

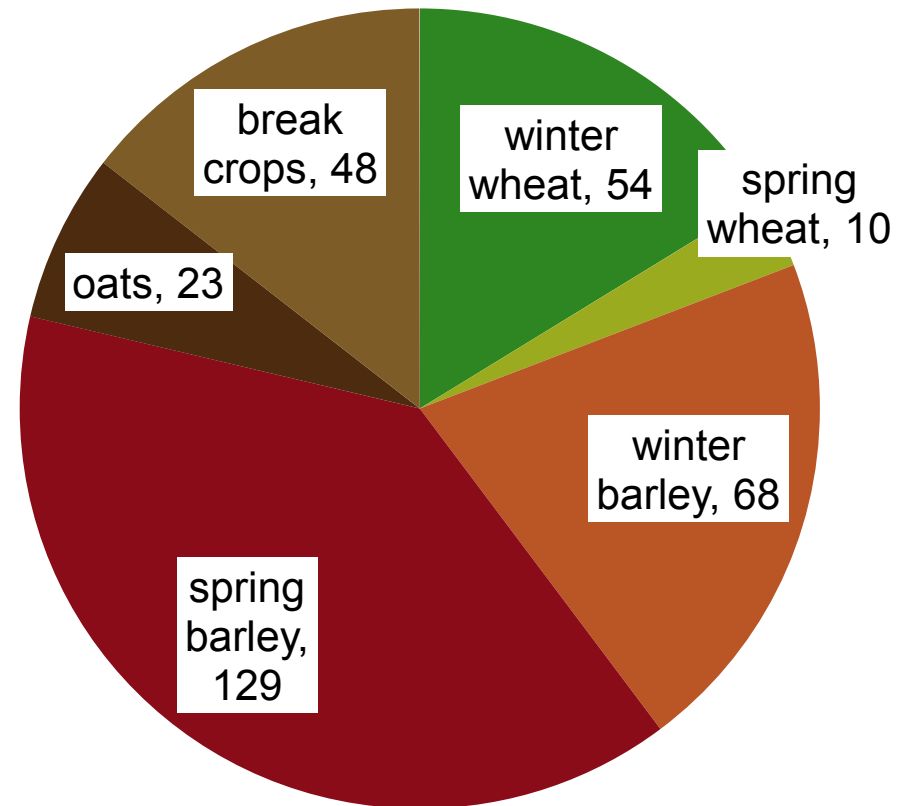


Crop Science

Crop Science: The sector

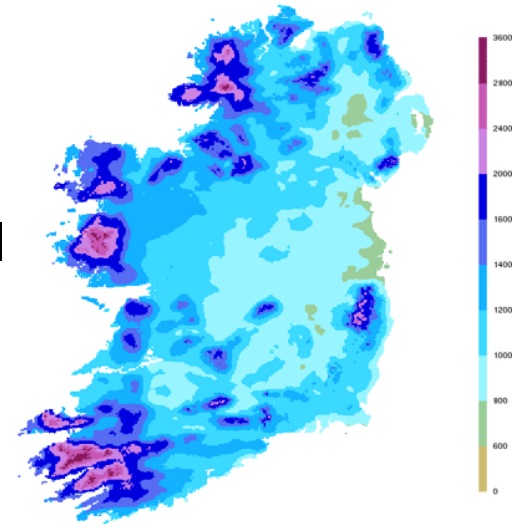
- 350,000 ha: 9% of the agricultural area
- High yield potential.
 - No 1 in World in Wheat
 - No 2 in World in Barley
- High disease pressure
- Food, feed and malting markets

Area of crops '000 ha



The challenges

- Production in our climate
 - Disease control: traditionally reliant on chemical plant protection- must change
 - Crop management / nutrition for a mild climate
 - Crop establishment in wetter conditions
- High cost production system
 - Smaller farm structure
 - High land rental costs
 - High input costs (disease control, fertiliser, machinery)



Crop Science: Vision

To develop a competitive crop production sector that underpins the production of food, drink and feed products by supplying high quality traceable produce with a low carbon footprint.

