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IP Australia

24 July 2026



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ABN: 38 113 072 755

Payment Notice for designation of a QP

PBR number
Botanical name
PBR name

\$350.00

Due 24 August 2026

PAY NOW

Dear ,

The fee listed below is now due:

Fee Type: designation of a QP

Amount : \$350.00

Payments can be made by using our [online services](#) or by submitting a payment options form to PO BOX 200 Woden ACT 2606. Information on our current fee schedule can be found [on our website](#).

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Yours sincerely,

IP Australia



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24 July 2026



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ABN: 38 113 072 755

Payment Notice for renewal of QP

PBR number
Botanical name
PBR name

\$350.00

Due 24 August 2026

PAY NOW

Dear ,

The fee listed below is now due:

Fee Type: renewal of QP

Amount : \$350.00

Payments can be made by using our [online services](#) or by submitting a payment options form to PO BOX 200 Woden ACT 2606. Information on our current fee schedule can be found [on our website](#).

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Yours sincerely,

IP Australia



Australian Government

IP Australia

28 July 2026

PBR QP Training Suite

Extracted from Thinkific on 28 July 2026



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1 – Let's talk PBR!

Let's talk PBR!



A Qualified Person (QP) has a very important role in every plant breeder's rights (PBR) application as they are the experts in particular plant groups and are accredited by IP Australia to verify technical details of applications. Every PBR application must be verified by a QP before a variety can be granted PBR by IP Australia.

The aim of this training suite is to provide QPs with training and ongoing support to ensure that they have a clear understanding of the PBR registration process in Australia and has the skills and knowledge required to successfully complete PBR registrations.

During this introductory module, you will be introduced to:

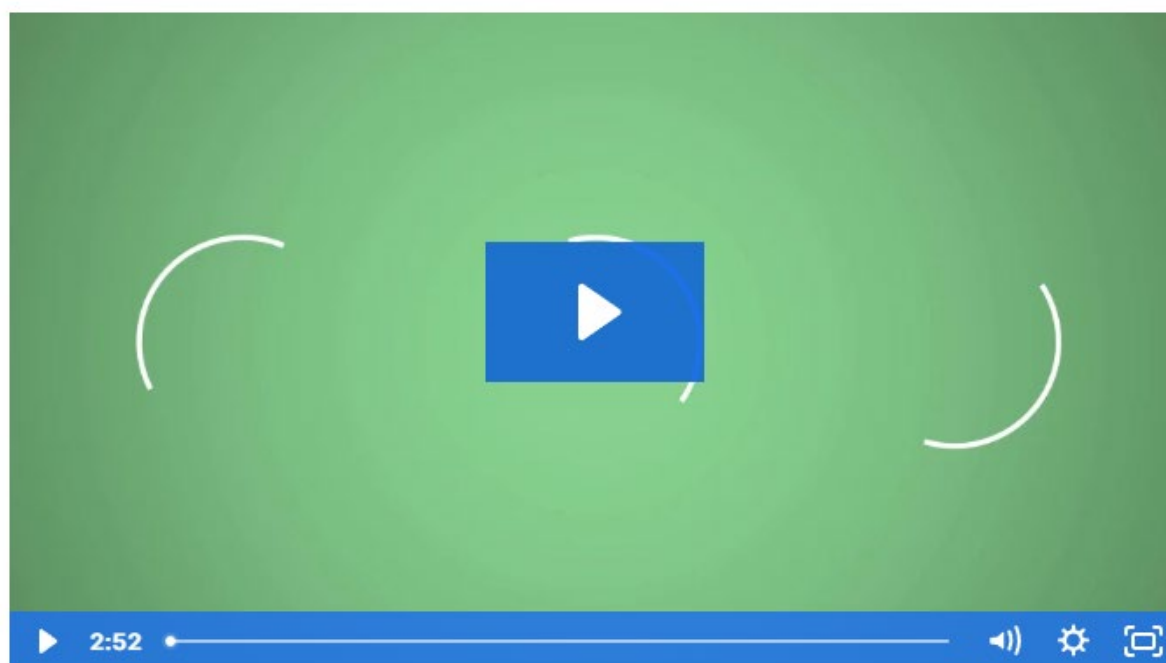
- IP Australia and an overview of the PBR Office
- The International Union for the Protection of New Varieties of Plants (UPOV) - Introduction to Harmonisation and related documents
- The purpose and importance of PBR registration
- The key relationships within the Australian PBR process.
- The relationships between QP, applicant and PBR Office.
- The role and responsibilities of a QP
- An overview of the workflow for PBR registration
- Knowing where a QP fits in within the workflow

IP Australia/PBR Office Video



Let's start with an introduction to IP Australia and an overview of the PBR office.

Click the play button to watch the video.



The importance and purpose of PBR



PBR is an exclusive intellectual property right granted to the plant breeders who have developed new varieties.

PBR gives plant breeders (or their licensee) exclusive rights to:

- produce or reproduce the plant material
- condition the plant material for the purpose of propagation (conditioning includes cleaning, coating, sorting, packaging and grading)
- offer the plant material for sale
- sell the plant material
- import and export the plant material
- stock the plant material for any of the purposes described above.

The duration of PBR protection extends for a maximum period of 25 years for trees and vines, and 20 years for all other plant types.

Plant breeding is a lengthy and expensive process and PBR provides a way for the breeders to recover the cost related to the development of a new plant variety. Royalties or license fees from PBRs allow plant breeders such as CSRIO to develop more productive or drought-tolerant crop varieties, the breeding of superior fruit cultivars, and the development of commercially attractive ornamental plants.

Plant industries are an important aspect of the economy and provide a means of living to a large percentage of the world's population. Having an effective plant variety protection system encourages breeders to develop new plant varieties that benefit society, including by providing access to new plant varieties for further breeding. PBR provides an incentive for breeders to produce reliable higher yielding new varieties so that they obtain a better return on their investment.

Protecting the IP rights associated with proprietary plant material is fundamental to the integrity and long-term viability of the plant-related industries and for the future development of improved varieties for consumers and growers.

Although the PBR Act doesn't mention the payment of royalties, it also doesn't prevent breeders from establishing a contract with growers for a royalty payment at some point in the supply chain. In Australia, this has led to the introduction of an industry-driven 'End Point Royalty' (EPR) system for many crops, especially in grain crops like wheat and barley.

Australia's wheat production is around 18 million tons/year and collecting a royalty on the harvested grain means that the return on investment is significantly higher than a seed-based royalty.

The increased return means more dollars are reinvested into the breeding of better wheat varieties. A wheat variety can cost around 3 million dollars to develop. Prior to the year 2000, 90% of wheat varieties in Australia were developed by public sector institutions with very little return from royalty payments. Currently, wheat breeding in Australia is 100% funded by the private sector using EPR, with a significant portion of the returns invested into further breeding. This is a testament to the success of the current PBR system.

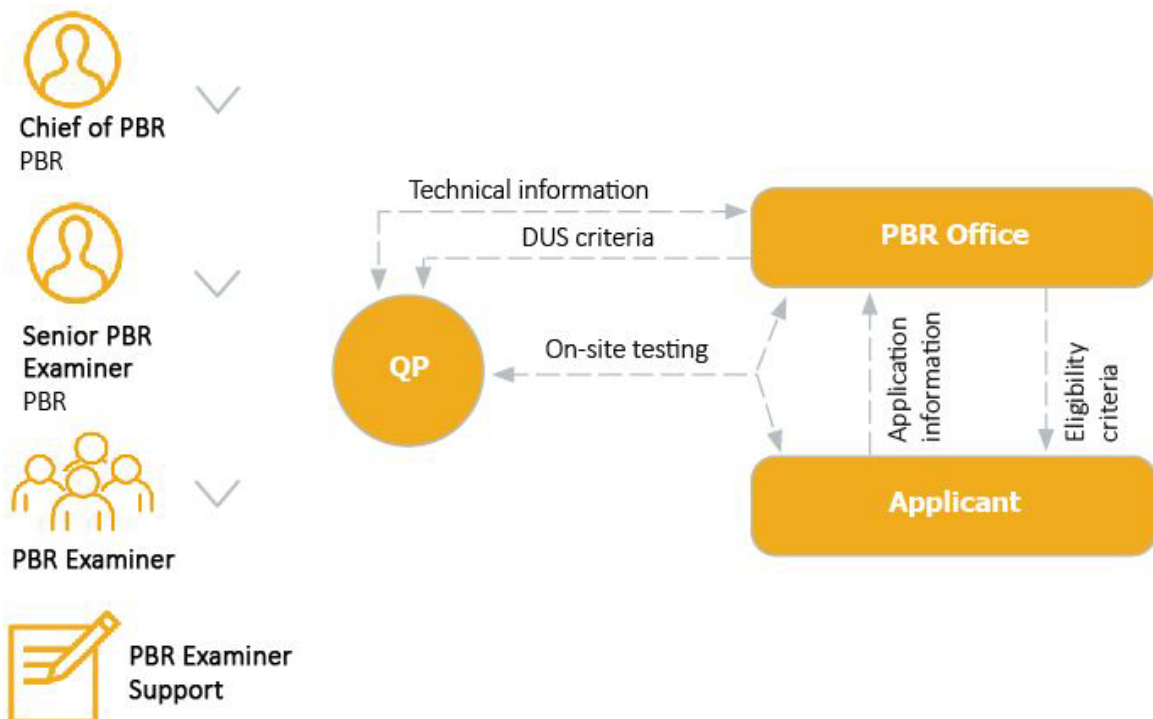
In a nutshell, the purpose of the PBR system is to provide a commercial exclusivity to the breeder, all the while making the protected genetic material available for further breeding for the benefit of society.

Further information can be found on the [UPOV website](#).

QP, applicant and the PBR Office - How they work together



Applicant-PBRO: The PBR Office has an initial interaction with the applicant by providing information on the PBR application process and eligibility requirements.	QP-Applicant: The QP continues to interact with the Applicant throughout the PBR application process and often act as the go-between for the applicant in communicating with the PBR Office.	QP-PBRO: Often, the Applicant delegates their role to the QP. Once an application is accepted into the scheme the PBR Office works with the QP in all the technical aspects of the application.
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Role and responsibilities of a QP



Before PBR can be granted, an application must undergo a rigorous distinctness, uniformity, stability (DUS) examination process through a comparative growing trial or examination of official overseas data. QPs oversee the comparative growing trial and assist with providing advice and guidance around evidence that a new variety is distinct, uniform and stable.

What does a QP do?

QPs have the responsibility of identifying and including the most similar variety(ties) of common knowledge (VCK) in the comparative growing trial.

They are also responsible for:

- experimental design
- management regime
- data collection
- statistical analysis
- photography
- writing the description of the plant variety

QPs help to ensure that applications for PBRs are robust enough to withstand any future infringement issues or legal challenge.

The main responsibility of a QP is to:

- VERIFY details of the application, including claims made
- SUPERVISE any test growings
- VERIFY a detailed description of the variety

In practice, this means that they:

- Gather the evidence to support DUS claims such as conducting field trials
- Prepare a detailed description of the variety that supports the claims made in the application, such as outlining how it is clearly distinguishable from all similar existing varieties. This includes providing evidence/statement of uniformity and stability
- Verifying the above points

QPs may also provide support to the applicant in other functions involved in the PBR process. However, this is discussed and negotiated between the QP and the applicant.

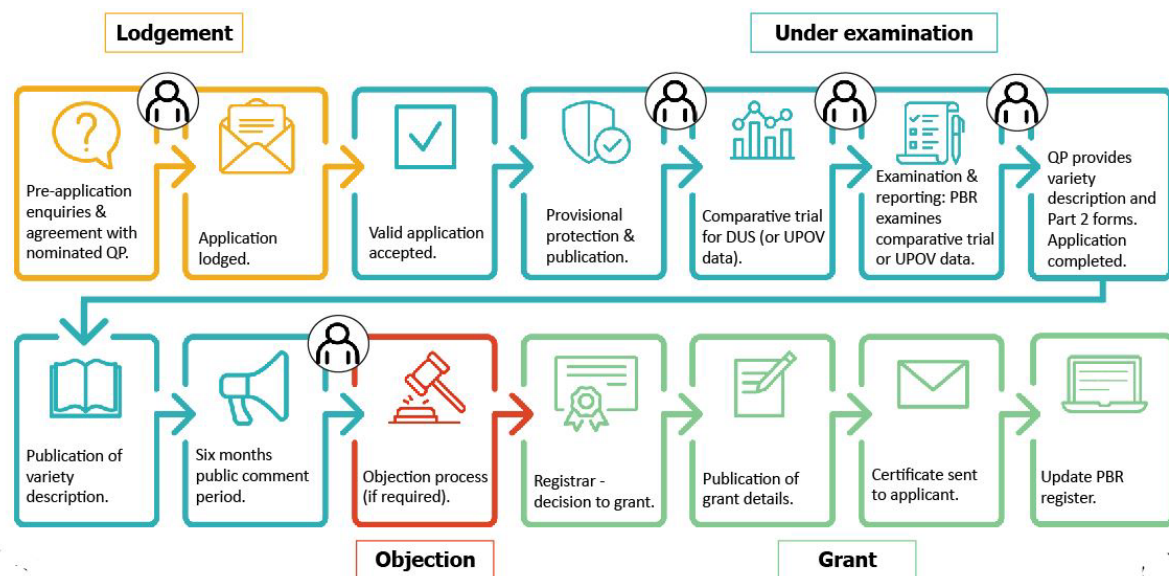
Ultimately, the PBR office is the decision-maker and considers the evidence provided by the QP when determining whether or not the requirements of the PBR Act have been met and the variety can be granted PBR.

PBR workflow



Let's now take a look at a simplified workflow for the PBR end-to-end process.

Where the QP fits within the workflow.



2 – All about the forms

All about the forms



The aim of this chapter is to provide you with assistance and support in understanding the various forms associated with the plant breeder's right (PBR) registration process in Australia.

During this module, you will be introduced to the forms needed for a valid PBR application prior to acceptance:

1. Part 1 General information form
2. Part 1 Supplementary (if there are multiple applicants)
3. Authorisation of Agent form (when the agent is appointed)
4. Nomination of Qualified Person (QP) form

Forms needed after acceptance but prior to grant:

1. PBR Part 2 form
2. Certification by QP form
3. Confirmation of submission of propagating material to a genetic resources centre (GRC) form.
4. Confirmation of submission of a satisfactory specimen to the herbarium (ACRA form) (needed only for Australian native plants)
5. Part 2 Description of Variety

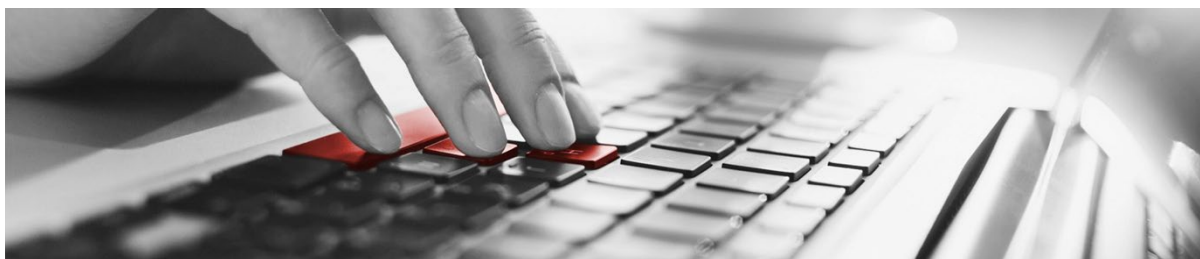
Forms needed for a valid application prior to acceptance



Let's take a look at the important forms.

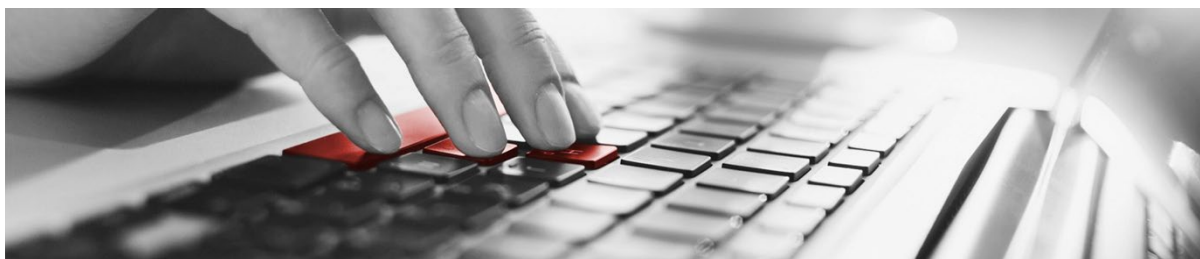
- **Application for Plant Breeder's Rights:** Commonly referred to as the 'Part 1', this form is the initial and primary form used for submitting a PBR application in Australia except for applications submitted through UPOV's PRISMA system. This form is used to collect information/details about the applicant, agent (if any), the breeder, the relationship between the breeder and the applicant, and preliminary information about the variety to establish a prima facie case for breeding and its breeding history. Successful completion of this form or a submission through PRISMA is a prerequisite for acceptance into the PBR scheme.
- **Authorisation of Agent:** This form is required if the applicant appoints an agent to act on their behalf in the process of obtaining PBR. If the applicant is an overseas resident, then an Australian or New Zealand agent is nearly always appointed although, in rare cases, an Australian postal address for the service of documents may be provided. Agent authorization form must be completed and signed by the applicant.
- **Nomination of a Qualified Person:** This form is used to nominate a QP accredited by the PBR office to work with the plant type under consideration. A list of QPs is available at IP Australia's website or in the current volume of the Plant Varieties Journal.
- **Supplementary Pages to the Part 1 Application:** This form is only required when there is more than one applicant in a PBR application and you are submitting an application through eServices or by mail. It is not required when submitting through PRISMA as the system already has the capacity to include multiple applicants. If you need to use this form, each additional applicant needs to complete a copy of the form. This form is used to collect information/details about the applicant, agent (if any), the breeder, the relationship between the breeder and the applicant. Each additional applicant must also complete an authorization of agent form (if applicable).

