UPOV

Internationaler Verband zum Schutz von Pflanzenzüchtungen

G

Technischer Ausschuß **TC/54/27**

Vierundfünfzigste Tagung **Original:** englisch
Genf, 29. und 30. Oktober 2018 **Datum:** 3. Oktober 2018

ANZAHL VON WACHSTUMSPERIODEN

Vom Verbandsbüro erstelltes Dokument

Haftungsausschluß: dieses Dokument gibt nicht die Grundsätze oder eine Anleitung der UPOV wieder

ZUSAMMENFASSUNG

1. Zweck dieses Dokuments ist es, über die Erörterung der Anzahl von Wachstumsperioden bei der DUS-Prüfung Bericht zu erstatten.

2. Der TC wird ersucht, die Erörterungen der TWP auf deren Tagungen in den Jahren 2017 und 2018 über die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf die Entscheidungen über DUS anhand aktueller Daten zur Kenntnis zu nehmen.

3. Der Aufbau dieses Dokuments ist nachstehend zusammengefaßt:

4. Folgende Abkürzungen werden in diesem Dokument verwendet:

TC:	Technischer Ausschuß
TC-EDC:	Erweiterter Redaktionsausschuß
TWA:	Technische Arbeitsgruppe für landwirtschaftliche Arten
TWC:	Technische Arbeitsgruppe für Automatisierung und Computerprogramme
TWF:	Technische Arbeitsgruppe für Obstarten
TWO:	Technische Arbeitsgruppe für Zierpflanzen und forstliche Baumarten
TWP:	Technische Arbeitsgruppen
TWV:	Technische Arbeitsgruppe für Gemüsearten

HINTERGRUND

5. Der TC hörte auf seiner zweiundfünfzigsten Tagung vom 14. bis 16. März 2016 in Genf folgende Referate über Sortenbeschreibungen und die Rolle von Pflanzenmaterial, einschließlich der Mindestanzahl von Wachstumsperioden für die DUS-Prüfung (in der Reihenfolge der Referate) (vergleiche Dokument TC/52/29 Rev. „Überarbeiteter Bericht“, Absatz 204):

Sortenbeschreibungen und die Rolle von Pflanzenmaterial, einschließlich der Mindestanzahl von Wachstumsperioden für die DUS-Prüfung	Frankreich (Herr Richard Brand)
Entwicklung und Verwendung von Sortenbeschreibungen	Deutschland (Frau Beate Rücker)
Mindestanzahl von Wachstumsperioden	Niederlande (Herr Kees van Ettekoven)
Verwendung von Sortenbeschreibungen und Prüfungsdauer – Aus neuseeländischer Perspektive	Neuseeland (Herr Chris Barnaby)

6. Der TC prüfte die Erörterung über die Anzahl von Wachstumsperioden in der DUS-Prüfung und vereinbarte, Verbandsmitglieder zu ersuchen, die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf Entscheidungen über DUS anhand aktueller Daten zu simulieren und auf den Tagungen der TWP im Jahre 2016 und auf der dreiundfünfzigsten Tagung des TC über ihre Ergebnisse zu berichten.

7. Der TC prüfte auf seiner dreiundfünfzigsten Tagung vom 3. bis 7. April 2017 in Genf das Dokument TC/53/21 „Anzahl von Wachstumsperioden“ (vergleiche Dokument TC/53/31 „Bericht“, Absätze 183 bis 187).

8. Der TC prüfte die von Sachverständigen auf den Tagungen der TWP im Jahre 2016 gehaltenen Referate, die die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf Entscheidungen über DUS anhand aktueller Daten simulieren, wie in den Anlagen des Dokuments TC/53/21 wiedergegeben.

9. Der TC nahm die Angebote von Verbandsmitgliedern zur Kenntnis, auf den Tagungen der TWP im Jahre 2017 Referate über die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf Entscheidungen über DUS anhand aktueller Daten zu halten, und vereinbarte, die TWP zu ersuchen, dem TC auf seiner Tagung im Jahr 2018 Bericht zu erstatten.

10. Der TC nahm die Interessensbekundung durch Behörden zur Kenntnis, die mit der DUS-Prüfung verbundenen Kosten zu reduzieren, und vereinbarte, daß die Anzahl von Wachstumsperioden für die DUS-Prüfung die notwendige Mindestanzahl für eine stabile Entscheidung über DUS und die Erstellung einer zuverlässigen Sortenbeschreibung betragen sollte.

11. Der TC vereinbarte, daß es nicht zweckmäßig sei, zu verallgemeinern, daß Ziersorten in einer einzelnen Anbauprüfung geprüft werden sollten, während andere Pflanzenarten in zwei Wachstumsperioden geprüft werden sollten, und vereinbarte, daß die übliche Anzahl von Wachstumsperioden je nach Pflanze festgelegt werden sollte.

REFERATE AUF DEN TAGUNGEN DER TWP IM JAHRE 2017

Technische Arbeitsgruppe für landwirtschaftliche Sorten

12. Die TWA prüfte auf ihrer sechsundvierzigsten Tagung vom 19. bis 23. Juni 2017 in Hannover, Deutschland, Dokumente TWP/1/21 „Number of growing cycles“, TWA/46/8 und TWA/46/8 Add „Impact of using different numbers of growing cycles on DUS decisions using actual data“ (vergleiche Dokument TWA/46/10 „Report“, Absätze 36 bis 41).

13. Die TWA hörte die folgenden Referate, wie in den Dokumenten TWA/46/8 und TWA/46/8 Add. wiedergegeben:

a) „Auswirkung der Anzahl von Wachstumsperioden auf Sortenbeschreibungen und Unterscheidungskraft bei Weizen und Gerste“, erstellt von einem Sachverständigen aus Deutschland
b) „Anzahl von Wachstumsperioden bei Kartoffel“, erstellt von einem Sachverständigen aus den Niederlanden
c) „Anzahl von Wachstumsperioden bei Kartoffelsorten - DUS-Prüfung von Lichtkeimen“, erstellt von einem Sachverständigen aus Polen
d) „Anzahl von Wachstumsperioden: die Auswirkung auf Sortenbeschreibungen von Getreide“, erstellt von einem Sachverständigen aus dem Vereinigten Königreich

14. Die TWA vereinbarte, daß Erörterungen über die Anzahl der Wachstumsperioden in der DUS-Prüfung für landwirtschaftliche Arten fortgesetzt werden sollten, und begrüßte die Angebote von Australien, Dänemark, Frankreich, Deutschland, dem Vereinigten Königreich und dem ISF, Referate auf ihrer siebenundvierzigsten Tagung zu halten.

Technische Arbeitsgruppe für Obstarten

15. Die TWF prüfte Dokument TWP/1/21 „Number of growing cycles“ (vergleiche Dokument TWF/48/13 „Report“, Absätze 81 bis 84)

16. Die TWF nahm zur Kenntnis, daß der TC vereinbart hatte, daß es nicht zweckmäßig sei, zu verallgemeinern, daß Ziersorten in einer einzelnen Anbauprüfung geprüft werden sollten, während andere Pflanzenarten in zwei Wachstumsperioden geprüft werden sollten. Darüber hinaus nahm sie zur Kenntnis, daß der TC vereinbart hatte, daß die übliche Anzahl von Wachstumsperioden ja nach Pflanze festgelegt werden sollte. Dennoch vereinbarte die TWF, dem TC gegenüber klarzustellen, daß in einigen Fällen im Obstsektor die normale Anzahl der Wachstumsperioden je nach Sortentyp festgelegt werden müsse (zum Beispiel Unterlagensorten, männlich-weibliche Sorten).

Technische Arbeitsgruppe für Automatisierung und Computerprogramme

17. Die TWC prüfte Dokument TWP/1/21 „Number of growing cycles“ (vergleiche Dokument TWC/35/21 „Report“, Absätze 45 bis 51).

18. Die TWC prüfte Dokument TWC/35/7 „Number of growing cycles in potato“ und hörte ein Referat von einem Sachverständigen aus den Niederlanden, das die Ergebnisse der Simulation über die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf Entscheidungen über DUS anhand aktueller Daten für Kartoffel beinhaltete. Eine Kopie des Referates ist im Anhang des Dokumentes TWC/35/7 wiedergegeben.

19. Die TWC nahm zur Kenntnis, daß die Ergebnisse zeigten, daß von den 37 erfaßten Merkmalen 73% die gleiche Bewertung gehabt hätten und 24% einen Unterschied zwischen der ersten Wachstumsperiode und der Note aus der kombinierten ersten und zweiten Wachstumsperiode von nur einer einzigen Note gehabt hätten.

20. Die TWC nahm zur Kenntnis, daß die Niederlande die Möglichkeit der Verwendung von molekularen Markerinformationen untersuchten, um die Anzahl der Wachstumsperioden für die DUS-Prüfung von Kartoffelsorten zu reduzieren.

REFERATE AUF DEN TAGUNGEN DER TWP IM JAHRE 2018

Technische Arbeitsgruppe für landwirtschaftliche Arten

21. Die TWA prüfte auf ihrer siebenundvierzigsten Tagung vom 21. bis 25. Mai 2018 in Naivasha, Kenia, Dokument TWA/47/5 „Impact of the number of growing cycles on variety descriptions and discrimination power

in potato“ und hörte ein Referat von einem Sachverständigen aus Deutschland. Eine Kopie davon würde als Dokument TWA/47/5 Add. bereitgestellt werden. (vergleiche Dokument TWA/47/7 „Report“, Absätze 35 bis 38).

22. Die TWA vereinbarte, daß Sortenbeschreibungen, die über zwei Wachstumsperioden erstellt werden, stabiler seien als die, die über eine einzige Wachstumsperiode erstellt werden. Die TWA vereinbarte auch, daß zwei Wachstumsperioden eine stabilere Bewertung der einzelnen Merkmale erlaubten.

23. Die TWA vereinbarte, daß eine stabile Entscheidung über die Unterscheidbarkeit nach einer einzigen Wachstumsperiode auf Basis eines ausreichend großen Unterschiedes der Merkmale erreicht werden könne.

24. Die TWA nahm zur Kenntnis, daß DNS-Marker-Informationen unterstützende Informationen in der DUS-Prüfung zur Verfügung stellen könnten, wie in Dokument TGP/15 „Anleitung zur Verwendung biochemischer und molekularer Marker bei der Prüfung der Unterscheidbarkeit, der Homogenität und der Beständigkeit (DUS)“ dargelegt. Die TWA nahm die von den Niederlanden berichtete Erfahrung zur Kenntnis, daß die DNS-Marker-Informationen auch verwendet werde, um die Rechte der Pflanzenzüchter durchzusetzen, in Kombination mit einer Seite-an-Seite-Überprüfung der Übereinstimmung von Pflanzenmaterial mit einer geschützten Sorte.

Technische Arbeitsgruppe für Automatisierung und Computerprogramme

25. Die TWO prüfte die Dokumente TWC/36/6 und TWC/36/6 Add. „Impact of the number of growing cycles on variety descriptions and discrimination power in potato“ und hörte ein Referat von einem Sachverständigen aus Deutschland (vergleiche Dokument TWC/36/15 „Report“, Absätze 24 bis 28).

26. Die TWC begrüßte die statistische Analyse, die den Genotyp nach Interaktion mit der Umwelt für über Jahre erstellte Beschreibungen quantifiziert.

27. Die TWC vereinbarte, daß Sortenbeschreibungen, die über zwei Wachstumsperioden erstellt werden, stabiler seien als die, die in einer einzelnen Wachstumsperiode erstellt werden.

28. Die TWC vereinbarte, daß klargestellt werden sollte, daß Dokument TWC/36/6 Add. und Dokument TWC/36/6 Add. Unterschiede in einzelnen Merkmalen über Perioden hinweg analysiert und keine Unterschiede zwischen Sorten für alle Merkmale bewertet haben.

29. Die TWC nahm den mündlichen Bericht von den Niederlanden zur Kenntnis, daß eine Studie über die Verwendung von DNS-Markern als unterstützende Information für Entscheidungen über die Unterscheidbarkeit durchgeführt werde, und die TWC vereinbarte, die Niederlande zu ersuchen, auf einer künftigen Sitzung über ihre Arbeit zu berichten.

30. Der TC wird ersucht, die Erörterungen der TWP auf deren Tagungen in den Jahren 2017 und 2018 über die Auswirkungen der Verwendung einer unterschiedlichen Anzahl von Wachstumsperioden auf die Entscheidungen über DUS anhand aktueller Daten zur Kenntnis zu nehmen.

[Anlagen folgen]

ANNEXE I / ANNEX I / ANLAGE I / ANEXO I
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

IMPACT OF NUMBER OF GROWING CYCLES ON VARIETY DESCRIPTIONS AND DISCRIMINATION POWER IN WHEAT AND BARLEY

Presentation by an expert from Germany at the forty-sixth session of the Technical Working Party for Agricultural Crops

Bundessortenamt

UPOV TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS
Forty-sixth Session, Hanover, Germany, June 19 to 23, 2017

Impact of number of growing cycles on variety descriptions and discrimination power in wheat and barley

Beate Rücker, Germany

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1

Bundessortenamt

Discrimination power of characteristics calculated in three steps:

(a) '1 cycle': Comparison of all varieties in the growing trial (year 0)
(b) '2 cycles': For all varieties which were also grown in the year before, distinctness was assessed in both years (year 0 / -1). Two varieties are considered to be distinct if a clear difference in the same direction was observed in both years.
(c) '2 out of 3 cycles': For all varieties which were also grown the two previous years, distinctness was assessed in all 3 years (year 0 / -1 / -2). Two varieties are considered to be distinct if a clear difference in the same direction was observed in at least 2 out of 3 years

The same analysis was performed for 2014, 2015 and 2016.

