Variety traits for the future

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Technologies in plant breeding

Conventional Breeding
- Crossing & phenotype selection
- Field focused improvements

Hybrid Technology
- Integration of genotypic, phenotypic and environmental information

Predictive Breeding
- Integration of genotypic, phenotypic and environmental information

OM Technology
- Exploit variation outside the species

Accelerated Breeding
- Shortened breeding cycles
- Faster rates of genetic gain
- More genetic understanding

GM Technology
- Exploit variation outside the species

New hybrid barley system: step-change in farm profitability

Conventional barley system
- Farmer pays: £750/ha
- Barley yields: 7.5 t/ha
- Farm profit: £113/ha

Hybrid barley system
- Farmer pays: £790/ha
- Barley yields: 9 t/ha
- Farm profit: £245/ha
- ROI of 3.3:1

UK hybrid barley solution
- Unique seed technology innovation
- Higher yield potential, better consistency / stress tolerance
- Requires change in agricultural practices: “Grow barley like wheat”, tailored inputs
- Tailored ag input protocols, leveraging Syngenta technology breadth/expertise
- On-farm education, leveraging Syngenta sales force reach

Result

Marker assisted trait selection: an example in wheat

Healthy wheat
- Isolate DNA from young plants

Infected wheat
- Selected plants
Benefits of double haploid breeding

- Double Haploid technology creates true-breeding lines in a single step.
- Combined DH & molecular marker technologies result in increased rates of genetic gain.
- Facilitates multiple trait stacking/pyramiding.
- Increases efficiency & probability of successful product development.
- Reduces time to market.

Modern Breeding Research
Technology integration for improved, faster product development.

Example: tomato fruit quality

- 300 diverse lines for candidate gene selection.
- “genome-wide” genotyping.
- 100 agronomic traits and metabolites scored.
- Genetic analysis to find markersgenes associated to the main traits (taste, colour, texture...).
- Integration of knowledge into ongoing breeding strategies.

Example: Drought - The Agrisure Artesian™ solution

- Using state of the art biotechnology and breeding capabilities...
- To deliver an innovative solution...
- Developed from the natural diversity of corn...
- That is on track to be the first to market drought tolerance product for farmers.

Benefits of Agrisure Artesian™ technology
Example: Insect Management - Agrisure Viptera™

Example Biofuels: Enogen Benefits In Corn Ethanol

Example: Delicious Melons

Example: Healthy and Colorful Lifestyle

Summary

- The Plant breeder has novel tools which enhance his/her ability to deliver novel products
- The demands of the world population not only increase but there is a paradigm shift to quality and sustainability
- We need two levels of integration:
  - A focus on production systems, where agronomy leverages the benefits of plant genetics and crop protection
  - Open collaboration where knowledge networks ensure that we share and build our capabilities through public-private partnerships

Thank you very much!