Forms needed after acceptance but prior to grant



- **PART 2 - Application for Plant Breeder's Rights:** Commonly referred to as "PBR Part 2 form" this form is required after any growing trials have been completed or overseas DUS examination results have been assessed. It is used in conjunction with the web-based "Interactive Variety Description System" (IVDS) and Plant Variety Journal to provide detailed information about the distinctness, uniformity and stability (DUS) of candidate variety.
- **Certification by a Qualified Person:** In this form, QPs list and certify the functions they have performed in relation to the PBR application under consideration.
- **Confirmation of submission of propagating material to a genetic resources centre (GRC):** This form is used by the applicant/agent to confirm that that propagating material of the new variety (the candidate variety) has been deposited for storage, at the expense of the applicant, in a genetic resource centre in Australia or New Zealand.
- **Confirmation of submission of a satisfactory specimen to the herbarium:** This form is required for all varieties of Australian native plants to confirm that an acceptable herbarium specimen has been submitted to the Australian Cultivar Registration Authority (ACRA).

How to submit a PBR application



There are two approved preferred methods of filing a PBR application. PRISMA or by eServices.

PRISMA

- PRISMA is a tool developed by UPOV that facilitates the submission of a PBR application in Australia. PRISMA has many benefits as it is a secure fully online lodgement system that guides users through the lodgement process. Where relevant, data from previous applications can be re-used. PRISMA allows the assigning of different user roles, such as drafter, signatory, agent, translator and provides controlled secure and confidential access.
- When using PRISMA to file a PBR application in Australia, the completed form submitted to IP Australia includes a PDF version that has the same look and feel as the forms submitted manually through eServices.
- When using PRISMA to file an application it is not necessary to use the Part 1 General Information form or the Part 1 Supplementary form as these are already incorporated in the PRISMA process.

You can view more detailed information on PRISMA, including benefits and tutorials on the [UPOV website](#).

eServices

- eServices provides a secure, reliable and convenient way to access a range of IP Australia's transactions and services.
- Applicants/agents must register for a free account before they can use eServices.
- eServices can be used to apply, register, renew and pay for IP rights including PBRs.
- To file an application through eServices, applicants need to download and complete the Part 1 General information and Nomination of QP forms and (if needed) Authorisation of agent or Part 1 Supplementary forms.
- Once all forms are completed, the applicants need to log into their eServices account and upload the forms and submit the appropriate application fee.

You can access forms, on the [IP Australia website](#).

3 – Denominations

Denominations



Denominations are commonly referred to as "variety names". Applicants often seek advice from their QP as to whether their proposed variety name is likely to be acceptable or not. Consequently, it is important for QPs to understand the fundamentals determining the likelihood of acceptability of a plant variety name.

The aim of this chapter is to provide training on the tools and sources of information to help you determine whether a variety name is likely to be acceptable or not, and will cover:

- Criteria and requirements for an acceptable variety name
- How to appropriately search variety names, including;
 - What databases are used
 - An overview of the different databases
 - How to conduct a variety name search

Denominations: Criteria and requirements for an acceptable variety name



Determining the acceptability of a proposed variety can be quite a complex process. Generally, the more original the name the more likely it will be acceptable.

The PBR Act specifies that the name of the variety must be:

- a word or words with or without the addition of
 - letter/s (that do not constitute a word)
 - figure/s, or both

The PBR Act also sets out that a variety name must not be:

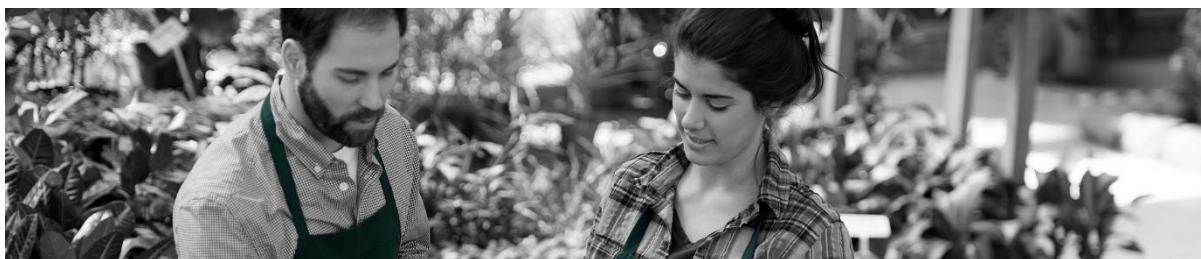
- Likely to deceive or cause confusion (especially, confusion with the name of another plant variety of the same plant class)
- Contrary to law, prohibited by regulations or contain scandalous or offensive matter
- Include an Australian trademark under the Trade Marks Act 1995 in respect of live plants, plant cells and/or plant tissues (this is where most variety names fail to pass and are rejected by the PBR Office).

There are also some less frequent reasons that may make a proposed variety name unacceptable. A variety name must not consist of, or include:

- The name of a living person
- The name of a deceased natural person (unless they died more than 10 years prior to filing)
- The name of a corporation or other organisation (unless they have given written consent)
- The name must not contain the words: variety, cultivar, cross, hybrid, grex, group, form, maintenance, mixture, mutant, seedling, selection, series, sport, strain, transformed
- The name must not contain the Olympic insignia or the word ANZAC

A variety name must also comply with the International Code of Botanical Nomenclature (ICBN) and subsidiary codes. More information on naming a new plant variety is available on the [IP Australia website](#).

Denominations: Appropriate Searching



In addition to the points mentioned in the previous slide, a decision to accept or reject a proposed variety name is based on searching the following databases:

Genie database:

Hosted by UPOV, the Genie database is used to identify the UPOV denomination class and to confirm the botanical name of the variety

Click the link below to see a video demo of Genie database search using potato as an example.

[Genie database](#)

PLUTO - Plant Variety database:

Used to find any previous internationally filled applications for the variety and to confirm that the same name has not been previously used internationally in the same denomination class.

Click the link below to see a video demo of a PLUTO database search for three proposed potato variety names:

- Purple Crisp
- Sugar Crisp
- Red Crisp

This search is performed in the Denominations Trade names and Breeders reference fields using 'OR' operator between the search fields and the search was limited to the exact phrase by selecting the '=' from the drop-down menu next to the search field box.

[PLUTO](#)

Australian Trade Mark database:

Used to check if the proposed name conflicts with any trademarks in respect of live plants, plant cells and tissues. We only search in class 31 of the Trademarks Act 1995 because the above-mentioned products are only included in that class.

Click the link below to see a video demo of trademarks database search for three proposed variety names Velvet, Velvat, and White Velvet using search parameters: class 31 (single) and 'pending or registered' status.

[Australian Trade Mark database](#)

PBR Web database:

Used to check for existing variety names under the same denomination class in the Australian PBR system.

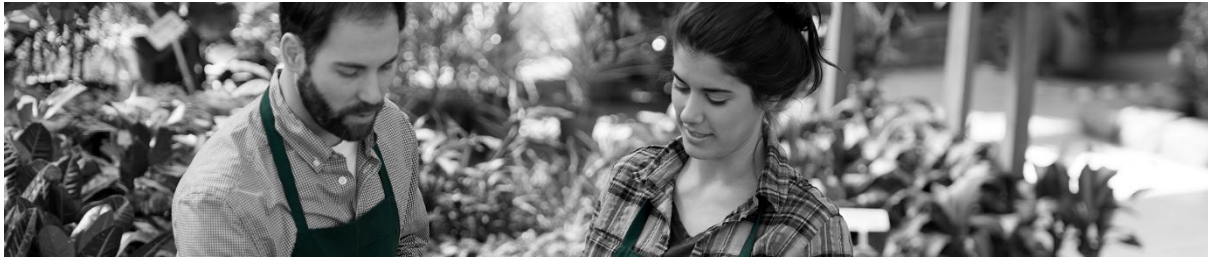
You can find out more about this database on the IP Australia website.

Click the link below to see a video demo of the PBR web database search using 'Crisp' as an example.

[PBR web database search.mp4](#)

These databases are freely available to search (PLUTO requires a free registration process).

Denominations: Key notes



So, the take-home message is the variety name/s must be:

- Word/s with or without letter/s and/or figure/s or both
- No genus/species/common name
- No repeat within the same genus or UPOV plant class (a list of plant classes is [available](#)).
- Same in all UPOV members (unless prevented by prior rights)
- Not registered or pending trademark (word only) in trademark class 31 for live plants, plant cells and plant tissues.

4 - Concept of variety, varieties of common knowledge and grouping characteristics

Concept of variety, varieties of common knowledge and grouping characteristics



In this chapter, you will be introduced to:

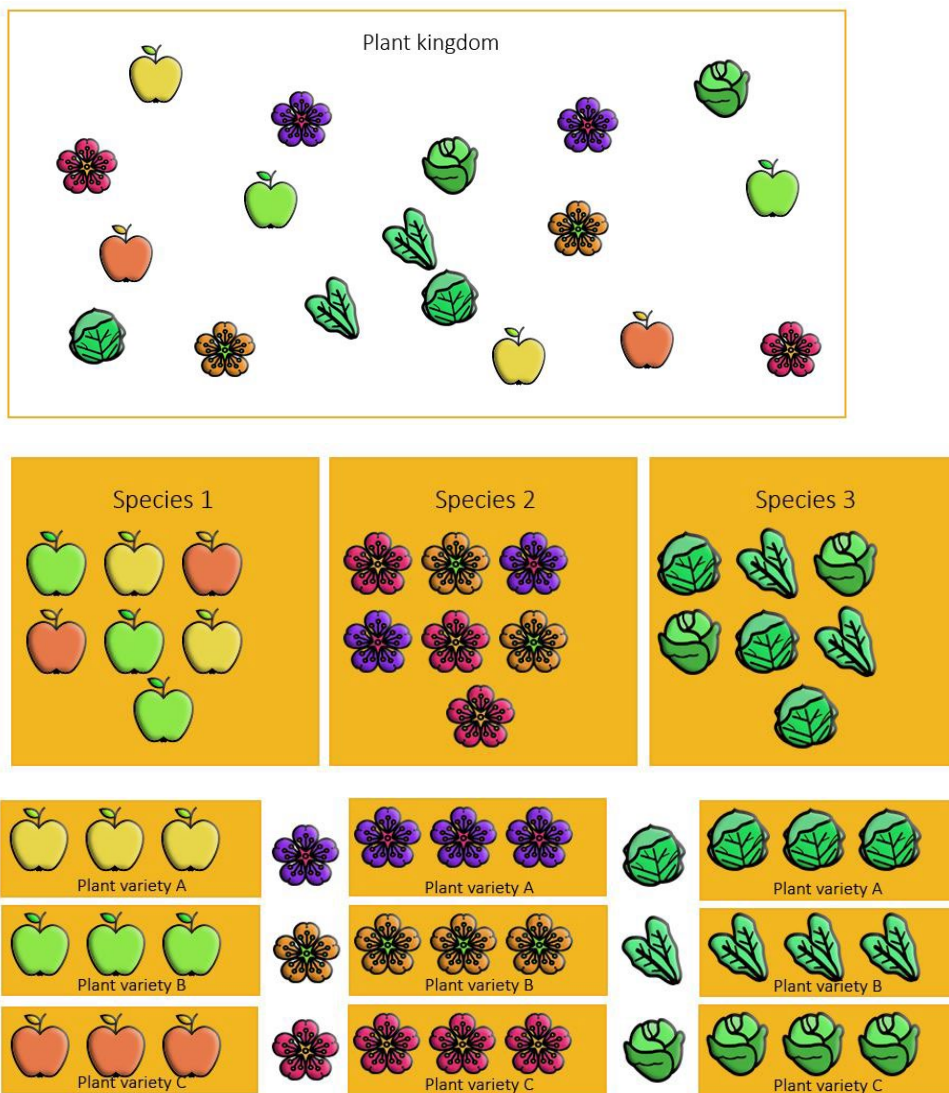
- The concept of plant variety
- The criteria for registrable varieties under the Plant Breeder's Rights Act 1994 (the PBR Act)
- The basis for distinctness, uniformity and stability (DUS)
- The concept of similar variety of common knowledge (VCK) and grouping characteristics
- Selecting the most similar VCK on the basis of grouping characteristics using data from real life-examples

What is a plant variety?



Generally, species is the lowest taxonomic rank or unit used in the botanical classification of plants. Within a species, plants can show a wide range of variability in their characteristics or environmental adaptability. Such differences can be very useful for practical purposes. For example, farmers and growers need plants with particular characteristics or plants that are adapted to their environment or their cultivation practices. The concept of variety was developed to define and recognise such differences that exist within a species.

So, in general terms, a plant variety represents a more precisely defined group of plants, selected from within a species, with a common set of characteristics.



Definition of a plant variety



The PBR Act defines plant variety as a plant grouping:

- that is contained within a single botanical taxon of the lowest known rank
- that can be defined by the expression of the characteristics resulting from the genotype of each individual within that plant grouping
- that can be distinguished from any other plant grouping by the expression of at least one of those characteristics
- that can be considered as a functional unit because of its suitability for being propagated unchanged.

This definition of plant variety is also consistent with Article 1(vi) of the 1991 Act of the International Union for the Protection of New Varieties of Plants (UPOV).

In short, we can say a plant variety is a sufficiently uniform group of plants belonging to a lowest known taxon that can be propagated unchanged and can be separated from other such groups of plants by expression of genetically controlled characteristics.

Criteria for registrable plant varieties



A plant variety needs to meet certain criteria before it can be protected by plant breeder's rights (PBR). In Australia, a plant variety is protectable or registrable under the PBR Act if the variety;

- has a breeder;
- is distinct;
- is uniform;
- is stable;
- has not been exploited or has been recently exploited (prior sale rule).

For the purpose of the PBR application process in Australia:

- A breeder is the person/s or organisation/s or employee/s of organisation/s who has bred the plant variety under consideration.
- A plant variety has not been exploited if, at the date of lodging the application for PBR in the variety, plant material of the variety has not been sold in Australia for more than one year. In case of overseas sale, a variety must not be sold for more than six years for trees and vines, and four years for all other plant species. In Australia, the plants belonging to the genera *Actinidia* (Kiwifruit), *Bougainvillea*, *Campsis*, *Hedera* and *Vitis* (grapevine) are regarded as vines for PBR purposes.

PBR protection can only be granted to a new plant variety after examination of the variety has shown that the variety is **distinct, uniform and stable (DUS)**.

What is DUS?



Distinctness, uniformity and stability of a plant variety is commonly referred to as DUS.

Distinctness

A plant variety is distinct (D) if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the PBR application.



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Uniformity

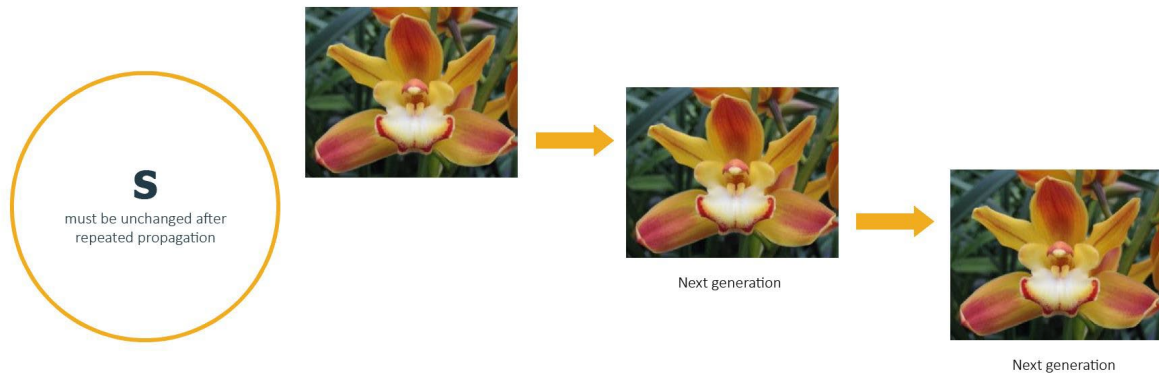
A plant variety is uniform if, subject to the variation that may be expected from the particular features of its propagation, it is uniform in its relevant characteristics on propagation.