2

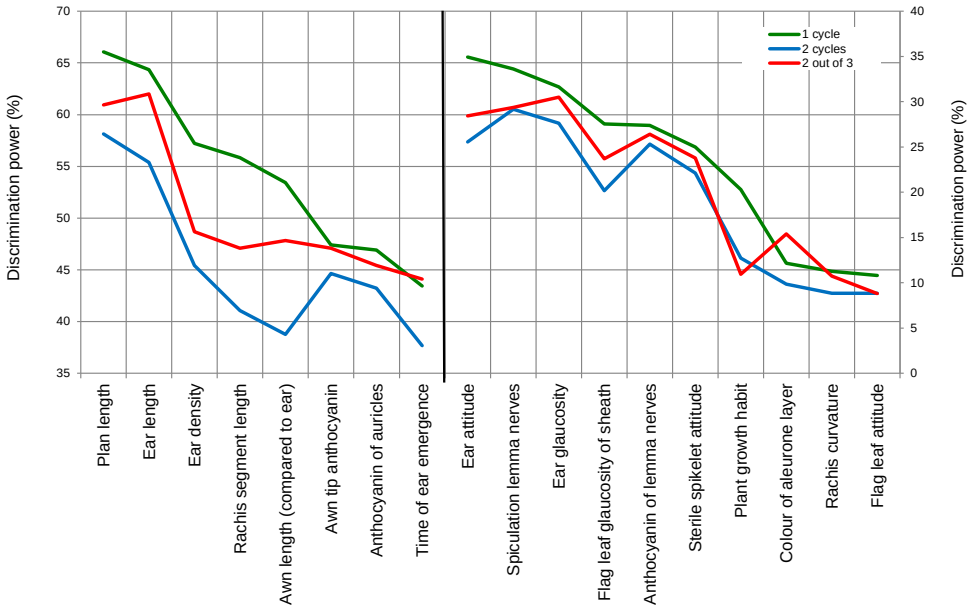
Bundessortenamt

Data for analysis of discrimination power from DUS growing trials:

- Trials comprise about 600 varieties in winter wheat and 300 varieties in winter barley.
- Two year data are available for about 70% of the varieties and three year data for about 50% of the varieties.
- Every year, the distinctness test included
  - (a) 1-cycle-comparisons: 40,000 in wheat and 30,000 in barley
  - (b) 2-cycle-comparisons: 25,000 in wheat and 15,000 in barley
  - (c) 2 out of 3 comparisons: 15,000 in wheat and 6,000 in barley

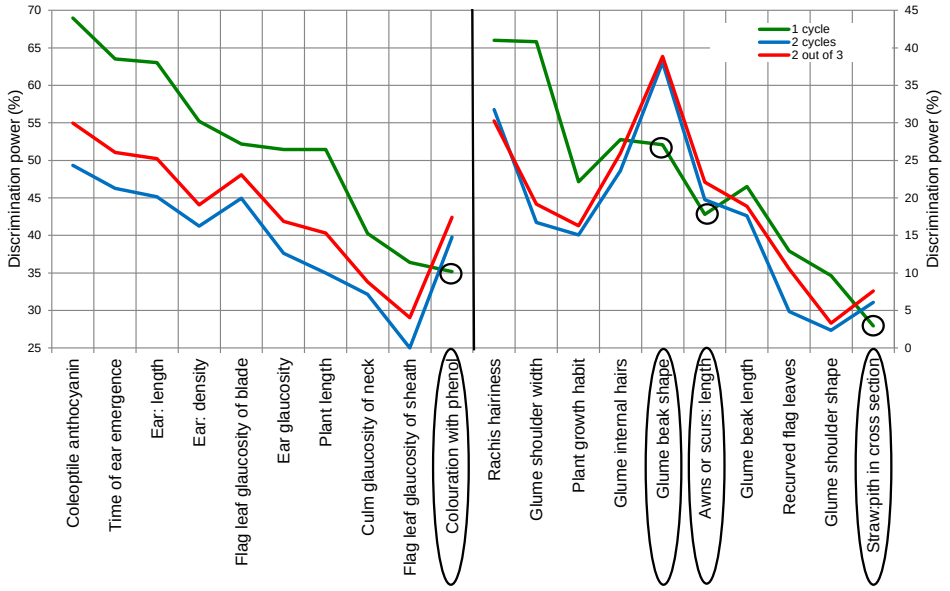
Bundessortenamt

Impact of the number of growing cycles on discrimination power – Barley



Bundessortenamt

Impact of the number of growing cycles on discrimination power – Wheat



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Bundessortenamt

Data for analysis of variety descriptions:

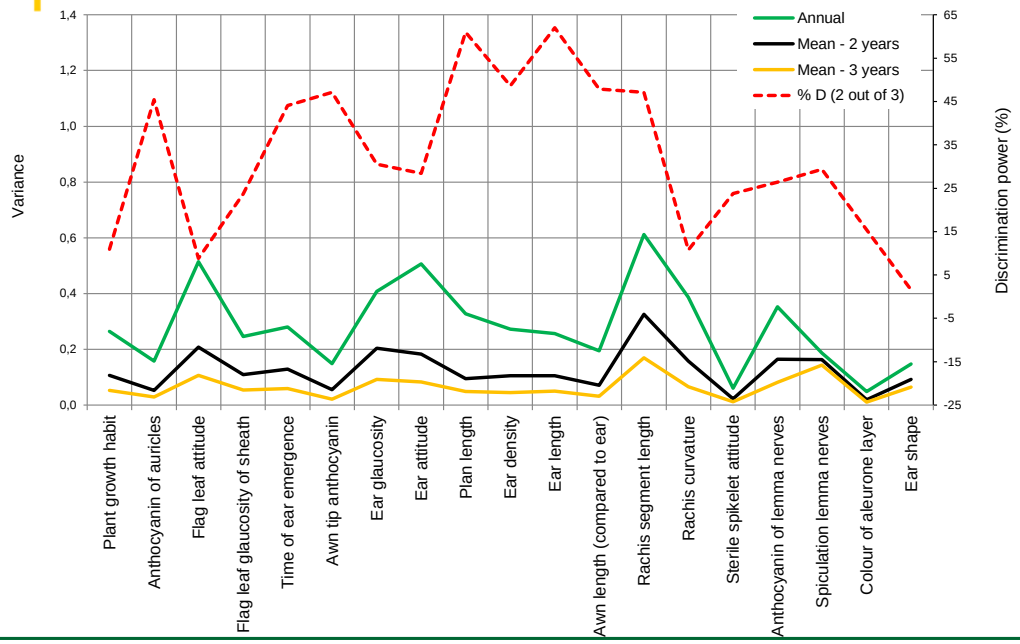
- DUS observations for 77 winter wheat varieties and 47 winter barley varieties in 6 successive growing cycles were used to establish
  - annual descriptions (year 0)
  - descriptions over 2 cycles (year 0 / -1)
  - descriptions over 3 cycles (year 0 / -1 / -2)

- The variation of descriptions over one, two and three cycles was calculated

6

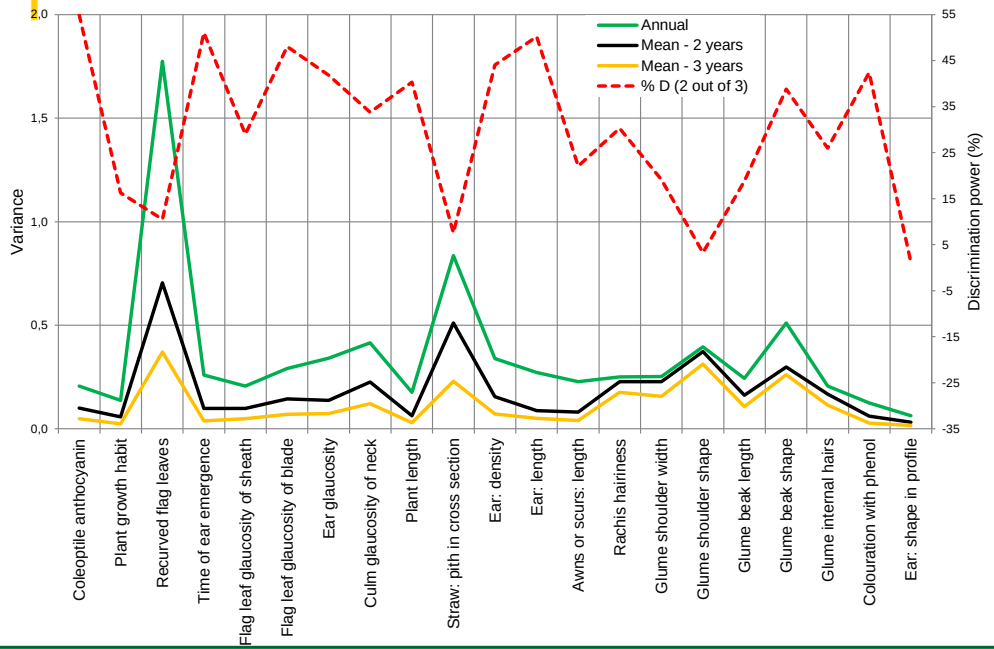
Bundessortenamt

Variance of variety descriptions over testing periods – Barley



Bundessortenamt

Variance of variety descriptions over testing periods – Wheat



Bundessortenamt

Conclusions:

- number of growing cycles has significant impact on distinctness decisions and variety descriptions
- Current recommendation in TG Barley and TG Wheat is appropriate: “The minimum duration of test should normally be two independent growing cycles”.
- Minimum duration of test should be followed to establish
  - official variety description – precondition for enforcement
  - “working description” – precondition for management of reference collection, in particular when databases are used
- Descriptions in a database should be based at least on the recommended minimum number of growing cycles. Any additional cycle can improve the quality of the description

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Bundessortenamt

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[L’annexe II suit /
Annex II follows /
Anlage II folgt /
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ANNEXE II / ANNEX II / ANLAGE II / ANEXO II
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

NUMBER OF GROWING CYCLES: THE IMPACT ON CEREAL VARIETY DESCRIPTIONS

Presentation by an expert from United Kingdom at the forty-sixth session of the Technical Working Party for Agricultural Crops

NIAB TAG

Number of growing cycles:
the impact on cereal variety descriptions

Presentation to UPOV TWA June 2017

NIAB TAG

Summary

- Background
- Examples
  - Barley
  - Wheat
- Do all varieties react the same?
- Summary of observations

UPOV No.	Characteristic	2015 Note	2016 Note
1	PLANT: GROWTH HABIT	5	6
2	LOWER LEAVES: HAIRINESS OF LEAF SHEATHS	1	1
4	FLAG LEAF: INTENSITY OF ANTH. COLOUR. OF AURICLES	6	7
	FLAG LEAF: ATTITUDE	4	5
6	FLAG LEAF: GLAUCOSITY OF SHEATH	6	7
7	TIME OF EAR EMERGENCE (1st spk. vis. on 50% ears)	6	5
9	AWNS: INTENSITY OF ANTHOCYANIN COLOUR. OF TIPS	5	6
10	EAR: GLAUCOSITY	5	6
11	EAR: ATTITUDE	2	2
12	PLANT: LENGTH (stem, ears and awns)	4	4
13	EAR: NUMBER OF ROWS	1	1
14	EAR: SHAPE	3	3
15	EAR: DENSITY	4	4
16	EAR: LENGTH (excluding awns)	4	5
17	AWN: LENGTH (compared to ear)	7	7
18	RACHIS: LENGTH OF FIRST SEGMENT	4	4
19	RACHIS: CURVATURE OF FIRST SEGMENT	5	3
	EAR: DEVELOPMENT OF STERILE SPIKELETS	1	1
20	STERILE SPIKELET: ATTITUDE (in mid-third of ear)	n/a	n/a
21	MEDIAN SPIKELET: LENGTH OF GLUME+AWN cf GRAIN	2	2
22	GRAIN: RACHILLA HAIR TYPE	1	1
23	GRAIN: HUSK	9	9
24	GRAIN: ANTHOCYANIN COLOURATION OF NERVES OF LEMMA	6	4
25	GRAIN: SPICULATION OF INNER LATERAL NERVES OF DORSAL	1	1
26	GRAIN: HAIRINESS OF VENTRAL FURROW	1	1
27	GRAIN: DISPOSITION OF LODICULES	2	2
28	KERNEL: COLOUR OF ALEURONE LAYER	1	
29	SEASONAL TYPE	3	

NIAB TAG

Example: barley variety

Key:

- 2 notes difference between years
- 1 note difference between years

UPOV No.	Characteristic	2015 Note	2016 Note
1	COLEOPTILE: ANTHOCYANIN COLOURATION	3	-
2	PLANT: GROWTH HABIT	6	5
4	PLANT: FREQ. OF PLANTS WITH RECURVED FLAG LEAVES	1	1
5	TIME OF EAR EMERGENCE (first spkt visible on 50% of ears)	8	7
6	FLAG LEAF: GLAUCOSITY OF SHEATH	6	7
	FLAG LEAF: GLAUCOSITY OF BLADE (lower side)	5	6
7	EAR: GLAUCOSITY	6	6
8	CULM: GLAUCOSITY OF NECK	6	6
9	PLANT: LENGTH (stem, ears, awns and scurs)	2	3
10	STRAW: PITH IN CROSS SECTION	1	1
11	EAR: SHAPE IN PROFILE	2	2
12	EAR: DENSITY	6	6
13	EAR: LENGTH (excluding awns and scurs)	4	5
14	AWNS OR SCURS: PRESENCE	2	2
15	AWNS OR SCURS AT TIP OF EAR: LENGTH	9	9
16	EAR: COLOUR	1	1
17	APICAL RACHIS SEGMENT: HAIRINESS OF CONVEX SURFACE	4	4
18	LOWER GLUME: SHOULDER WIDTH	3	3
19	LOWER GLUME: SHOULDER SHAPE	6	6
20	LOWER GLUME: BEAK LENGTH	5	5
21	LOWER GLUME: BEAK SHAPE	4	4
22	LOWER GLUME: EXTENT OF INTERNAL HAIRS	4	3
24	GRAIN: COLOUR	2	-
25	GRAIN: COLOURATION WITH PHENOL	6	-
26	SEASONAL TYPE	1	1

