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## Breeding in a World of Scarcity



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Isabel Roldán-Ruiz • Joost Baert  
Dirk Reheul  
Editors

# Breeding in a World of Scarcity

Proceedings of the 2015 Meeting  
of the Section “Forage Crops  
and Amenity Grasses” of Eucarpia

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EUCARPIA

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## Preface

The 31st Eucarpia Fodder Crops and Amenity Grasses Congress took place in Ghent, Belgium, on 13–17 September 2015. Attendance was good, with 124 scientists and breeders from 25 countries. The Institute for Agricultural and Fisheries Research (ILVO) and Ghent University were co-organizers; it was the third time that Belgium had the honor of hosting this congress.

The theme of the meeting was “breeding in a world of scarcity.” Scientific presentations and discussions were divided into four sessions: (1) scarcity of natural resources, (2) scarcity of breeders, (3) scarcity of land, and (4) scarcity of focus. Session 1 refers to the consequences of climate change, reduced access to natural resources, and increased pressure for adopting more sustainable agricultural practices. Global warming results in more extreme weather conditions. Biodiversity and genetic resources are under pressure as a consequence of climatic change and anthropogenic actions. High-yielding crops require high doses of nutrients with shrinking availabilities. Plant breeding may help by developing varieties with a more efficient use of water and nutrients and a better tolerance to biotic and abiotic stress. Session 2 refers to the shrinking number of breeders. Field breeders are becoming a rare breed, and modern plant breeders are expected to combine knowledge from different disciplines far more than in the past. There is a need for a mutual empathy between field-oriented and lab-oriented breeding activities. New methods of phenotyping and genotyping need to be integrated in breeding and bridge the gap between lab and field. Session 3 deals with the scarcity of agricultural land. Agricultural land has to be optimally used. Forage needs to be intensively produced in a sustainable way, at a competitive cost while still meeting the energy, protein, and health requirements of livestock. Well-adapted varieties, species, and mixtures of grasses and legumes are needed, not only to use as feed but also to use as turf and bioenergy and to provide ecosystem services. Session 4 refers to the fading of focus in primary production triggered by a range of societal demands. There are few farmers left, and they are asked to meet many consumer demands. Various crops and management systems are involved. Both large-scale, multi-purpose species and varieties and specialized niche crops are required to fulfill all these diverse needs and expectations.

This book contains the invited and submitted papers presented at the conference, whose Parts I, II, III, and IV correspond to the four sessions described above. Part V summarizes the conclusions of the debates, working groups, and workshops held during the meeting. Two open debates were

organized: one on the future of grass and fodder crop breeding and a second one on feed quality breeding and testing. The content of these debates was determined on the basis of a survey in which several breeding companies and institutes participated. Different, and sometimes contrasting, views of these topics were presented and discussed in plenary sessions. The 31st section conference hosted meetings of two working groups, namely, “Multisite rust evaluation” and “Festulolium.” During the “genomic selection and association mapping” workshop, participants shared experiences about the use of genetic and genomics tools in forage crop breeding. In the “phenotyping” workshop, current applications of noninvasive phenotyping tools in forage crop breeding research were presented, with a focus on the implementation in practical breeding. Part V contains also short sketches of breeding ideas presented as short communications by conference participants meant to help create progress in forage crop breeding.

We gratefully acknowledge the efforts of the members of the scientific committee (Ulf Feuerstein, Roland Kölliker, Paolo Annicchiarico, Philippe Barre, Susanne Barth, Johan De Boever, Alex De Vliegheer, Trevor Gilliland, Mike Humphreys, Bernhard Ingwersen, Bernadette Julier, Petter Marum, Jan Nedelnic, Ulrich Posselt, Niels Roulund, Daniele Rosellini, Dejan Sokolovic, Leif Skot), for the critical review of the offered papers. Their pivotal contribution ensured the high quality of the chapters included in this book. Special thanks go to Miriam Levenson (ILVO) for the careful English-language editing of all submissions.

The local organizing committee (Jonas Aper, Mathias Cougnon, Johan De Boever, Alex De Vliegheer, An Ghesquiere, Geert Lejeune, Katrien Liebaut, Nancy Mergan, Hilde Muylle, Tom Ruttink, Ariane Staelens Kristiaan Van Laecke, and Tim Vleugels) did a great job before, during, and after the meeting. It was a pleasure to organize the conference with such a good, tight team.

Finally, we express our gratitude to all the participants for daring to attend a meeting peppered with unconventional formats and for their valuable contributions to the presentations, debates, and discussions.

Melle and Ghent, Belgium

Isabel Roldán-Ruiz  
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Joost Baert

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