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Stability

A plant variety is stable if its relevant characteristics remain unchanged after repeated propagation.



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References

'Tadao M, 2018 in "The Training Course for Distinctness, Uniformity and Stability Test of Maize, Myanmar'

Basis for distinctness, uniformity and stability



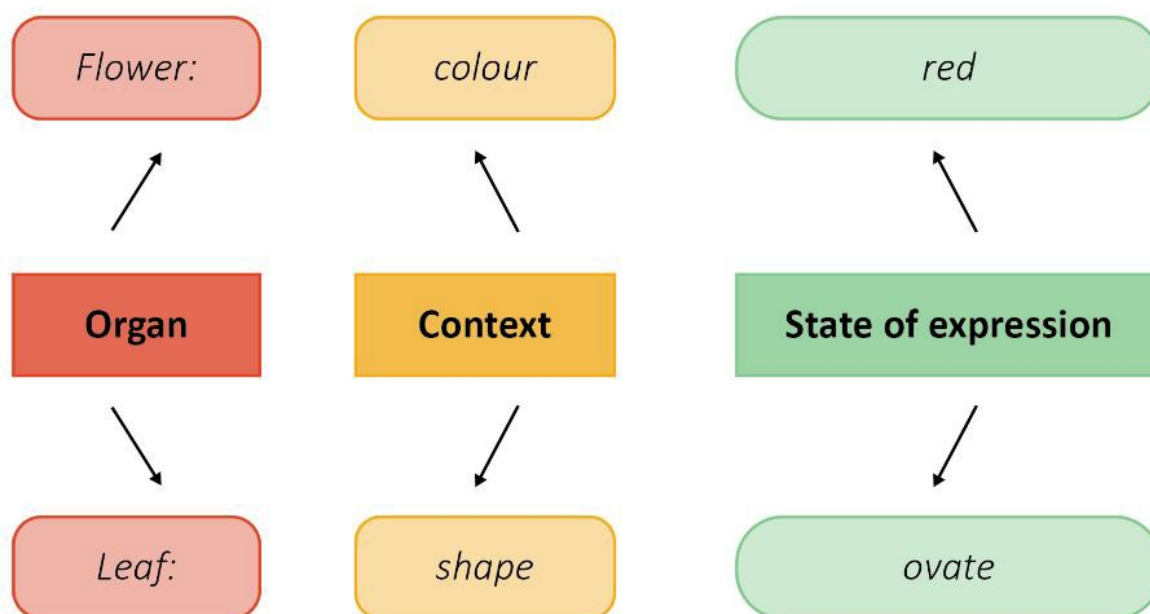
Characteristics are the Basis for Examination of DUS

1. For any variety to be capable of protection **it must first be clearly defined.**
2. Only after a variety has been defined **can it be finally examined for fulfilment of DUS criteria required for protection.**
3. A **variety is defined by the state of expression of its characteristics** and those characteristics are therefore the basis on which a variety can be examined for DUS.

Characteristics and their 'states of expression' are the basis for examining distinctness, uniformity and stability of a plant variety. DUS trial is conducted firstly, to define the candidate variety using characteristics and the state of expression of those characteristics and secondly, to confirm the distinctness, uniformity and stability or DUS of the candidate variety.

A characteristic is an arbitrary term for the combination of the identification of a plant part (organ) and the nomination of the context in which the plant part is being observed.

For example, in the case of red flower colour, flower is the plant part, colour is the context and red is the state of expression. In the case of ovate leaf shape, leaf is the plant part, shape is the context and ovate is the state of expression.



States of expression of characteristics



UPOV has developed standardised guidelines for conducting PBR DUS trials in a large number of plant species. These guidelines are known as ‘test guidelines’ or TGs and they ensure that PBR trials and DUS examination is performed in a harmonised manner across all the UPOV member countries. The test guidelines are available at UPOV website.

‘If UPOV test guidelines are available for a species, they must be used for planning and examination of PBR DUS trials for that species.’

In the UPOV Test Guidelines, the range of expression of a characteristic is divided into a defined number of states and each state is attributed to a numerical ‘note’. Depending on the type of characteristics under examination, UPOV uses a scale of 1-9 or 1-7 or 1-5 or 1-3 where 1 represents the lower extreme and 9, 7, 5 or 3 represents the upper extreme of the characteristic. The division into notes for states of expression is influenced by the type of expression of the characteristic under examination.

It is important to remember that states of expression cover the whole spectrum of variation within that plant taxon.

For example, in the case of leaf size, the state of expressions should have enough states to cover the smallest leaf seen in that taxon to the biggest leaf seen in that taxon.

E



TG/3/12

ORIGINAL: English

DATE: 2017-04-05

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

WHEAT

UPOV Code(s): TRITI_AES

Triticum aestivum L. emend. Fiori et Paol.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative names:*

Botanical name	English	French	German	Spanish
<i>Triticum aestivum</i> L. emend. Fiori et Paol.	Wheat	Blé	Weizen	Trigo

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

Selecting characteristics suitable for PBR DUS examination



Not all characteristics are suitable for use in DUS examination. Some characteristics may vary widely due to environmental factors or may not be consistent between generations while some other characteristics may not have sufficient variation within the species to establish distinctness.

For a characteristic to be suitable for use in the PBR DUS examination process it must meet the following six criteria listed below. It must:

1. result from a genotype or combination of genotypes
2. be sufficiently consistent and repeatable in a particular environment
3. exhibit sufficient variation to establish distinctness
4. be capable of precise definition and recognition
5. allow uniformity requirements to be fulfilled
6. allow stability requirements to be fulfilled

As an example, let's consider the three characteristics: fruit colour, leaf shape and yield:

Before we can use them in DUS examination, we need to confirm that these characteristics have all six attributes required and are suitable for use in PBR DUS examination.

Selection of Characteristics for DUS examination

Criteria	Fruit: color	Leaf: shape	Yield
(a) results from a given genotype or combination of genotypes	Yes	Yes	Yes
(b) sufficiently consistent and repeatable in a particular environment	Yes	Yes	(No)
(c) exhibits sufficient variation between varieties to be able to establish distinctness	Yes	Yes	???
(d) is capable of precise definition and recognition	Yes	Yes	(No)
(e) allows uniformity requirements to be fulfilled	Yes	Yes	???
(f) allows stability requirements to be fulfilled	Yes	Yes	???
ACCEPTABILITY	Yes	Yes	No

Fruit colour and leaf shape have all six required attributes and meet the criteria for an acceptable characteristic and can be used in DUS examination. But yield, a very important commercial characteristic, does not meet the criteria for acceptable characteristics and cannot be used in DUS examination and to differentiate between varieties for PBR DUS purposes. For example, in grain crops yield is reported as tons/hectare and can be the result of many factors such as seed size, seed weight, number of seeds per plant, number of plants per hectare as well as various environmental factors such as nutrients availability. Thus, conventionally reported yield is not acceptable for use in DUS examination. However, if the yield is broken down to its components such as an average number of seeds per plant, or average seed weight or size, they can be used in DUS examination.

Remember, commercial importance or relevance is not a criteria considered when deciding if a characteristic is suitable for use in DUS examination.

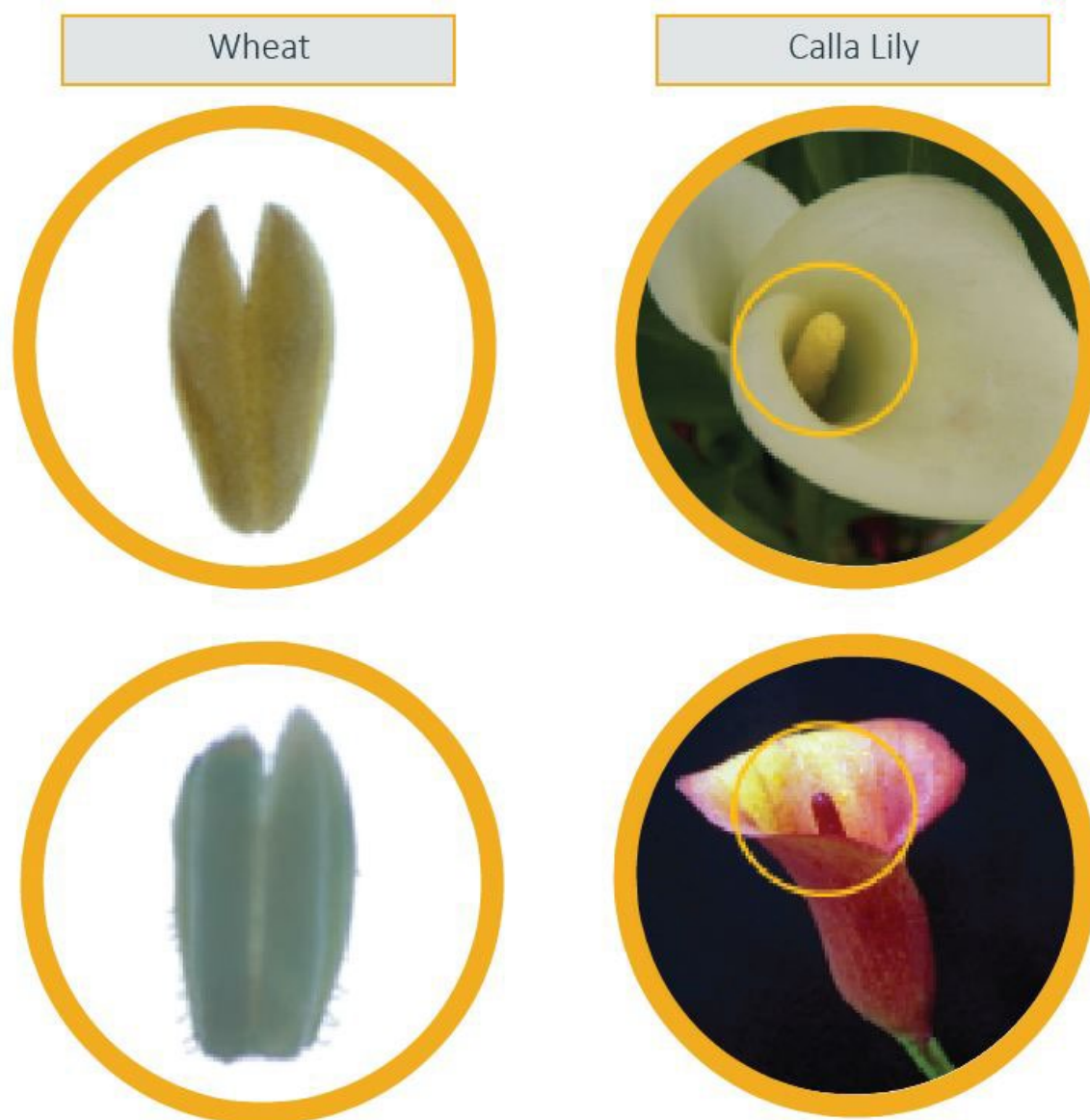
Additional characteristics

Qualified Persons (QPs), in consultation with the PBR office, can develop and use characteristics additional to the UPOV Test Guidelines (TG). But these characteristics must have the six basic attributes of suitable characteristics and cover the full states of expression found in all the varieties in the taxon under consideration (not just the candidate or comparators included in the growing trial).

Additional characteristics are only necessary for distinctness or grouping and should include 'type' or example variety and 'notes' for each state of expression. It is a good idea to use a truncated scale to allow 'room' for new varieties in future.

An important point to remember is that PBR does not assess a new variety's commercial advantage. For example, if a wheat variety has white coloured anther while the most similar variety has yellow coloured anther, then the varieties are clearly distinguishable, even though the 'merit' or commercial value of anther colour in wheat is questionable. But in Calla Lily anther colour is obviously a commercially important difference. For PBR examination both cases are treated equally.

Example: Another colour (Wheat and Calla Lily)



Distinctness and the concept of varieties of common knowledge



Article 7 of the UPOV Convention 1991 states that ‘The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application.’

To establish distinctness, a new variety must be shown to be clearly distinguishable from all other varieties of common knowledge (VCK) present at the time of the PBR application. There is no comprehensive definition of VCK. UPOV identifies the following circumstances where common knowledge can be established, and VCK can be found:

- A variety is cultivated and marketed in the public domain
- An application for PBR or entry into an official register in any country
- [Sufficiently] precise description in a publication
- Inclusion in a reference collection
- Existence of living material in publicly accessible plant collections
- List of protected varieties in official registers. For example, PBR, UPOV, Community Plant Variety Office (CPVO), United States Patent and Trademark Office (USPTO), etc
- List of varieties in other registers. For example, plant societies and the Australian Cultivar Registration Authority (ACRA)
- Commercial documents in which varieties are marketed as propagating or harvested material. For example, Catalogues
- Plant collections. For example, genetic resources, collection of old varieties and breeder’s own collection
- Published information. For example, books, journals, periodicals, magazines and newsletter, electronic media and internet
- Example varieties such as the ones mentioned in UPOV TG

This list is not conclusive and varieties found in comparable circumstance should also be regarded as VCK.

The test of VCK is a worldwide test and is not restricted by any national boundary. **So, when selecting VCK for a DUS trial, all existing varieties worldwide need to be considered, not just those present in Australia.**

Distinctness: the concept of grouping characteristics and most similar variety of common knowledge



To establish distinctness a new variety must be compared against all existing varieties of common knowledge worldwide.



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However, it is not practical or feasible to do a systematic individual comparison with all existing VCK worldwide. Logically, when a candidate variety is sufficiently different and distinct in its characteristics from a particular group (or groups) of VCK, it is not necessary to do a systematic comparison with the individual varieties of that group (or groups).

For example, if a new Marigold variety has plain light yellow flowers, then it is generally not necessary to compare it with all existing Marigold varieties with bright yellow or orange flower or with varieties that have variegated flowers.

Example 1:



VS



No need to compare candidate variety with a different group of varieties

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Example 2:

Where a candidate variety is sufficiently different from a particular group of varieties, there is no need to compare candidate variety with a different group of varieties.



