Use of plant variety protection and other IP in the development of agriculture

The perspective of an international breeding company

UPOV/USPTO “Train the trainer course” - May 6, 2015
Michael Kock

Syngenta offers tailored agronomic solutions

With the broadest portfolio in the industry

Seeds
Seed Care
Crop Protection
Lawn and Garden
Syngenta … in a glance

- Over $1.4 billion annual R&D investment and more than 5,000 R&D staff
- Over 27,000 employees in some 90 countries
- $15.1bn sales in 2014

Innovating across technologies to transform the way crops are grown

<table>
<thead>
<tr>
<th>Grower's needs</th>
<th>Technology</th>
<th>Weed control</th>
<th>Insect control</th>
<th>Disease control</th>
<th>Nematode control</th>
<th>Yield potential</th>
<th>Nitrogen efficiency</th>
<th>Drought</th>
<th>Quality traits</th>
<th>Labor shortage</th>
<th>Post harvest</th>
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<td>Biological solutions</td>
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Breeding: myth and reality
High technology in an easy-to-copy form

Every plant used in agriculture today is genetically modified by man
(with the exception of some wild berries and mushroom)

Example: Clubroot in Broccoli & Cauliflower

Problem: Clubroot is a devastating disease in broccoli, cauliflower, white cabbage with no solution.

Solution: Clubroot resistant broccoli by introgressing a resistance from Chinese cabbage.

The chimera was not viable. Embryo rescue and multiple backcrossing was used to establish a broccoli with the resistance gene.

Costs: 18 years; >€10m

Challenge: Starting from Syngenta’s commercial variety competitors can “extract” the new trait by conventional breeding within 3 years.
Development of new plants
A lengthy and costly endeavour

<table>
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<tr>
<th>Stage</th>
<th>Time (a)</th>
<th>Costs</th>
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<tr>
<td>R &amp; D</td>
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The IP tool kit
Protection of plant related innovations

Plant Variety Protection
Patents
Breeding traits

Conventional breeding
GM traits

Protection by

Time

Classification: Public
Plant variety protection vs. Patents
Exclusivity is not exclusivity: Why we need both

Plant variety protection for variety A
(Protection of the whole – but not the part)
- Protects plant variety defined by all characteristics.
- Breeders exemption
  → Efficient protection for variety A
  → No efficient protection for gene / trait X

Patent for Gene X
(Protection of the part – but not the whole)
- Protects an invention (new gene).
- Limited breeders exemption (DE, FR, NL, CH, UPC)
  → Efficient protection of gene / trait X
  → No efficient protection for variety A genetics

1. Prerequisites: PVP is granted for a plant variety if it is
   i. Distinguished (by at least one relevant feature)
   ii. Uniform (low genetic variability within a population)
   iii. Stable (over several propagation cycles)

2. Exceptions:
   • Farm-saved-seed: Farmers can save grain for use as seed.
     - EU: FSS is limited to certain species, farmer has to pay a fee
     - CH: FSS is free (not UPOV 91 conform)
     - Problem: Enforceability (value loss: >50% in wheat).
   • Breeders exemption: Breeders can freely use a protected variety for breeding new varieties incl. commercialization.
     - Problem: Progress in breeding technology has shortened the breeding cycle to 30-50% over the last 20 years.
     - Copy-cat varieties can be developed very fast → Erosion of effective protection

Flower forms for DUS testing of azalea
Plant Breeding & Patentability
A world in Black & White?

Breeding (incl. native traits)

New Breeding Techniques

Plant Biotechnology

<table>
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<th>Patentability</th>
<th>Process</th>
<th>Plant</th>
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<th>Patentability</th>
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| EU: Politically not wanted |

G2/12!

