

Preface

From the 4–8th of September 2011, the Eucarpia Fodder Crops and Amenity Grasses Section held its 29th Meeting in the impressive surroundings of Dublin Castle in Ireland. Over one hundred and twenty scientists from 21 countries, all working in the area of the genetics and breeding of forage species, attended the meeting, which was themed ‘**Breeding strategies for sustainable forage and turf grass improvement**’. Why did we choose this theme?

Grasslands cover a significant proportion of the land mass of the world, and play a pivotal role in global food production. At the same time we are faced with several challenges that affect the way in which we think about this valuable set of resources. The population of the world is expected to exceed 9 billion by 2050, and increase of about one third relative to today’s levels. This population increase will be focused in urban areas, and in what are currently viewed as “developing” countries, meaning that the buying power of this increased population will be greater—shifting the balance of demand from staple crops to high value items such as meat and dairy products. Overall this means that the world will have to approximately double agricultural output across all categories of food to meet the demands of this larger, urbanised population. This is occurring against a backdrop of equally large challenges in terms of global climate change. Agriculture is already a significant contributor to things such as greenhouse gas emissions, deforestation and soil erosion. The situation is made more complex by an increased emphasis on biofuels as a solution for our imminent oil shortage, resulting in increased competition between land utilised for food and fuel. In short, agriculture must continue to feed the world, whilst not contributing to damaging it further. It must be sustainable. Plant breeding plays a significant but frequently understated role in meeting the challenges presented by this complex and changing scenario. However, plant breeding and improvement is itself undergoing radical change, driven by technologies that, quite frankly, seem to have sprung from the pages of science fiction novels written decades ago.

Thus, it seemed to us, when given the opportunity to organise this meeting, that it was timely to explore how forage and turf breeding is changing and adapting to meet these challenges using the technological advances being experienced in plant breeding as a whole. Consequently, the meeting focused heavily on how next generation sequencing technologies are interacting with advanced phenotyping strategies for a variety of increasingly well defined traits. This type of analysis is powerful,

potentially telling us a lot about the genetic control of these traits, but also has the potential to revolutionise plant breeding via approaches such as genomic selection (GS).

A wonderful characteristic of the membership profile of Eucarpia is that the membership is composed of a mixture of plant scientists from multiple disciplines and practical breeders. While some of us wax lyrical about the potential of approaches such as GS, it's always useful to have breeders present who can ask pointed questions about how much this is going to cost them, and how it's better (i.e. more cost effective per unit of genetic gain) than what they currently do. This can sometimes be an uncomfortable experience, but it is through such a frank exchange of ideas that real progress is made.

As well as the focus on advanced technology, the meeting featured the usual interesting array of topics that attract the broad audience that attends the section meetings. Several contribution focused on the use of germplasm of grasses and legumes to improve the vegetation in different environmental conditions, particularly under conditions to be expected by climate change—these addressed the theme in a way in which we hadn't considered when we discussed it originally (again showing the advantage in a broad section membership). There were also regular topics such as the results of the EUCARPIA multi-site rust evaluation, showing that over a period of 11 years there is no evidence that crown rust resistance in individual *Lolium* cultivars was overcome by the pathogen), and the Festulolium satellite workshop.

This book contains papers based on many of the oral and poster presentations presented at the Dublin meeting. With some minor changes to represent the diversity of material presented, the papers are organised in sections fairly similar to the session topics, and for the purpose of this volume, are grouped into the following sections: European grasslands in the future; Breeding strategies; Novel emerging tools for the breeding of forage and turf crops; Breeding towards breeding objectives; Genetic variation and adaptation; and Agronomy and performance of forage and turf crops. We hope they present a good snapshot of a very stimulating meeting, and will be a useful resource for participants and those who couldn't attend.

We would like to acknowledge the enormous efforts of the local organising committee members (Connie Conway, Dermot Forristal, Dermot Grogan, Eleanor Butler, Patrick Conaghan), with a special mention for Connie Conway and Eleanor Butler, without whom the meeting would not have run so smoothly and efficiently. Finally, the work of the scientific committee and referee board for this book (Beat Boller, Bohumir Cagas, Christian Huyghe, Daniele Rosellini, Danny Thorogood, Dejan Sokolovic, Dermot Grogan, Dirk Reheul, Jan Nedelnik, Joost Baert, Michael Abberton, Michael Camlin, Niels Roulund, Paolo Annichiarico, Petter Marum, Roland Kölliker, Trevor Gilliland, Trevor Hodgkinson, Ulf Feuerstein and Ulrich Posselt) must also be acknowledged, especially in providing their time so graciously and uncomplainingly to review the papers for this volume, and ensuring a high quality of presentation in these proceedings.

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grass improvement

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