PS-9.2-03

For the Love of Wise Agronomy: Transition Paths to Legume Supported Food- and Feed-Systems in Europe

Pietro Iannetta[1], Balint Balazs[2], Chantel Davies[3], Karen Hamann[4], Marko Debeljak[5], Karen Hamann[4], Howard Becky[6], Eszter Kelemen[2], Alicia Kolmans[7], Henrik Maaß[7], Georgia Ntatsi[8], Robert Rees[9], Dimitrios Savvas[10], Geoff Squire[11], David Styles[12], Luiza Toma[9], Aneta Trajanov[5], Marta Vasconcelos[13], Roger Vickers[6], Michael Williams[14]

[1]Ecological Sciences, James Hutton Institute, UK, [2]Environmental Social Science Research Group (ESSRG), Hungary, [3]Growing Research International Ltd., UK, [4]Institute for Food Studies & Agroindustrial Development (IFAU), Denmark, [5]Jozef Stefan Institute, Slovenia, [6]PGRO, The Research Station, UK, [7]Research Centre for Global Food Security and Ecosystems (GFE), University of Hohenheim, Germany, [8]Institute of Plant Breeding and Genetic Resources, ELGO-DEMETER, Greece, [9]SRUC, UK, [10]Agricultural University of Athens, Department of Crop Science, Laboratory of Vegetable Production, Greece, [11]Ecological Sciences, James Hutton Institute, UK, [12]SENRGy, Bangor University, UK, [13]Universidade Católica Portuguesa, Centro de Biotecnologia e Química Fina (CBQF), Laboratório Associado, Escola Superior de Biotecnologia, Portugal, [14]Department of Botany, School of Natural Sciences, Trinity College Dublin, Ireland

Abstract: The importance of biological nitrogen fixation, as delivered by legume supported cropping systems to help underpin sustainable food production, is generally agreed by stakeholders spanning the whole supply-chain. Despite this, legume-supported cropping-systems in Europe remain underutilised, as the vast majority Europe's protein requirement is satisfied by sources external to the continent. Such imports originate predominantly from the Americas and are mainly delivered in bulk as soybeans which constitute a major component of animal feeds. This scenario caters for consumer demands within Europe, and meets the rising international demand for meat consumption. The result is European cropping systems dominated by non-legumes requiring large inputs of man-made mineral-nitrogen fertiliser plus other nutrients and pesticides with consequent negative environmental impacts, including poor human diets.

Even if aggregation of European legume production were to offset such imports, a large-scale 'home-grown' approach would likely fail to underpin sustainable food systems, as environmentally unsustainable levels of meat consumption would be maintained, nor new consumption patterns, or '*sustainable diets*', encouraged. Improving gross-margins for farmers through more profitable short supply chains that may sustain local economic development and enhance valuable regional food cultures presents a viable alternative vision. Since it is also important that legume-based commodities become accessible to smaller-scale processors, to be attractive and affordable - as demanded by the growing number of 'consumer-citizens'. The transition-paths to legume supported feed- and food-systems are therefore complex, and demand a series of transitions from education to capacities and cultures throughout the supply-chain. Furthermore, the balance of small- and large-scale operations will need tailored to the ambitions identified by European, national and regional strategic development programmes.

Such observations offer a glimpse of initial findings from the first series of multi-stakeholder European Legume Innovation (ELIN) workshops held by the EU-funded TRUE project (www.true-project.eu). The perspectives highlight that good agronomy alone cannot realise legume supported food- and feed-chains, and that cooperative effort throughout the food-system will be essential. This feedback is discussed with respect to other aspects of the TRUE research project that assesses the capacity of legumes as the foundation to realising '*environmental-diets*', and a means by which we may harmonise the ambitions of consumers and commerce, whilst also meeting environmental needs and safe-guards.

Keywords: Biological nitrogen fixation, legumes, sustainable food systems, environmental diet, consumer citizen