UPOV

International Union for the Protection of New Varieties of Plants

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Technical Working Party on Automation and Computer Programs **TWC/35/7**

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NUMBER OF GROWING CYCLES IN POTATO

Document prepared by an expert from the Netherlands

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The Annex to this document contains a copy of a presentation “Number of Growing Cycles in Potato” to be made at its thirty-fifth session of the Technical Working Party on Automation and Computer Programs (TWC).

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[Annex follows]


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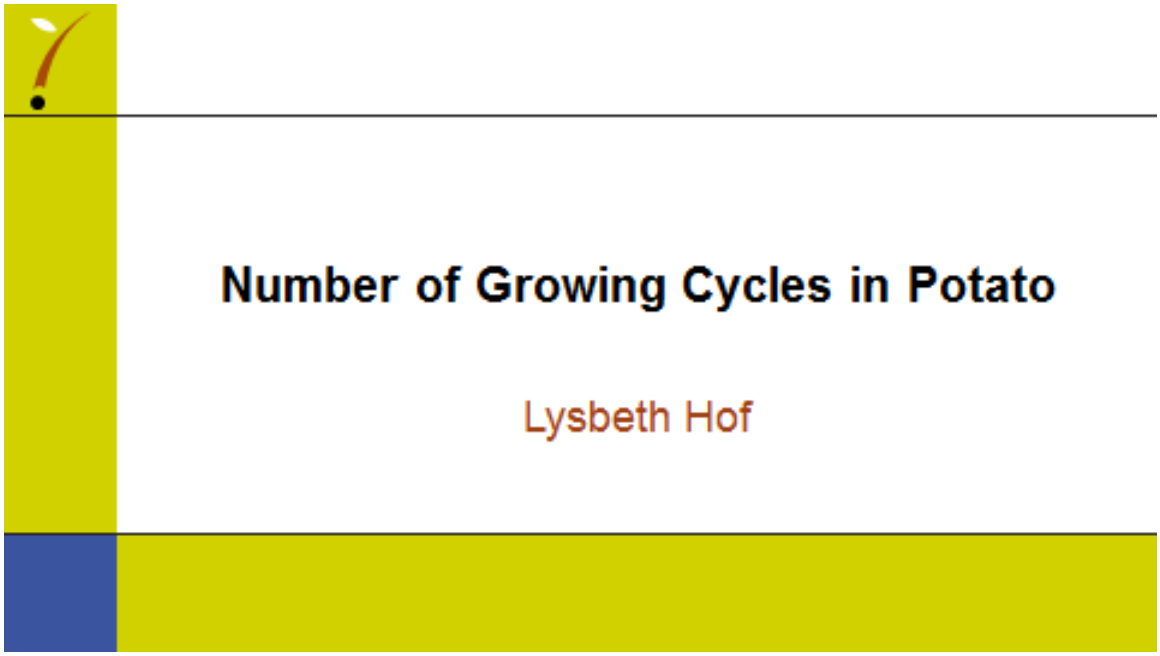
Number of Growing Cycles in Potato
Lysbeth Hof

Introduction

- Question: Is it possible to reduce the number of growing cycles in potato to 1 without loss of quality?
  - Effect on variety description
  - Other practical issues

Effect on Variety Description

- Comparison of description after 1 cycle with description after 2 cycles
- All new applications in period 2013-2016
- All observations by 1 person
- Observations in 2nd year independent of 1st year
- All withdrawn applications deleted
- End total of 117 varieties

Effect on Variety Description

- Descriptions according to CPVO TP/23/2 (similar to UPOV TG/23/6, minus 5 characteristics)
- 37 char. (33 QN and 4 PQ)
- Nr observations per variety can be smaller than 37:
  - Char 29 and 30 only observed if flowers not white
  - Char 37 only observed if tuber is yellow

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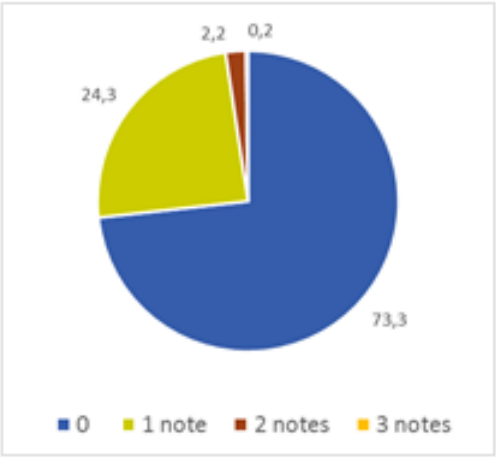
QN characteristics

Difference between scores after 1st cycle and final scores.
(QN char. only, 3673 obs., 117 var.)

