



Innovation in Agriculture
The role of Plant Breeding

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The role of Plant Breeding – Ag Innovation
05.02.2015

Presentation Structure

- ✿ About ESA European Seed Association and the EU seed sector
- ✿ The value of seeds
- ✿ Contributions of plant breeding...
- ✿ ... in a challenging environment
- ✿ Potential growth areas
- ✿ Competitiveness
- ✿ Commitment and conclusions

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ESA in words

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Representing the European plant breeding and seed production sector:

- ✿ 52 direct company members
- ✿ 36 national association members
- ✿ 31 associate members

The voice of the sector towards:

- ✿ European Institutions (EP, COM, Council)
- ✿ Other Institutions: CPVO, ISTA, OECD, UPOV, UN-ECE

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ESA in pictures

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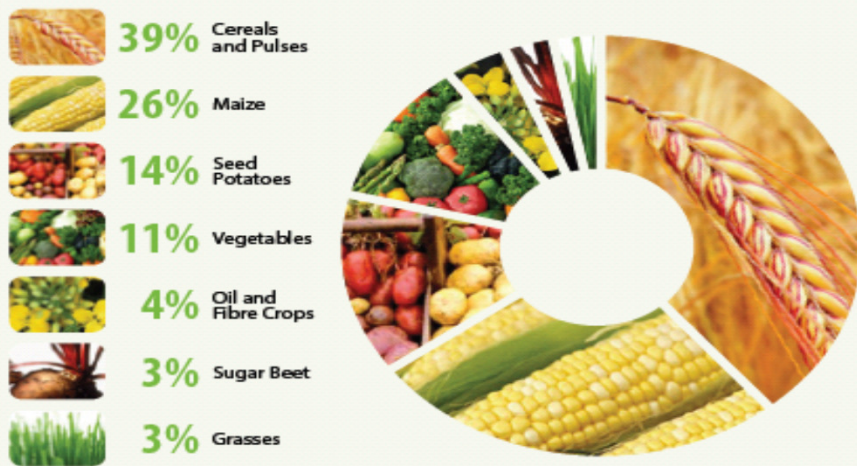
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European seed sector

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Total value commercial EU Seed Market ~ 7bn €



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European Seed Sector - Facts & Figures

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Item	Importance
Value EU seed market	€ 7 bn
Export	EU first seed exporter
Number of seed companies	7.000 - 70% SME
Employment	ca 52.000
Annual R&D Spending	4% – 20% (of turnover)
R&D Stations	750
R&D Employees	ca 12.500

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The value of seeds - Innovation & Impact

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Annual R&D spending of seed industry EU	Up to 20% ≥ € 1 bn
Value seed market EU	€ 7 bn
Farm gate value agricultural products EU	> € 70 bn
Value processed agricultural products EU	> € 700 bn

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The value of seeds

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Yield from 1 kg of seed at average seeding rates

<u>Crop</u>	<u>Yield from 1 kg seed</u>
Maize	500 kgs grain
Oil seed rape	<1.000 kgs oil seed
Tomato	3.0 – 9.0 mill. kgs tomatoes
Sugar beet	10.000 kgs sugar
Soybean	80 kgs beans
Wheat	70 kgs grain

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Contributions of plant breeding

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Breeding for yield increase: produce more from the same land in a sustainable manner

- ✿ 1940 – 1970: 50% yield increase based on genetics
- ✿ 1980 – : 90% yield increase based on genetics

Plant breeding is THE key technology for achieving sustainable intensification of (EU) farming!

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Contributions of plant breeding

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Breeding for resistance to biotic stresses

- ✿ 10.000s of resistant varieties to fungi, insects, viruses, bacteria, nematodes, etc.
- ✿ disease resistance alone saves
 - The environment (less spraying)
 - 100 of millions of Euro/yr in crop protection products

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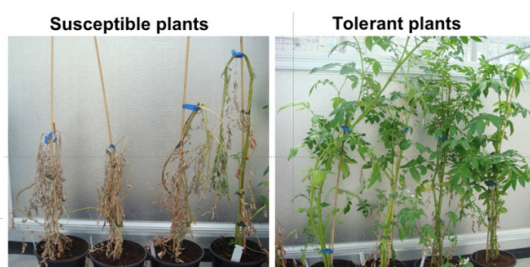
Contributions of plant breeding

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Breeding for resistance to abiotic stresses

- Plant Breeders focus on tolerance for:
 - Drought (90 million people affected/yr)
 - Flood (106 million people affected /yr)
 - Salt (900 million ha affected)
 - Better nutrient uptake



Potato plants grown without watering for 3 weeks

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.... in a challenging environment

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Plant breeding in the starting blocks

- World population to reach 9 to 10 billion by 2050
- Food production must increase 2 to 3 times by 2050
- Climate change threatens up to 20% of today's productive land
- Water shortage, salination etc. may limit crop options
- Loss of productive land to housing etc.
- Societal demand to preserve currently unused land (forests) etc.



Challenges for plant breeding as key input technology for a sustainable intensification of (European) farming

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Potential growth areas – Plant breeding

- ✿ Bioenergy & Bioeconomy
- ✿ nutrient and water use efficiency, bioremediation and soil improvement;
- ✿ highly targeted biobased applications and to deliver specific ingredients;
- ✿ Identification of new crops for the bioeconomy

Yield & resistance

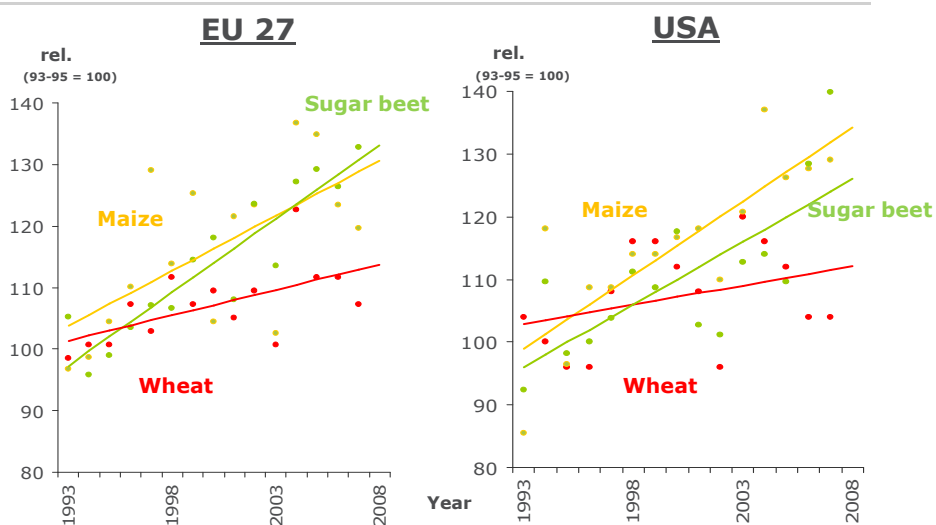
remain key for all crop production, irrespective of final use(s)

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Competitiveness – Genetic gain (Yield)



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Competitiveness – genetic gain (Yield)

Maize

- yield difference in tons per ha


	1990	2010
USA	0	+ 1 ton
Europe	+ 1 ton	0

Reasons

- lack of investment
- lack of access to new technologies

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Making innovation reality

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graph TD
    LF[Legal frameworks] <--> F[Funding]
    LF <--> P[Policy]
    F <--> P
    
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Commitments & conclusions

- ✿ Innovation and technology are key for agriculture
- ✿ Research **is** fundamental –
but shouldn't stay fundamental **only...**
- ✿ Political role of science
- ✿ Safeguard competitiveness of EU Agricultural production



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