ESA

European Seed Association

Potential obstacles for future plant breeding

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DanSeed Symposium 2011
March 8, 2011

Disclaimer: The presentation contains the personal views of the author and does not necessarily reflect the position of ESA.

Before I start:

SOME WORDS ABOUT ESA

ESA

About ESA:

ESA is the voice of the European seed industry, representing the interests of those active in research, breeding, production and marketing of seeds of agricultural, horticultural and ornamental plant species.

ESA's mission is to work for:

- effective protection of intellectual property rights relating to plants and seeds;
- fair and proportionate regulation of the European seed industry;
- freedom of choice for customers (farmers, growers, industry, consumers) in supplying seeds as a result of innovative, diverse technologies and production methods;

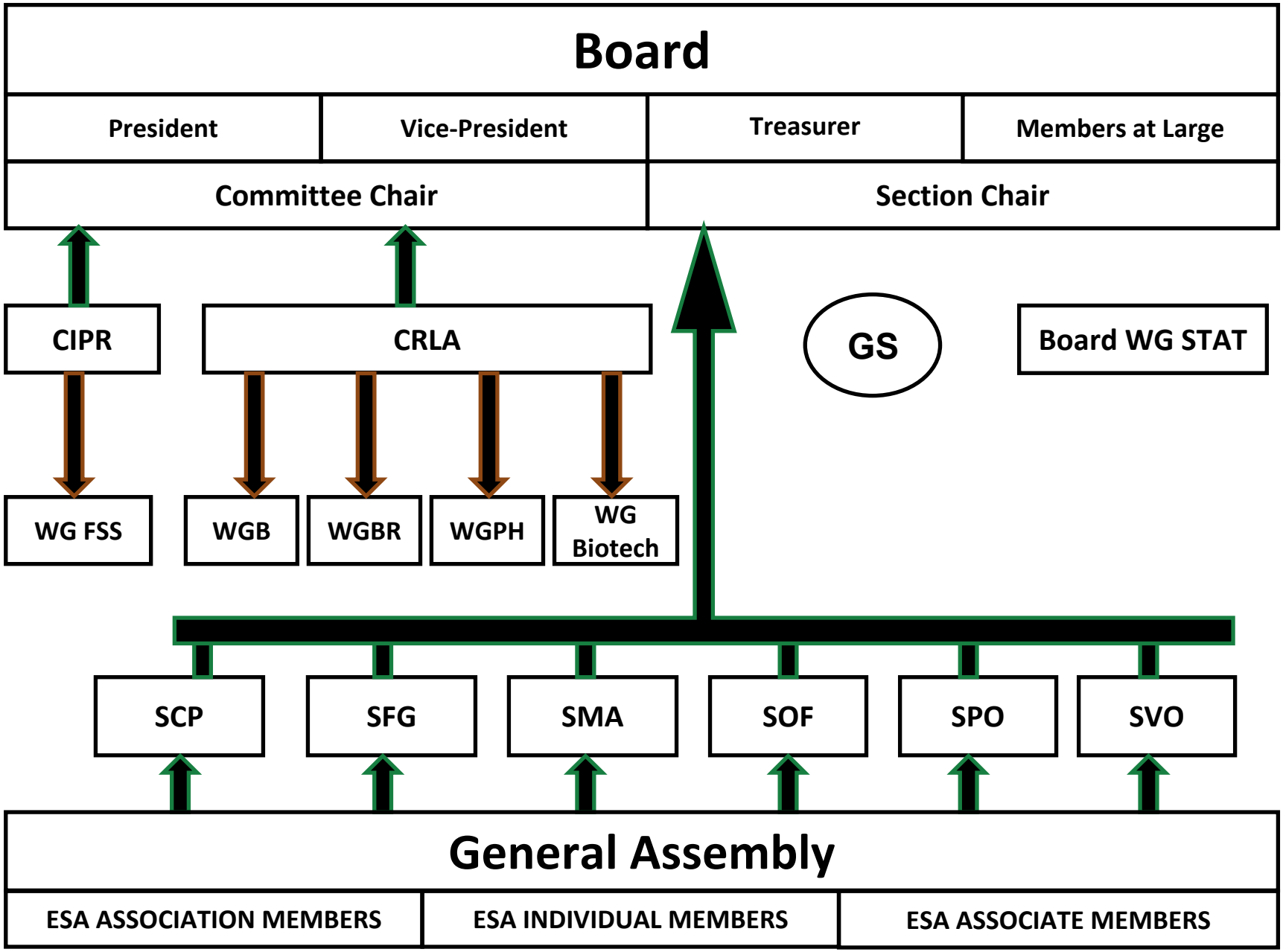
ESA

ESA members:

- Association members:
  - 35 National Seed Associations
- Individual Members:
  - 43 Seed Companies – direct members
- Associate Members:
  - 18 Companies

ESA Members today

ESA Structure



Summary

1.Are there any obstacles for plant breeding?