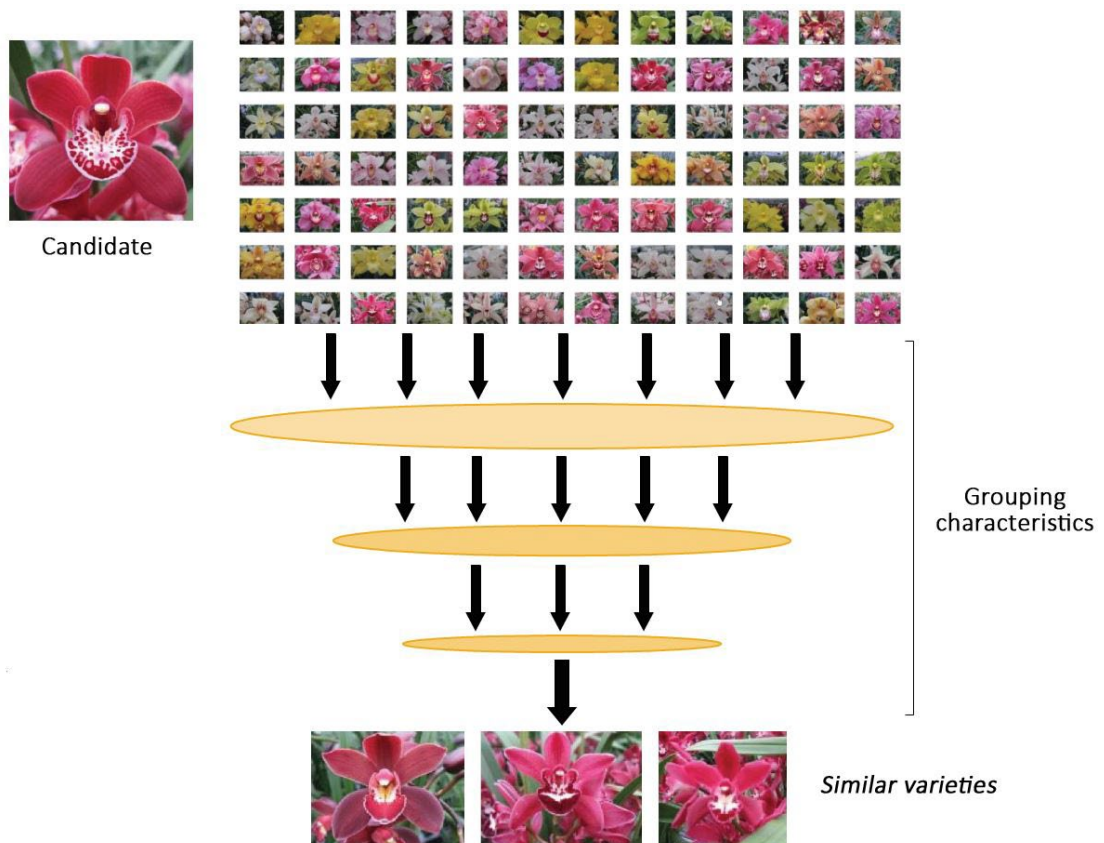
VS



No need to compare candidate variety with a different group of varieties

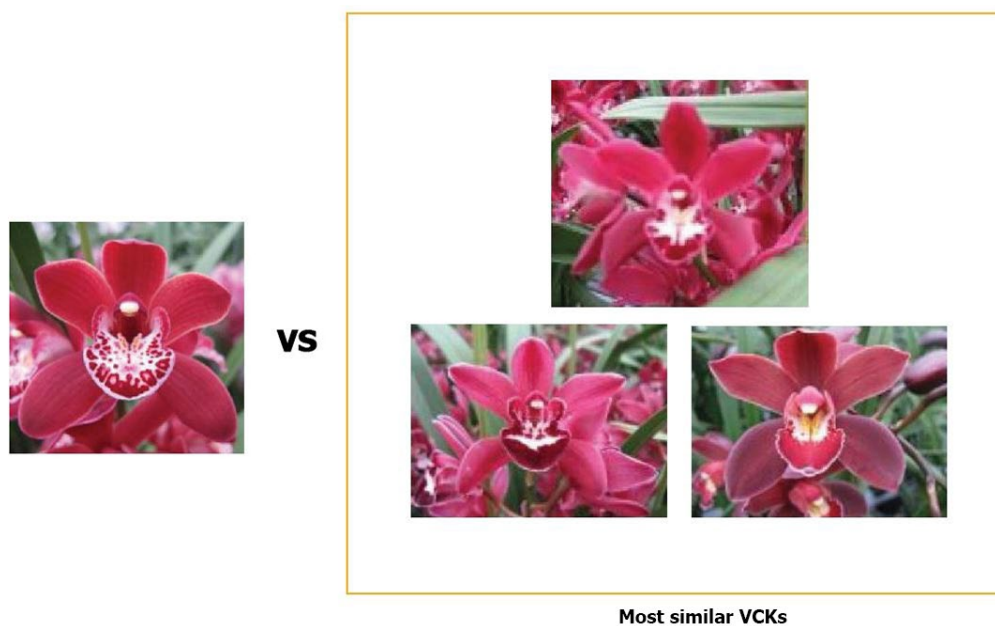
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This process of excluding groups of VCKs from consideration for a side by side comparison in a growing trial is commonly referred to as 'grouping' and the characteristics used in this exclusion process are known as grouping characteristics. Characteristics suitable for grouping of varieties are those which are known not to vary or vary slightly within a variety and can provide useful discrimination between VCKs. Ideally, various states of expression of the grouping characteristics should be fairly evenly distributed throughout the existing VCKs.



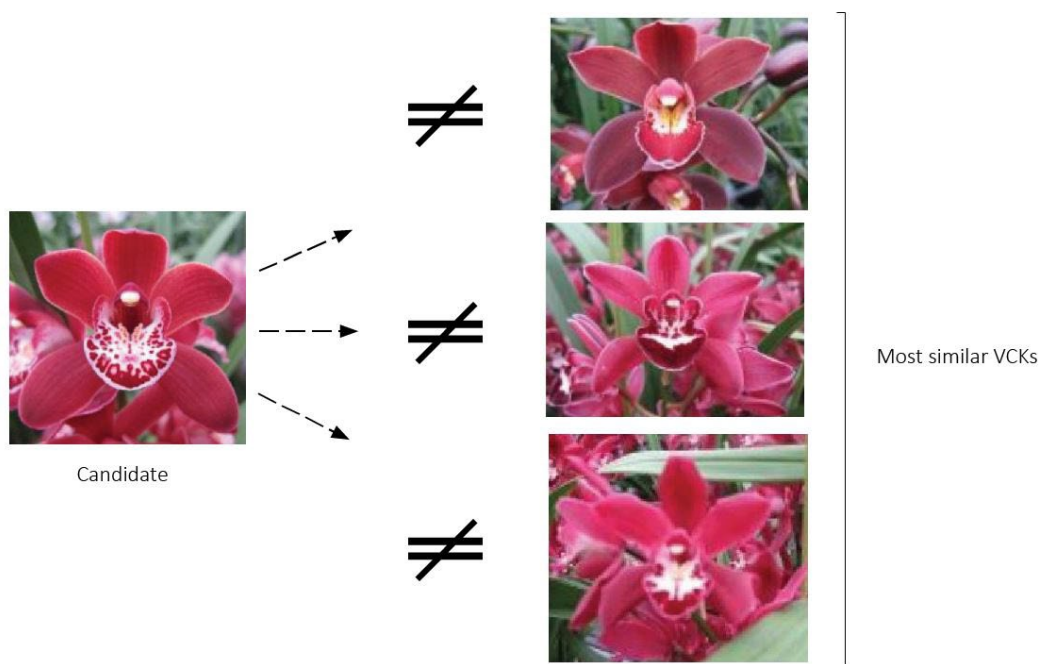
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This process of excluding a group of VCK using a grouping characteristic is repeated several times until we are left with variety or varieties that are very similar to the candidate variety and a side by side growing trial is needed to establish if the candidate variety is different and distinct from them.



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Common sense dictates that if a variety is shown to be distinct from the most similar variety, it will be distinct from all the other VCKs and can be considered to be distinct from all existing varieties.



The candidate variety is considered to be distinct from all existing varieties.

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In the first instance, QPs must use the grouping characteristics listed in the relevant UPOV TG. However, if these are insufficient or not relevant to the candidate variety in question, QPs can, based on their experience and in consultation with the PBR office, use other characteristics from the TG's 'Table of Characteristics' (particularly asterisk ones) for grouping. In rare cases, QPs may need to develop 'additional characteristics' and use them for grouping. The newly developed additional characteristics must have the six attributes of an acceptable characteristic as described before.

Including the most similar VCK as the comparator in the growing trial is the most crucial part of the DUS examination process and failing to do so will lead to a rejection of the trial. QPs are required to justify the rationale for their selection of similar VCK by publishing the list of grouping characteristics in the detailed description of the variety in Plant Variety Journal.

Next we will do a couple of exercises to demonstrate the use of grouping characteristics for identification of most similar VCKs.

References:

Tadao M, 2017 in 'Training Course for Distinctness, Uniformity and Stability Test of Marigold', Thailand'.

Tadao M, 2018 in 'The Training Course for Distinctness, Uniformity and Stability Test of Maize', Myanmar'.

Selecting the most similar VCK on the basis of grouping characteristics: a practical demonstration



The aim of this exercise is to develop the habit of systematic use of grouping characteristics to identify the most similar VCK for a side by side DUS trial.

Let's say, we have a new apple variety and have the following information on the characteristics of the new variety and existing six VCKs (click the video below):

[Selecting the most similar VCK on the basis of grouping characteristics a practical demonstration.mp4](#)

Selecting the most similar VCK on the basis of grouping characteristics: data for practice



The excel file “Wheat PBR Varieties” contains state of expression information for 179 wheat varieties that are in the PBR system in Australia. The aim of this exercise is to demonstrate how grouping characteristics can be used to exclude all these wheat varieties except one from the DUS trial. The diagram shows the structure of the data in the Wheat PBR Varieties excel file.

	A	B	C	D	E	F
1	Organ	Coleoptile	*Plant	Flag leaf	Plant frequenc y of plants with recurved ear	*Time of emergen ce
2	context	anthocyanin colouration	growth habit	anthocya nin colourati on of auricles	leaves	
3	Variety name	state of expression				
4						
5	1991/053 LAWSON					
6	1993/127 Sunstate	weak	semi-erect		high	early
7	1993/187 PELSART		semi-erect	absent or very weak		medium

The data structure of the excel file Wheat PBR Varieties:

Column A (from row 5) has the name of the varieties. The characteristics of the Wheat TG is arranged in the columns (from B) while Row 1 and 2 gives information on the organ and context of the characteristics. Click the link below to download the excel file "Wheat PBR Varieties"

- [Wheat PBR Varieties.xls](#)

Finding the most similar VCK for hypothetical new wheat variety:

Let's say, we have a new wheat variety (candidate) that has the following state of expression for grouping characteristics and asterisk characteristics listed in UPOV wheat TG. The aim of this exercise is to find the most similar VCK from the VCKs listed in the Wheat PBR Varieties file:

Grouping characteristics	State of expression in candidate
Straw: pith in cross section (grouping characteristics from TG)	thin
Ear: colour (grouping characteristics from TG)	white
Ear: shape in profile (asterisks characteristics from TG)	parallel sided
Plant: length (asterisks characteristics from TG)	medium
Ear: time of emergence (asterisks characteristics from TG)	medium to late

The Wheat PBR Varieties file has filter function activated at row 4. Use the drop-down menu to sequentially filter out (exclude) all the varieties that do not have the same state of expression as the candidate for the grouping characteristics listed above. Click the link below to view the video demo on how to use the excel file "Wheat PBR Varieties" and to filter data to find the most similar VCK for a growing trial.

- [Video demo.mp4](#)

Once all the filters have been applied, **2006/303 'Bolac'** should be the only variety left and is the most similar VCK for the candidate variety in question and must be included in the side by side growing trial.

Now using the same data set find the most similar VCK for a new variety that has the following state of expressions for the grouping characteristics:

Grouping characteristics	State of expression in candidate
Straw: pith in cross section (grouping characteristics from TG)	thin
Ear: colour (grouping characteristics from TG)	white
Ear: shape in profile (asterisks characteristics from TG)	parallel sided
Plant: length (asterisks characteristics from TG)	short
Ear: time of emergence (asterisks characteristics from TG)	late

Answer: Wheat (*Triticum aestivum*) variety 'Manning' is the most similar VCK for the exercise above and must be included in the trial.

The Australian PBR office can provide data in excel file for candidate and comparator varieties of any plant taxon that are in their scheme. QPs at minimum should consider these varieties when they are planning their DUS trial. QPs can request the PBR office to obtain similar data sets for any plant species that are currently in the PBR scheme in Australia.

5 - DUS Trial | Examining Distinctness

DUS Trial - Examining Distinctness



In the previous chapter, we learned about grouping and grouping characteristics and their use to identify the most similar variety/varieties of common knowledge (most similar VCK). Most similar VCKs are used for side by side DUS trials to determine the distinctness, uniformity and stability of a variety. In the current module, we will learn about the distinctness component of the DUS examination of a new plant variety.

What is distinctness?

The International Union for the Protection of New Varieties of Plants (UPOV) Convention Article 7:

'The variety shall be deemed to be distinct if it is **clearly distinguishable** from any other variety whose existence is a matter of common knowledge at the time of the filing of the application.'

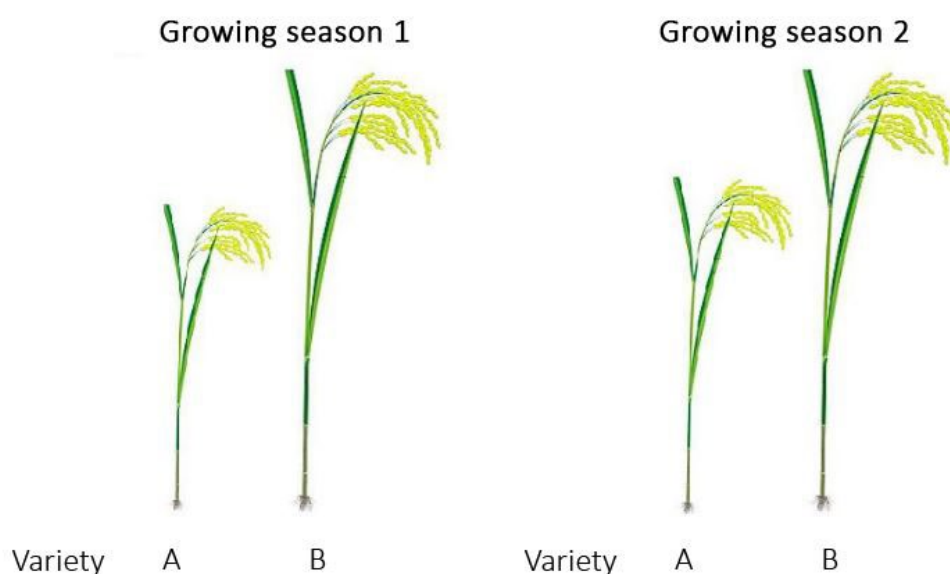
The main aim of the DUS test/trial is to determine if the variety is clearly distinguishable from the most similar VCK. If a variety is clearly distinguishable from the most similar variety, it will be clearly distinguishable from all other (less) similar varieties. According to UPOV (TGP/9), 'a variety may be considered to be clearly distinguishable if the difference in characteristics under consideration is **consistent and clear**.'

Consistent difference and Clear difference - Key issue



Consistent difference

The expression of a characteristic observed in the candidate variety needs to be consistently and sufficiently different from the expression of the same characteristic observed on the most similar VCK (comparator variety). This means that the difference observed between the candidate and the VCKs must be sufficiently consistent when observations are made within a year, within years, between sites or within sites. Most importantly, the 'direction' of the difference between the candidate and the comparator should be the same.



Clear difference - Key Issue

Determining what constitutes a clear difference between two varieties and whether the observed difference between the candidate and the most similar VCK is clear or not can be subjective, it can also vary depending on the person making the observations or on various other factors such as the effect of the environment.

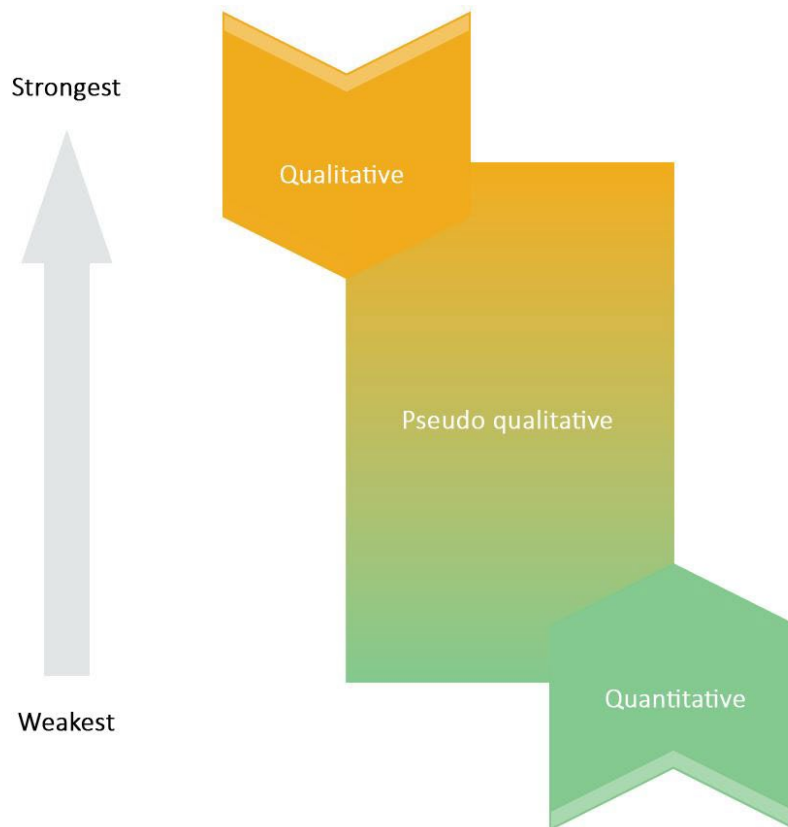
To remove subjectivity and enhance consistency, UPOV has developed agreed 'rules', that use characteristics and their states of expressions to assess clear differences between varieties. But to get it right, we must know which type of characteristics (qualitative, quantitative or pseudo qualitative) are being assessed and the relevant rules of thumb.

