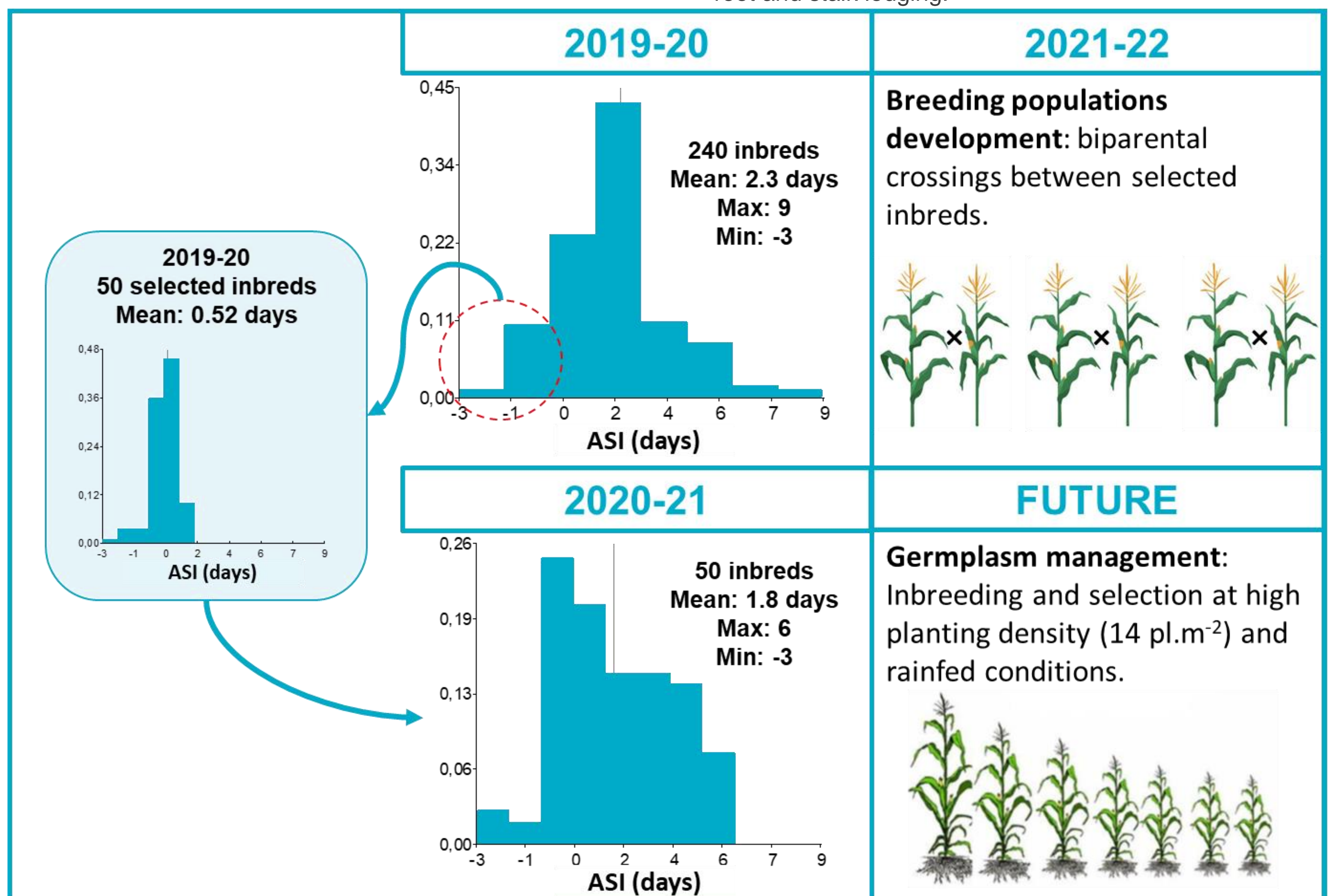


Figure 1: Flow chart of the working procedure and results.

Results

- ✦ Genotypic differences in ASI ($p < 0.05$):
 - ✦ 2019-20 → mean: 2.3 d, range: -3 to +9 days,
 - ✦ 2020-21 → mean: 1.8, range: -3 to +6 days.
- ✦ Biparental crosses to develop breeding populations.
- ✦ Inbreeding and selection will be carried out at high planting density (14 pl.m⁻²).

This selection method will allow the development of more stable, stress-tolerant germplasm. In the future, it is expected to be able to establish a recurrent selection breeding program.