2.What are the obstacles?

3.How to overcome the obstacles?

ARE THERE ANY OBSTACLES FOR PLANT BREEDING?

Are there any obstacles?

obstacle = plant breeding cannot function in a way to meet its aim

aim = creation of plant varieties capable to meet new needs and challenges → innovation

↓

obstacles = elements that impede or slow down the continuous innovation

↓

Yes, there are obstacles to plant breeding.

WHAT ARE THE OBSTACLES?

Innovation

Innovation is key for plant breeding

How is this innovation stimulated?

By two major means:

- via a well designed regulatory framework: seed marketing legislation
- via a balanced and effective IP protection

Innovation – S&PM

The Seed Marketing Legislaion:

- has created a level playing field for European breeders
- has created a common market for seed
- has provided farmers and growers with ever better quality and choice
- has made more biodiversity available than ever before

↓

Stimulates innovation in its current form → no obstacle

N.B.: under review

Innovation - IP

IP protection:

IP = exclusive right (monopoly) granted by the State to an inventor

IP → allows a fair return on investment

↓

IP stimulates innovation

Innovation - PVP

IP protection in plant breeding:

Plant variety protection – UPOV Convention

Specific: tailored to the needs of the plant breeding sector

Exclusive right but “open source” → breeding exemption

Allows a return on investment but proper enforcement necessary

Innovation - PVP

Enforcement of PVP

→ Weak point:

- enforcement possibilities not satisfactory
- farm saved seed

↓

Can become an obstacle to plant breeding and breeding progress

Innovation - PVP

What is the problem?

Self-reproducing material → easy to infringe, difficult to police and prove

Enforcement provisions not tailored to the specific material and IP

Innovation - PVP

FSS: current legislation makes enforcement and royalty collection burdensome and ineffective

"Clue"??

Innovation - PVP

How to overcome this obstacle?

Improve the legislation

EU PVP Regulation – currently under revision

↓

Room and possibility for improvements

Innovation - patents

IP for plant-related inventions:

Patent protection – “new”, unusual tool for the sector

For: innovative breeding techniques; GM traits; but also for breeding methods; native traits

Real monopoly situation – no breeding exemption = no possibility to freely use the genetic material for further breeding

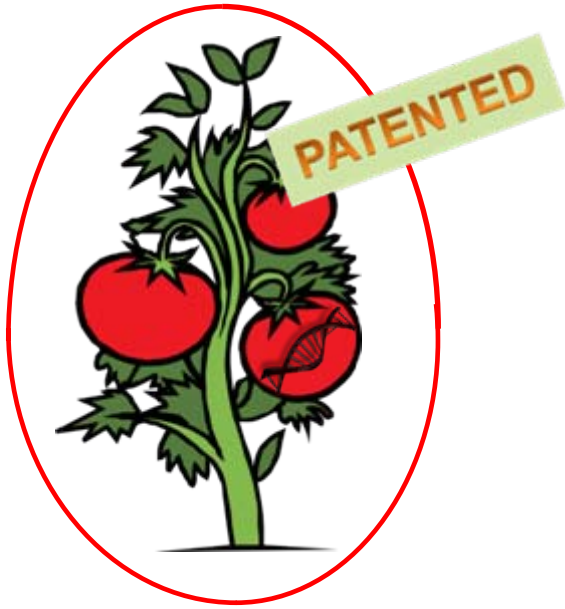
Innovation - patents

Difference between the two systems:

PVP

a plant variety =
a <u>specific</u> combination
of genetics

Patents



a <u>generic</u> building block =
a gene / trait

Innovation - patents

Innovation in plant breeding – dependent on the availability of genetics

Patents – may protect the building blocks - touch upon the basics of breeding

Innovation - patents

Potential consequences:

If building blocks are patented

→ pool of freely available genetics reduced

→ less basis for innovation

Available if one can afford

→ few can afford

→ reduction of the diversity of the sector

→ reduction of choice

Innovation - patents

This is NOT to say that:

- patents are not good for innovation
- plant breeding sector does not need patents

To the contrary:

- Patents are necessary to protect important inventions
- PVP can only provide protection for plant varieties as such – not for other subject matter

BUT tendency: more and more things get patented that should not – do not merit patent protection

→ a solution is needed

Innovation - patents

WHAT IS THE SOLUTION?