Difference between 1st–final score	number of observations	%
0	2691	73,3
1 note	894	24,3
2 notes	79	2,2
3 notes	9	0,2
	3673	



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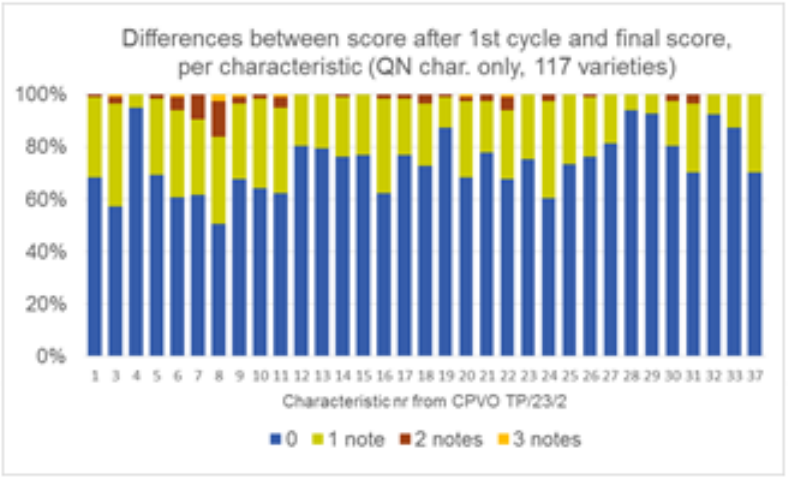
QN characteristics



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QN characteristics

- Char. 4 (colour of base of lightsprout), 28 (flower colour intensity) and 29 (flower colour) are very stable
- Char 8 (colour of tip of lightsprout) is less stable

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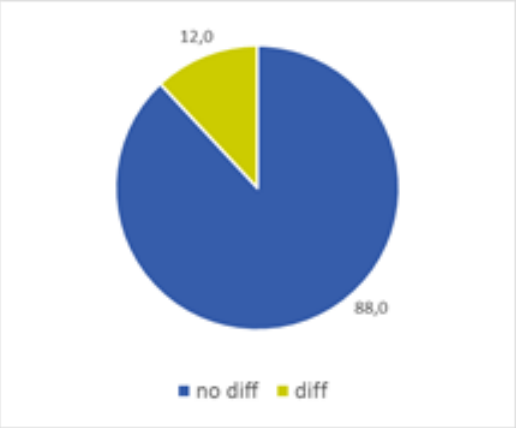
PQ characteristics

Difference between scores after 1st cycle and final scores.
(PQ char. only, 468 obs., 117 var.)

Difference between 1st–final score	number of observations	%
No difference	412	88,0
Difference	46	12,0
	468	



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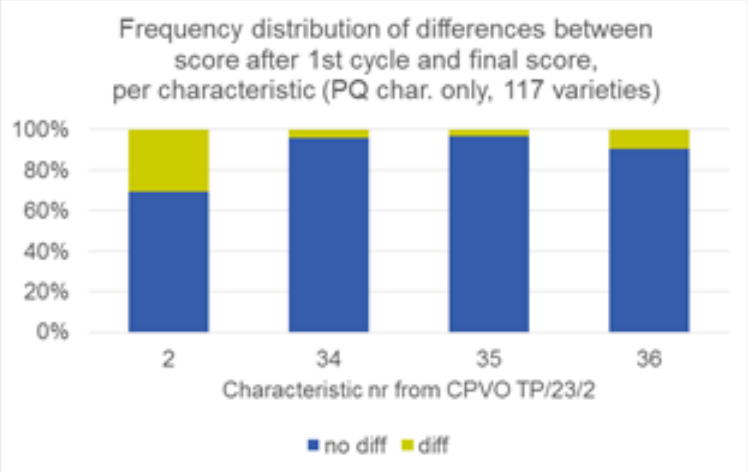
PQ characteristics



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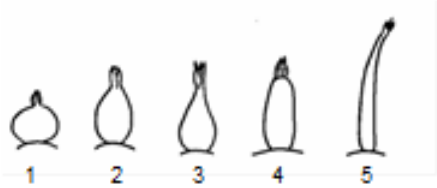
PQ characteristics

- Char. 34 (Tuber skin colour), and 35 (Tuber base of eye colour) are very stable
- Char 2 (Shape of lightsprout) is less stable



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Effect on Variety Description

- Variety descriptions of potato are slightly adjusted when a second testing year is added
- But how significant/important are those adjustments?