NIAB TAG

Example: wheat variety

Key:

- 2 notes difference between years
- 1 note difference between years

UPOV No.	Characteristic	2015 Note	2016 Note	2015 Note	2016 Note
		Variety A		Variety B	
1	COLEOPTILE: ANTHOCYANIN COLOURATION	2		3	
2	PLANT: GROWTH HABIT	4	5	5	5
4	PLANT: FREQ. OF PLANTS WITH RECURVED FLAG LEAVES	5	5	7	5
5	TIME OF EAR EMERGENCE	3	5	8	8
6	FLAG LEAF: GLAUCOSITY OF SHEATH	5	7	8	8
	FLAG LEAF: GLAUCOSITY OF BLADE (lower side)	5	5	9	7
7	EAR: GLAUCOSITY	5	6	8	6
8	CULM: GLAUCOSITY OF NECK	5	7	8	7
9	PLANT: LENGTH (stem, ears, awns and scurs)	9	7	2	3
10	STRAW: PITH IN CROSS SECTION	1	1	2	2
11	EAR: SHAPE IN PROFILE	1	1	2	2
12	EAR: DENSITY	3	3	4	3
13	EAR: LENGTH (excluding awns and scurs)	6	5	4	4
14	AWNS OR SCURS: PRESENCE	2	2	2	2
15	AWNS OR SCURS AT TIP OF EAR: LENGTH	9	8	7	7
16	EAR: COLOUR	1	1	1	1
17	APICAL RACHIS SEGMENT: HAIRINESS OF CONVEX SURFACE	6	6	7	7
18	LOWER GLUME: SHOULDER WIDTH	3	3	5	5
19	LOWER GLUME: SHOULDER SHAPE	7	6	4	5
20	LOWER GLUME: BEAK LENGTH	5	5	4	4
21	LOWER GLUME: BEAK SHAPE	3	3	3	3
22	LOWER GLUME: EXTENT OF INTERNAL HAIRS	7	7	7	7
24	GRAIN: COLOUR	2		2	
25	GRAIN: COLOURATION WITH PHENOL	7		7	
26	SEASONAL TYPE	3	3	3	3

NIAB TAG

Do all varieties react the same way to environmental changes?

Key:

2 notes difference between years

1 note difference between years

NIAB TAG

Summary of observations

- The state of expression can be variable over two years
- Quantitative characteristics are more variable
- Some QN characteristics are more variable than others
- Change in the environment does not affect all varieties the same way

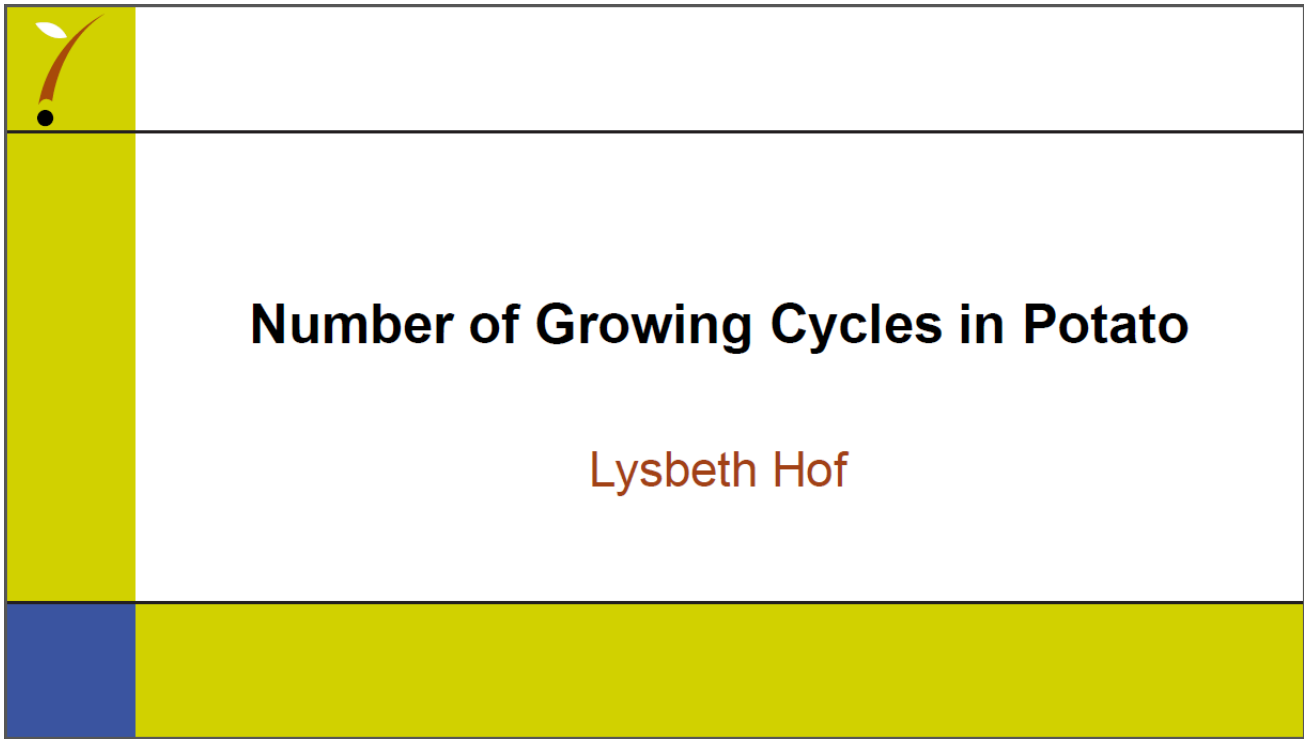
Two growing cycles produce more robust variety descriptions

[L'annexe III suit / Annex III follows / Anlage III folgt / Sigue el Anexo III]

ANNEXE III / ANNEX III / ANLAGE III / ANEXO III
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

NUMBER OF GROWING CYCLES IN POTATO

Presentation by an expert from Netherlands at the forty-sixth session of the Technical Working Party for Agricultural Crops and at the thirty-fifth session of the Technical Working Party on Automation and Computer Programs



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

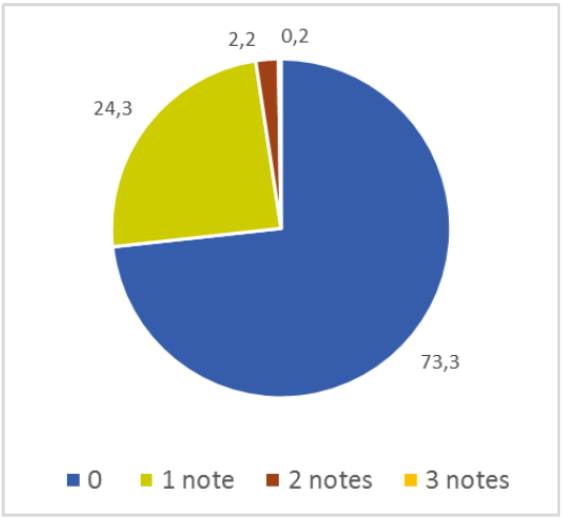
- Descriptions according to CPVO TP/23/2 (similar to UPOV TG/23/6, minus 5 characteristics)
- 37 char. (33 QN and 4 PQ)
- Nr observations per variety can be smaller than 37:
  - Char 29 and 30 only observed if flowers not white
  - Char 37 only observed if tuber is yellow

5

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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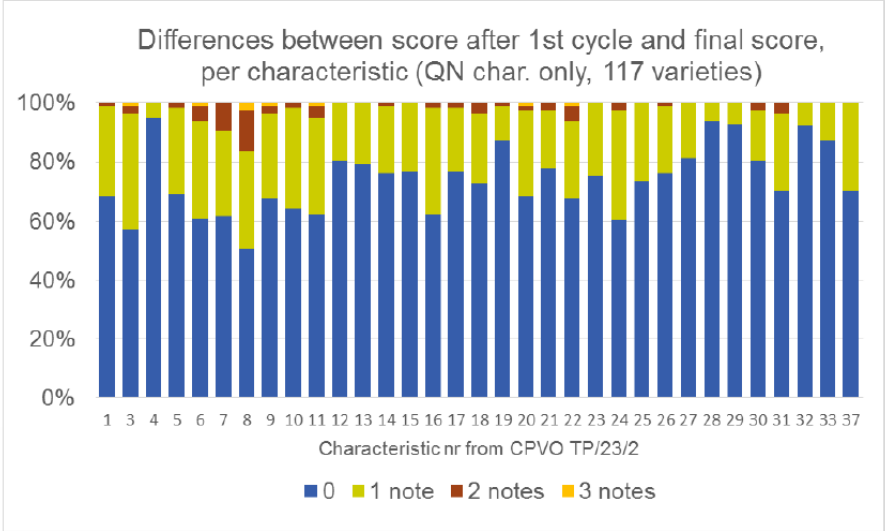
QN characteristics



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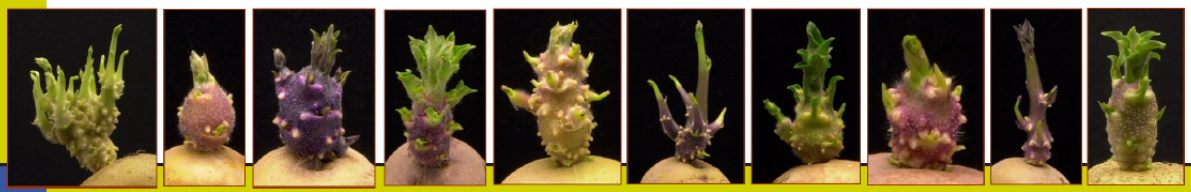
QN characteristics

- 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

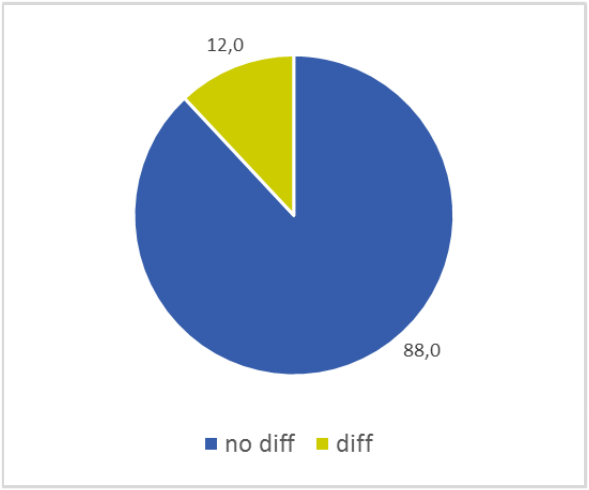


8

PQ characteristics

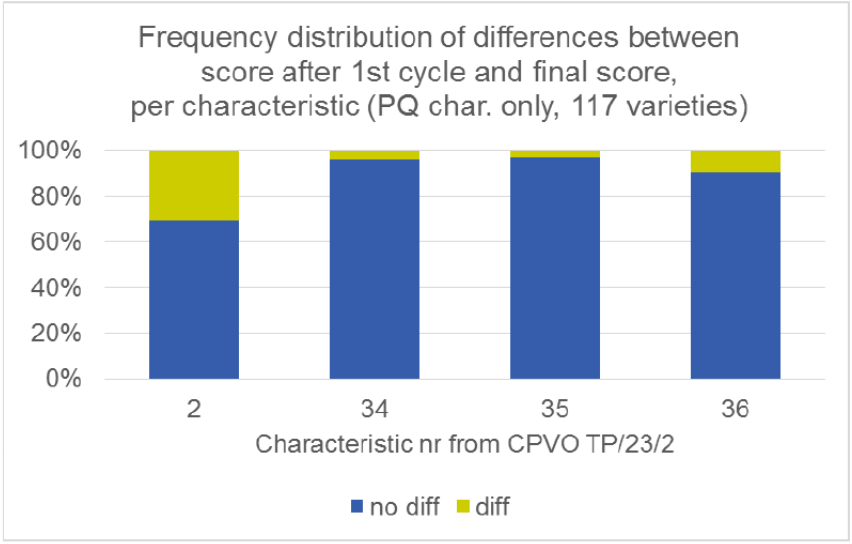
Difference between scores after 1st cycle and final scores. (PQ char. only, 468 obs., 117 var.)

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



9

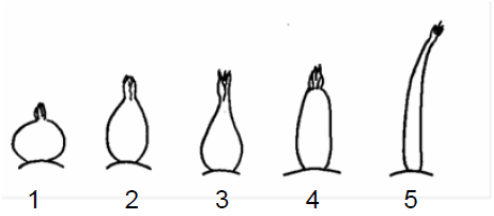
PQ characteristics



10

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



11

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?

