14. European master in animal breeding and genetics (EMABG): A training for research, practical, and transversal skills

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Abstract

The European Master in Animal Breeding and Genetics (EMABG) is an international master program operating on a global scale, with the aim to train experts and future leaders for research and industry. The training and education takes place at six European universities, within four study tracks with carefully designed curricula. One of the central parts of the MSc programme is the integration of teamwork activities and training of transversal skills to increase the employability of the graduates. To achieve this goal several major events are incorporated into the study programme during the entire duration of the two years. Also, strong emphasis is placed on integration of experts from the industry in the form of talks during joint events, internships, and direct work during special courses, as well as the final thesis.

Introduction

The general aim of the livestock sector is to meet the aspirations of the world's population for increased availability of animal products in a sustainable manner, while ensuring food safety, animal welfare, and maintenance of genetic diversity. To meet the challenge of the growing demands for food, livestock production needs to double in the coming thirty years, while halving its environmental impact (FAO, 2017). This implies that livestock production needs to improve efficiency of production, robustness and welfare of animals, and quality of animal products. Genetic improvement programmes help to meet these challenges by selecting animals for increased production with less input, reduced environmental impact per unit of product, and improved animal health and welfare. In the past, typically more than 50% of improvements of livestock productivity were caused by genetic progress through breeding. This illustrates both the need and opportunity for innovations in farm animal genetic improvement. Accordingly, training of young professionals addressing current and future challenges in animal breeding is needed.

European Master in Animal Breeding and Genetics

The European Master in Animal Breeding and Genetics (EMABG) presents a programme that results from intense discussion among six European partner universities. The programme is innovative in that it combines e-learning tools with training that follows the most recent scientific developments, effectively combining the expertise of each partner. It provides a rich learning environment through intense interaction with industry partners and NGOs, and offers flexible and personal learning paths (Figure 1). Summarizing all intakes and editions, a total of 161 students from 54 countries were trained in the program.

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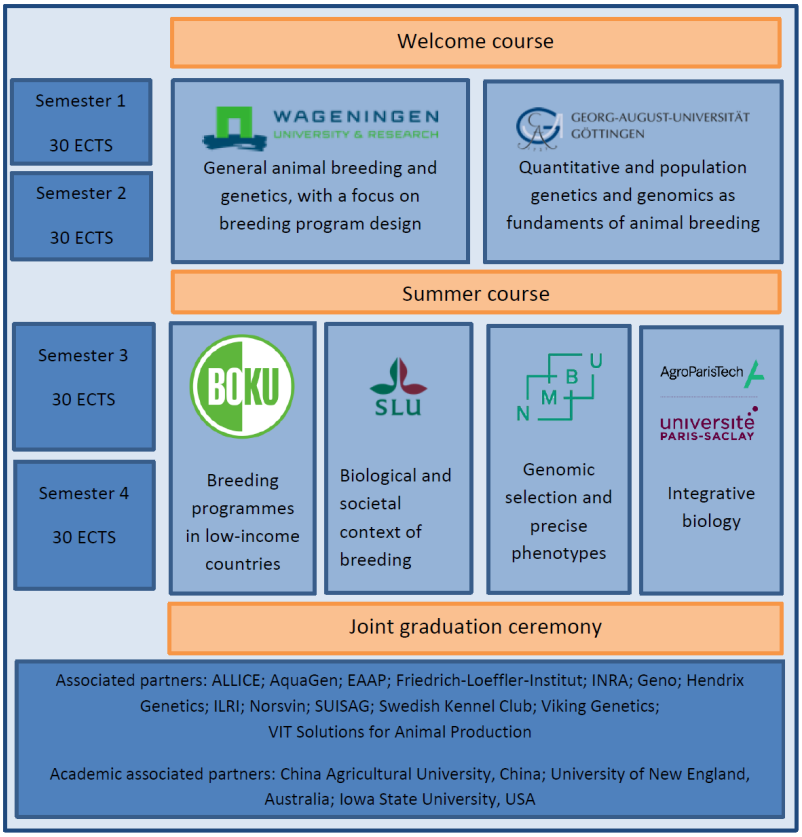

Figure 1. The structure of the EMABG MSc course.

The common vision of the programme is to deliver graduates that are experts in animal breeding and genetics, but with different foci, depending on their chosen study track. This makes them suitable for, e.g. managing breeding programmes in low-income countries, conducting breeding value estimations as required by industry, or responding to societal needs to combat climate change or improving animal welfare through breeding. The ultimate goal is to train a new generation of graduates that are fit to respond to current and future needs of the animal breeding sector in a global context.

The EMABG is a joint master programme that fills a real need for the industry sector and the whole society. It is designed to answer the scientific, practical, and societal challenges of animal breeding and genetics. These challenges can be summarised as follows:

- meet the increased demand for animal and fish products, while preserving or improving product quality and animal welfare, and minimizing the environmental impact;
- preserve natural resources, with special attention to biodiversity;
- make efficient use of novel tools and technologies to reach these goals while maintaining or improving societal acceptance of animal breeding;
- develop sustainable animal breeding programmes that contribute to improved livelihood of farmers and efficient food chains;
- develop sustainable breeding programmes that contribute to improved health and welfare of companion animals, including populations in zoos and nature reserves.