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Variety Descriptions across Europe

In 2005, a ringtest for potato was carried out in Europe:

- 12 varieties
- 12 countries
- Plant material (tubers) of same origin

- Main sources of variation in observations:
  - Location (weather, soil, nutrition etc.)
  - Observer
  - Interactions

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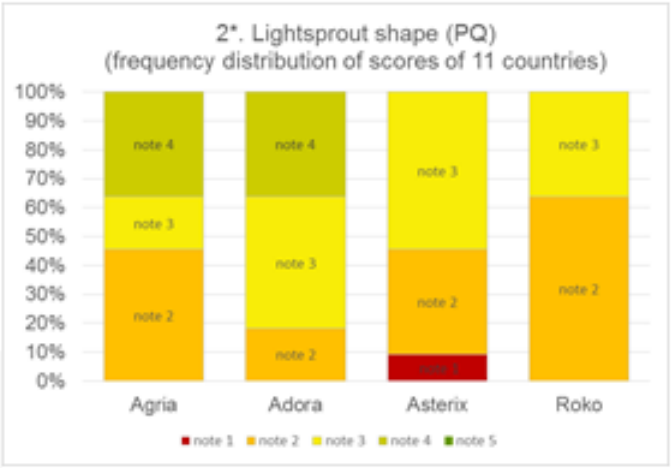
Variety Descriptions across Europe

Legend:
note 5 = narrow cylindrical
note 4 = broad cylindrical
note 3 = conical
note 2 = ovoid
note 1 = spherical



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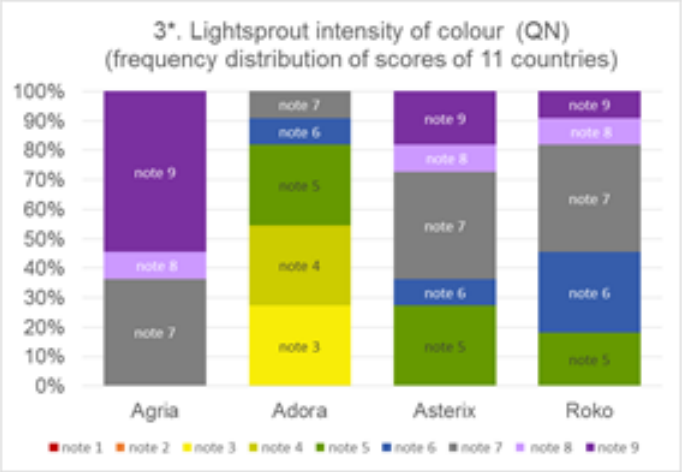
Variety descriptions across Europe

Legend
note 9 = very strong
note 1 = absent or very weak



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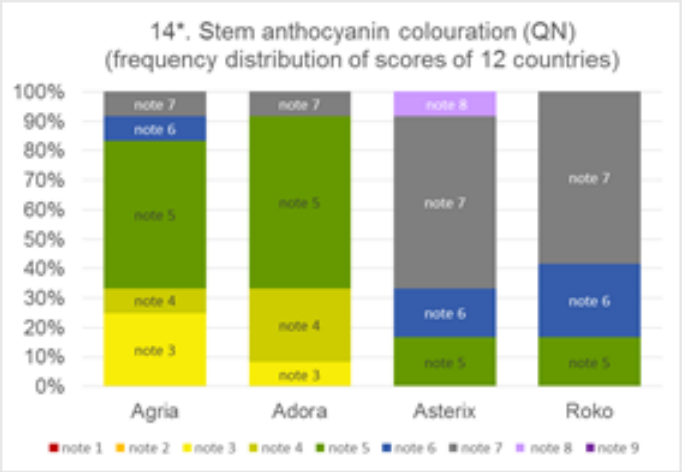
Variety Descriptions across Europe