Objectives

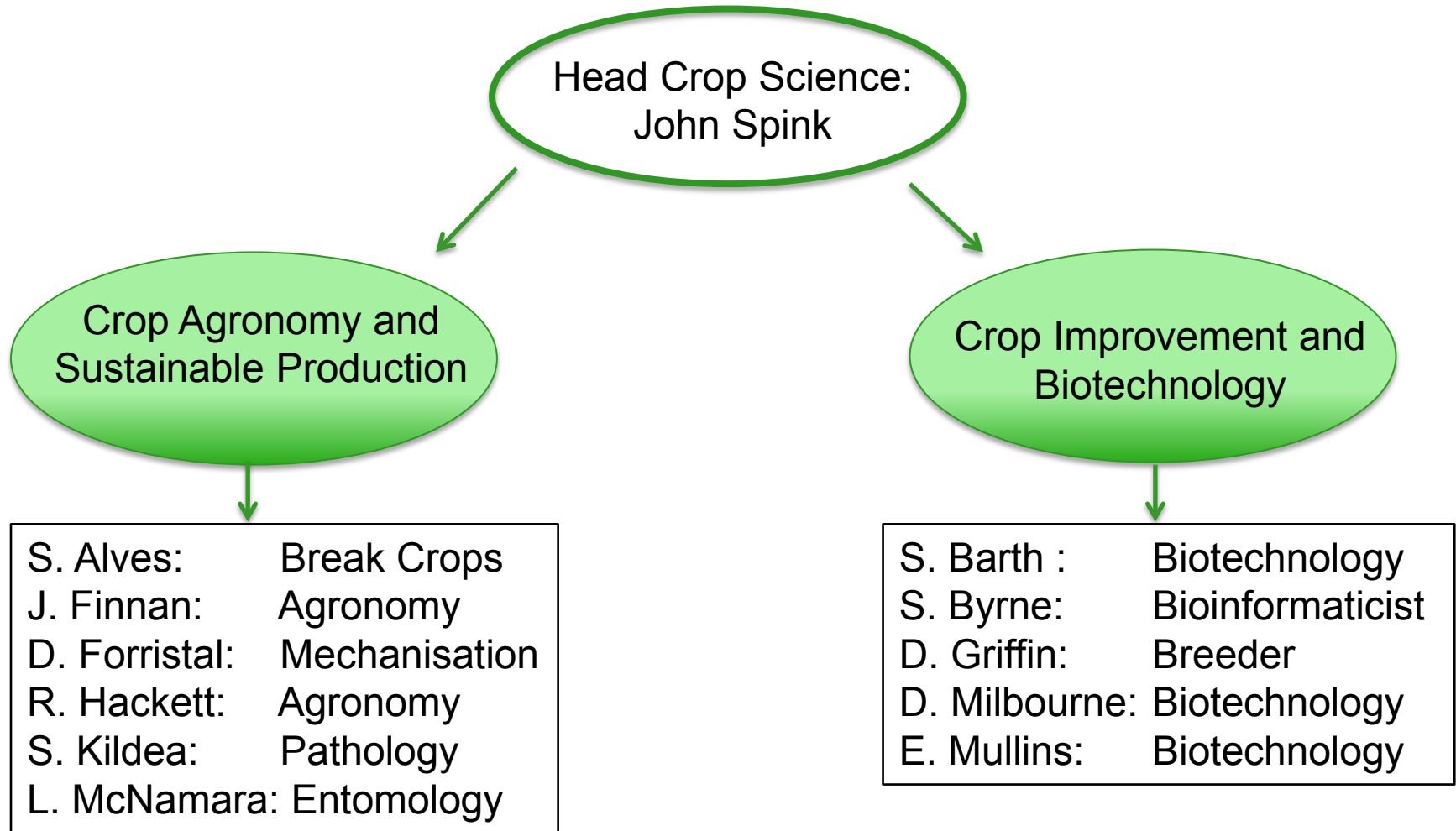
To develop cost effective crop production systems that:

