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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
Geneva

TECHNICAL WORKING PARTY FOR VEGETABLES

Fiftieth Session
Brno, Czech Republic, June 27 to July 1, 2016

ADDENDUM TO

NUMBER OF GROWING CYCLES IN DUS EXAMINATION

Document prepared by the Office of the Union

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This document contains presentations to be made at the fiftieth session of the Technical Working Party for Vegetables (TWV), as follows:

- Annex I: “Minimum number of growing cycles”, by an expert from France;
- Annex II: “Minimum number of growing cycles”, by an expert from the Netherlands

[Annexes follow]

ANNEX I

MINIMUM NUMBER OF GROWING CYCLES FOR DUS EXAMINATION
BY AN EXPERT FROM FRANCE

Minimum number of growing cycles.
for DUS examination

UPOV TWV/50
FR - GEVES proposal

GEVES
Expertise & Performance

TC UPOV Workshop (March 2016) –
Further discussions...

1. Number of growing cycles for DUS examination:

- How many, *at minimum*?
- Which aims?

- A feedback on "basic" rules

➤ Can we propose some evolutions ?

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1- Number of growing cycles for DUS exam

So, today, to validate « sufficiently consistent differences »:

- « Only » the following options (depending on the crops)

- field crops 2 DUS cycles
- vegetables 2 DUS cycles
- fruits 2 DUS cycles + opening to 1 DUS cycle (cost)
- ornamentals 1 DUS cycle + species with 2 DUS cycles

➤ Where is the logic of these guidances?



1- Number of growing cycles for DUS exam

TGP/8/2: PART I: 1. DUS TRIAL DESIGN



UPOV Framework

1.2 Growing cycles?

1.2.1.2 The UPOV Test Guidelines, where available, specify the recommended number of growing cycles. When making the recommendation, the experts drafting the UPOV Test Guidelines take into account factors such as the number of varieties to be compared in the growing trial, the influence of the environment on the expression of the characteristics, and the degree of variation within varieties, taking into account the features of propagation of the variety e.g. whether it is a vegetatively propagated, self-pollinated, cross-pollinated or a hybrid variety.

Yes, BUT ... **NO absolute rules**

- Better controlled conditions under glasshouse ? **Not really**
- Sexual/Vegetatively reproduced ? **A lot of exceptions**
- Autogamy/Allogamy ? **Too many significant exceptions**



1- Number of growing cycles for DUS exam

Consistency of the **DISTINCTION**... “at least 2 independent **GROWING** cycles”

TGP/8/2: PART I: 1. DUS TRIAL DESIGN

1.2 Growing cycles²

1.2.1 Introduction

UPOV Framework

1.2.1.1 A key consideration with regard to growing trials is to determine the appropriate number of growing cycles. In that respect, document TGP/7, Annex I: TG Template, section 4.1.2, states:

*4.1.2 Consistent Differences

*The differences observed between varieties may be **so clear that more than one growing cycle is not necessary**. In addition, in some circumstances, the **influence of the environment** is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. **One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent** is to examine the characteristic in at least **two independent growing cycles**.



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1- Number of growing cycles for DUS exam

Consistency of the **DISTINCTION**... “at least 2 independent **GROWING** cycles”

1.2.2 Independent growing cycles

1.2.2.1 As indicated in section 1.2.1.1, **one means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.**

1.2.2.2 In general, the assessment of independence is based on **the experience of experts.**

1.2.2.3 When a characteristic is observed in a growing trial in two independent growing cycles, it is **generally observed in two separate plantings or sowings.** However, in some perennial crops, such as fruit trees, **the growing cycles take the form of one trial observed in two successive years.**

1.2.2.4 When field or greenhouse crop trials are planted/sown **in successive years,** these are considered to be independent growing cycles.

1.2.2.5 Where the two growing trials are **in the same location and the same year,** a suitable time period between plantings may provide two independent growing cycles. In the case of trials grown in greenhouses or other highly controlled environments, **provided the time between two sowings is not "too short,"** two growing cycles are considered to be independent growing cycles.

1.2.2.6 Where two growing cycles are conducted **in the same year and at the same time,** a suitable distance or a suitable difference in growing conditions between two locations may satisfy the requirement for independence.

