

Quantitative Traits Breeding for Multifunctional Grasslands and Turf

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Editors

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 Springer



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Preface

Grasslands are among the largest ecosystems in the world and consequently are of great importance to human populations. They constitute a third of all agriculture land in Europe, and have played a major role in the development of agriculture and rural economy in many parts of Europe, from ancient times to the present day.

Grasslands are an important source of animal feed, particularly for ruminants. They provide most of feeds, not only during the grazing season, but also during winter staple housing. In addition, grasslands both protect and utilise marginal soils that are unsuitable for arable cropping. Although there being both permanent and temporary grasslands, they exhibit the best ecosystem quality of all agricultural production systems in Europe. They preserve the biodiversity, including the forage species, and provide undisturbed habitats for species originally present in natural ecosystems. At the same time, grasslands protect soil, improve water quality and recover natural habitat through the reduction of nutrient losses, soil water evaporation and water and wind erosion, as well as by limiting leaching of nitrate and pesticides.

The genotypes of the species which are the main components of the grasslands have great influence on total outcome and successful utilization of grasslands. Therefore, continuous improvement of fodder crop varieties is crucial for adhering to the latest practices in agriculture production and landscape architecture, and for meeting the needs and expectations of end-users. Similarly, turf cultivars contribute to the quality of environment and human life by producing quality swards under adapted management, particularly in urban areas. The large turf and forage seed markets and their high economic value further highlight the importance of the breeding of these species.

A wide range of breeding programs for forage and amenity species have resulted in substantial genetic improvements in herbage yield, quality and disease resistance, in recent years. Furthermore, new breeding methods and techniques (especially selection based on molecular markers) are rapidly expanding the boundaries of cultivars improvement and making it possible to achieve outstanding breeding results.

The *30th Meeting of the EUCARPIA Fodder Crops and Amenity Grasses Section* was held from 12 to 16 May 2013, in Vrnjačka Banja, Serbia. The Meeting was

organised and supported by the Institute for forage crops, Kruševac. Additional support was provided by the Serbian Ministry of Education, Science and Technological Development, EUCARPIA, City of Kruševac, the company Rubin (Kruševac) and the dairy farm Lazar (Blace). Among the participants were geneticists, professional plant breeders, molecular biologists and other researchers from institutes, universities and seed companies, but also plant scientists, phytocenologists and gene bank officers from both the private and the public sector. There were scientists whose areas of research ranged from improving fodder and turf breeding methods and implementing new techniques in molecular biology, to cutting edge fodder crops and amenity grasses genetics. There were also professional plant breeders who required practical outputs of this research and the reduction of the overall cost of implementation. Their synergy always ensures huge importance and fruitfulness of EUCARPIA Fodder Crops and Amenity Grasses Section Meetings.

This book includes both plenary and invited papers, but also offered papers that were presented orally or as posters during the conference. Presentations and discussions covered a broad range of themes in fodder and turf breeding and research. Attention was also given to topics that arise from the border areas of presented scientific fields, especially through invited presentations that provided new ideas for integrated and interdisciplinary research.

The title of the Meeting and the book, *Quantitative Traits Breeding for Multifunctional Grasslands and Turf*, focuses on the challenges associated with the breeding of quantitative traits, which directly impact grasslands and fodder crops productivity, profitability and sustainability. It also focuses on a multidisciplinary approach to grassland research and utilisation. The papers are arranged in seven parts to reflect the structure of the Meeting: “Introduction,” “Genetic Diversity Among and Within Species,” “Practical Breeding of Fodder Crops,” “Turf Grass Breeding,” “New Biotechnology Methods in Sustainable Breeding: Strategies and Implementation,” “Breeding for New Roles of Multifunctional Forage Species,” and “Forage and Seed Production.” We hope that the included papers offer a unique collection of ideas and breakthroughs in the fields of fodder crop and turf breeding and genetics, as well as in the creative and innovative application of new tools in practical breeding.

The scientific programme of the 30th EUCARPIA Fodder Crops and Amenity Grasses Section conference and selection of invited and proffered speakers were arranged by Christian Huyghe, as chairman of the Scientific Committee, and by members of Scientific Committee: Dirk Reheul, Ulrich Posselt, Roland Kolliker, Jan Nedelnik, Charles E. Brummer, Danny Thorogood, Susanne Barth, Zoran Lugić, Sanja Vasiljević, Jasmina Radović and Dejan Sokolović. The Scientific Committee also carried out the important and demanding, but time-consuming, task of reviewing papers. The editors are sincerely grateful for their contributions and whole-hearted engagement that ensured the success of the Meeting and high standard of the papers in this book.

We would also like to thank all the members of the local organising committee (Snežana Babić, Jasmina Milenković, Snežana Anđelković, Tanja Vasić, Mirjana Petrović, Zoran Lugić, Bojan Anđelković, Milomir Blagojević, Vladimir Zornić

and Dragan Terzić from IFKKS; Borisav Kobiljski and Vojislav Mihajlović from IFVCNS; Zorica Tomić from IAHBG and Dušica Delić from ISRBG) who did an excellent job in running the Meeting smoothly and in providing a friendly atmosphere.

We express our gratitude to all participants for their interesting presentations and lively discussions during the Meeting, but also those authors who were not able to attend. Additionally, we would want to thank all the authors for preparing their papers for these Proceedings and for their commitment, hard work and responsibility which made it possible. Finally, we express our appreciation to Jacco Flipsen and Ineke Ravesloot from Springer, for the excellent collaboration and their assistance in the publishing of this book.

Kruševac, Serbia
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Kruševac, Serbia

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