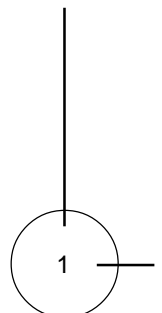


Breeding for Drought and Nitrogen Stress Tolerance in Maize

From Theory to Practice

M. Bänziger, G.O. Edmeades, D. Beck, and M. Bellon



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Printed in Mexico.

Correct citation: Bänziger, M., G.O. Edmeades, D. Beck, and M. Bellon. 2000. Breeding for Drought and Nitrogen Stress Tolerance in Maize: From Theory to Practice. Mexico, D.F.: CIMMYT.

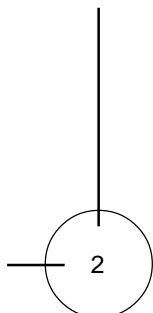
Abstract: Targeted initially for maize breeders in sub-Saharan Africa, the content is based on a successful approach developed at CIMMYT for improving the tolerance of maize to drought and low nitrogen stress. Intended as a supplement to a course for breeders and agronomists of at least BSc level, it deals with the effects of water and N deficits on the maize plant, the level of yield increases to be expected from selection, factors that affect the severity of drought and low N stress in maize, selecting suitable fields for drought and low N screening, managing uniform stress in drought or low N experiments, designing effective experiments and field layouts for stress trials, the choice and analysis of data, and the use of drought and low N screening in a normal breeding program.

ISBN: 970-648-46-3

AGROVOC descriptors: Maize; Zea mays; Selection; Injurious factors; Drought stress; Nutrient deficiencies; Nitrogen; Plant breeding; Drought resistance; Africa South of Sahara; Research projects

AGRIS category codes: F30 Plant Genetics and Breeding
H50 Miscellaneous Plant Disorders

Dewey decimal classification: 633.1553



Preface

This manual was developed initially for maize breeders in sub-Saharan Africa, as part of a regional effort to improve the tolerance of maize in southern and eastern Africa to drought and low N stress. The content is based on a successful approach developed at CIMMYT for improving stress tolerance in tropical maize—an approach born of research begun at the center in the early 1980s. Credit belongs to all contributing researchers. Suggestions for corrections and additions should be directed to the authors.

The manual is intended to supplement a course targeted to breeders and agronomists of at least BSc level and which enables them to:

- Understand the effects of water and N deficits on the maize plant.
- Understand the level of yield increases to be expected from selection.
- Understand factors that affect the severity of drought and low N stress in maize.
- Select fields suitable for drought and low N screening.
- Manage uniform stress in drought or low N experiments.
- Design suitable experiments and field layouts for stress trials.
- Become aware of the data that should be taken in drought and low N screening trials.
- Analyze data from stress trials.
- Use drought and low N screening effectively in a maize breeding program.

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