- Improve competitiveness, profitability and product quality
- Minimise impact on the environment

To develop molecular tools and breeding approaches that:

- Determine the genetic basis for key traits/ characteristics of crops, weeds, pests and pathogens that impact on production
- Allow the incorporation of improved disease resistance and other traits in varieties targeted for Irish growing conditions

Crop Science: Structure and Programmes



Crop Agronomy and Sustainable Production:

- **Crop agronomy**
 - » Building a comprehensive knowledge base to underpin sustainable crop management
- **Crop Nutrition:**
 - » N optimisation for yield and quality including the role of cover crops, dealing with in-field variability and crop reflectance sensing techniques.
- **Break crops /rotation**
 - » Developing the agronomy of break crops including crop establishment for our climate
 - » Evaluating new crop options.
- **Disease / Weed / Insect control**
 - » Monitoring pathogen, insect and weed sensitivity to chemical plant protection products
 - » Developing/evaluating integrated pest management techniques for our climate and crops
 - » Understanding the molecular underpinning of sensitivity loss and varietal resistance loss
- **Soils / mechanisation**
 - » Evaluating /Adapting mechanisation systems for our farm structures, climate, soils and cropping practices

Crop Improvement and Biotechnology

Contribute to sustainable competitive production by:

- » Breeding improved varieties of potato for a variety of markets
- » Monitoring / understanding the reduction of sensitivity of pathogens to fungicides and the breakdown of varietal disease resistance.
- » Developing biotechnology tools for the genetic improvement of perennial ryegrass, white clover, potatoes and other species
- » Assessing the potential impact of novel GM crops for policymakers, and to develop management strategies for GM crops
- » In particular to contribute to the development of crop varieties that minimise the need for chemical plant protection in our climate

Key Activities

- Developing a new approach to crop improvement by sourcing and integrating improved genetics e.g. VICCI
- Monitoring the changing challenges caused by resistance development in pathogens weeds and pests
- Developing more robust cropping systems including rotations, cultivations, targeted nutrients and integrated pest management

Impacts

- The highest yields of winter wheat and spring barley in the world
- World leading capacity in disease resistance monitoring and disseminating related integrated pest management advice
- The provision of quality potato varieties that successfully penetrate many different markets.

Sample project:

Virtual Irish Centre for Crop Improvement

Six Crops

Four Challenges for Irish Agriculture



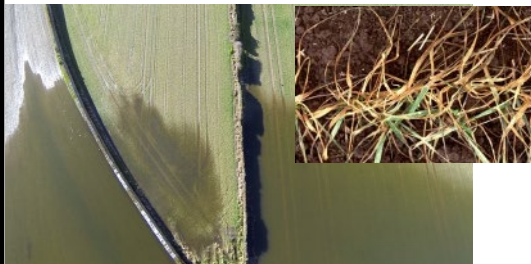
Nutrient Use Efficiency



Disease Resistance



Abiotic Stress Tolerance



Import Replacement



Crop Science Resources

People:

| | | | | |
|---|------------------------------|-----------|------------------------------------|-----------|
| » | Researchers: | 12 | Technicians/technologists : | 10 |
| » | Post docs (contract): | 7 | Contract technical: | 6 |
| » | Walsh Fellows: | 27 | Admin: | 3 |

Facilities:

- » 220ha of land for trials + additional farm sites
- » Suite of trials machinery with 3 fully instrumented plot combines and GPS guided machines
- » In-field crop monitoring equipment and extensive crop processing laboratories
- » Molecular labs (3), plant pathology labs (2), and breeding programme support facilities
- » Glasshouses and growth chambers

Collaboration / Linkages

- **Internal**

- » **CELUP:**

- GHGs and Carbon
- Crop nutrition and fate of nutrients

- » **AGRIP**

- Grass breeding, feeds

- » **REDP,**

- Economics

- » **FOOD**

- Nutrition

- » **Advisory specialists;**

- **External**

- » **Industry:**

- Growers
- Merchants Seed and plant protection

- » **Research**

- Universities
- Research institutes