It is a common vision of EMABG partners to meet these challenges by intensive cooperation in the education and training of students, further enhanced by the complementarity among participating universities. Thus, the EMABG was set up to:

- offer quality higher education with a European perspective in the field of animal breeding and genetics, which is attractive to both programme (EU) and partner country nationals;
- enhance the quality of training in animal breeding and genetics and to strengthen attractiveness of the European Higher Education Area;
- contribute to solving societal needs by developing the qualifications of the students so they possess the appropriate skills, are open-minded and internationally experienced.

Joint events for the entire master course. There are three jointly organized courses, and a jointly supervised thesis between first-year and second-year universities (Figure 1). The Welcome course and the Summer course allow for personal interactions between all EMABG students and teaching staff from all partner universities. The teaching activities during the Welcome and Summer courses are covered by lecturers from all partners, associated partners and invited lecturers from academia and industry. The Breeding lab is organized at both WU and UGOE, and involves close collaboration with industry partners in specific group assignments. In addition to these courses, a transversal educational project was set up, where the students expand their knowledge and review various aspects of animal breeding and genetics in the context of the UN Sustainable Development Goals (SDGs).

The Welcome course is the highly successful cornerstone of the EMABG programme (according to regular feedback from students), and the defining element of academic and cultural induction of the students to the European higher education environment. This introductory event was developed to ensure a proper academic orientation of international students. EMABG students are introduced into the academic system in Europe, get the opportunity to establish personal contacts and friendships among each other, and get settled in before the start of the academic year. The students are also introduced to the European and global dimension of farm-animal breeding. During teaching and group work, close attention is paid to cultural differences and to rights and responsibilities of students and teachers in the EMABG. The course includes an intensive skills training part, which introduces students to topics ranging from poster and presentation skills to information literacy and scientific writing. Staff from all six partners participates in this event, which makes it possible to introduce each partner university and discuss the individual learning paths and study track choices of students.

The Breeding lab, is a course that is scheduled in the first and second semester of studies, simultaneously organised by WU and UGOE. Groups of students work on an assignment in close collaboration with associated industry partners. The aim of this course is to familiarize students with the competences and skills that are needed to work in a professional environment. The assignment is solved in interactive group work under the supervision of industry and academic staff from the partner universities. Examples are the design of a breeding programme for a specific environment or market, the definition of a new breeding goal, or the validation of a novel technology for breeding purposes. The aim is to put the knowledge of different elements of animal breeding acquired in the first year into a practical context. This helps the students to identify preferences for the choice of master projects.

The Summer course takes place between the second and third semester, overlapping with the Welcome course. The Summer course, titled 'Contribution of Animal Breeding to Global Food Security', is also offered as part of a summer school within the framework of the Euroleague for Life Sciences (ELLS) network, thus open to a worldwide audience. The content of the summer course is focused on widening the knowledge of students in terms of societal context of animal breeding and its practical relevance, with

participation of industry representatives and other associated partners. This increased networking outside of the academic environment makes it possible for the students to decide on their final preferences on the master thesis topic, including the possibility to collaborate with industry to solve currently relevant problems. The personal interactions also enable the screening of students for potential new hires by the industry, thus increasing the employability of EMABG graduates.

The overlap of the summer course with the Welcome course enables the two student groups to meet in a crucial time point in their studies. In this joint event the summer course students share their experience and give valuable advice to their younger colleagues regarding the habits, expectations, and workplace culture at the first-year universities. Intensifying the connectedness and interpersonal links between students in their mid-studies and those just starting further increases the cohesion of the EMABG programme.

The EMABG student graduation is a one-day event when the students from all second-year universities reunite to present their Master theses, celebrate their success, and receive their EMABG Diploma certificate. Graduates present their MSc theses in a conference-like setting, potentially also including associated partners and industry representatives, family members (online) and other guests. This small conference gives an additional possibility for the students to highlight their professional qualities and connect to potential employers. According to our EMABG alumni survey in 2017, about 40% of the graduates were already employed at the time of their graduation; this increased to over 90% six months after their graduation. The graduation itself is held as a formal ceremony, with the attendance of representatives from all EMABG partner universities, as well as senior officials from the organizing university.

A new element compared to previous iterations of the EMABG programme is the setup of the transversal projects on UN SDGs. This joint student project increases the interactions between the students within and between universities. One of the core elements of the transversal project is the preparatory group work within each university, supervised by each EMABG partner. Within this project the students work on competences that are needed in a professional working (industry) environment. They experience workgroup dynamics and aim-oriented working plan activities. The necessity of these transversal skills was highlighted within our needs analysis survey among potential employers. After course activities at each partner university the students engage in a joint videoconference to present their work and views on components of SDGs. This meeting gives an additional work-related meeting opportunity for the students in mid-semester.

Conclusions

The EMABG is an international master programme aimed at training experts and future leaders for the animal breeding research and industry. This training is being done at six partner universities, along four study tracks that cover various aspects and nuances for the breeding of livestock, fish, and companion animals on the global scale. A strong emphasis is placed on integration of industry experts at various stages of the two years of the MSc, so the students obtain the necessary teamwork, collaboration, and transversal skills. These skills, along with the strong theoretical background and practical computation skills are the foundation of their future success and increased employability.

References

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