Types of characteristics



There are three types of characteristics:

1. Qualitative (QL) characteristics
2. Quantitative (QT) characteristics
3. Pseudo-qualitative (PQ)



Qualitative characteristics



'Qualitative characteristics' (QL) are those that are expressed in discontinuous states (eg. sex of plant: dioecious female (1), dioecious male (2), monoecious unisexual (3), monoecious hermaphrodite (4)). QL characteristics have the following attributes:

- Discontinuous range of variation
- Usually non-linear (for example male, female)
- Every expression can be described by a single self-explanatory state
- Number of potential states are not limited
- Order of states is not important
- As a rule, not influenced by the environment
- QL characteristics are, in general, observed visually

Rule of thumb for determining clear difference for QL characteristics:

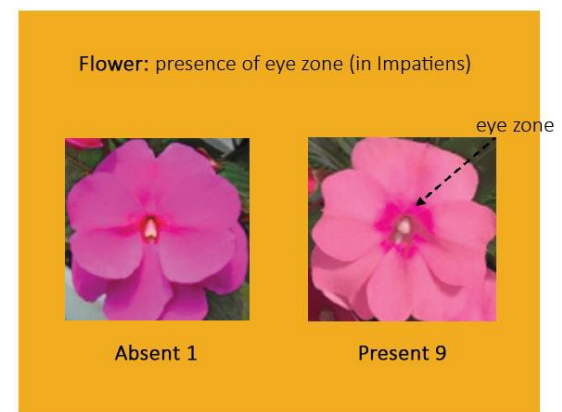
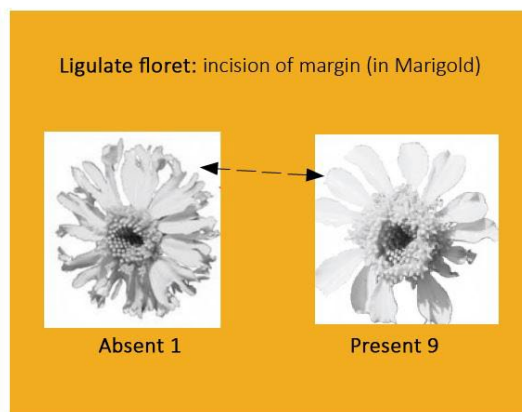
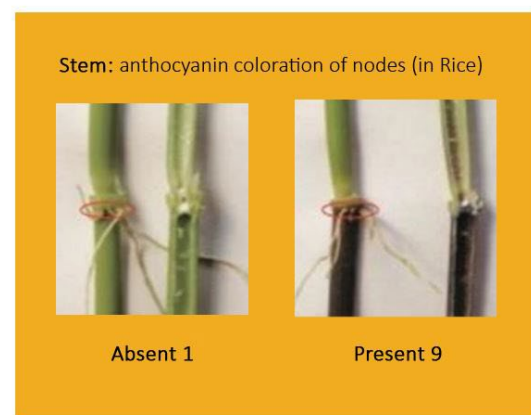
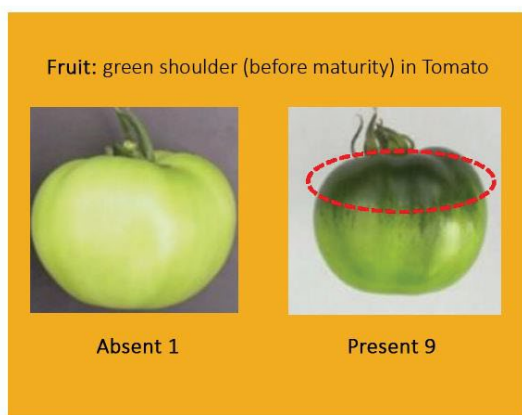
- If varieties are in different states, then differences are clear and therefore varieties are distinct
- If varieties are in the same state, differences are not clear and therefore varieties are not distinct

Examples of QL characteristics



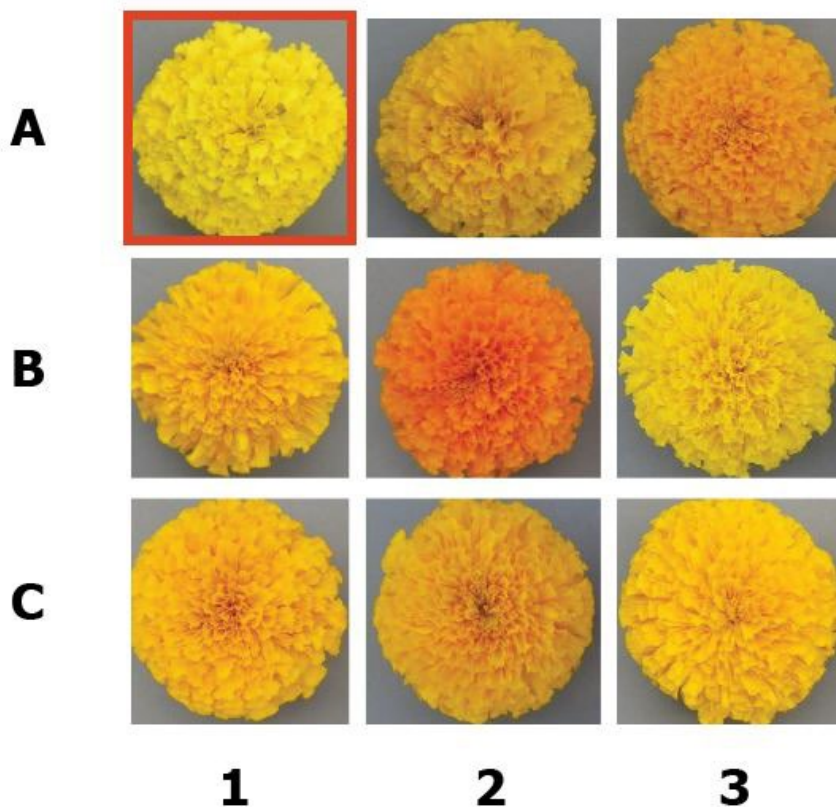
Qualitative characteristics (QL)

- Expressed in discontinuous states
- As a rule, the characteristics are not influenced by the environment



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Clear Difference: Flower colour in Marigold

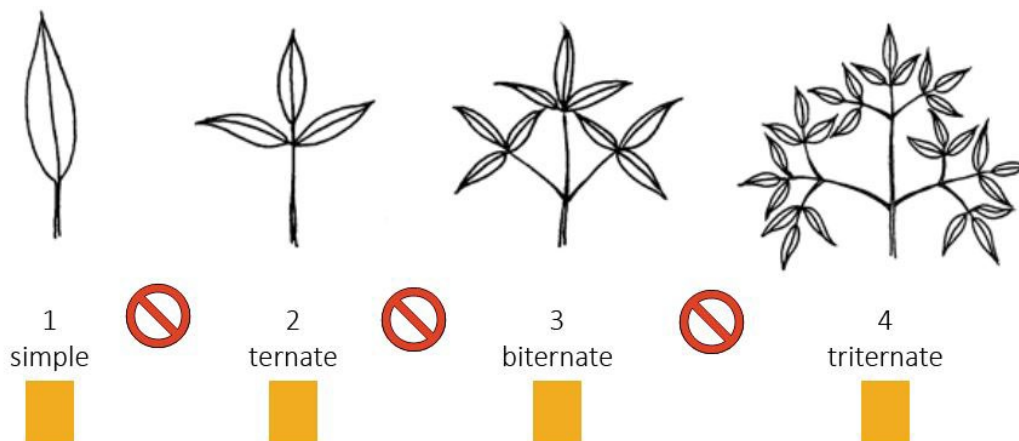


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Leaf type in Clematis is an example of a QL characteristic and its state of expression can be simple, ternate, biternate or triternate. There is no overlap between the states and their expression does not vary due to environment. So, if two varieties have a different state of expressions for leaf type characteristics, they would be clearly different and distinct.

Qualitative (QL) characteristics

Clematis: Leaf: type



UPOV test guideline for *Clematis*, TG/215/1 Rev., 2007-03-28, available at www.upov.int



UPOV test guideline for *Wheat*, TG/3/12, 2017-04-05, available at www.upov.int

Awns or Scurs in wheat:

'Ears: Awns or Scurs' can have three states of expressions (awns present, scurs present or both absent) is another example of QL characteristic. If two varieties have a different state of expressions, then they are clearly distinct.

Anthocyanin colouration: QL (=absent/present) ?

	Variety A	Variety B	Variety C
Environment A	Absent	Present	Absent
Environment B	Absent	Present	Present

Anthocyanin colouration is an example of a characteristics that can be a QL characteristic in some plant groups and have only two states of expressions (either present or absent) and is not influenced by the environment. For example, anthocyanin colouration of nodes in Rice stem is a Qualitative characteristics and occurs either as present (9) or absent (1). However, in some cases, anthocyanin colouration can be under environmental control (as in the variety C) and is not a QL characteristic and in such cases, it cannot be used to establish clear differences.

Other common examples of Qualitative characteristics include:

- **Ploidy:** diploid, triploid, tetraploid
- **Sex:** male, female
- **Leaf margin:** entire, serrate, dentate
- **Flower type:** single, double
- **Colour of vein:** green, red
- **Border of eye zone:** sharp, diffuse
- **Fruit: surface:** smooth, bumpy

Quantitative (QN) characteristics

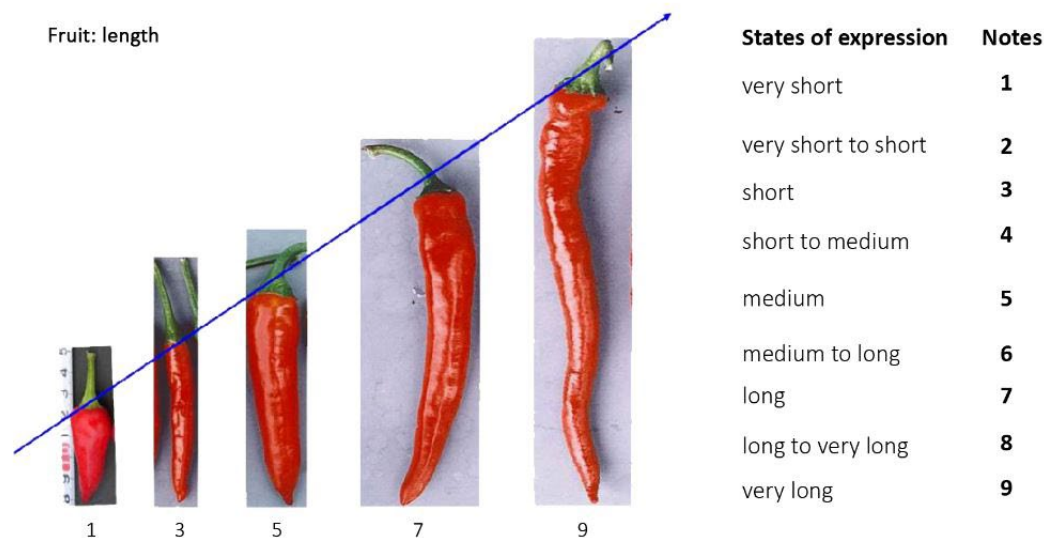


'Quantitative characteristics' are those where the expression covers the full range of variation from one extreme to the other. These expressions can be measured or recorded on a one-dimensional, continuous or discrete, linear scale. QN characteristics have the following attributes:

- Continuous variation
- Linear (in one dimension, for example, short to tall)
- Description of expression may fall between states
- Number of states is limited - full range can be predicted by defining the extremes
- Unless the Test Guidelines (TG) requires and if visual observation is sufficient, statistics are not required.

Quantitative characteristics (QN)

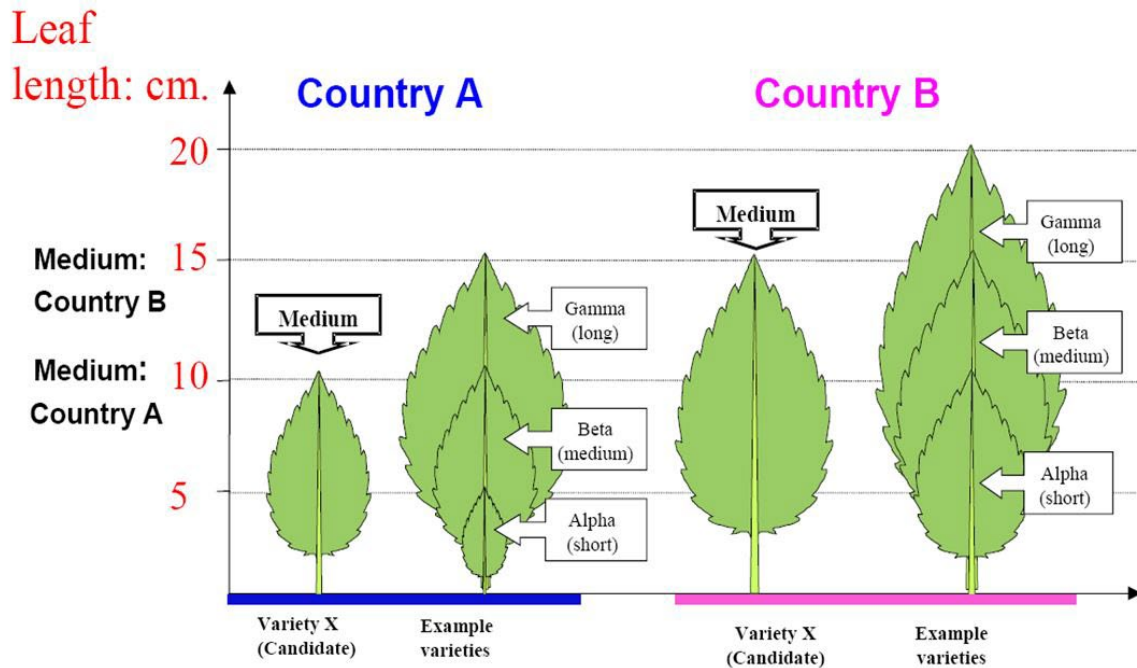
- measurable on a one-dimensional scale and show continuous variation
- length, height, width, thickness, weight, etc



For practical purposes, the continuous range of expression of a QN characteristic is divided into a number of states. For example, state of expression for fruit length in chilli is divided into nine states and each state is represented by a note.

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Example varieties: 'Biological rulers'

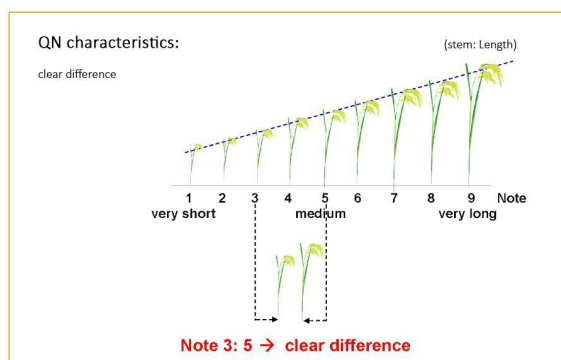
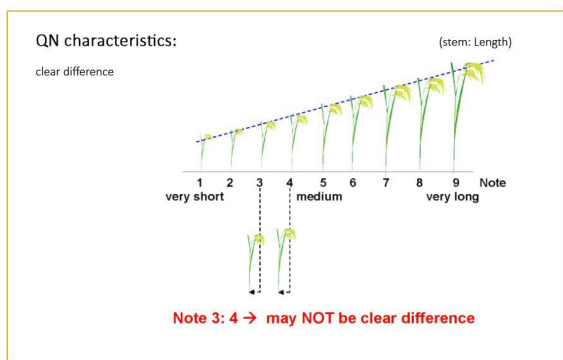
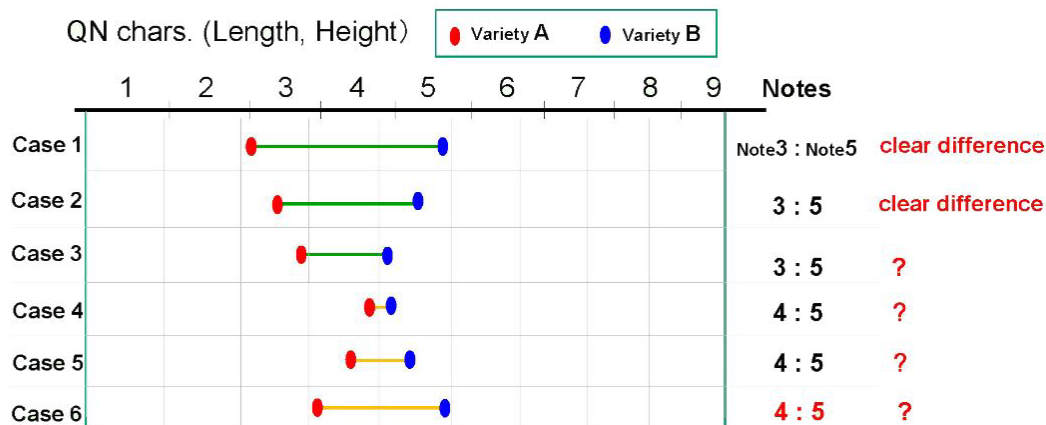


Example varieties depicting these states are listed in the UPOV TG. These divisions generally provide an even distribution across the scale. The example varieties act as biological rulers and help to determine where the new variety sits within the range of expression of the QN characteristic. Example varieties are very handy when the expression of characteristics can vary due to environmental factors such as the country or geographical location. For example, the actual measured leaf length of a variety may vary between country A and country B, however generally it will still be placed in the same category when compared to the example varieties.