I don’t know.

Innovation - patents

Within ESA – IP committee

→ discussing the topic

→ trying to find the best way to cope with the problem

Both regarding:

- Kinds of patents granted
- Access to patented genetic material for breeding

Some recent developments

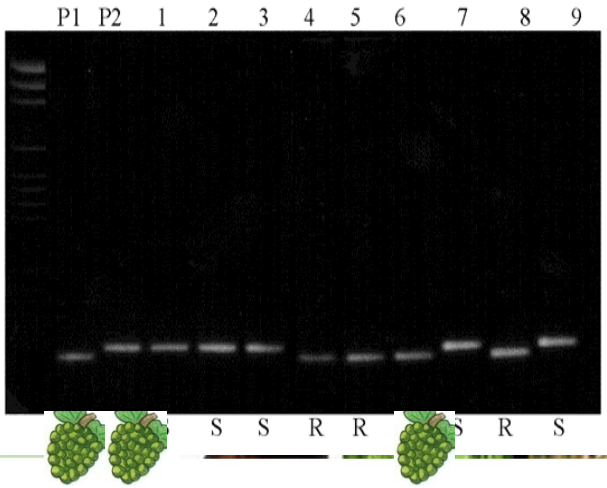
Broccoli decision (G2/07)

X

= biological crossing

→ not patentable

+



= technical step involved

→ not patentable

Way forward

Broccoli provides a small clarification

Need for further clarification on patentable subject matter

→ how?

Balanced solution to ensure the smooth continuation of traditional breeding work but keep incentive and reward for “real” plant-related inventions

THANK YOU FOR YOUR ATTENTION!

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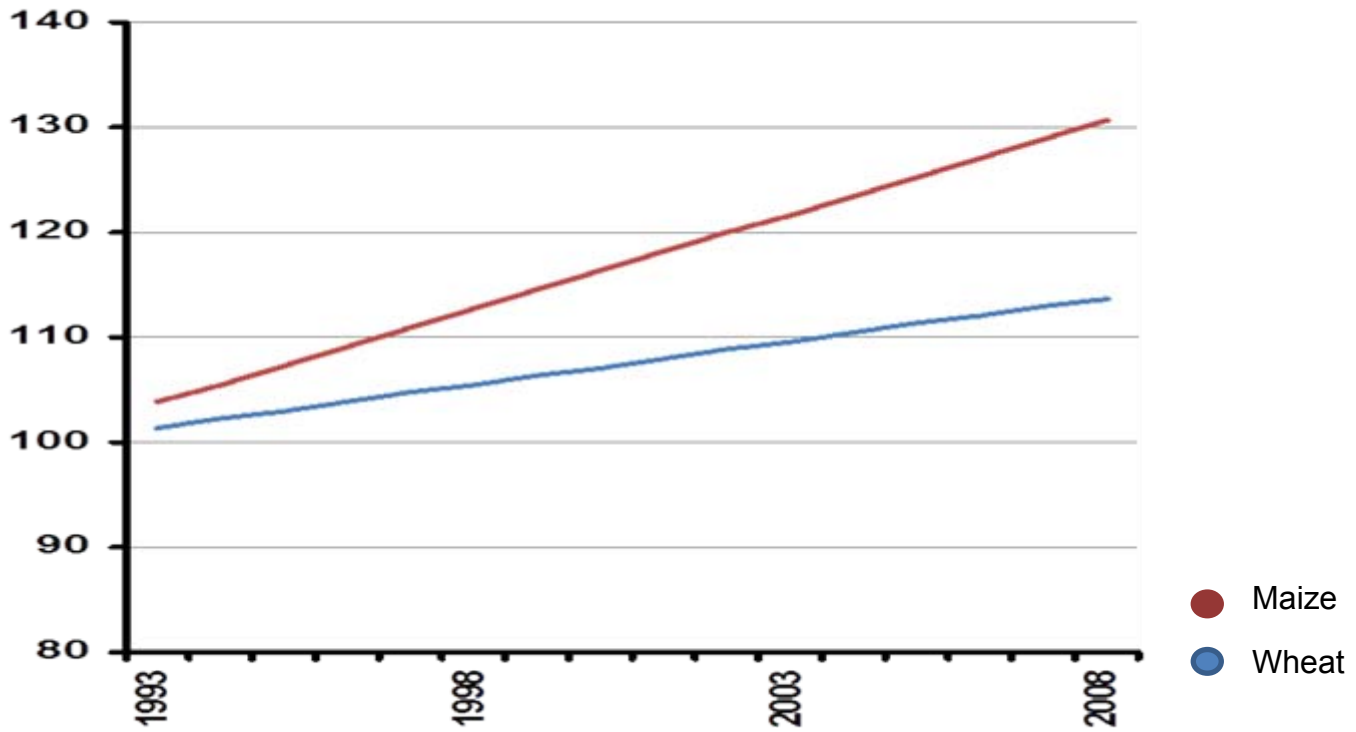
Back-ups