1.2.2.7 The rationale for using independent growing cycles is that **if the observed difference in a characteristic results from a genotypic difference between varieties, then that difference should be observed if the varieties are compared again in a similar environment but in an independent growing cycle.**



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1- Number of growing cycles for DUS exam

Consistency of the **DISTINCTION**... “at least 2 independent **GROWING** cycles”

- Several available arrangements (TGP/8/2, 1.2.2)
- Independence based on the **experts’ experience**

→ Why?


Robustness on distinction, and regularly on QUALITATIVE characteristics


→ Which cycle?

Different seasons, years, places, conditions (openfield/ greenhouse)

→ How?

Different sowings, or only one planting during several years
but same material (trees)

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 1- Number of growing cycles for DUS examination

Check **Uniformity**

For some species or varieties, we assess uniformity based on the off-type approach


... it exists UPOV tables which take care already of the risks
(especially the risk to exam on unique sample and eventually one cycle)


→ One cycle may be enough

And, for species or varieties not suitable for the off-type approach, and for candidate varieties where there are doubts (interaction with environnement), it is **necessary** to continue the U examination

→ Additional cycle(s) needed

with eventually descendance to be considered.

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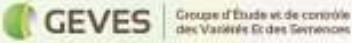


2- Number of growing cycles for DUS examination
Check Stability

TGP11 " (...) Experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable. (...)"

So once a variety is U on a single DUS cycle base,
→One cycle may be enough
→Additional cycle(s) needed ? Why ?

→ to rely on maintenance control
→ consider **new tools** (molecular identification, DNA storage...)
to check the compliance of renewals of the material



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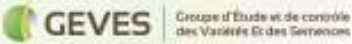
1- Number of growing cycles for DUS examination
CONCLUSION

For a reliable DUS examination

- with results as quickly and consistent as possible,
- at the « right » cost
(if possible less expensive, without loss of the PBR strength)

The « single DUS examination » can be an option.

- **with associated tools to consider**, case by case
 - Additional cycle(s) when needed
 - Participation of the applicant in the DUS
 - Assistance of molecular markers



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Thank you
for attention

UPOV – TWV/ 50
June 27 to July 1, 2016 (*Brno, Czech Republic*)




[Annex II follows]

MINIMUM NUMBER OF GROWING CYCLES
BY AN EXPERT FROM THE NETHERLANDS




Minimum Number of growing cycles

2016
Naktuinbouw




Importance

- **TGP 8:**
1.2.2.7 The rationale for using independent growing cycles is that if the observed difference in a characteristic results from a genotypic difference between varieties, then that difference should be observed if the varieties are compared again in a similar environment but in an independent growing cycle




Importance

- In TGP 8 solely linked to Distinctness
- Also important for high quality stable descriptions!



Number of growing cycles


- Mentioned in TG's based on factors:
 - the number of varieties to be compared in the growing trial,
 - the influence of the environment on the expression of the characteristics, and
 - the degree of variation within varieties,
 - the features of propagation of the variety e.g. whether it is a vegetatively propagated, self-pollinated, cross-pollinated or a hybrid variety.



Independent growing cycles


- **When a characteristic is observed in a growing trial in two independent growing cycles, it is generally observed in two separate plantings or sowings.**

However, in some perennial crops, such as fruit trees, the growing cycles take the form of one trial observed in two successive years.




Independent growing cycles

- **Two cycles in same place**
 - Usually two years to have comparable environment. Two plantings in one place in one year is possible with sufficient time between plantings.
- **Two cycles in different places in one year**
 - Possible with sufficient distance between places, but risk to introduce new variation




Practice

- **Roughly the present UPOV practice:**
- **Seed propagated agricultural and vegetable crops: two independent growing cycles**
- **Fruit crops: two independent growing cycles**
- **Vegetatively propagated ornamentals: one growing cycle**



Full growing cycles?

- **Bolting characteristics in separate trial once, also for crops with two cycles**
- **Disease resistant tests in separate trial once, also for crops with two cycles**
- **Some additional tests as Light Sprout tests in potato separate from normal growing trial**
- **Can DNA test replace one year of growing trial?**

	<h2>Items for discussion</h2>
	<ul style="list-style-type: none">- Re-think the criteria to establish the number of cycles. Apply on a crop by crop basis or even application by application. - Can we consider two independent tests instead of growing cycles? E.g. One full growing cycle plus an additional test such as a resistance test, a light sprout test or a DNA test? - Will applicants accept a less predictable system (costs)?