12

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

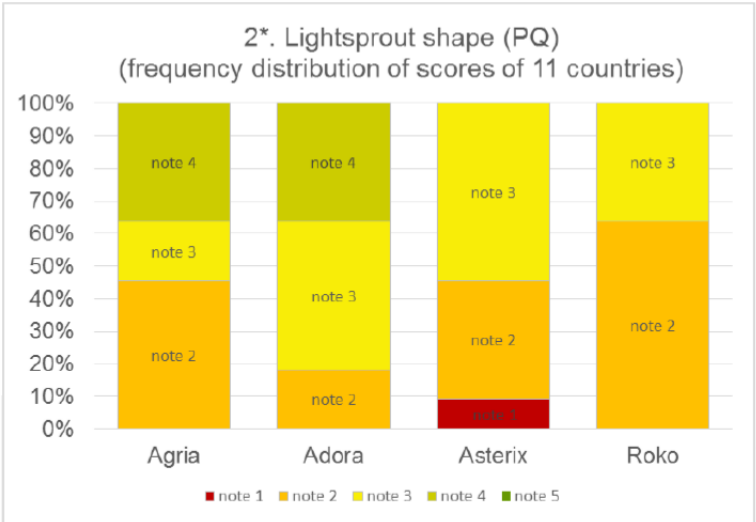
- Main sources of variation in observations:
  - Location (weather, soil, nutrition etc.)
  - Observer
  - Interactions

13

Variety Descriptions across Europe

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

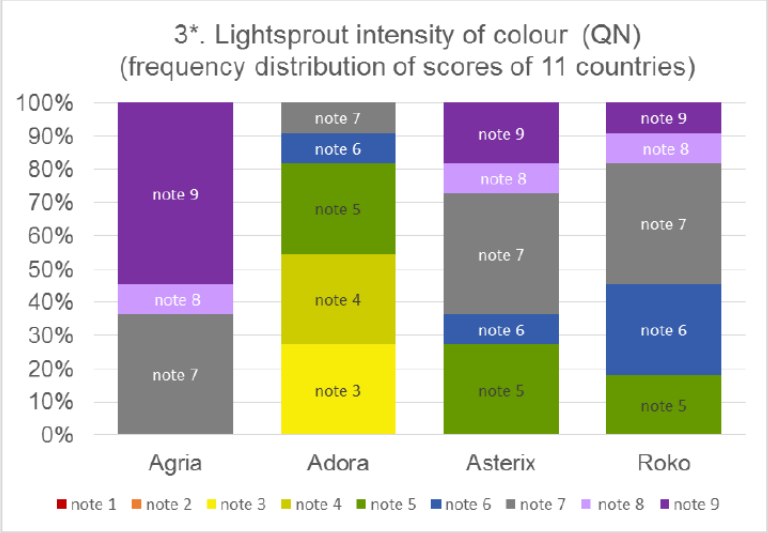
1 2 3 4 5



14

Variety descriptions across Europe

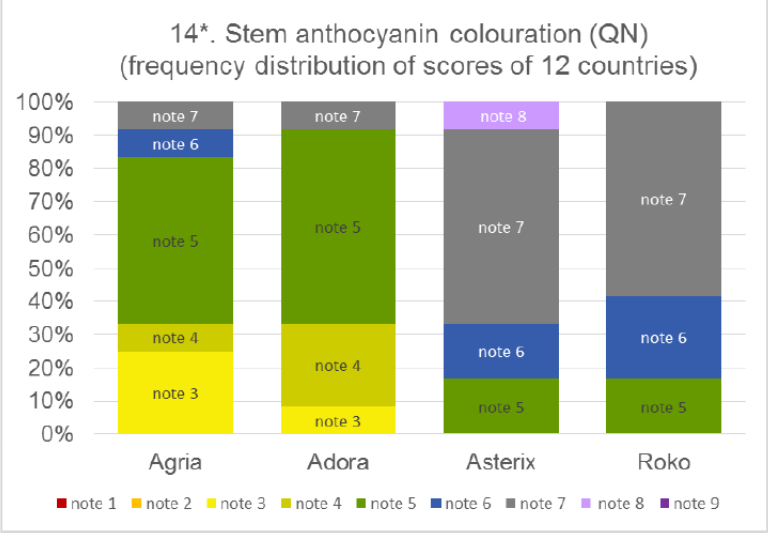
Legend
note 9 = very strong
note 1 = absent or
very weak



15

Variety Descriptions across Europe

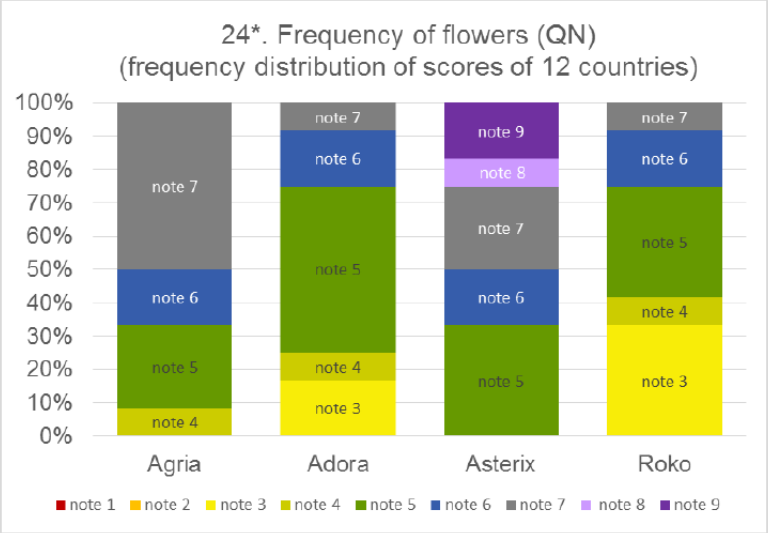
Legend
note 9 = very strong
note 1 = absent or
very weak



16

Variety Descriptions across Europe

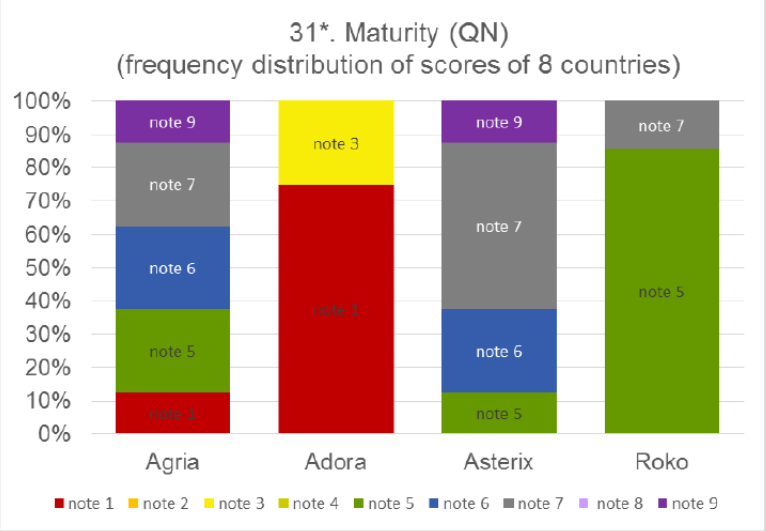
Legend
note 9 = very high
note 1 = absent or very low



17

Variety Descriptions across Europe

Legend
note 9 = very late
note 1 = very early

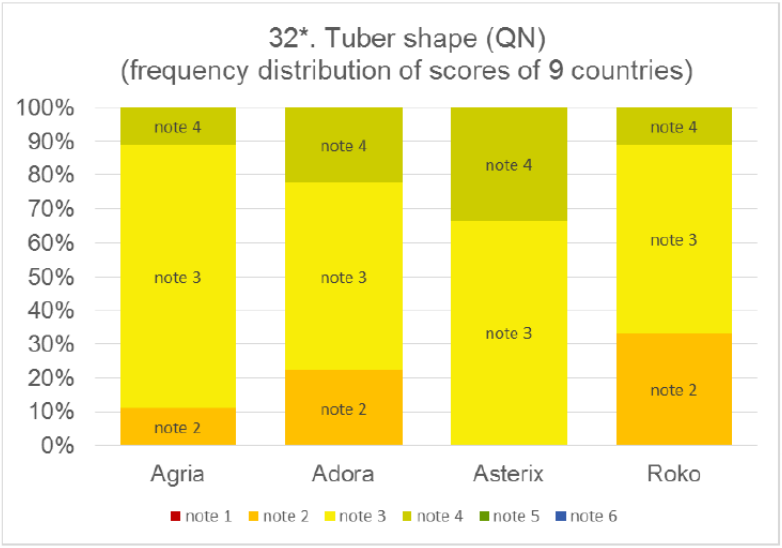


18

Variety Descriptions across Europe

Legend
note 6 = very long
note 1 = round

1 2 3 4 5 6



19

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

20

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

22

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.

23

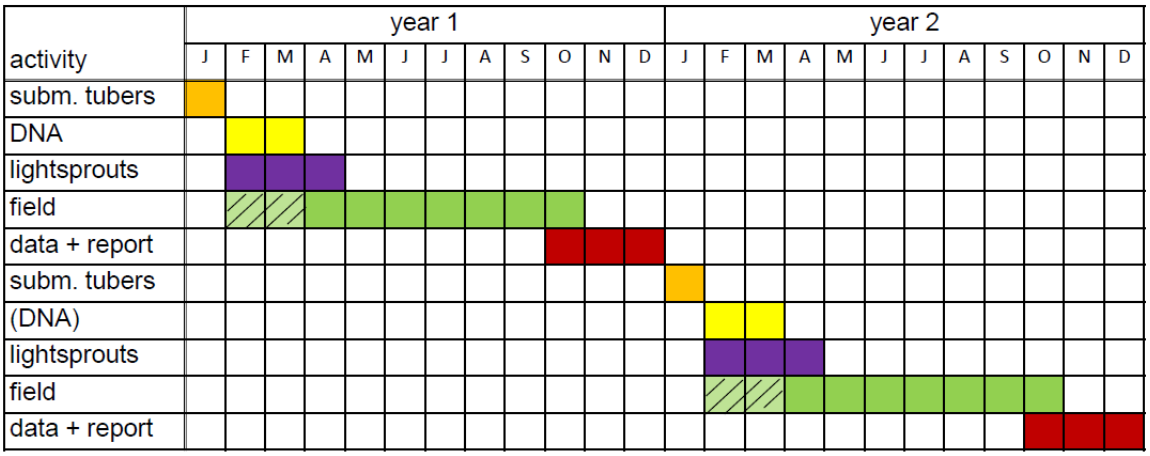
Database DNA

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)

24

Time line DUS potato in NL



25

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

26

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

27

Number of growing cycles in potato?

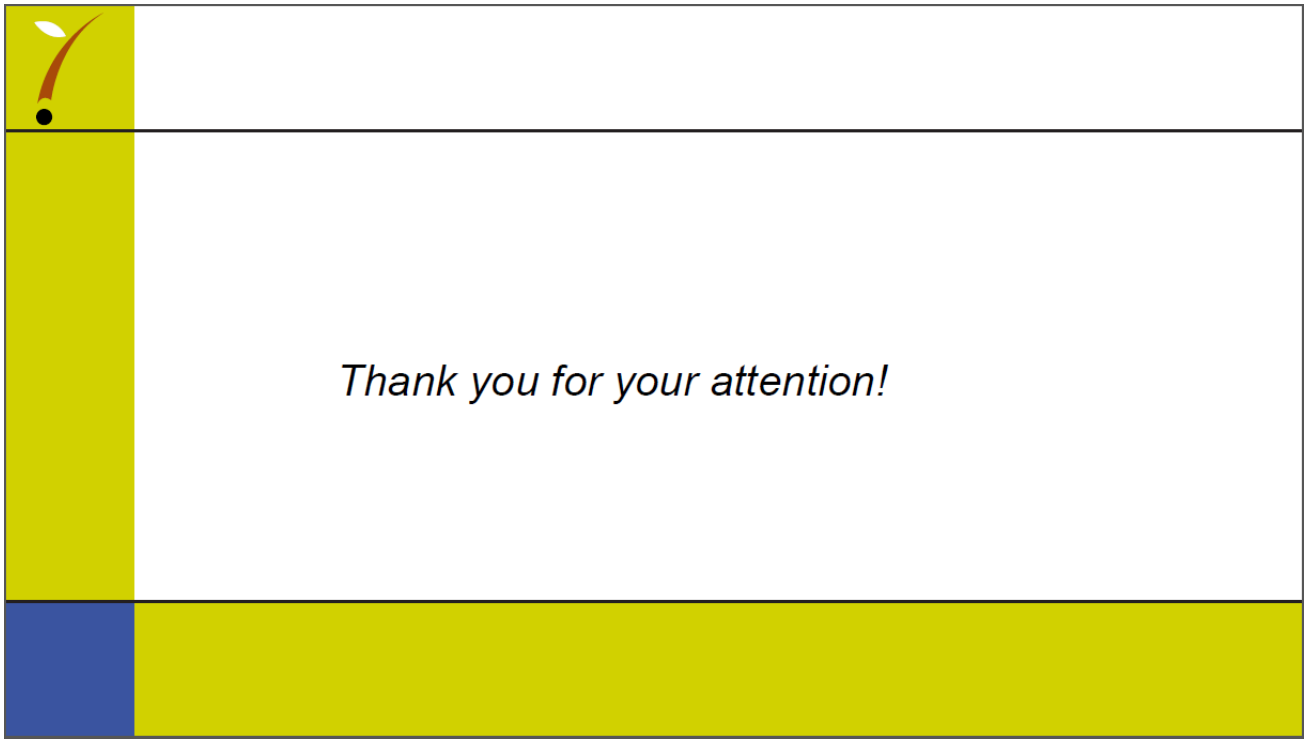
Conclusion:

- **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!