FSS

Yield development in maize and wheat in EU 27



Source: FAOSTAT

Patent data

According to data of the EPO (2009):

1300 European patents have been granted for inventions relating to plants

of which:

- 1221 for inventions involving genetic modification of a plant
- 79 for inventions which do not involve genetic modification

Source: EPO

Broccoli decision

1. A method for the production of .*Brassica oleracea* with elevated levels of 4-methylsulfinylbutyl glucosinolates, or 3-methylsulfinylpropyl glucosinolates, or both, which comprises:

a) crossing wild *Brassica oleracea species selected* from the group consisting of *Brassica villosa and Brassica drepanensis with broccoli double haploid* breeding lines;

b) selecting hybrids with levels of 4-methylsulfinylbutyl glucosinolates, or [illegible]inylpropyl glucosinolates, or both, elevated above that initially found in broccoli double haploid [illegible]

c) backcrossing and selecting plants with the genetic combina[illegible]xpression of elevated levels of 4-methylsulfinylbutyl glucosinolates, or 3-methylsulfinyl[illegible]s, or both; and

d) selecting a broccoli line with elevated levels of [illegible] glucosinolates, or 3-methylsulfinylpropyl glucosinlates {sic], or both, capable of cau[illegible]tion of phase II enzymes, wherein molecular markers are used in steps (b) and (c)[illegible]with genetic combination encoding expression of elevated levels of 4-methylsulfin[illegible]es, or 3-methylsulfinylpropyl glucosinolates, or both, capable of causing a strong in[illegible]nzymes."

2. A method accordin[illegible]n the *Brassica oleracea breeding lines are broccoli double haploid* breeding lines [illegible]SI alleles the presence of which results in self-incompatibility in the *Brassica oleracea* [illegible] *comprising crossing* wild *Brassica oleracea with broccoli double haploid* breeding lines cont[illegible]he specific SI alleles to produce plants; and selecting for said plants by screening for said specific SI al[illegible]es with molecular probes.

3. The method according to claim 1 or claim 2, wherein only 4-methylsulfinylbutyl glucosinolate is elevated relative to that initially found in the *Brassica oleracea breeding lines.*

4. The method according to claim 1 or claim 2, wherein only 3-methylsulfinyipropyl glucosinolate is elevated relative to that initially found in the *Brassica oleracea breeding lines.*

NOT PATENTABLE

Broccoli decision

5. An edible *Brassica plant produced according to the* method of any one of claims 1 to 4.

6. An edible portion of a broccoli plant produced according to the method of any one of claims 1 to 4.

7. Seed of a broccoli plant produced according to the method of any one of claims 1 to 4.

8. A broccoli plant having elevated levels of 3 -methylsulfinyipropyl glucosinolates, or 4-methylsulfinylbutyl glucosinolates, or both, wherein the broccoli plant is a hybrid plant following crossing of broccoli double haploid breeding lines with wild *Brassica oleracea species selected from the group* consisting of *Brassica villosa and .Brassica drepanensis* and the levels of 3-methylsulfinylpropyl glucosinolates, or 4-methylsulfinylbutyl glucosinolates, or both, are between 10 and 100 pmoles per gram of dry weight of said plant.

9. A broccoli inflorescence having elevated levels of 3-methylsulfinylpropyl glucosinolates, or 4-methylsulfinylbutyl glucosinolates, or both, wherein the broccoli inflorescence is obtained from a hybrid plant following crossing of broccoli double haploid breeding lines with wild *Brassica oleracea species* selected from the group consisting of *Brassica viliosa* and *Brassica drepanensis and the levels of* 3-methylsulfinyipropyl glucosinolates, or 4-methylsulfinylbutyl glucosinolates, or both, are between 10 and 100 pmoles per gram of dry weight of the inflorescence.