Rule of thumb for determining a clear difference in QN characteristics



- For characteristics assessed Visually on Single plants (VS) or assessed Visually on Group of plants (VG), if the state of expression is two or more notes apart then the difference is clear, and the varieties are distinct.
- A difference of less than two notes generally do not represent a clear difference for visually assessed QN characteristics. If the difference is only one note, both varieties could be very close to the same borderline (for example, the high end of note four and low end of note five as in Case 4) and the difference between the varieties might not be clear. In such cases switching to measurements and statistics may help.
- For characteristics Measured on Single plants (MS) or Measured as a Group of plants (MG), if the difference is statistically significant (at $P \leq 0.01$) then the difference is clear and varieties are distinct.



Examples of Quantitative Characteristics

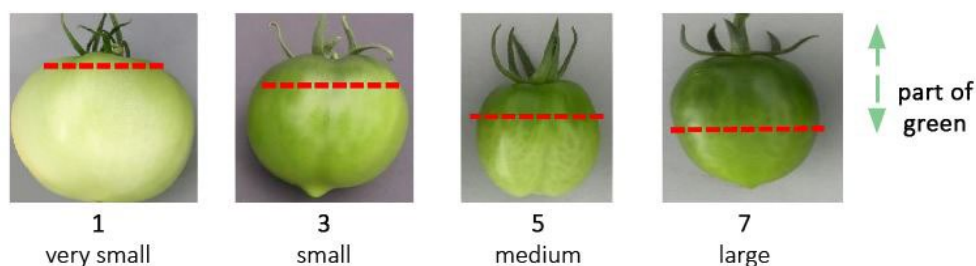


Common examples of quantitative characteristics include:

1. height, length, width, thickness, diameter, weight, size, firmness, number of flowers/fruits
2. time of flowering, time of harvest, time of maturity,
3. intensity of colour, intensity anthocyanin colouration,
4. leaf: attitude of blade, hairiness, leaf: waxiness, leaf: waviness, leaf: undulation of margin, leaf: angle of apex, fragrance, glossiness,

The range of expression for these characteristics form a continuous variation within the taxon and can have state of expressions that fall between states such as short to medium or tall to very tall.

Fruit: extent of green shoulder (before maturity) in Tomato



Fruit: ribbing at peduncle end in Tomato



UPOV test guideline for *Tomato*, TG/44/11 Rev. 2, 2011-10-20 + 2013-03-20 + 2018-10-30, available at www.upov.int

Ear: length of penduncle in Maize



3



5



7

Stem: anthocyanin coloration of brace roots in Maize



1



3



5



7



9

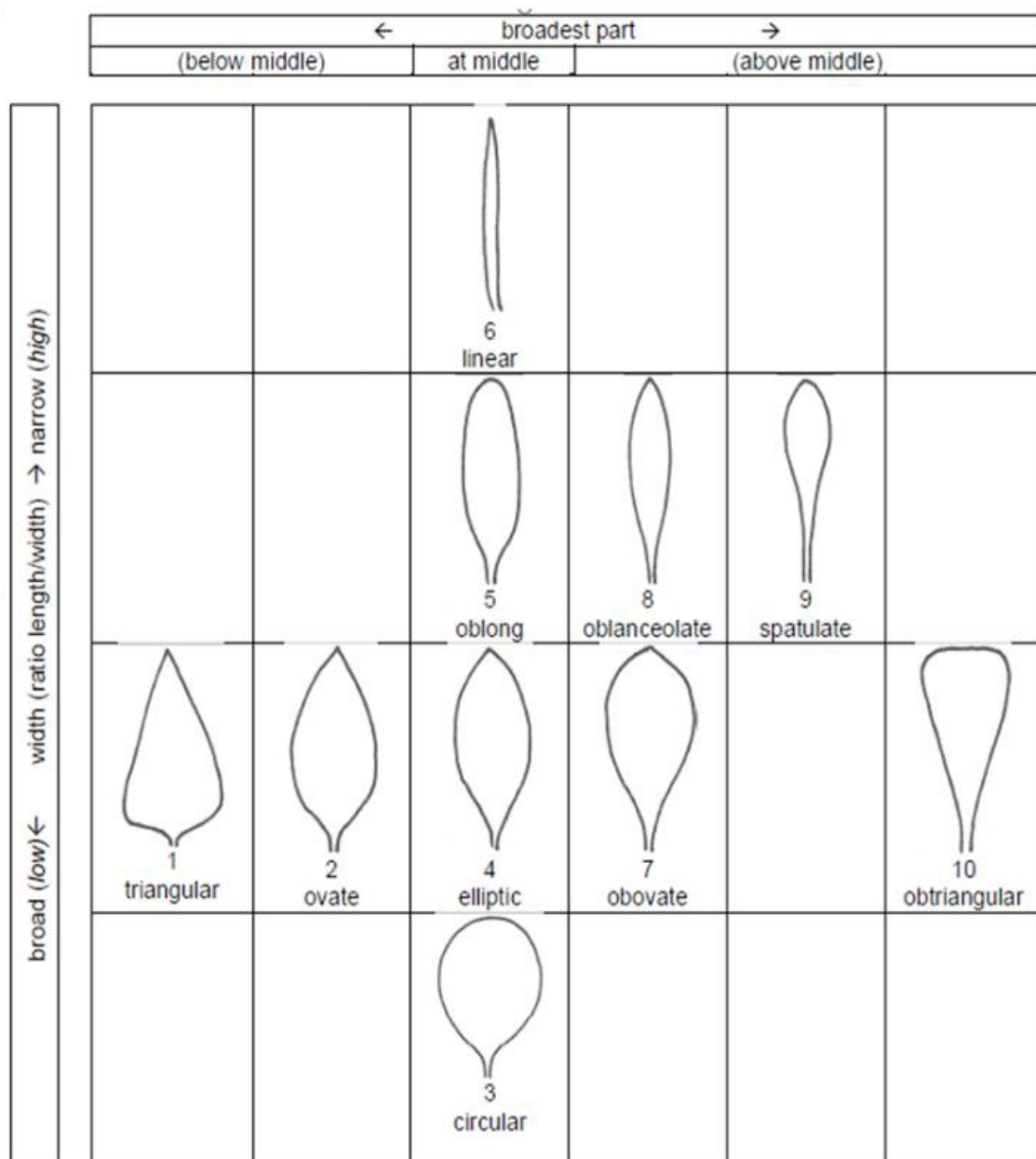
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Pseudo-qualitative (PQ) characteristics



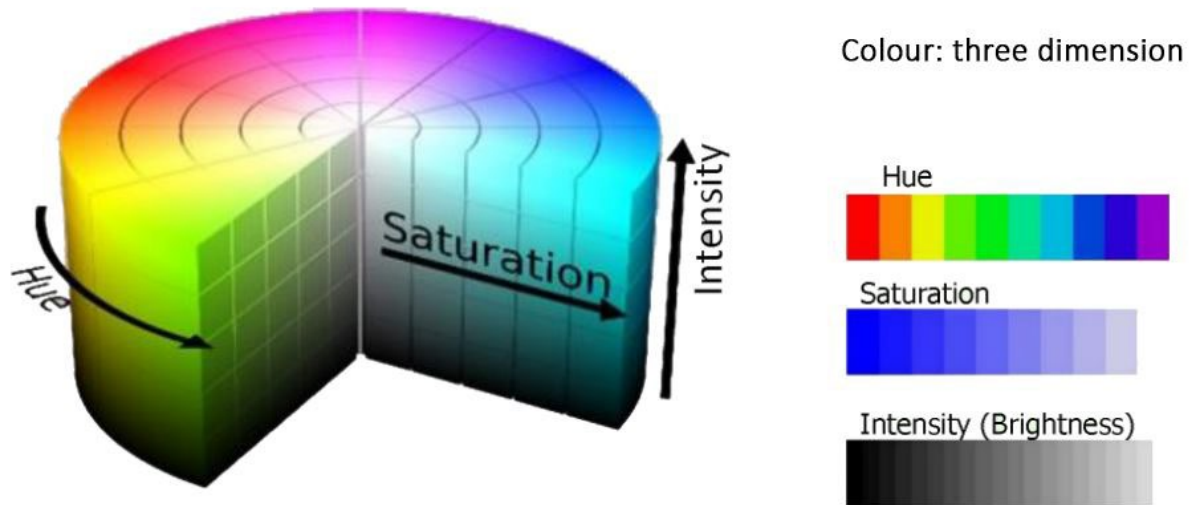
In 'pseudo-qualitative characteristics' the range of expression varies in more than one dimension (for example, shape: ovate (1), elliptic (2), circular (3), obovate (4)) and is at least partly continuous, but cannot be adequately described by just defining two ends of a linear range. In a similar way to QL (discontinuous) characteristics– each individual state of expression needs to be identified to adequately describe the range of the characteristic. PQ characteristics have the following attributes:

- Partly continuous variation and partly discontinuous variation, or complicated series of continuous variations
- Multi-dimensional
- Cannot be defined by just defining two ends of a linear range
- Number of states potentially unlimited
- Sometimes some states have a logical number order, but not always – therefore special care when using 'notes' is required.



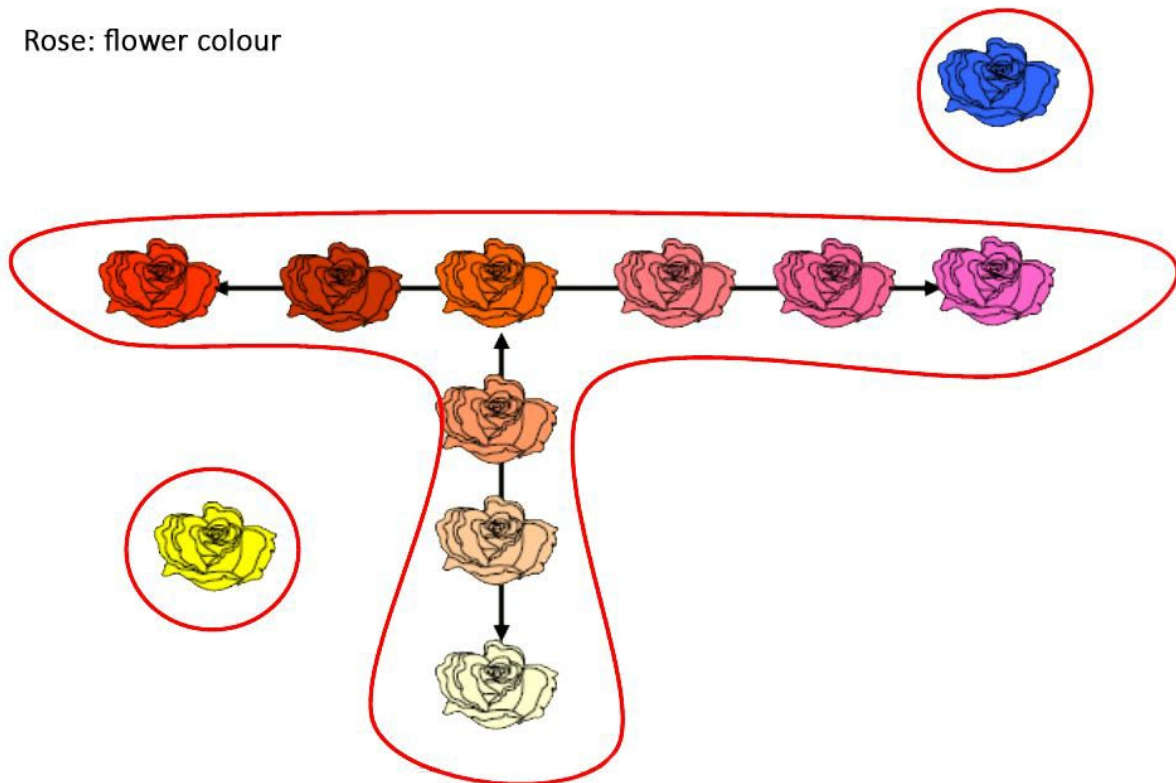
UPOV - Document TGP/14, TGP/14/4, 2019-11-01, available at www.upov.int

Colour is a very common example of a PQ characteristic. It can vary in colour (For example, red, pink, yellow etc), can vary in saturation level or it can vary in intensity within those colours (for example a red rose can be deep red, medium red or light red).



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Rose: flower colour



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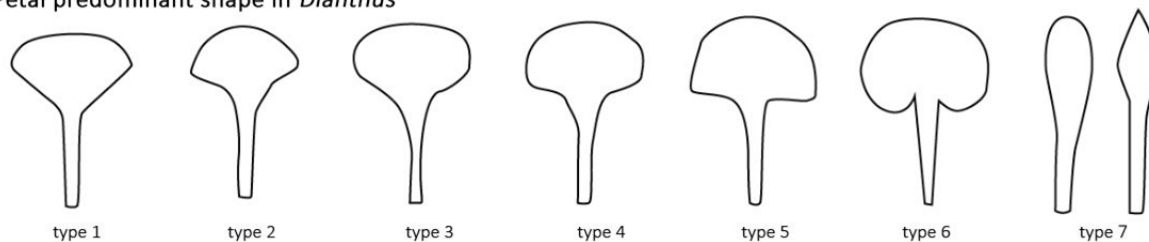
UPOV test guideline for *Tomato*, TG/44/11 Rev. 2, 2011-10-20 + 2013-03-20 + 2018-10-30, available at www.upov.int

Flower colour in Endive (*Cichorium endiva*)



UPOV test guideline for *Endive*, TG/118/5 Corr., 2013-03-20 + 2014-07-15, available at www.upov.int

Petal predominant shape in *Dianthus*



UPOV test guideline for *Dianthus*, TG/25/9, 2015-03-25, available at www.upov.int

Rule of thumb for determining a clear difference in PQ characteristics

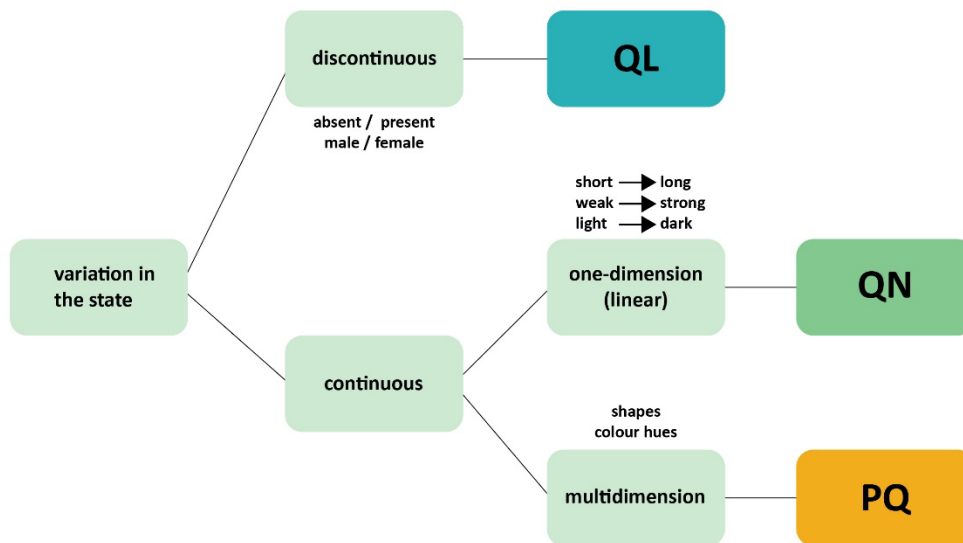


- Different states may not always be clearly different
- Needs to be assessed on a case-by-case basis
- Need to understand which part of the characteristic is being assessed
- In some parts, the QL rules apply (one state difference represents clear difference)
- In other parts, the QN rules apply (two states or more difference represents clear difference)
- Two states difference in any direction is a safe approach

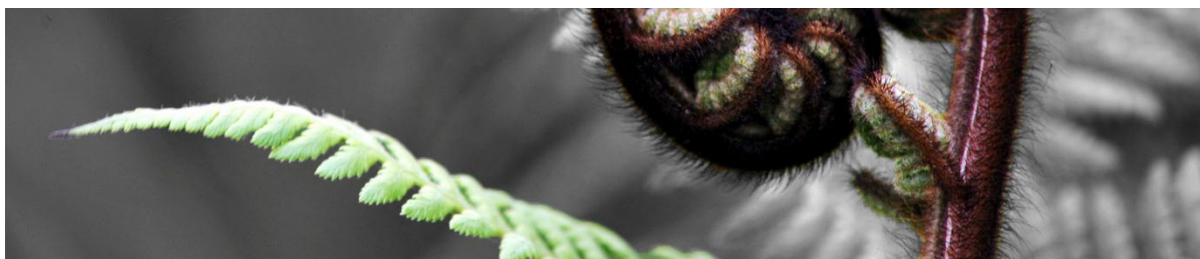
QL, QN or PQ: Decision-making chart



The diagram below can be used to get a rough idea whether a characteristic is QL, QN or PQ.



Method of Observation and Type of record



Method of Observation and Type of record

Once the type of characteristics (QN, QL or PQ) under examination is known, appropriate method to observe those characteristics and suitable type of records to document those observations needs to be determined. The type of expression of the characteristic (QN, QL or PQ) and the method of propagation of the variety determines what method of observation and what type of record is appropriate for the assessment of distinctness during a DUS examination.