28

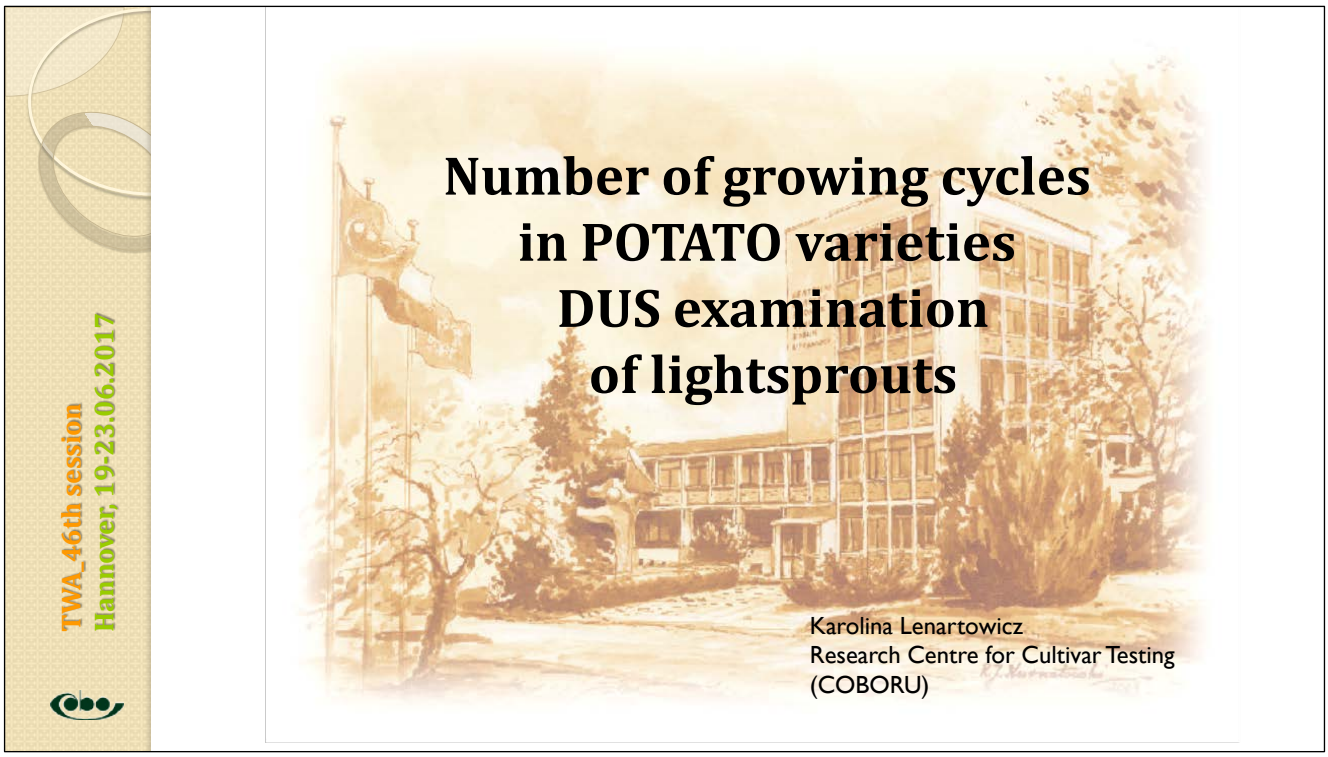


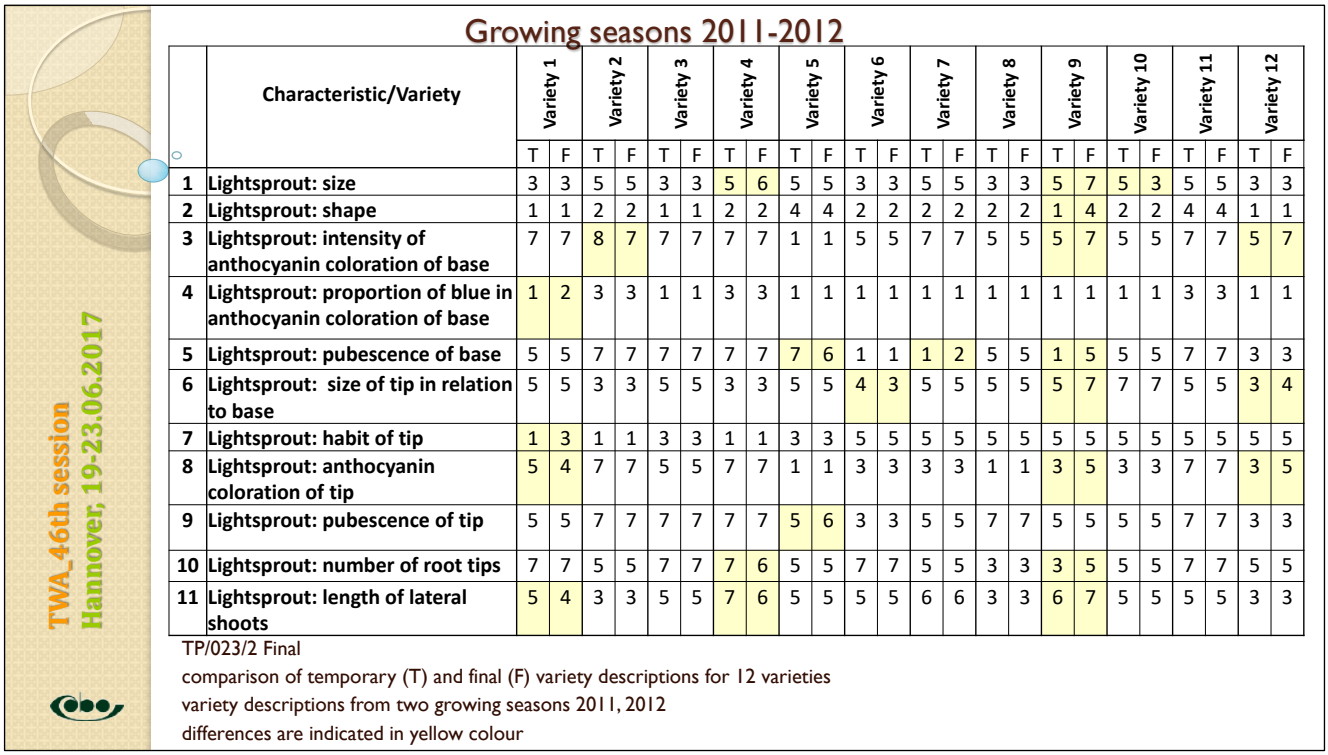
[L'annexe IV suit /
Annex IV follows /
Anlage IV folgt /
Sigue el Anexo IV]

ANNEXE IV / ANNEX IV / ANLAGE IV / ANEXO IV
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

NUMBER OF GROWING CYCLES IN POTATO VARIETIES – DUS EXAMINATION OF LIGHTSPROUTS

Presentation by an expert from Poland at the forty-sixth session of the Technical Working Party for Agricultural Crops





Growing seasons 2011-2012

	Characteristic/Variety	Variety 1		Variety 2		Variety 3		Variety 4		Variety 5		Variety 6		Variety 7		Variety 8		Variety 9		Variety 10		Variety 11		Variety 12	
		T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F
1	Lightsprout: size	3	3	5	5	3	3	5	6	5	5	3	3	5	5	3	3	5	7	5	3	5	5	3	3
2	Lightsprout: shape	1	1	2	2	1	1	2	2	4	4	2	2	2	2	2	2	1	4	2	2	4	4	1	1
3	Lightsprout: intensity of anthocyanin coloration of base	7	7	8	7	7	7	7	7	1	1	5	5	7	7	5	5	5	7	5	5	7	7	5	7
4	Lightsprout: proportion of blue in anthocyanin coloration of base	1	2	3	3	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1
5	Lightsprout: pubescence of base	5	5	7	7	7	7	7	7	7	6	1	1	1	2	5	5	1	5	5	5	7	7	3	3
6	Lightsprout: size of tip in relation to base	5	5	3	3	5	5	3	3	5	5	4	3	5	5	5	5	5	7	7	7	5	5	3	4
7	Lightsprout: habit of tip	1	3	1	1	3	3	1	1	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8	Lightsprout: anthocyanin coloration of tip	5	4	7	7	5	5	7	7	1	1	3	3	3	3	1	1	3	5	3	3	7	7	3	5
9	Lightsprout: pubescence of tip	5	5	7	7	7	7	7	7	5	6	3	3	5	5	7	7	5	5	5	5	7	7	3	3
10	Lightsprout: number of root tips	7	7	5	5	7	7	7	6	5	5	7	7	5	5	3	3	3	5	5	5	7	7	5	5
11	Lightsprout: length of lateral shoots	5	4	3	3	5	5	7	6	5	5	5	5	6	6	3	3	6	7	5	5	5	5	3	3

TP/023/2 Final
comparison of temporary (T) and final (F) variety descriptions for 12 varieties
variety descriptions from two growing seasons 2011, 2012
differences are indicated in yellow colour

TWA_46th session
Hannover, 19-23.06.2017

Growing seasons 2012-2013-2014

	Characteristic/Variety	Variety 1			Variety 2			Variety 3			Variety 4			Variety 5			Variety 6		Variety 7		Variety 8		Variety 9			Variety 10	
		T	F	3	T	F	3	T	F	3	T	F	3	T	F	3	T	F	T	F	T	F	T	F	3	T	F
1	Lightsprout: size	3	5	5	3	3	3	5	7	7	5	7	7	5	5	5	5	5	5	5	3	3	3	5	5	3	5
2	Lightsprout: shape	1	3	3	2	2	2	2	1	1	4	2	2	2	2	2	4	4	2	4	2	2	1	2	2	2	4
3	Lightsprout: intensity of anthocyanin coloration of base	5	7	7	1	1	1	5	5	5	5	5	5	1	7	7	1	1	7	7	6	6	1	1	1	7	9
4	Lightsprout: proportion of blue in anthocyanin coloration of base	2	3	3	3	3	3	2	1	1	1	1	1	3	1	1	3	3	2	1	2	2	1	1	1	3	3
5	Lightsprout: pubescence of base	6	7	7	3	3	3	5	5	5	5	7	7	3	5	5	7	7	3	4	1	1	5	3	3	5	7
6	Lightsprout: size of tip in relation to base	5	5	5	3	3	3	3	4	4	5	7	7	3	3	3	3	3	3	3	3	3	3	3	3	4	4
7	Lightsprout: habit of tip	3	5	5	3	3	3	5	5	5	5	5	5	5	3	3	5	5	3	3	3	3	3	3	3	3	5
8	Lightsprout: anthocyanin coloration of tip	4	5	5	5	5	5	5	1	1	3	1	1	3	4	4	3	3	3	1	7	7	1	1	1	7	7
9	Lightsprout: pubescence of tip	5	5	5	3	3	3	5	3	3	5	5	5	7	5	5	7	7	4	5	3	3	3	3	3	7	7
10	Lightsprout: number of root tips	6	7	7	7	7	7	5	5	5	5	7	7	7	7	7	7	7	7	6	5	5	7	7	7	5	7
11	Lightsprout: length of lateral shoots	5	5	5	3	3	3	3	3	3	5	7	7	7	5	5	3	3	5	5	3	3	5	5	5	5	5

TP/023/2 Final

comparison of temporary (T) and final (F) variety descriptions for 10 varieties

variety descriptions from two growing seasons 2012, 2013 and for some varieties additional (3) growing season 2014

differences are indicated in yellow colour

differences between 2012 a 2013 result from a change of the conditions in the growing chamber (light, temperature), for comparision added some variety descriptions from 2014

TWA_46th session
Hannover, 19-23.06.2017

Growing seasons 2013-2014

	Characteristic/Variety	Variety 1		Variety 2		Variety 3		Variety 4		Variety 5		Variety 6		Variety 7		Variety 8		Variety 9	
		T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F
1	Lightsprout: size	6	6	7	7	6	6	7	7	7	7	7	7	7	7	7	7	5	5
2	Lightsprout: shape	2	2	5	5	3	3	2	2	3	3	1	1	2	2	1	1	1	1
3	Lightsprout: intensity of anthocyanin coloration of base	3	3	1	1	4	4	7	7	3	3	9	9	7	7	1	1	9	9
4	Lightsprout: proport12ion of blue in anthocyanin coloration of base	1	1	2	2	2	2	1	1	2	2	3	3	1	1	1	1	2	2
5	Lightsprout: pubescence of base	3	3	4	4	4	4	3	3	3	3	5	5	5	5	7	7	7	7
6	Lightsprout: size of tip in relation to base	5	5	7	7	5	5	7	7	5	5	3	3	5	5	7	7	3	3
7	Lightsprout: habit of tip	5	5	3	3	5	5	5	5	3	3	1	1	3	3	5	5	1	1
8	Lightsprout: anthocyanin coloration of tip	1	1	1	1	4	4	3	3	1	1	7	7	5	5	1	1	5	5
9	Lightsprout: pubescence of tip	3	3	1	1	5	5	4	4	1	1	6	6	5	5	9	9	5	5
10	Lightsprout: number of root tips	4	4	7	7	7	7	7	7	6	6	7	7	7	7	7	7	7	7
11	Lightsprout: length of lateral shoots	3	3	3	3	3	3	4	4	5	5	3	3	5	5	6	6	5	5

TP/023/2 Final

comparison of temporary (T) and final (F)variety descriptions for 9 varieties

variety descriptions from two growing seasons 2013, 2014

differences are indicated in yellow colour

no differences – 2013-2014

TWA_46th session Hannover, 19-23.06.2017

Growing seasons 2014-2015

	Characteristic/Variety	Variety 1		Variety 2		Variety 3		Variety 4		Variety 5		Variety 6		Variety 7		Variety 8		Variety 9		Variety 10	
		T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F	T	F
1	Lightsprout: size	5	5	5	5	6	6	5	5	5	5	5	5	5	5	5	5	5	5	7	7
2	Lightsprout: shape	1	1	2	2	2	2	1	1	3	3	1	1	2	2	2	2	2	2	3	3
3	Lightsprout: intensity of anthocyanin coloration of base	5	5	7	7	4	4	9	9	5	5	7	7	7	7	3	3	1	1	1	1
4	Lightsprout: proportion of blue in anthocyanin coloration of base	1	1	1	1	1	1	3	3	1	1	1	1	3	3	1	1	1	1	1	1
5	Lightsprout: pubescence of base	3	3	3	3	5	5	5	5	4	4	4	4	7	7	5	5	1	1	5	5
6	Lightsprout: size of tip in relation to base	5	5	5	5	4	4	3	3	5	5	5	5	3	3	6	6	3	3	3	3
7	Lightsprout: habit of tip	5	5	5	5	5	5	3	3	5	5	5	5	5	5	3	3	3	3	3	1
8	Lightsprout: anthocyanin coloration of tip	4	4	1	1	1	1	9	9	1	1	1	1	7	7	2	2	1	1	1	1
9	Lightsprout: pubescence of tip	7	7	3	3	5	5	7	7	5	5	5	5	7	7	5	5	1	1	4	4
10	Lightsprout: number of root tips	5	5	7	7	5	5	7	7	7	7	5	5	7	7	7	7	3	3	5	5
11	Lightsprout: length of lateral shoots	4	4	4	4	3	3	3	3	3	3	3	3	4	4	3	3	3	3	5	5

