Plant Variety Protection Seminar
Hangzhou City 8-10 January 2018
Recent developments in PVP in the Netherlands and the European Union

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Naktuinbouw, the Netherlands
20 years of PVP in China, 75 years PVP in the Netherlands. For both countries in the coming years important developments can be expected.
Plant breeding in the Netherlands

• The Dutch Breeding sector - world market leader
  o Vegetables
  o Ornamentals
  o Potatoes

• 24% of value of world export of seeds and propagating material from the Netherlands
Plant breeding in the Netherlands

The Netherlands:

• +/- 350 breeding companies

• Small and Medium Sized Enterprises

• 20-30% of annual turnover - R&D

• Return on investment needed!
Plantbreeding in the Netherlands

- Why is plant breeding in the Netherlands so successful?
  - Climate
  - School system, training
  - Size of the country (too small to be a threat, export to survive, languages to export)
  - Trading Nation
Two kinds of PVP: (1) Regional European Union PVP or (2) National PVP
Total 65,673 applications since 1960 for 665 different species (PVP and Listing):
## Number of applications

<table>
<thead>
<tr>
<th>Crops</th>
<th>2016 List</th>
<th>2016 PVP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nat</td>
<td>CPVO</td>
<td></td>
</tr>
<tr>
<td>Ornamentals</td>
<td>-</td>
<td>232</td>
<td>562</td>
</tr>
<tr>
<td>Agriculture</td>
<td>251</td>
<td>82</td>
<td>8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>676</td>
<td>486</td>
<td>111</td>
</tr>
<tr>
<td>Trees</td>
<td></td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>927</td>
<td>800</td>
<td>700</td>
</tr>
</tbody>
</table>
Benefits of Plant Breeding

Socio–economic impact of Plant Breeding in the EU (Noleppa report)

http://www.plantetp.org/hffa-research-paper-plant-breeding-eu

- 1.24% yield increase / year
  - 74% yield increase = Plant breeding
- Reduction of CO2 emissions
- Prevention of loss of biodiversity
PVP and Small holder farmers

- Where do smallholder farmers get their seeds from?
- 9660 observations across six countries, covering 40 crops
  - 51% from local markets
  - 31% farmers own stock
  - 8.6% from neighbours
  - 7.3% from government / NGOs / UN
  - 2.4% from agro-dealers

Observations from Kenya (UPOV member since 1999)
- 40% from local markets
- 36% farmers own stock
- 11.6% from agro-dealers
- 6% from government / NGOs / UN
- 5.7% from neighbours

www.seedsystem.org
# Focus Group on potatoes in Njabini, Kenya, April 2013

<table>
<thead>
<tr>
<th>Seed Type</th>
<th>Benefits</th>
<th>Drawbacks</th>
<th>Prefer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm-saved seed</td>
<td>Low cost</td>
<td>Could be diseased</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Known quality</td>
<td>Yield decreases over time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adaptability to land</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neighbours’ seed</td>
<td>Availability</td>
<td>Diseases</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Known quality</td>
<td>Mixed varieties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small quantity available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local market seed</td>
<td>Cheap ($12 for 50kg)</td>
<td>Unknown source</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Readily available</td>
<td>Mixed varieties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>Diseased</td>
<td></td>
</tr>
<tr>
<td>Quality Declared Seed</td>
<td>Disease-free</td>
<td>Leads to indebness if crop fails</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>High yielding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Credit Facility</td>
<td>Expensive (12% interest)</td>
<td></td>
</tr>
<tr>
<td>Certified Seed</td>
<td>Disease free</td>
<td>Not available (40km)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>High Yielding</td>
<td>Expensive ($29-50 kg + transport cost)</td>
<td></td>
</tr>
</tbody>
</table>
Plant Variety Protection - the Netherlands

Farmers Rights

Subsistence farmers (private and non-commercial use) - not present in the Netherlands

Farm Saved Seed (Farmers Privilege)
• Cereals - Potatoes
• Small farms
  – Information
  – exempted from payment
• Online system

https://www.eigenzaaizaad.nl/eigen-zaaizaad-fss/
Effect of PVP

- Incentive to invest in Research and Development?
- Does mankind gain?
- Contribution to agricultural and horticultural development?
Added value of tomato seed

