

HORTICULTURE RESEARCH IN EUROPE

A positioning paper by the EPSO Horticulture Working Group.

Why Horticulture matters.

Horticulture can be defined as the branch of Agriculture concerned with plants that are used by people for food, either as edible products, or for culinary ingredients, for medicinal use or ornamental and aesthetic purposes. Horticultural products play a major role in modern society and economy. Fruits and vegetables are part of everyday meals, including special high-value diets for infants and the elderly. Fruits and vegetables are an important component of traditional food, but are also central to healthy diets of modern urban population. They form the basis of a wide array of processed or partially processed products. Increasingly innovative products use fresh fruits and vegetables in fast foods and components of ready meals. Ornamental plants have high cultural values for Europeans, and urban green is considered an important part of city quality of life.

Horticulture, gardening, and green environments are important issues in both rural and urban areas in Europe.

Horticulture has a large share in agricultural production value in all European countries. The total production value of Horticultural crops in the EU for 2009 was over \$100 billion, compared with about \$40 billion for cereals (FAO statistics) and this value difference is multiplied through the path to retail. Protected cultivation is able to contribute largely to a high economic production value in the agricultural sector, e.g. in The Netherlands almost 40% of the national agricultural production value is created by protected cultivation on 7% of the total agricultural area.

Horticulture is therefore a highly significant economic sector.

In addition it is an important employment sector in rural areas often with staff with less education. Horticultural products and specialties can achieve good market prices but is in direct competition both within and outside Europe. Horticultural production is in most cases not supported by subsidies.

Competitive advantage in Horticulture is therefore heavily linked to research capability and translation.

Horticultural production is associated with a high level of management in their production and subsequent use. Horticulture depends on cropping systems that are intensive i.e. require investment, labour and other inputs such as energy and nutrients. They tend to use smaller units of high quality land than other types of agriculture and have generally a high level of innovation. A significant amount of horticulture takes place through protected cultivation where environmental management and precise irrigation in closed circuits are the rule so the environmental impact can be controlled. Inputs such as water, nutrients and chemicals are used highly effectively in protected cropping systems.

As a consequence, horticultural products usually have a much higher per unit value than arable crops grown in less intensive systems using less inputs.

In spite of this background, horticultural research in the past decades has largely been overlooked in public and policy discussions about agricultural production, food security and societal health. The Agricultural industry, bioeconomy and genetic research focus

Importance of Horticultural Research

6-Nov-13

on a few agricultural staple crops. Similarly, agro-environmental research has focused on the few agricultural crops that now dominate landscapes. Horticultural plants have been neglected both in biological and in applied research, and horticultural research across Europe is fragmented.

The European horticultural industry, dominated by small and medium enterprises, has not been supported well by any coordinated research.

Europeans require healthy food and green urban areas, but research portfolios are still concentrated on conventional issues such as biomass for energy, biorefineries or high yielding cereals even though horticultural cropping systems are complex and the common use of many different varieties favours preservation of genetic resources and therefore biodiversity.

A European Research Initiative in Horticulture.

The grand challenges facing the world of population increase, healthy food supply and will have as big an impact in the horticultural arena as in other areas of Agriculture both in and outside Europe, particularly as we enter a period of increasingly rapid climate change. Horticulture will, however, require a distinct and explicit research agenda. This will include:

- Maintaining genetic resource collections to prevent erosion of the genetic base for future crop improvement.
- Improving integrated systems for production with minimal resource inputs creating a controllable and predictable market-oriented production
 - Increasing the highly efficient use of energy and the use of sustainable energy sources
 - Maintaining healthy and sustainable soil systems and efficient use of fertilisers
 - Creating controllable production systems increasing the highly efficient use of water
 - Decreasing the amount of emissions of pesticides and nutrients to soil and air
 - Developing chemical free production systems
 - Developing intelligent production automation with the aim of facilitating an efficient use of labour
- Minimising waste in horticultural production and use of horticultural products
- Innovative approaches to production and horticultural products such as semi-processed and health related foods.
- Maximising the benefits of horticultural products to healthy and balanced nutrition
- Enhancing biodiversity in rural and urban environments.
- Integrating production and amenity Horticulture in urban and surrounding urban environments
- Developing horticultural systems as contained factories for non-food products including pharmaceuticals and industrial cofactors

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These research challenges should draw on developments in a range of disciplines ranging from genome sequencing, metabolomics, nutritional studies, systems biology, mathematical modeling over a wide range of scales, automation and robotics.

Against this background, it is now essential that researchers, industry and policy makers work much more closely together to develop a strategy for maximizing the economic and societal benefits from Horticulture in the medium to long term. We propose a strategy where the stakeholder groups work together at National levels to ensure the importance and potential of Horticulture is understood and that we work together at the European level to ensure that Horticulture is fully integrated into consideration of future Framework programmes.

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