TP/023/2 Final
comparison of temporary (T) and final (F) variety descriptions for 10 varieties
variety descriptions from two growing seasons 2014, 2015
differences are indicated in yellow colour

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Growing seasons 2015-2016

	Characteristic/Variety	Variety 1		Variety 2		Variety 3		Variety 4		Variety 5	
		T	F	T	F	T	F	T	F	T	F
1	Lightsprout: size	7	7	5	5	5	5	7	7	7	7
2	Lightsprout: shape	2	2	1	1	2	2	1	1	1	1
3	Lightsprout: intensity of anthocyanin coloration of base	5	5	3	3	5	5	1	1	1	1
4	Lightsprout: proportion of blue in anthocyanin coloration of base	1	1	1	1	1	1	1	1	1	1
5	Lightsprout: pubescence of base	5	5	3	3	5	5	1	1	1	1
6	Lightsprout: size of tip in relation to base	3	3	3	3	3	3	3	3	3	3
7	Lightsprout: habit of tip	3	3	3	3	3	3	5	5	5	5
8	Lightsprout: anthocyanin coloration of tip	3	3	3	3	3	3	1	1	1	1
9	Lightsprout: pubescence of tip	1	1	1	1	1	1	3	3	3	3
10	Lightsprout: number of root tips	7	7	3	3	7	7	5	5	5	5
11	Lightsprout: length of lateral shoots	3	3	3	3	3	3	3	3	3	3

TP/023/2 Final
comparison of temporary (T) and final (F) variety descriptions for 5 varieties
variety descriptions from two growing seasons 2015, 2016
differences are indicated in yellow colour
no differences – 2015-2016

TWA_46th session
Hannover, 19-23.06.2017

Conclusions

- modification of growing conditions in the chamber(temperature, light) since 2013 growing season had significant impact on attributed notes
- there are generally slight differences (or no differences) between temporary and final variety descriptions for potato lightsprouts characteristics
- reduction of observation seasons for potato lightsprouts could be possible

TWA_46th session
Hannover, 19-23.06.2017

[L'annexe V suit /
Annex V follows /
Anlage V folgt /
Sigue el Anexo V]

ANNEXE V / ANNEX V / ANLAGE V / ANEXO V
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

IMPACT OF NUMBER OF GROWING CYCLES ON VARIETY DESCRIPTIONS AND DISCRIMINATION POWER IN POTATO

Presentation by an expert from Germany at the forty-seventh session of the Technical Working Party for Agricultural Crops

Bundessortenamt

UPOV TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS
Forty-Seventh Session Naivasha, Kenya, May 21 to 25, 2018

Impact of number of growing cycles on variety descriptions and discrimination power in potato

Beate Rücker, Germany

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Website: www.bundessortenamt.de E-Mail: bsa@bundessortenamt.de

Bundessortenamt

Background

TC/53, 2017:

- TC invited presentations to the TWPs on the impact of using different numbers of growing cycles on DUS decisions using actual date
- TC agreed in relation to costs for DUS examination that the number of growing cycles should be the minimum necessary for a robust DUS decision and the establishment of a reliable variety description.
- TC agreed that the appropriate number of growing cycles should be established on a crop-by-crop basis.

TWA/47, 2017

- Examples on wheat and barley (DE, UK) and potato (PL, NL)
- Further examples invited for 2018

Bundessortenamt

Introduction

- TG/23/6 for Potato: minimum duration of tests should normally be two independent growing cycles.
- Aim of this study: to validate whether two growing cycles are necessary or the duration of test could be reduced.
- Impact of the number of growing cycles was analyzed for quantitative characteristics in potato on the basis of data from actual DUS trials

3

Bundessortenamt

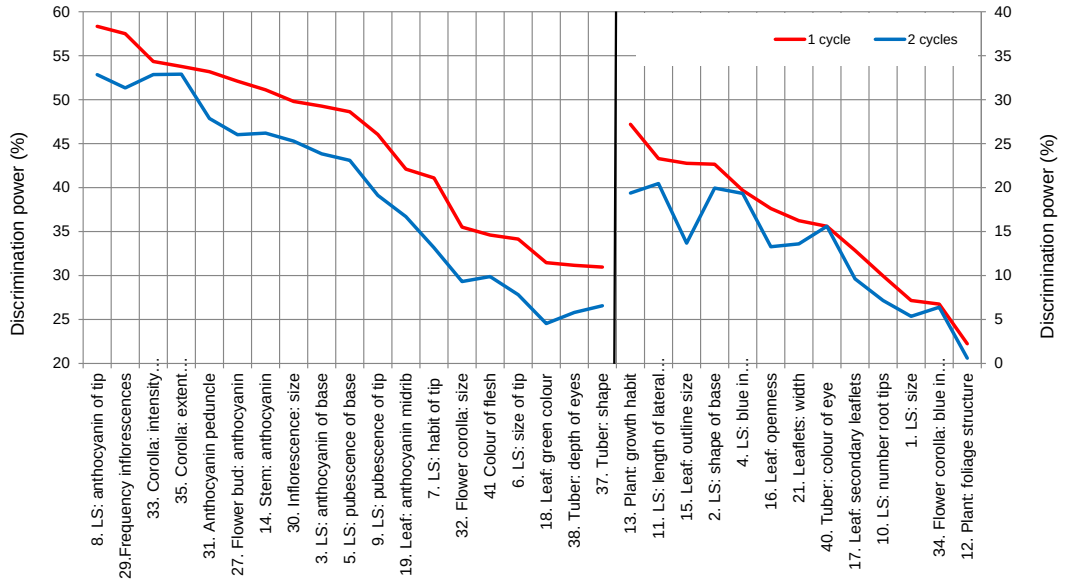
Data for analysis of discrimination power from DUS growing trials:

- Trials comprise about 360 varieties, incl. 50-70 candidates in 1st and 2nd year.
- Discrimination power of individual characteristics was calculated based on 2nd-year-candidates. Comparison to all varieties in the same growing trial.
- Two distinctness tests performed:
  - (a) '1-cycle': second year only.
    Two varieties are considered to be distinct if a clear difference was observed.
  - (b) '2-cycles': second year and first year.
    Two varieties are considered to be distinct if a clear difference in the same direction was observed in both years.
- Same analysis 2013 to 2017. In total, about 130 candidates compared to 350 reference varieties, resulting in ca. 45,000 pairwise comparisons.

4

Bundessortenamt

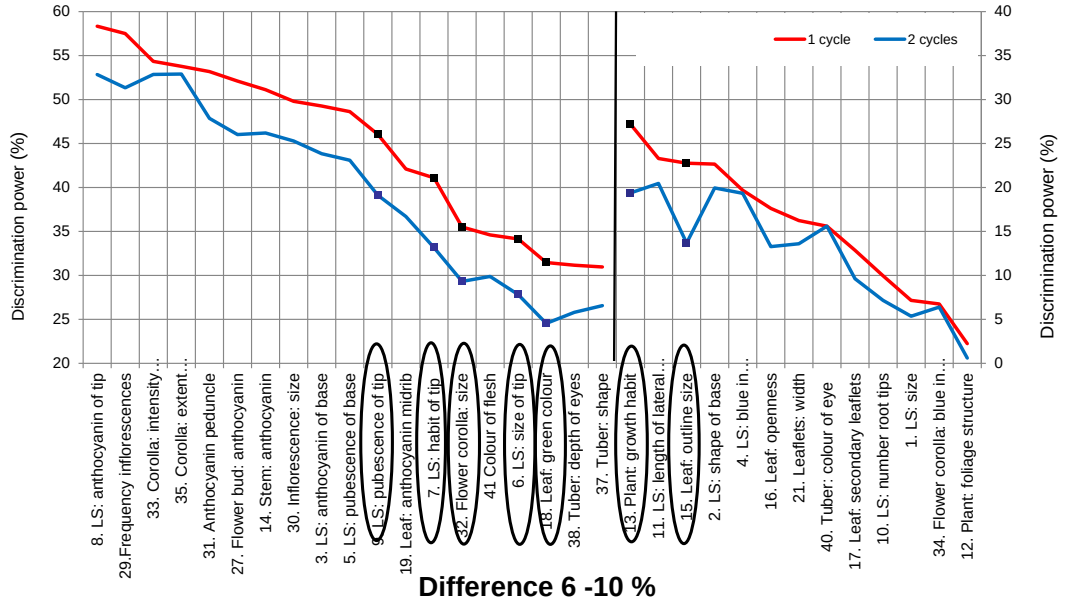
Impact of the number of growing cycles on discrimination power



5

Bundessortenamt

Impact of the number of growing cycles on discrimination power



Difference 6 -10 %

6

Bundessortenamt

Impact on discrimination power:

- discrimination power in a single cycle between 58 % and 2 %.
- clear difference observed in one cycle was not always confirmed in the second cycle
- consequently, discrimination power was lower after 2 cycles (up to 10 % less)
- '2 out of 3 cycles' option was not analyzed
- reliable decisions based on a single cycle, would require larger minimum differences for some characteristics
- larger minimum differences would lead to lower discrimination power

7

Bundessortenamt

Data for analysis of variety descriptions:

- Orthogonal DUS observations for 211 varieties in 6 successive growing cycles (2012-2017)
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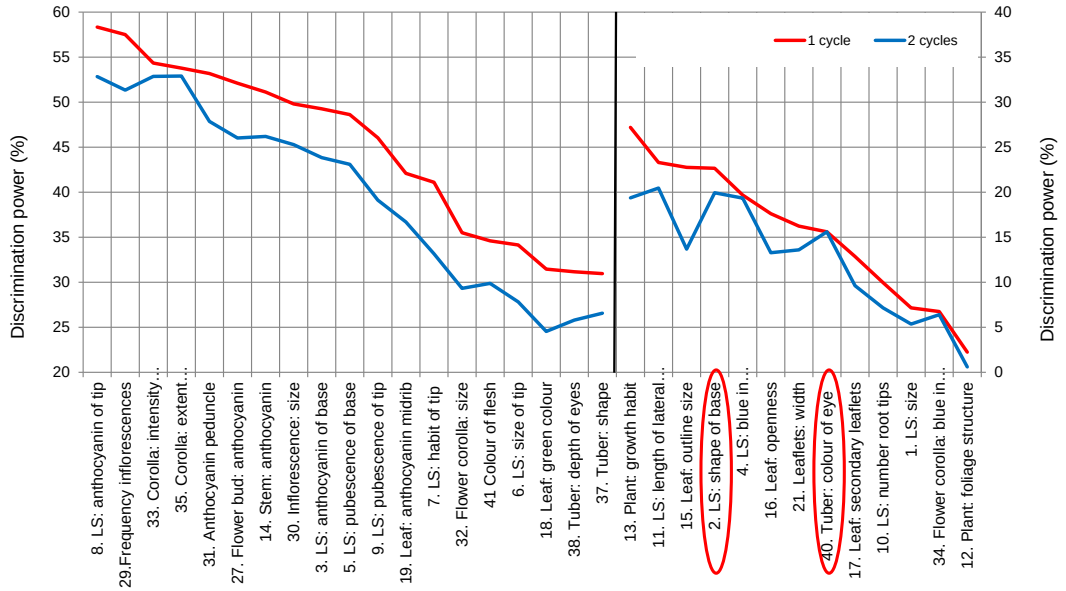
- Same characteristics as for distinctness analysis

8

Bundessortenamt

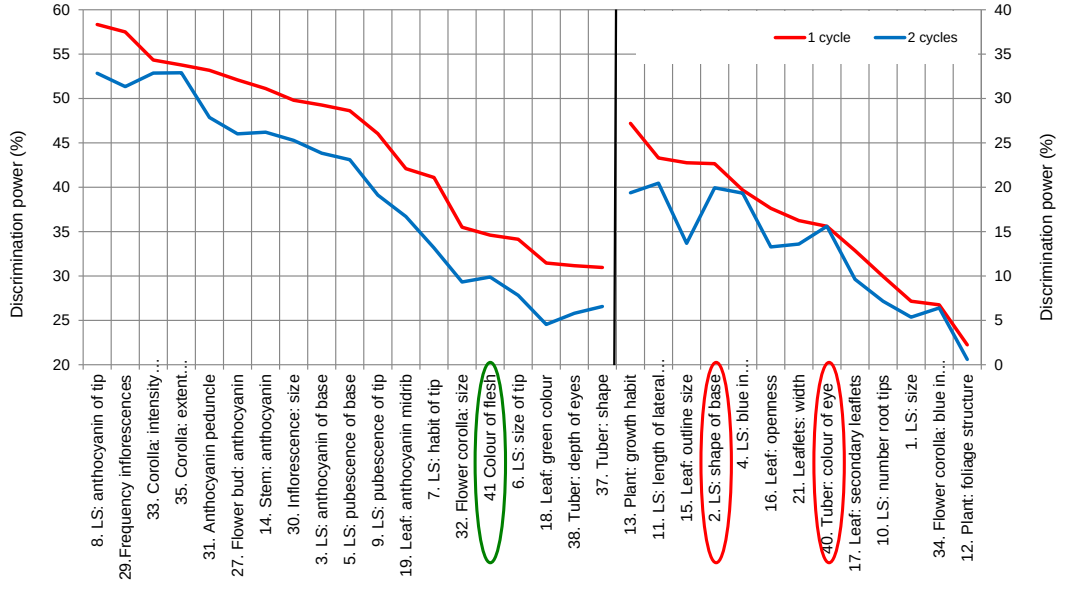
Impact of the number of growing cycles on discrimination power