• 1 for kilo tomato seed, a grower has to pay Euro 50,000 (more expensive than 1 kilo gold)
• From 1 kilo tomato seed the grower can grow 8 hectares of glasshouse tomatoes
• Per hectare he harvests 600,000 kilo that is worth prox 450,000 Euro (the one kilo seed represents 8x450,000 = 3,500,000 Euro)
• The consumer value of the harvested tomatoes is 3x3,5 milj = 10,000,000 Euro.
• So in the end the value of the seed is 200 times higher.

Source: Plantum
The effect of PBR in the Netherlands

NL PBR (applications)

- NL Kwekersrecht (aanvragen) Landbouw
- NL Kwekersrecht (aanvragen) Groente
- NL Kwekersrecht (aanvragen) Sier
- NL Kwekersrecht (aanvragen) Boomkwekerij
- NL Kwekersrecht (aanvragen) Totaal
The “CPVO effect”

NL + EU kwekersrecht (aanvragen)

- NL Kwekersrecht (aanvragen) Landbouw
- NL Kwekersrecht (aanvragen) Groente
- NL Kwekersrecht (aanvragen) Sier
- NL Kwekersrecht (aanvragen) Boomkwekerij
- EU Kwekersrecht (aanvragen) Landbouw
- EU Kwekersrecht (aanvragen) Groente
- EU Kwekersrecht (aanvragen) Sier
- EU Kwekersrecht (aanvragen) Boomkwekerij
- Totaal NL + EU KWR (aanvragen)
Reports taken over from the Netherlands

DUS take over requests in the Netherlands

- Countries inside the EU
- Countries outside the EU
- CPVO
- Total take over requests
Reports taken over by the Netherlands

DUS take over requests by the Netherlands

Countries inside the EU
Countries outside the EU
CPVO
Total take over requests
A system for the intellectual protection of plant varieties was established by a Regulation of the European Community in 1994.

The intellectual property rights granted under this system are valid throughout the territory of the 28 Member States of the European Union (EU) encompassing over 450 million consumers.
Application procedure:

- One application
- One procedure
- One technical examination
- One decision
- One valid right covering the territory of the 28 Member States of the European Union
The CPVO has not created its own technical infrastructure.

Technical examination to confirm DUS is carried out by the Examination Offices such as Naktuinbouw entrusted by the Administrative Council.
CPVO network of Examination offices in the EU
Technical examination

• Once the technical examination is concluded, a technical report (positive or negative) for the CPVO, with accompanying variety description in case of positive report.

• Applicant is given an opportunity to comment on the draft report and description before the Committee takes a decision on the application for Community rights.
Cooperation with other UPOV members

Selling of technical reports

If a technical examination of a variety has been or is being carried out in view of a Community plant variety right, national authorities having received an application for the same variety may consider the examination report of the CPVO to be sufficient basis for their decision.
Applications per year in CPVR System

Number of applications received from 01/01/2006 to 31/12/2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Applications received</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2,751</td>
</tr>
<tr>
<td>2007</td>
<td>2,998</td>
</tr>
<tr>
<td>2008</td>
<td>3,007</td>
</tr>
<tr>
<td>2009</td>
<td>2,768</td>
</tr>
<tr>
<td>2010</td>
<td>2,886</td>
</tr>
<tr>
<td>2011</td>
<td>3,184</td>
</tr>
<tr>
<td>2012</td>
<td>2,868</td>
</tr>
<tr>
<td>2013</td>
<td>3,297</td>
</tr>
<tr>
<td>2014</td>
<td>3,626</td>
</tr>
<tr>
<td>2015*</td>
<td>3,111</td>
</tr>
</tbody>
</table>
Applications per Sector

Number of applications from 27/04/1995 to 01/04/2016*

- Ornamentals: 31,309 (56.2%)
- Agriculture: 13,655 (24.5%)
- Vegetables: 7,270 (13.1%)
- Ornamentals: 3,432 (6.2%)
Guidance for DUS Examination