Legend
note 9 = very strong
note 1 = absent or very weak



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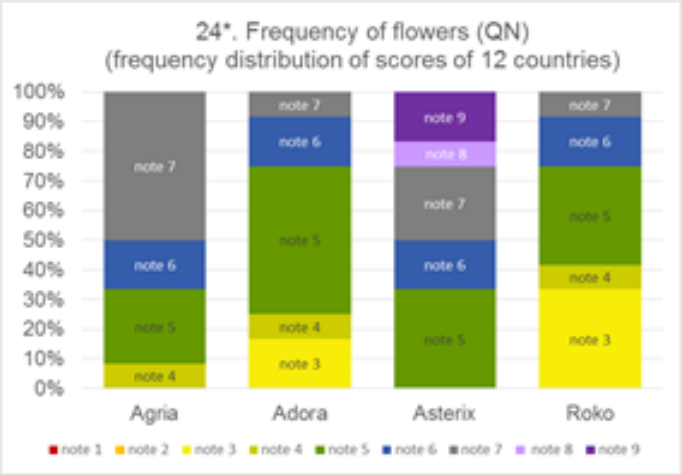
Variety Descriptions across Europe

Legend
note 9 = very high
note 1 = absent or very low



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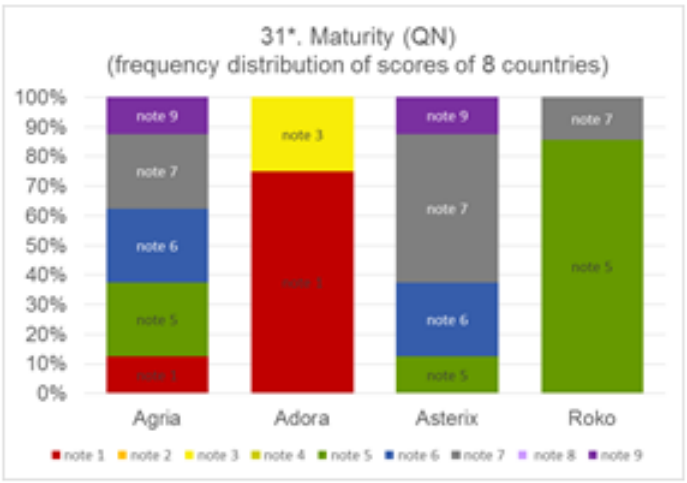
Variety Descriptions across Europe

Legend
note 9 = very late
note 1 = very early



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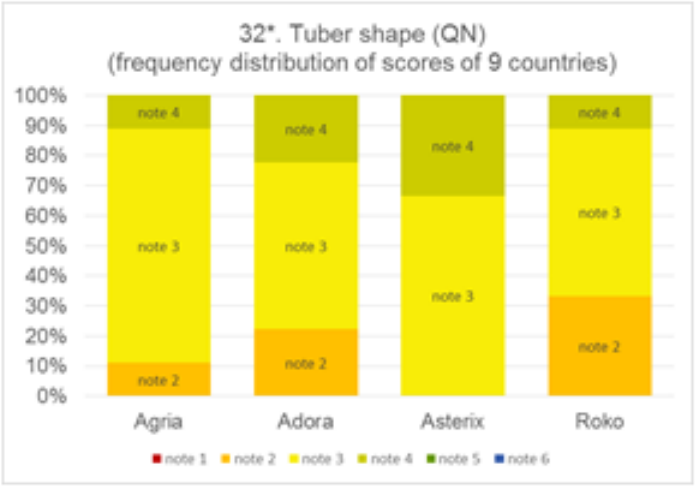
Variety Descriptions across Europe

Legend
note 6 = very long
note 1 = round



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Effect on Variety Descriptions

Conclusions:

- Variety descriptions are very variable across Europe, especially for some characteristics
- In NL variety descriptions were relatively stable between both testing years:
  - the second year did not add much more information to the variety description
  - no effect on distinctness decision

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From 2 cycles to 1?

- Question: Is it possible to reduce the number of growing cycles in potato to 1 without loss of quality?
  - Effect on variety description
  - Other practical issues

Current situation

- All new varieties are tested against morph. database(s) as well as DNA database
- DNA is very useful for selecting genetically close varieties (> 85% Jaccard similarity)
- DNA is very useful as supporting evidence with DUS
- DNA helps finding anomalies fast (wrong sample, mixtures)
- Distinctness and uniformity are rarely a problem in potato

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Database morphological char.