Method of observation:

The expression of characteristics can be observed visually (V) or by measurement (M).

Visual observation (V):

“Visual” observation (V) is an observation made on the basis of the expert’s judgement. “Visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. colour charts).

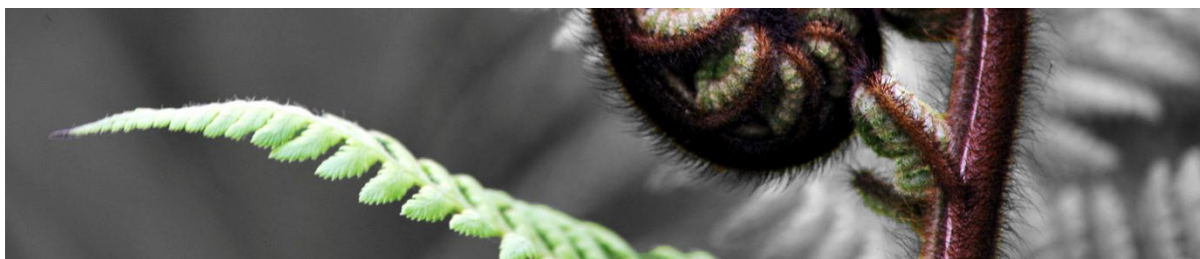
Visual observations are generally quicker and cheaper than measurements but, because they are based on the expert’s judgement, appropriate training is required to ensure that observations for a characteristic are accurate and consistent and repeatable.

Measurement (M):

Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colourimeter, dates, counts, etc.

The choice of method of observations for the assessment of distinctness depends on the type of expression of the characteristic (QN, QL or PQ) and on the variability between and within varieties. Qualitative characteristics (QL) and Pseudo-qualitative characteristics (PQ) are generally observed visually whereas Quantitative characteristics (QN) can be measured or visually observed.

Type of record(s)



For the purposes of distinctness, observations may be recorded as:

1. a single record for a group (G) of plants or parts of plants
2. records for a number of single (S) individual plants or parts of plants.

1. A single record for a Group of plants or parts of plants (G):

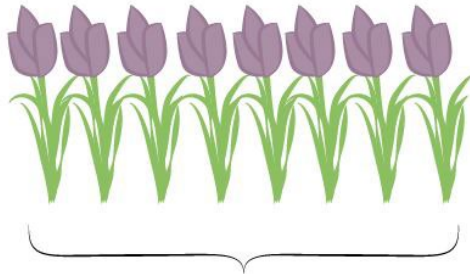
If there is relatively little variation within varieties, the state of expression of a characteristic can be recorded as a single record for a group of plants/plant parts (G). A single record (G) is suitable for most characteristics in self-pollinated and vegetatively propagated varieties and for qualitative and pseudo-qualitative characteristics in cross-pollinated varieties.

The single record (G) may result from an overall observation of a plot (e.g. leaf colour) or it may result from an overall observation of parts of plants taken from a group of plants (e.g. colour of the lower side of the leaf, hairiness of sheath of the lowest leaf). The sample size of the group should be representative of the variety. '

In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness. However, in some cases of "G", e.g. where there are several repetitions or plots, or more than one growing trial, more than one record per variety may be obtained, in which case statistical methods may be applied.

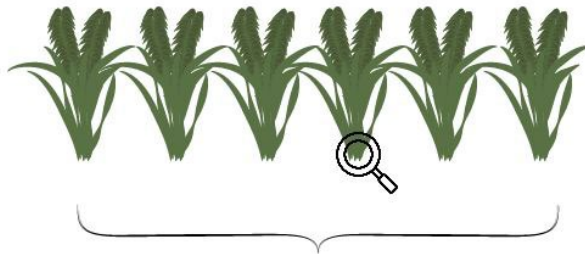
Visual observation (V) and a single record for a group of plants or plant parts (G)

Example (VS):
Flower: type
(tulip: vegetatively propagated)



single variety record

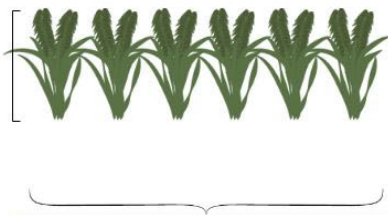
Example (VG)
Lowest leaf: hairiness of leaf sheaths
(barley: self pollinated)



single variety record

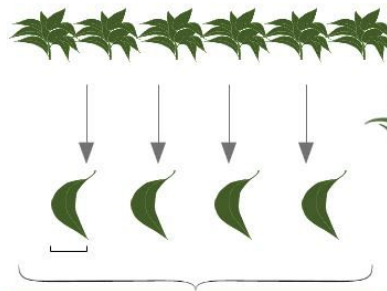
Measurement (M) and a single record for a group of plants or plant parts (G)

Example (MG):
Plant: height
(wheat: self-pollinated)



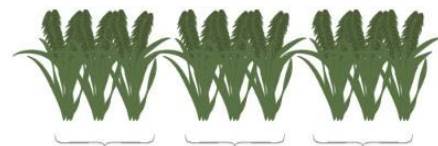
single variety record

Example (MG)
Leaf blade: width
(hosta: vegetatively propagated)



single variety record

Example:
(statistical analysis)



record 1

record 2

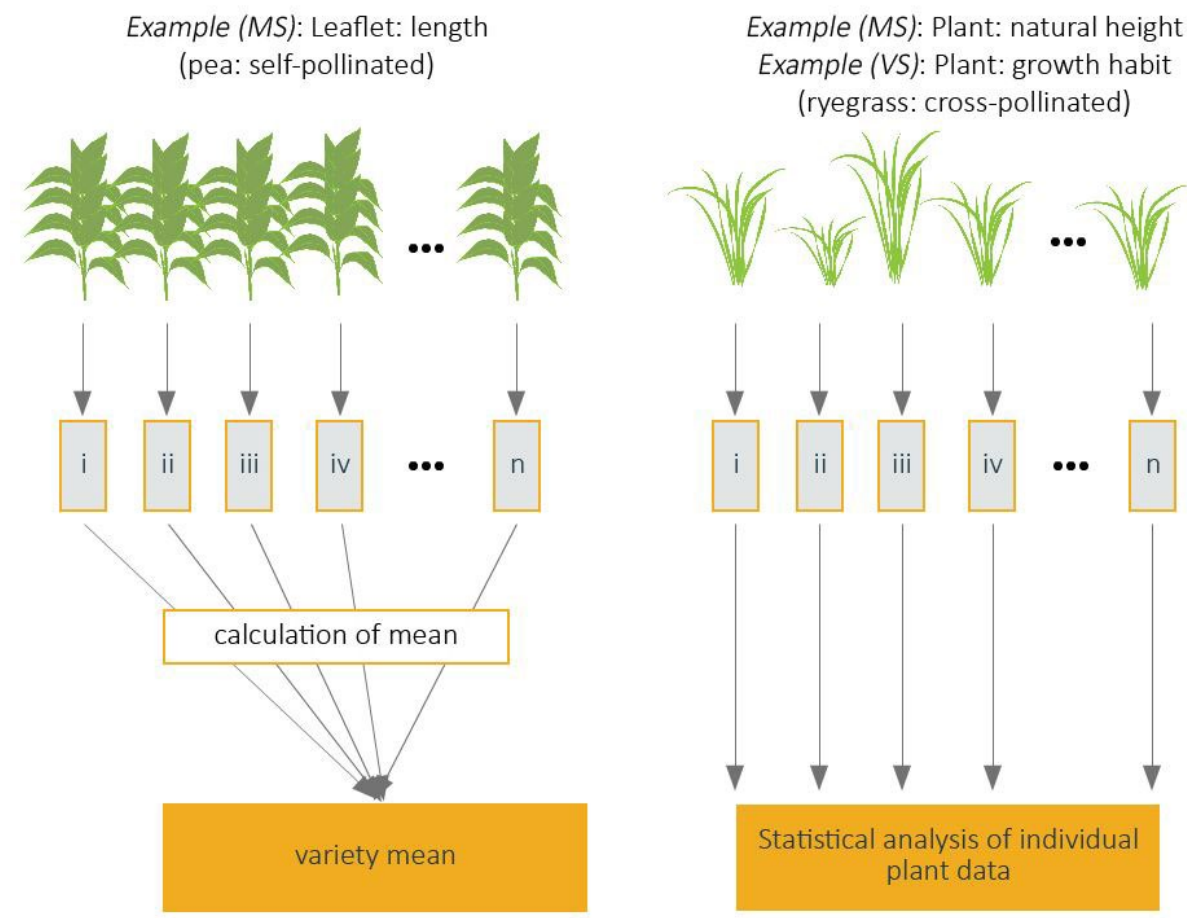
record 3

variety mean / statistical analysis
of individual group data

2. Records for a number of single, individual plants or parts of plants (S)

When varietal means or statistical analysis is used for assessment of distinctness, then records for a number of Single, individual plants or plant parts (S), assessed either visually (V) or by measurement (M), are made.

Quantitative characteristics in cross-pollinated varieties generally have considerable variation within varieties and require records for individual plants in order to determine the mean expression and the variation within a variety. Distinctness is then assessed by comparing variety means calculated from the individual plant data, taking into account the random variation inherent in the variety means.



The following table summarizes the common method of observation and type of record for the assessment of distinctness:

Method of propagation of the variety	Type of expression characteristic		
	QL	PQ	QN
Vegetatively propagated	VG	VG	VG/MG/MS
Self-pollinated	VG	VG	VG/MG/MS
Cross-pollinated	VG/(VS*)	VG/(VS*)	VG/MG/MS

Hybrids	VG/(VS*)	VG/(VS*)	**
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* Records of individual plants only necessary if segregation is to be recorded.

** To be considered according to the type of hybrid.

The table of characteristics in UPOV TGs clearly indicates whether a characteristic is QL, QN or PQ and the method of observation and the type of record appropriate for that characteristic.

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	PQ VG	(+)				
	Plant: growth habit	Plante : port	Pflanze: Wuchsform	Planta: hábito de crecimiento		
	upright	dressé	aufrecht	erguido	Edward Goucher	1
	semi-upright	semi. dressé	halbaufrecht	semierguido	Minaud	2
	rounded				Golden Panache	3
	spreading	étalé	breitwüchsig	extendido	Lynn	4
2. (*)	QN VG					
	Plant: height in relation to width	Plante : hauteur par rapport à la largeur	Pflanze: Höhe im Verhältnis zur Breite	Planta: altura en relación con la anchura		
	taller than broad	plus haute que large	höher als breit	más alta que ancha	Edward Goucher, Sherwood	1
	as tall as broad	aussi haute que large	gleich hoch wie breit	tan alta como ancha	Golden Panache	2
	broader than tall	plus large que haute	breiter als hoch	más ancha que alta	Rupestri	3
3.	QN VG	(+)				

UPOV test guideline for *Abelia*, TG/320/1, 2017-04-05, available at www.upov.int

Exercise quiz: types of characteristics

Question 1 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Shoot: length of internodes		
short	3	
medium	5	
long	7	

Choose only ONE best answer.

A – QN (This answer is correct)

B - QL

C – PQ

Question 2 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Shoot: anthocyanin colouration		
absent or very weak	1	
weak	3	
medium	5	
strong	7	
very strong	9	

Choose only ONE best answer.

A – QN (This answer is correct)

B - QL

C – PQ

Question 3 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Leaf: type		
simple	1	
pinnate	2	

Choose only ONE best answer.

A - QN

B – QL (This answer is correct)

C - PQ

Question 4 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Leaf blade: variegation		
absent	1	
present	9	

Choose only ONE best answer.

A - QN

B – QL (This answer is correct)

C - PQ

Question 5 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Leaf blade: main colour		
yellow	1	
light green	2	
medium	3	
dark green	4	

Choose only ONE best answer.

A - QN

B - QL

C – PQ (This answer is correct)

Question 6 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Flower: type		
single	1	
double	2	

Choose only ONE best answer.

A - QN

B – QL (This answer is correct)

C – PQ

Question 7 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Time of beginning of flowering		
early	3	
medium	5	
late	7	

Choose only ONE best answer.

A – QN (This answer is correct)

B - QL

C – PQ

Question 8 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Young shoot: pubescence		
absent	1	
present	9	

Choose only ONE best answer.

A - QN

B – QL (This answer is correct)

C - PQ

Question 9 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Leaf blade: ratio length/width		
very low	1	
low	3	
medium	5	
high	7	
very high		

Choose only ONE best answer.

A – QN (This answer is correct)

B - QL

C - PQ

Question 10 of 10

This table of characteristics is from a UPOV TG. Please identify which type of characteristic each of these are.

English	Note	Type of characteristics
Leaf blade: shape		
lanceolate	1	
ovate	2	
oblong	3	
elliptic	4	
oblanceolate	5	
obovate	6	

Choose only ONE best answer.

A - QN

B - QL

C – PQ (This answer is correct)

6 - Examination of uniformity and stability

Examination of uniformity and stability



In the previous chapter, we learned about the distinctness aspect of DUS examination process. In the current chapter, we will learn what the uniformity and stability components of DUS examination. Confirming that a plant variety is uniform and stable is a key part the of DUS examination process for plant breeder's rights (PBR) registration. During this module, you will learn what examination of uniformity and stability really means, and in a broad sense, how it is done.

What is uniformity?

Article 8 of the International Union for the Protection of New Varieties of Plants (UPOV) Convention 1991.

"The variety shall be deemed to be uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics."

How is uniformity examined?

During DUS examination, uniformity is examined only for the relevant characteristics of the candidate variety. Any obvious characteristic may be considered relevant, irrespective of whether it appears in the Test Guidelines (TG) or not. Relevant characteristics of a variety include at least all characteristics used for the examination of DUS.

Relationship between uniformity and the type of characteristics and mode of propagation:

Method of propagation of the variety	Type of expression of characteristic		
	Qualitative (QL)	Pseudo-Qualitative (PQ)	Quantitative (QN)
Vegetatively propagated	<i>Off-types</i>	<i>Off-types</i>	<i>Off-types (visual observation)</i> <i>Standard Deviations (measurement)</i>
Self-pollinated	<i>Off-types</i>	<i>Off-types</i>	<i>Off-types (visual observation)</i> <i>Standard Deviations (measurement)</i>
Cross-pollinated	<i>Off-types</i>	<i>Off-types</i>	<i>Standard Deviations</i>
Single-cross hybrid (in-bred parent lines)	<i>Off-types</i>	<i>Off-types</i>	<i>Off-types (visual observation)</i> <i>Standard Deviations (measurement)</i>
Other hybrids	*	*	*

Depending on the mode of propagation of the variety and type of characteristics under consideration, uniformity can be examined by “off type count” method or by “relative variance” method. The table above summarises the common approaches for the assessment of uniformity, taking into account the method of propagation, type of expression of the characteristic and the method of observation. The most common approaches are listed first.

Off type count method



Off type count method is used to assess the uniformity of qualitative (QL) and pseudo-qualitative (PQ) characteristics and for visually assessed quantitative (QN) characteristics in self-pollinated and vegetatively propagated varieties. The sample size required for assessment of uniformity and the acceptable number of off-types varies with plant type and type of characteristics under examination.

Allowable off-types

Sample size	Maximum no. of 'off-types	
	1%, 95% vegetative/self pollinated	2%, 95% Partially self pollinated
5	0	0
6 – 35	1	2
36 – 82	2	4
83 – 137	3	6

See relevant TG or TGP /8 for further information

Generally, a population standard of one per cent and an acceptance probability of at least 95 per cent is used for the assessment of uniformity in self-pollinating seed propagated varieties, vegetatively propagated varieties and single cross hybrids. This means that in the case of a sample size of 10 plants, the maximum number of off-types allowed would be one. In the case of partially self-pollinated plants, a population standard of two per cent and an acceptance probability of at least 95 per cent should be applied. Consult the relevant UPOV TG for the exact information on the required sample size and allowable off types for uniformity assessment.

OFF TYPE METHOD TABLE

Characteristic	Normal state for candidate	Total number of plants/samples assessed for this characteristic	Total number of off-types for this characteristic	Abnormal expressions observed
<i>Example:</i> Flower colour	Red	10	1	Yellow

☐ No off-types have been recorded for any of the distinctive characteristics of the candidate variety assessed by observation.