9

Bundessortenamt

Impact of the number of growing cycles on discrimination power



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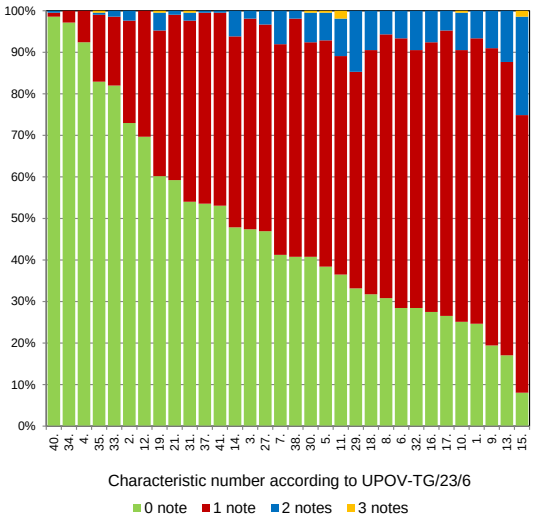
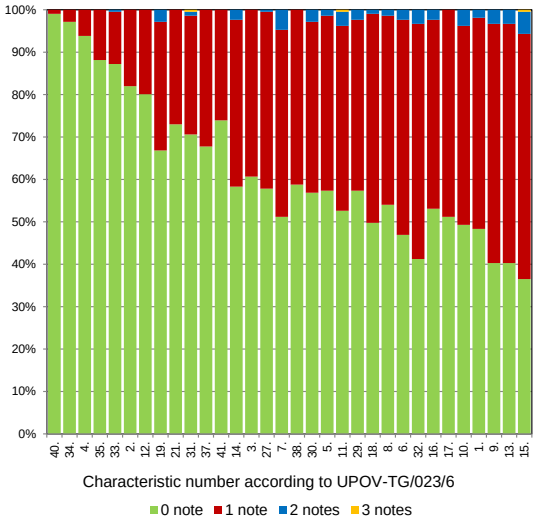
Difference between variety descriptions
(Maximum difference between 6 descriptions per variety, 211 varieties)

1-cycle variety descriptions



2-cycle variety descriptions



Bundessortenamt

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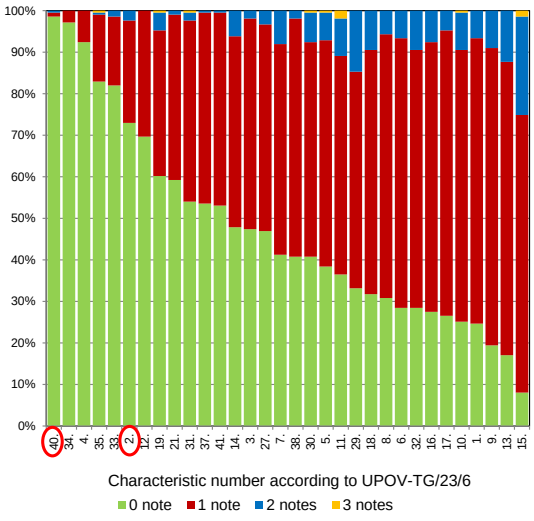
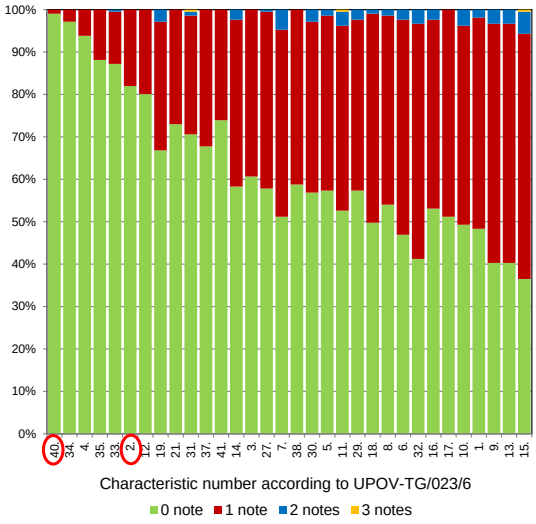
1-cycle variety descriptions



2-cycle variety descriptions



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Impact of the number of growing cycles on variety descriptions:

- Frequency of zero notes difference considerably higher between 2-cycle descriptions. Summary over all characteristics:

Differences	1-cycle	2-cycles
0 notes	47 %	62 %
1 note	47%	36 %
>1 note	6 %	2 %

- 1 note difference can be considered as quite stable descriptions. Nevertheless, +/- 1 note can lead to different decisions.
- Two cycles produce more robust descriptions.
- Robust descriptions have particular importance for databases used for management of reference collections (impact on thresholds and efficiency to exclude varieties from growing trials).

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Conclusion

- Number of growing cycles has significant impact on distinctness decisions and variety descriptions
  - Impact on distinctness decisions for varieties compared in the same growing trials
  - Impact on the management of the reference collection on the basis of descriptions stored in a database.
- Two growing cycles produce more robust variety descriptions and DUS decisions.
- The recommended minimum number of two growing cycles should be followed.
- Variety descriptions based on two cycles provide a better basis for enforcement.

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THANK YOU!

[L'annexe VI suit /
Annex VI follows /
Anlage VI folgt /
Sigue el Anexo VI]

ANNEXE VI / ANNEX VI / ANLAGE VI / ANEXO VI
[in English only / en anglais seulement / nur auf Englisch / solamente en inglés]

IMPACT OF THE NUMBER OF GROWING CYCLES ON VARIETY DESCRIPTIONS AND DISCRIMINATION POWER

Presentation by an expert from Germany at the thirty-sixth session of the Technical Working Party on Automation and Computer Programs

Bundessortenamt

UPOV TECHNICAL WORKING PARTY ON AUTOMATION AND COMPUTER PROGRAMS
Thirty-sixth Session, Hanover, Germany, July 2 to 6, 2018

Impact of the number of growing cycles on variety descriptions and discrimination power

Beate Rücker, Germany

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30627 Hannover, Germany
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Introduction

- TC 2017 considered impact of number of growing cycles
- TC: number of growing cycles should be the minimum necessary for a robust DUS decision and the establishment of a reliable variety description.
- TC: number of growing cycles should be established on crop-by-crop basis.

- TGs wheat, barley and potato: minimum duration of tests should normally be two independent growing cycles.
- Aim of this study: to validate whether two growing cycles are necessary or the duration of test could be reduced.
- Impact of the number of growing cycles was analyzed on the basis of data from actual DUS trials in winter wheat, winter barley and potato performed in DE (see TWA/46/8 Annex I, TWA/47/5)

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1. Analysis of discrimination power

Data for Potato:

- Trials comprise about 360 varieties, incl. 50-70 candidates in 1st and 2nd year.
- Discrimination power of individual characteristics was calculated based on 2nd-year-candidates. Comparison to all varieties in the same growing trial.
- Two distinctness tests performed:
  - (a) '1-cycle': second year only (year 0)
  - (b) '2-cycles': second year and first year (year 0 / -1)
    Two varieties are considered to be distinct if a clear difference in the same direction was observed in both years.
- Same analysis 2013 to 2017. In total, about 130 candidates compared to 350 reference varieties, resulting in ca. 45,000 pairwise comparisons.

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Data for Winter Wheat and Winter Barley:

- Trials comprise about 600 varieties in wheat and 300 varieties in barley.
- Discrimination power of individual characteristics was calculated based on all varieties in the same growing trial(s).
- Distinctness analyzed in three steps:
  - (a) '1 cycle': Comparison of all varieties in the trial (year 0)
  - (b) '2 cycles': For varieties also grown in the year before, distinctness was assessed in both years (year 0 / -1)
    Two varieties are considered to be distinct if a clear difference in the same direction was observed in both years.
  - (c) '2 out of 3 cycles': For varieties also grown the two previous years, distinctness was assessed in all 3 years (year 0 / -1 / -2)
    Two varieties are considered to be distinct if a clear difference in the same direction was observed in at least 2 out of 3 years.

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- Two-year data are available for about 70% of the varieties and three-year data for about 50% of the varieties.
- Same analysis for 2014, 2015 and 2016
- Every year, the distinctness test included
  - (a) 1-cycle-comparisons: 40,000 in wheat and 30,000 in barley
  - (b) 2-cycle-comparisons: 25,000 in wheat and 15,000 in barley
  - (c) 2 out of 3 comparisons: 15,000 in wheat and 6,000 in barley

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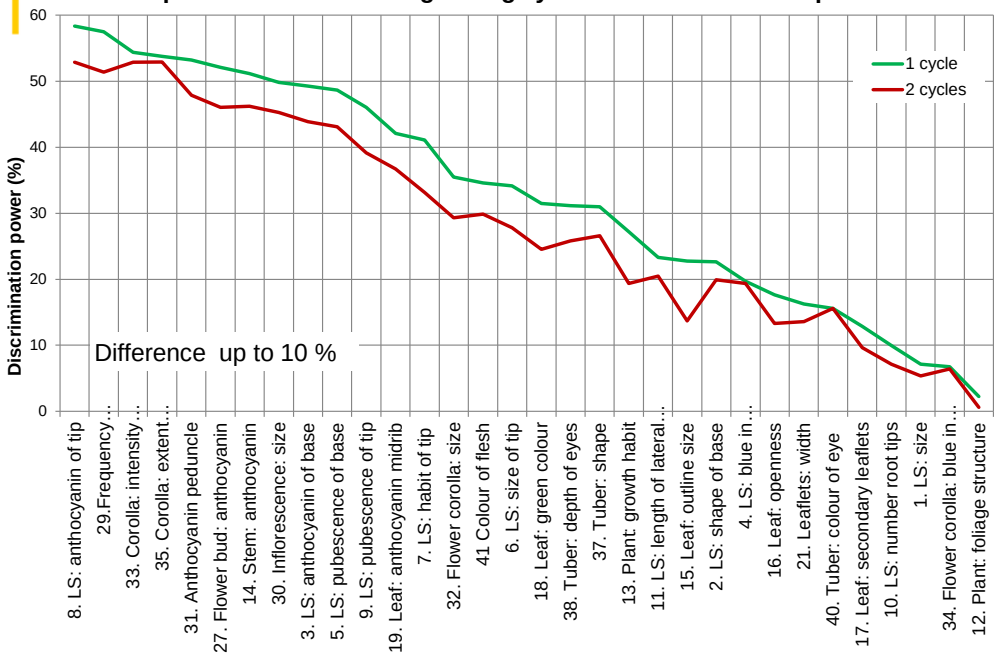
Potato

Impact of the number of growing cycles on discrimination power



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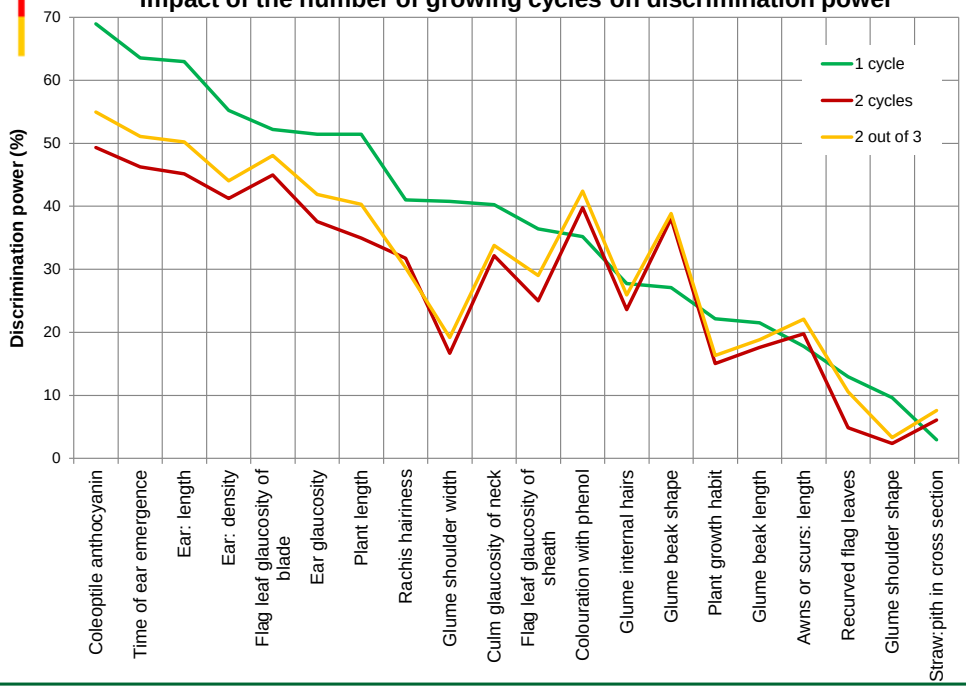
Wheat

