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**Drought Stress in
Maize (*Zea mays* L.)**
Effects, Resistance
Mechanisms, Global
Achievements and
Biological Strategies
for Improvement

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ISSN 2211-808X
SpringerBriefs in Agriculture
ISBN 978-3-319-25440-1
DOI 10.1007/978-3-319-25442-5

ISSN 2211-8098 (electronic)
ISBN 978-3-319-25442-5 (eBook)

Library of Congress Control Number: 2015952763

Springer Cham Heidelberg New York Dordrecht London
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Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media
(www.springer.com)

Contents

1	Introduction	1
2	Effects of Drought on Maize	5
2.1	Effects on Crop Stand Establishment	6
2.2	Effects on Growth and Development	8
2.3	Effects on Reproductive Growth Stages	11
2.3.1	Pollen Development	12
2.3.2	Silk Development	13
2.3.3	Pollination	14
2.3.4	Embryo Development	14
2.3.5	Endosperm Development	15
2.3.6	Grain or Kernel Development	16
3	Mechanisms of Drought Resistance	19
3.1	Drought Escape	21
3.2	Drought Avoidance	22
3.3	Drought Tolerance	23
3.3.1	Osmotic Adjustment	24
3.3.2	Antioxidative Defense Mechanism	26
3.3.3	Plant Growth Regulators	28
3.3.4	Molecular Mechanisms of Drought Tolerance	30
4	Global Achievements in Drought Tolerance of Maize	37
4.1	Contribution of CIMMYT, IITA, and Other Collaborative Partners	38
4.2	Contribution of Multinational Seed Companies	42

- 5 Biological Practices for Improvement of Maize Performance 45**
 - 5.1 Screening for Drought-Tolerant Maize Germplasm. 45
 - 5.2 Conventional Breeding Strategies. 47
 - 5.3 Marker-Assisted and Genomic-Assisted Breeding 50
 - 5.4 Transgenic Maize Development. 54
- 6 Conclusions and Summary 57**
- References 59**

Abstract

Drought is one of the most detrimental abiotic stresses across the world which is seriously hampering the productivity of agricultural crops. Maize is among the leading cereal crops in world, but it is sensitive to drought. Maize is affected by drought at different growth stages in different regions. Germination potential, seedling growth, seedling stand establishment, overall growth and development, pollen development, silk development, anthesis–silking interval, pollination, embryo development, endosperm development, and kernel development are the events in the life of maize crop which are seriously hampered by drought stress. Plants have developed numerous strategies which enabled them to cope with drought stress. Maize germplasms also have numerous features which enable some accessions to cope with drought stress in better ways. One of the adaptive strategies is the earliness which helps the plants to escape the drought stress. Some genotypes have the ability to avoid the drought stress either by reducing water losses or by increasing the water uptake. Drought tolerance is also an adaptive strategy which enables the crop plants to maintain the normal physiological processes and harbors higher economical yield under prevailing drought stress. Osmotic adjustment by accumulation of osmolytes, plant self-defense by accumulation of antioxidants, plant growth regulators, stress proteins, and water channel proteins, transcription factors and signal transduction pathways are involved in conferring the drought tolerance on maize. Maize genotypes have the differential capability to escape, avoid, or tolerate the drought stress. Great efforts were made by CIMMYT, IITA, and other multinational companies in the development of drought-tolerant maize open-pollinated varieties (OPVs) and hybrids. Drought-tolerant hybrids and OPVs of maize are being cultivated in numerous African countries. There is a need to further improve the level of adaptability against drought stress for combating the global issue of food security. Screening of available maize germplasms for drought tolerance, conventional breeding strategies, marker-assisted and genomic-assisted