PhD IN SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

Multidisciplinary talks

CU5 "Agriculture and Forestry" - January 19, 2022

11.00-11.15 – Donatella Spano (University of Sassari) welcomes and introduces the CU5 event

11.15-12.20 – **Cool plants in a warming world**

Christian Rixen (Swiss Federal Institute for Forest, Snow and Landscape Research WSL - Birmensdorf, Switzerland) introduced by Michele Freppaz

12.20-13.00 – Discussion

15.00-15.40 – **The best strategies to answer future questions for livestock products**

Andrea Rosati (Secretary General at EAAP - The European Federation of Animal Science) introduced by Paolo Ajmone Marsan

15.40-16.00 – Discussion

16.00 –16.40 – **Strategies to enhance long term sustainability of agricultural systems**

Bruno Basso (Michigan State University, USA) introduced by Pier Paolo Roggero

16.40-17.00 – Discussion and Conclusions

Free admittance:

https://www.youtube.com/channel/UC5tmXs35lU5Y6XjsLASOaVw

Presentation of Christian Rixen

Christian Rixen is a plant ecologist and a senior researcher at the WSL Institute for Forest, Snow and Landscape Research. He has been working in Arctic and alpine environments for more than 20 years. He has studied vegetation changes e.g. in long-term monitoring plots (some dating back more than 170 years) and in global warming experiments (e.g. the International Tundra Experiment ITEX). While many of his research projects are in the Swiss Alps, his field work and research visits also brought him to Alaska, Scandinavia, Greenland, Siberia and mountain ranges in Australia and New Zealand. With his work he has contributed to the IPCC and IPBES.

Cool plants in a warming world

As we all know and experience, climate has been warming considerably in recent decades, but warming has been most pronounced in cold regions, i.e. in alpine regions and the Arctic. In my talk I will report about plant responses to warming in (very) long-term monitoring plots, global warming experiments and elevation gradient studies. As global change is rarely driven by temperature alone I will highlight specifically effects of snow, freezing events etc. on phenology, plant traits, species composition and biodiversity. Many drivers I talk about are global (such as temperature change). But as we often try to maintain or restore biodiversity globally, I will also report on local efforts in the Alps to support biodiversity and its ecosystem functions, e.g. by land-use and restoration.

Presentation of Andrea Rosati

Andrea Rosati graduated at University of Perugia (Italy) in animal science, then he received a M.Sc. in Animal Genetics and a Ph.D. in Biometry and Animal Genetics both at University of Lincoln Nebraska (USA). He had worked from 1993 to 2001 for the Italian Animal Breeders Organization (AIA) with growing responsibilities to plan and manage animal performance recording and genetic evaluation at national scale. From 2002 to 2004 he was general manager of LGS, the Italian Animal Genetics Laboratory. Later he became the Secretary General of the European Federation of Animal Science (EAAP) and of the World Association for Animal Production (WAAP). He had also been Secretary General of the International Committee for Animal Recording (ICAR) until 2014. During his career he gained long experience of cooperation with both governmental and non-governmental international organizations. For his responsibilities within ICAR he had managed the world standards for animal farming, such as animal identification, performance recording and genetic evaluation. He also coordinated and managed 3 international research projects supported by the European Union and participated as partner at different level to other 18 EU projects. He gives lectures in many different countries about agriculture, and more specifically, about animal production sustainability and development. Andrea was the co-founder of four animal science journals and still part of their management boards. His daily activities is mainly to lead a group that organizes scientific conferences, among the others the annual European Annual Meeting of animal science as well as the World Animal Science Conference that is held every five years, webinars and workshops.

The best strategies to answer future questions for livestock products

The world population, now 7.9 billion with a projection of reaching 10 billion in 2055, has grown exponentially in recent decades; it was only 2 billion just a hundred years ago. However, this growth has differed between continents. The demand for food must therefore necessarily increase in the coming years. In addition, there is an incremental demand for products of animal origin due to

the global transformation of diets. To answer these questions, efficient strategies must be put in place in a short time. The strategies must be different for every area of the world, and even within the same area, there will be plans that will best adapt according to the production system, the animal species, the final product, etc. The strategies will be many requiring therefore to define the many factors affecting each local situation to find the best solution to make production more efficient. The goal of each breeder is the economic gain, and the strategy that must be sought for animal farmers is that of maximum economic efficiency related to all present elements such as investment capacity, available technology, traditions, regulations relating to environmental sustainability and to animal welfare, labour cost, the cost of animal feed, etc. There is therefore not a unique strategy but a method to approach the specific best strategy. An example of factors to be considered to answer to the increased requests for livestock products is that relating to the cultural level of the operators. In developed countries the development of these productions, in fact, takes advantage of a generally higher cultural level of breeders and therefore more able to incorporate the required innovative systems. Research activities from rich areas has more funds than research from developing countries, and because scientific research developed in rich countries is consistently aimed at finding solutions and improvements for animal husbandry in these countries, the gap between the different areas increases. The application chain of research in developed countries is not only more effective but shorter, certainly the proximity to rich markets will allow animal husbandry in rich areas to have a strong ability to invest in development.

Presentation of Bruno Basso

Bruno Basso is an agro-ecosystem scientist and University Foundation Professor in Department of Earth and Environmental Sciences at Michigan State University. His research focuses on long term sustainability of agricultural systems, digital technologies, water, and nutrients fluxes across agricultural landscapes under current and future climates. He holds global patents on AI, crop model systems to evaluate land productivity and environmental sustainability.

He is a Fellow of the American Association for the Advancement of Science (AAAS); Soil Science Society of America (SSSA); American Society of Agronomy (ASA); 2016 recipient of the Innovation of the year award and 2019 Outstanding Faculty Award at Michigan State University. He serves on the advisory council of the Department of Energy, Office of Science Biological and Environmental Research, on the scientific advisory board of Agriculture and Natural Resources of the US National Academy of Sciences; Field to Market, Invaio and various European firms. He is the cofounder and chief scientist of CiBO Technologies. He is ranked as top 2% scientist across all disciplines (PLOS One study). He received his Ph.D. from Michigan State University.

Strategies to enhance long term sustainability of agricultural systems

The seminar will focus on potential solutions to enhance the sustainability of agriculture systems. Synergies between AI, models and digital technologies will be discussed.