Statutory exceptions
Large global heterogeneity

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Different countries - different claims
→ Complex global freedom-to-operate
### Syngenta IP Use

#### Plant related patent applications 2014

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<th>Category</th>
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<td>US Variety Patents (seed propagated)</td>
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<td>US Plant Patents (vegetatively propagated)</td>
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#### Plant variety protection applications (2014)

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<table>
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<tr>
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<th>Soybean</th>
<th>Corn</th>
<th>Others</th>
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<td>213</td>
<td>93</td>
<td>59</td>
<td>52</td>
<td>30</td>
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<td>460</td>
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</table>

The other side of the coin
Freedom & license to operate

1995
- Seed Industry

2015
- Seed Industry

2025
- Seed Industry

CP + Biotech Regulatory

CBD: Convention on Biological Diversity
Plant related innovation
Balancing protection, access, and benefit sharing

- Unprecedented need for innovation
- Increasing technification and investment
- Increasing complexity of IP, legal, and regulatory landscapes

Protection
- Incentive for knowledge sharing
- Incentive for innovation ($ return / exclusivity)

Public Goods
- Preservation of genetic diversity & environment
- High quality seed & food
- Diversity of choice

Access
- Manageable transaction / legal / regulatory costs
- Access to genetic resources

IP is a Tool
IP is a tool

A tool as such is neither good nor bad
A tool can be used in a beneficial or problematic way

**Beneficial use**
- Licensing, technology dissemination, benefit sharing
- Enables “open innovation”

**Beneficial effects**
- Encourages innovation & R&D investment
- Encourages knowledge sharing

**Problematic use**
- Monopolistic / anticompetitive use ("trolls")

**Problematic effects**
- Can block innovation (if without research exemption)
- Can increase transactional & legal costs

Can we minimize the problematic effects without losing the benefits?

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**Shaping “New use of IP”**

**Plant Innovations**

- **High Quality Patents**
- **Patent Transparency**
- **Access to Genetic Diversity**
- **Access to Plant Innovation**

- European Seed Association PINTO Database
- Limited Breeders Exemption DE FR NL CH UPC
- Internat. Licensing Platform Vegetables

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Classification: Public
Patent Transparency

**Issue:** It is often difficult to find out whether a plant variety is patented.

**Solution:** Databank to link plant varieties to related patents.

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### Welcome to the PINTO database

PINTO (Patent Information and Transparency: Oils) has been created with the aim to provide an interactive, user-editable and accessible patent database. PINTO’s unique project provides the link between a plant and its related patent. The primary goal of PINTO is to allow breeders to make a more informed choice when deciding whether or not to use a particular plant variety, especially when it is not clear whether the variety was patented. The main feature of PINTO is the search tool function which allows users to look through the content of the database. In order to become a user an account has to be created which can be done by clicking on the “Register” button. If you are already a registered user click on “Go to database” to quickly access the search form.

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**Classification:** Public

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**International Licensing Platform - Vegetables**

**Basic principle:** “Free access but not access for free”

- No obstruction of breeding material through patents
- Limited to vegetable “non-regulated” traits and variety patents
- Contractual breeders exemption: right to use legally available material for breeding and commercializing new varieties (excludes the use of patented technology e.g., markers)
- Reasonable, independent reviewable remuneration for patent holder
- Fast and pragmatic baseball arbitration of remuneration disputes
- Consistent with competition law
- Broad stakeholder acceptance
Aiming for FRAND Licenses

Key Elements

1. Transparency
2. Most-Favored Nation Principle
3. Fair & Independent Pricing
4. Pull-in Effect “Give & Take”

Baseball Arbitration (the basics)

- Bilateral Agreement within 3 months?
  - Yes: Bilateral License Agreement
  - No:
    1. Both parties submit a proposal for a royalty percentage
    2. Secretary provides submissions to both parties

- Agreement within 3 weeks?
  - Yes: Bilateral License Agreement
  - No: Expert Committee choses between the two submissions the most reasonable

- Binding Standard License Agreement

- Sets “Most-favored-nation” royalty %
- Other members can directly obtain license at same terms
- Arbitration fees are paid by the “losing” party
Summery

- 4 years of negotiations
- Launched Nov. 12, 2014
- Currently 11 members
  (60% vegetable seed market share)
  - Agrisemen, Bayer, Bejo, Enza, Holland-Select, Limagrain, Limgroup, Pop Vriend, Rijk Zwaan, Syngenta, Takii
- 8 Parties in the process of joining the ILP.
- Estate: approx. 120 patent families
  (60% of the relevant patents in the vegetable field)

Thank you very much!