Impact of the number of growing cycles on discrimination power



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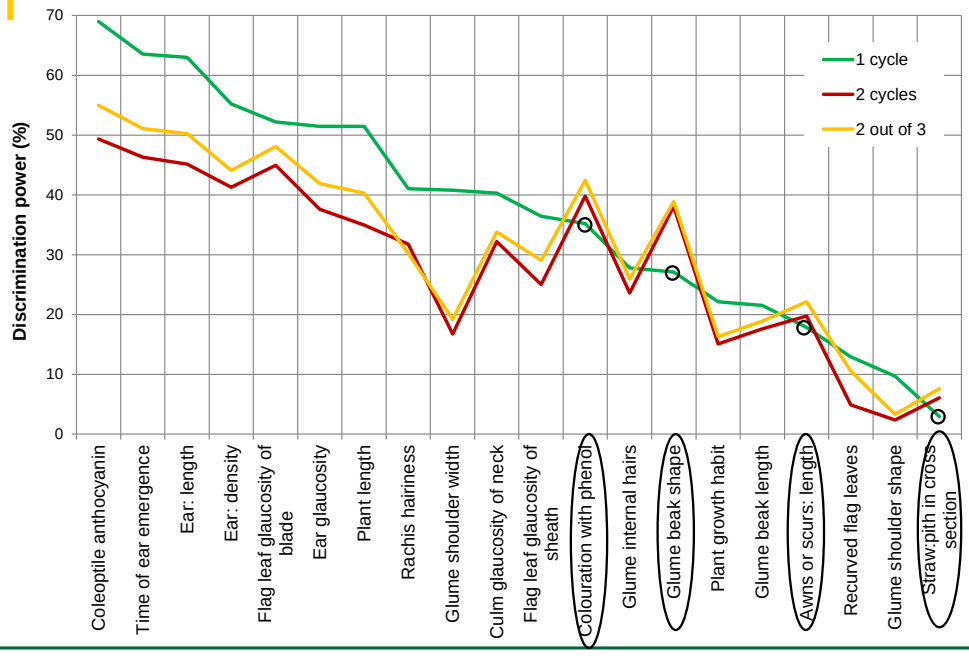
Wheat

Impact of the number of growing cycles on discrimination power



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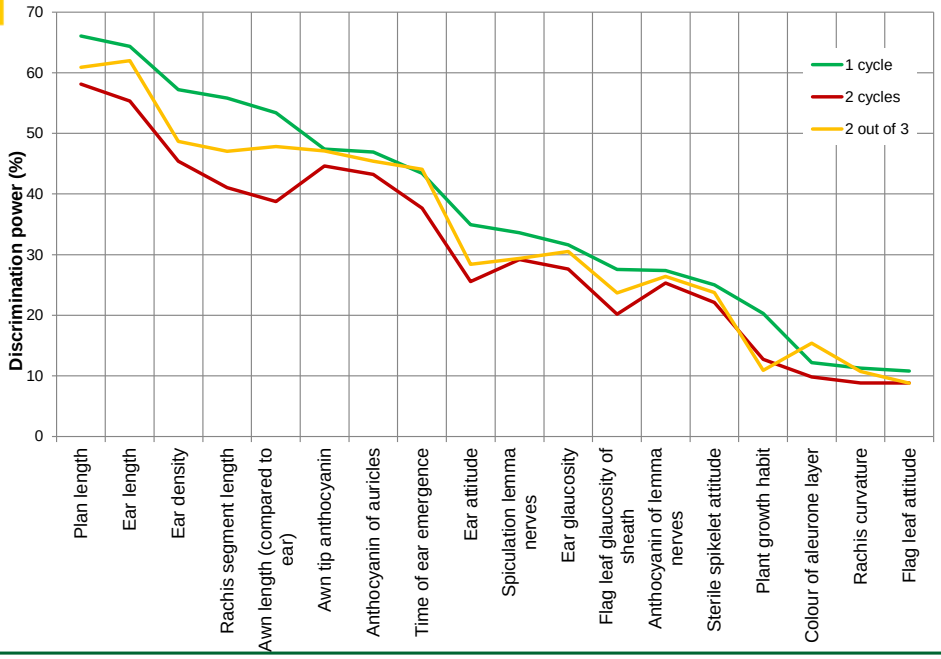
Barley

Impact of the number of growing cycles on discrimination power



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Impact on discrimination power:

- clear difference observed in one cycle was not always confirmed in the 2nd cycle
- consequently, discrimination power was lower after 2 cycles
- 3 cycles better than 2 cycles because a difference in 1 cycle can be confirmed in 3rd cycle (3rd cycle not analyzed for potato because normally there are sufficient characteristics with clear differences after 2 cycles)
- reliable decisions based on a single cycle, would require larger minimum differences for most characteristics
- larger minimum differences would lead to lower discrimination power

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2. Analysis of variety descriptions

Data for Potato:

- Orthogonal DUS observations for 211 varieties in 6 successive growing cycles (2012-2017)
- For each variety establishment of
  6 annual descriptions and
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- The variation of descriptions over one and two cycles was analyzed (maximum difference between the 6 descriptions).
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(Maximum difference between 6 descriptions per variety, 211 varieties)

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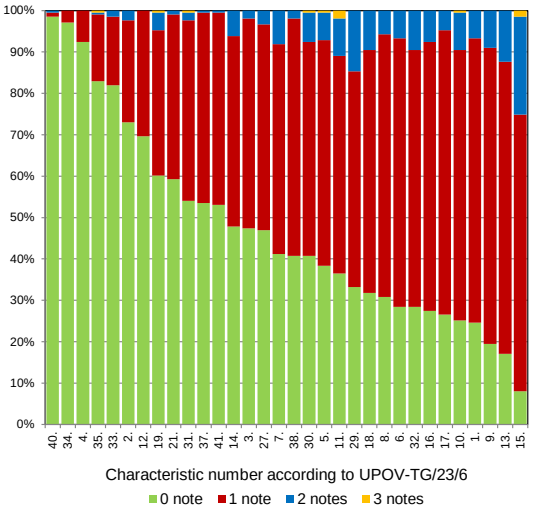
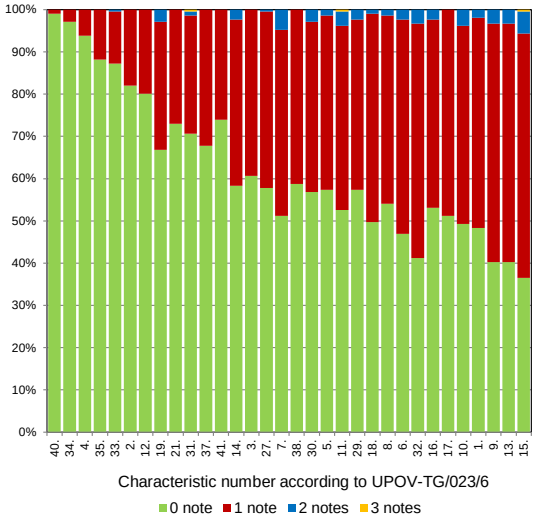


2-cycle variety descriptions



Bundessortenamt

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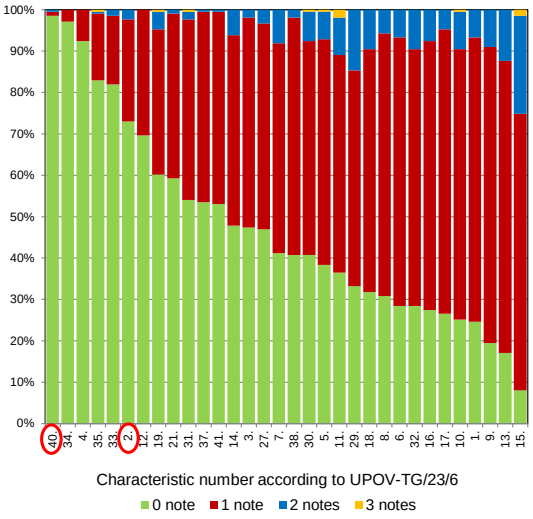

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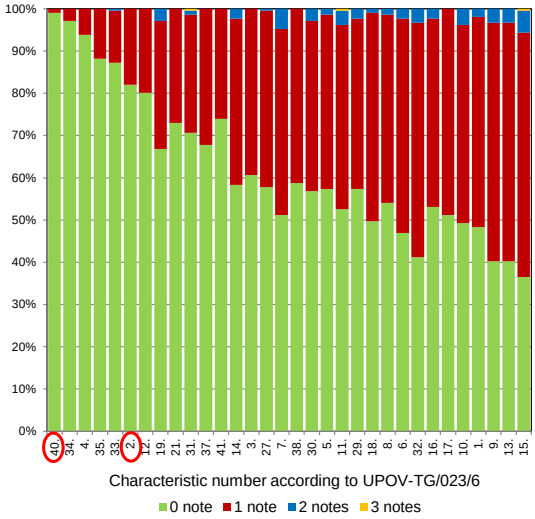

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- 1 note difference can be considered as quite stable descriptions. Nevertheless, +/- 1 note can lead to different decisions.
- Two cycles produce more robust descriptions.

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Data for Wheat and Barley:

- DUS observations for 77 winter wheat varieties and 47 winter barley varieties in 6 successive growing cycles were used to establish
  - annual descriptions (year 0)
  - descriptions over 2 cycles (year 0 / -1)
  - descriptions over 3 cycles (year 0 / -1 / -2)

- The variation of descriptions over one, two and three cycles was calculated

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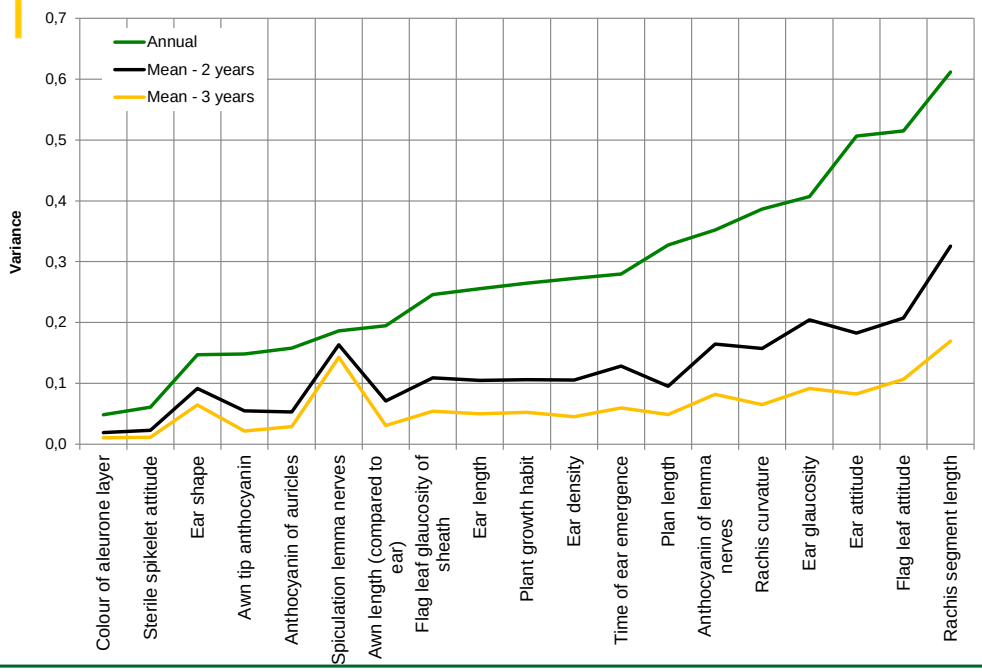
Barley

Variance of variety descriptions over testing periods



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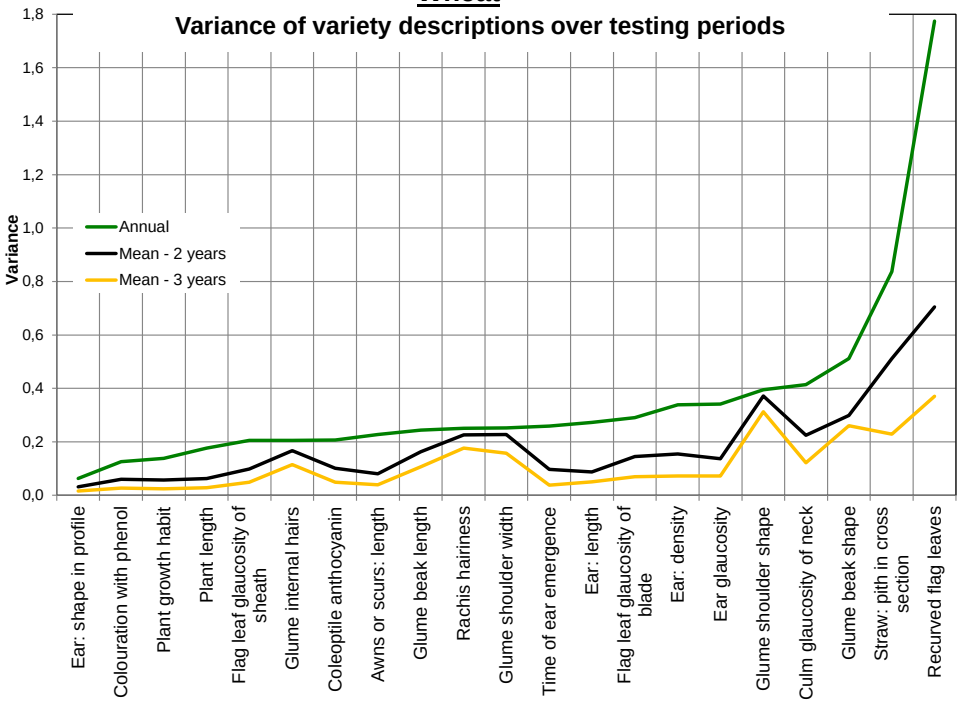
Wheat

Variance of variety descriptions over testing periods



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Conclusions

- Number of growing cycles has significant impact on distinctness decisions and variety descriptions
  - Impact on distinctness decisions for varieties compared in the same growing trials
  - Impact on the management of the reference collection on the basis of descriptions stored in a database.
- Two growing cycles produce more robust variety descriptions and DUS decisions.
- Current recommendation in TG Barley, TG Wheat and TG Potato is appropriate: “Minimum duration of test should normally be two independent growing cycles”.

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- Minimum duration of test should be followed to establish official variety description (basis for identification & enforcement)
- Robust descriptions have particular importance in databases used for management of reference collections (impact on thresholds and efficiency to exclude varieties from growing trials).
- Descriptions in a database (“working description”) should be based at least on the recommended minimum number of growing cycles. Any additional cycle can improve the quality of the description

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THANK YOU!

[End of Annex VI and of document /
Fin de l'Annexe VI et du document /
Ende der Anlage VI und des Dokuments /
Fin del Anexo VI y del documento]