CPVO Technical Protocols

UPOV Technical Guidelines

National Protocols

160 Protocols

303 Guidelines

ca. 170 National protocols
Cooperation between authorities:

The Netherlands offers reports to all countries.
The Netherlands has:

- **Bilateral agreements:**
  - Rose: for Colombia

- **Multilateral agreements:**
  - Alstroemeria: centralised for EU / CPVO

**Other Examination Offices:**

- Flax: France
- Maize: France, Germany, Czech Republic
- Wheat: Czech Republic, Germany
- Fruit: Germany
Conclusion

- Plant Variety Protection in the Netherlands
  - Crucial for investment in plant breeding
  - Adapted varieties for other countries and climates
The Netherlands considers a strong PVP system in the world as important both for the world food situation as for the development of our seed industry.

As long as there are strong breeding activities in the Netherlands, there also should be a strong PVP system in place with local state of the art test facilities.
Future of PVP in the Netherlands

• If new developments in breeding make it necessary to adjust the PVP testing, the Dutch testing authorities should take the lead.

• The Netherlands is a strong supporter for international cooperation.

• Other countries are actively supported to develop their PVP systems.
Future of PVP in the Netherlands

• Ideally one single test in the UPOV area should be enough to establish if a variety is DUS.

• To reach this situation the management of common knowledge has to be centralized through international cooperation.

• Molecular data should be the basis for the management of reference collections.
Use of molecular techniques

• (Joint) Databases with molecular data should be established.

1. Based on sequence data a global SNP set should be developed.

2. Varieties of Common Knowledge should be tested on this marker set and included in a database.
Use of molecular techniques

• (Joint) Databases with molecular data should be established.

3. The database should be used to look for genetically indentical and closest varieties for inclusion in a growing trial with the candidate variety.

4. The morfological results from the growing trial will be used to recheck possible closest varieties.
Use of molecular techniques

- The database should be maintained by a small number of Examination Offices.
- The use of the databases should be free for all DUS authorities at a cost.
- Examples; potato database NL/UK
  Tomato database project France/Netherlands and China.
Challenges

• UPOV was created in the 1960’s, based on the state of breeding and by countries that already had a national variety protection and usually well established seed infrastructure.

• Now we are in the phase that new Member States often have no National system and sometimes no seed infrastructure either. An additional issue is that many new Member States have many small holder farmers.

• **Challenge** for UPOV to accommodate these different levels of development.
Challenges

• When UPOV was created, varieties were bred using classic techniques. Breeding was a long process. The vision of UPOV is based on that situation (e.g. breeders’ exemption).

• Today, varieties are created using Molecular techniques. This makes the breeding process much faster. More varieties come out of the programs, distinction could become a problem. Patent plays a bigger role.

• **Challenge** for UPOV to see how the DUS definitions can be handled in this Molecular world.
Challenges

• The UPOV system is based on morphological establishment of DUS. Resulting in a variety description.

• In a small regional based UPOV this works well. Today with many Member States in very different climates, the value of variety descriptions is limited. This leads to many repeating trials.

• **Challenge** for UPOV; ongoing discussions on the use of variety descriptions.
Challenges

- The UPOV system is growing and the number of varieties is growing. The management of Common Knowledge per MS is a growing burden. Cooperation between MS’s in different climate zones difficult due to the morphological approach of UPOV.

- Modern molecular techniques could be a good tool to cooperate. Joint databases with DNA of varieties of common knowledge are the solution.

- **Challenge** for UPOV; to combine molecular data with the morphological approach.
Challenges

• Modern breeding techniques such as Crips-Cas will speed up the creation of new varieties leading to more applications. But the differences between the varieties will be harder to detect and lead to more Essential Derived Varieties.

• **Challenge** for UPOV members; to deal with high numbers of applications and to further clarify the EDV concept.
Conclusion

• There is an important role for countries as China to help UPOV to understand the needs of many new and potential new Member States.

• Joining UPOV ‘91 with a law that is both in conformity with the UPOV convention, but at the same time pays attention to the situation in a non-western country, could be a huge contribution for other countries who are in doubt if they were to join UPOV or join UPOV ‘91
Questions?
Quality in Horticulture