- NL database with variety descriptions
- As of 2018: European Common Database with potato descriptions since 2013 of all CPVO entrusted E.O.'s. Only 17 most stable characteristics.

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Database DNA

In addition: DNA database. In NL part of DUS since 2009.

- Currently ≈ 2000 varieties, mainly from Europe
  As of 2017 including all available varieties of Common Catalogue
- 9 SSR markers (≈ 115 alleles in total)
- Jaccard similarity < 85% = clear genetic difference (based on research evidence)
- DNA data will be included in European Common Database (morph. char/DNA/lightsprout pictures)

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Time line DUS potato in NL

activity	year 1 J	F	M	A	M	J	J	A	S	O	N	D	year 2 J	F	M	A	M	J	J	A	S	O	N	D
subm. tubers																								
DNA																								
lightsprouts																								
field																								
data + report																								
subm. tubers																								
(DNA)																								
lightsprouts																								
field																								
data + report																								

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Practical problems with 1 cycle

- Time schedule: DNA results in March. Field trials already prepared (pre-sprouting of tubers). No changes possible with regard to reference varieties. DNA results currently used for 2nd cycle.
- Some varieties do not (or hardly) flower. Currently extra test in 2nd cycle: cultivation on stone

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Practical problems with 1 cycle?

Solutions:

- Shift submission of tubers to Jan 1st (or 15th at the latest)
- Shift DNA test to end of January (results available before planning of trial)
- Put all low frequency flowering varieties in flowering test (based on TQ data) or shift this test to summer/fall

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Number of growing cycles in potato?

Conclusion:

- **Q:** can we reduce the number of growing cycles for DUS in potato to 1 without loss of quality?
- **A:** Yes for the majority of varieties, provided that time schedules can be adjusted.

- In case of doubt, add 2nd cycle.

- N.B. VCU will remain 2 yrs!

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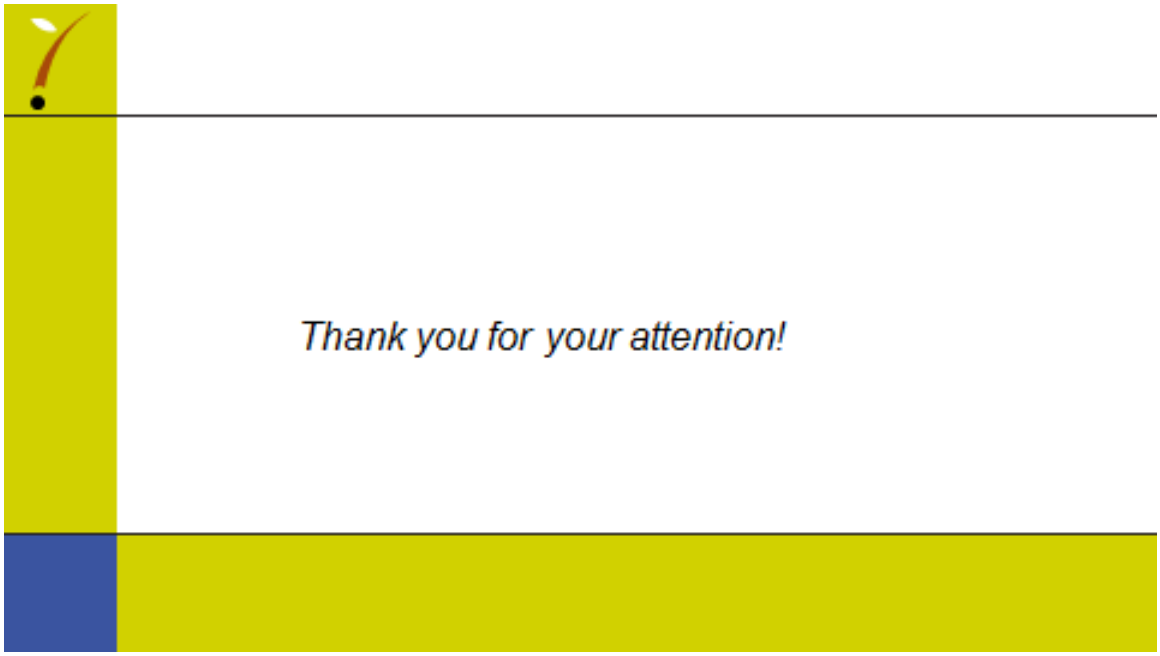

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