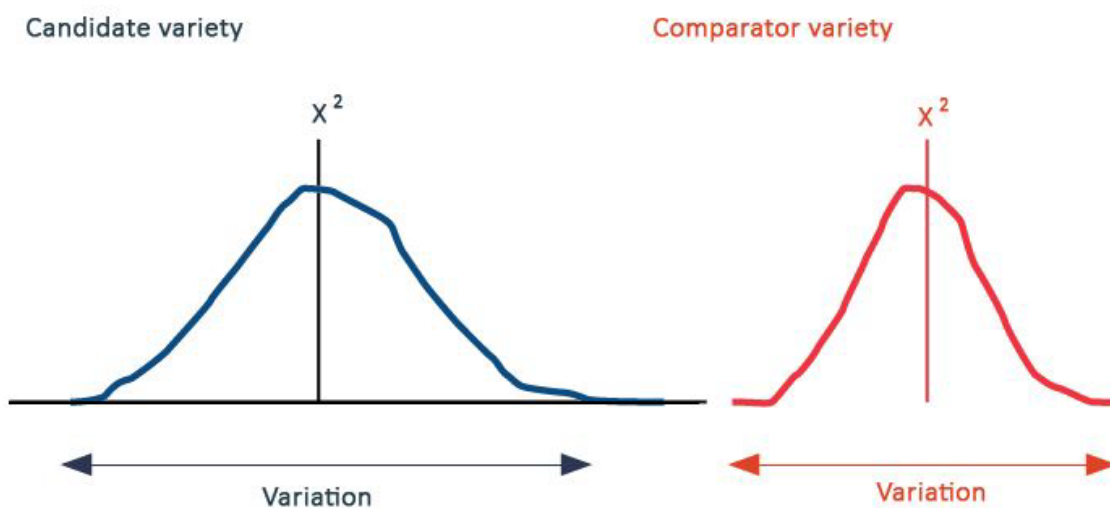
Qualified Persons (QPs) report the number of off-types observed in the table provided in the part-2 form. If there is no off type observed, QPs need to tick the box with that statement.

Relative variance method of determining uniformity



The principle behind the relative variance method is that the candidate should not be significantly less uniform than the comparator varieties. The relative variance for a particular characteristic refers to the variance of the candidate variety divided by the average variance of the comparator varieties (i.e. Relative variance = variance of the candidate/average variance of the comparable varieties) and F statistic (at $P = 0.01$) is used to determine whether the observed difference is significant or not.

Relative variance method is generally only used to examine the uniformity of cross-pollinated varieties.



F Tables are used to check whether these differences are acceptable

When the calculated relative variance is lower than the tabulated **value of F statistic** for the relevant sample size, then it is reasonable to assume that the variances are equal, and **the candidate variety is uniform** in that particular characteristic. If the calculated **relative variance is higher** than the tabulated **value of F**, then the candidate variety is deemed to have a higher variance than the comparator varieties for that particular characteristic and, therefore, **does not meet the uniformity criteria**.

Thresholds of F (at $P = 0.01$) varies with the sample size. For F value, degrees of freedom for the candidate variety (df1) varies with the sample size of the candidate variety, but degrees of freedom of comparator variety (ies) (df2) is always kept at infinity (∞). Infinity (∞) is chosen to cover the

whole range of possible comparable varieties within a species and thus providing a conservative estimate of the threshold.

Under these conditions and taking the relevant values from the F table, table below shows the thresholds that would apply for different sample sizes of the candidate varieties.

Sample size of candidate	Threshold limit for variance ratio
60	1.47
80	1.41
100	1.36
150	1.29
200	1.25

For cross-pollinated varieties UPOV generally recommends taking 60 measurements per characteristic per variety. The tabulated value of F at P = 0.01 where df1 = 60 (degrees of freedom of candidate) and df2 = ∞ (degrees of freedom of comparable variety(ies)) is 1.47. Therefore, 1.47 is the threshold for cross-pollinated species with 60 measurements per characteristic per variety. For a given sample size, if the relative variance exceeds the threshold, the candidate variety will be deemed to be non-uniform for that characteristic.

RELATIVE VARIANCE TABLE								
Characteristic	Variance of candidate variety	Variance of comparator variety	Variance of comparator variety	Variance of comparator variety	Variance of comparator variety	Variance of reference variety	Combined mean variances of comparator varieties	Ratio candidate/mean of comparators
<i>Example:</i> Plant: height (cm)	5.1	6.5	5.5	4.3	5.3	6.2	5.56	0.917

QPs are required to report the data for relative variance in the table provided in the part-2 form or if needed in a separate paper.

Example of relative variance method for determination of uniformity



In two DUS trials, two cross-pollinated candidate varieties were grown together with four comparator varieties. For each variety, 60 plants were measured for plant height and the variance data is presented in the tables below.

Trial one	
variety	variance
candidate 1	5.6
VCK1	7.8
VCK2	4.5
VCK3	3.2
VCK4	5.8
average variance of VCKs	5.325
Relative variance = variance of the candidate/average variance of the comparable varieties	$=5.6/5.325=1.05$
for a sample size of 60, the threshold for relative variance ratio is 1.47	candidate variety is sufficiently uniform

Trial two	
variety	variance
candidate 1	4.8
VCK5	2.4
VCK6	3.1
VCK7	2.8
VCK8	4.1
average variance of VCKs	3.1
Relative variance = variance of the candidate/average variance of the comparable varieties	$=4.8/3.1=1.55$
for a sample size of 60, the threshold for relative variance ratio is 1.47	candidate variety is not sufficiently uniform

Looking at the F table above, for a sample size of 60, the threshold is 1.47. Therefore, we can conclude that for plant height characteristic in the candidate variety is sufficiently uniform in trial one but is not sufficiently uniform in trial two.

Relationship between relative variance and standard deviation

Sometimes in DUS trials, the uniformity data is presented in terms of standard deviations, not as variances. Standard deviation can easily be converted into variance using the mathematical formula **variance= square of standard deviation**.

Exercise - Relative variance method for determination of uniformity:

A cross-pollinated candidate variety and two comparator varieties (VCK1 and VCK2) were grown together in a DUS trial. For each variety, 60 plants/plant parts were measured, and the variance data is presented in tables in the following pages. Please determine if the candidate variety is uniform or not for each of these measured characteristics and then select the correct answer (Yes/No). Click onto the next page to start the exercise:

Exercise - Relative variance method for determination of uniformity

Question 1 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Internode: width (mm)					
Mean	3.4	3.53	4.1		
Std. Deviation	0.4	0.35	0.6		
Variance	0.16	0.1225	0.36	0.24125	0.66

Choose only ONE best answer.

A – Yes (This answer is correct)

B – No

Question 2 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Plant height (cm)					
Mean	331	295	285.5		
Std. Deviation	10.2	5.6	3.4		
Variance	104.04	31.36	11.56	21.46	4.85

Choose only ONE best answer.

A - Yes

B - No (This answer is correct)

Question 3 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Internode: length (cm)					
Mean	95.69	83.05	94.13		
Std. Deviation	4.32	5.39	4.05		
Variance	18.6624	29.0521	16.4025	22.7273	0.82

Choose only ONE best answer.

A – Yes (This answer is correct)

B - No

Question 4 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Node: width of root band (mm)					
Mean	106.7	113.9	123.3		
Std. Deviation	5.01	7.64	6.71		
Variance	25.1001	58.3696	45.0241	51.69685	0.49

Choose only ONE best answer.

A – Yes (This answer is correct)

B – No

Question 5 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Fruit weight (gm)					
Mean	108	95.6	88.2		
Std. Deviation	12.5	4.4	3.8		
Variance	156.25	19.36	14.44	16.9	9.25

Choose only ONE best answer.

A – Yes

B – No (This answer is correct)

Question 6 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Leaf blade: width (mm)					
Mean	48.6	48.9	37.9		
Std. Deviation	4.8	5.1	4		
Variance	23.04	26.01	16	21.005	1.10

Choose only ONE best answer.

A – Yes (This answer is correct)

B – No

Question 7 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Leaf sheath: length (mm)					
Mean	309.7	311.2	338.6		
Std. Deviation	17	15.3	18.2		
Variance	289	234.09	331.24	282.665	1.02

Choose only ONE best answer.

A – Yes (This answer is correct)

B – No

Question 8 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Leaf: midrib width (mm)					
Mean	4.8	6.1	4.3		
Std. Deviation	1.2	1	0.8		
Variance	1.44	1	0.64	0.82	1.76

Choose only ONE best answer.

A – Yes

B – No (This answer is correct)

Question 9 of 9

Uniform (Yes/No)?

Organ/Plant Part: Context	'Candidate'	'VCK1'	'VCK2'	Average Variance of comparator varieties	Relative variance
Flower diameter (mm)					
Mean	53.5	35.8	68.1		
Std. Deviation	9.4	4.2	3.3		
Variance	88.36	17.64	10.89	14.265	6.194181563

Choose only ONE best answer.

A – Yes

B – No (This answer is correct)

What is stability?



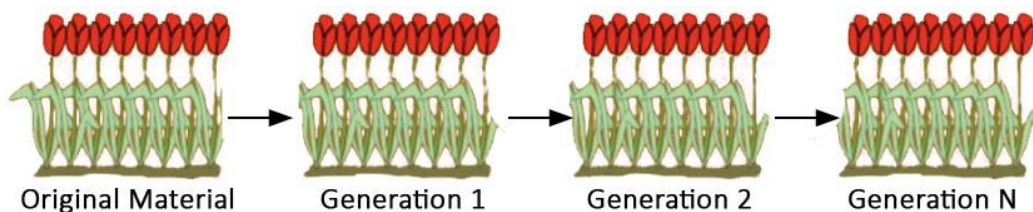
Article 9 of the International Union for the Protection of New Varieties of Plants (UPOV) Convention 1991:

“A variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.”

Stability is examined only for the candidate variety and only for its relevant characteristics. If the variety is not stable, material produced will not conform to the characteristics of the variety, and where the breeder is unable to provide material conforming to the characteristics of the variety PBR may be revoked.

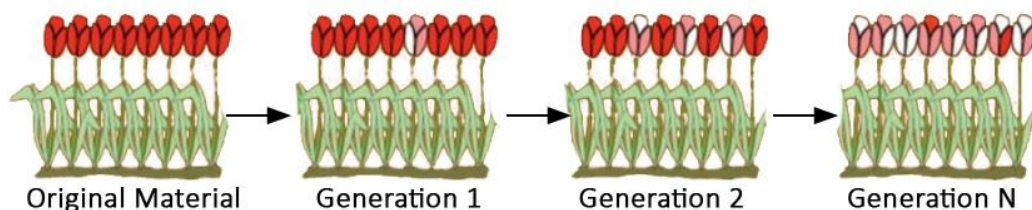
Stable variety

The relevant characteristics of the variety do not change through the generations.



Unstable variety

The relevant characteristics of the variety change through the generations. The plants grouping no longer retains the expression of the relevant characteristics of the original variety.



How is stability examined?



In the context of the UPOV Convention, references to stability and its examination refer to the stability of the variety, after repeated propagation. There are two methods in which stability can be examined:

1. **Indirect – inferred from uniformity:** Asexually propagated varieties are taken to be stable if they are sufficiently uniform in their relevant characteristics.
2. **Direct – comparison between two generations:** Sexually (seed) propagated varieties are taken to be stable if two generations are not significantly different. For examination of stability, seed samples from two generations or two rounds of multiplication are grown side by side in the DUS trial. The second sample of the candidate variety is compared to the first sample to establish that there is no difference between them in their relevant characteristics. The variety is considered to be stable if the two samples conform to each other.

In the example below, sample means from two generations were compared to determine the stability of the measured characteristics plant height and leaf blade length. LSD value is used to determine the significance of the observed difference between the two generations. The difference between the two mean values is compared to the LSD value. If the difference is greater than the LSD value, then the means are significantly different. If two generations are significantly different then the variety is not stable.

Characteristic	Mean for Generation 1	Mean for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)	Same (S) or Different (D)?
Leaf blade length (mm)	270.82	260.73	10.08	40.70	S
Plant height (cm)	128.32	117.37	10.95	6.90	D

STABILITY TABLE							
Characteristic	Mean or state Generation 1	for	Mean or state Generation 2	for	Difference between the means	LSD* (P = 0.01) (measured characteristics only)	Same (S) or Different (D)?
Example: Plant: height (cm)	127.1		130.2		3.1	3.5	S

A similar approach is used for hybrid varieties where the stability is tested on the hybrid itself. The breeder is requested to submit samples from different cycles of propagation, which are compared side-by-side in the field.

Exercise: Determination of stability



Sample mean for various characteristics from two generations of a candidate variety is given in the following pages. For each of these characteristics please determine if the candidate variety is stable (Same) or not stable (Different) by selecting the appropriate answer (Same/Different).

Question 1 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Internode length (mm)	186.35	200.53	14.18	22.00

Choose only ONE best answer.

A – S (This answer is correct)

B – D

Question 2 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Internode diameter (mm)	5.70	4.79	0.91	0.39

Choose only ONE best answer.

A – S

B – D (This answer is correct)

Question 3 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Leaf blade length (mm)	260.9	250.73	10.26	40.70

Choose only ONE best answer.

A – S (This answer is correct)

B – D

Question 4 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Leaf blade width (mm)	11.10	9.38	1.72	1.07

Choose only ONE best answer.

A – S

B – D (This answer is correct)

Question 5 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Plant height (cm)	128.32	128.37	0.05	6.90

Choose only ONE best answer.

A – S (This answer is correct)

B – D

Question 6 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P < 0.01$) (measured characteristics only)
Peduncle length (mm)	413.34	411.02	2.32	34.60

Choose only ONE best answer.

A – S (This answer is correct)

B – D

Question 7 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P \leq 0.01$) (measured characteristics only)
Flag leaf sheath length (mm)	178.57	189.88	11.31	10.50

Choose only ONE best answer.

A – S

B – D (This answer is correct)

Question 8 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P \leq 0.01$) (measured characteristics only)
Flag leaf length (mm)	150.97	154.02	3.05	19.10

Choose only ONE best answer.

A – S (This answer is correct)

B – D

Question 9 of 9

Same (S) or Different (D)?

Characteristic	Mean or state for Generation 1	Mean or state for Generation 2	Difference between the means	LSD ($P \leq 0.01$) (measured characteristics only)
Flag leaf width (mm)	4.64	4.91	0.27	0.47

Choose only ONE best answer.

A – S (This answer is correct)**B – D**

Uniformity and stability: points to remember



1. The PBR examination process is not just a test for distinctness, it also includes testing for uniformity and stability.
2. Distinct characters must be uniform and stable.
3. Do not claim distinctness on a particular characteristic if it is not uniform and stable.
4. Submit your completed part 2 form immediately after submitting the detailed description to avoid any corrigenda arising from uniformity or stability issues and the possibility of a delay in granting the PBR.

7 - Variety description

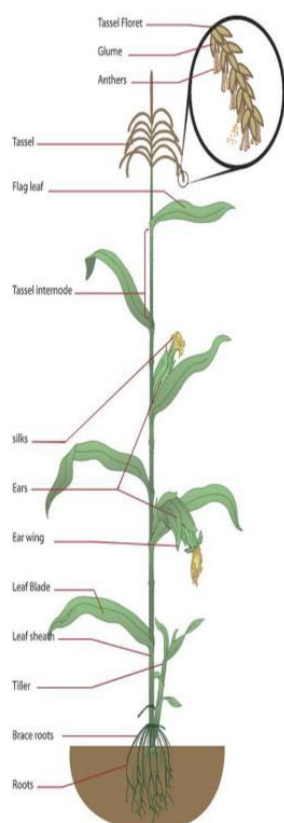
Variety description



DUS trial is carried out to determine the state of expression of the characteristics that define a new variety and to establish distinctness, uniformity and stability (DUS) of that variety. The DUS examination following UPOV test guidelines (TGs) also generates a harmonised description of the variety detailing its relevant characteristics (e.g. plant height, leaf shape, time of flowering), by which it can be defined as a variety in terms of Article 1(vi) of the UPOV Convention.

For example, the UPOV TG for Maize has 41 characteristics listed in its “Table of Characteristics”.

UPOV TG for Maize: 41 characteristics



1

7



1

7



17 (+)	Stem: anthocyanin colouration of brace roots	
QN	absent or very weak	1
	weak	3
	medium	5
	strong	7
	very strong	9

20. (+)	Stem: anthocyanin colouration of internodes	
QN	absent or very weak	1
	weak	3
	medium	5
	strong	7
	very strong	9

28 (*) (+)	Ear: length	
QN	very short	1
	short	3
	medium	5
	long	7
	very long	9

Variety Description system

For a new Maize variety, the state of expression of these characteristics will be determined during DUS examination and then recorded as “notes” to compile a harmonized variety description of that variety.



Char No.	Characteristics	Notes
1	First leaf: anthocyanin colouration of sheath	5
2	First leaf: shape of apex	3
3	Foliage: intensity of green colour	2
4	Leaf: undulation of margin of blade	2
5	Leaf: angle between blade and stem	3
6	Leaf: curvature of blade	3
....		2
....		4
41		3

The variety description — defined by the states of expression of the characteristics

This harmonization is important because it facilitates cooperation in DUS testing and also helps to provide effective protection through the development of harmonized, internationally recognized descriptions of protected varieties.

Variety description in Australia



In Australia, QPs are responsible for compiling and submitting the description of the variety detailing its relevant characteristics in support of a plant breeder's rights (PBR) application. According to the PBR Act 1994 the detailed description of a variety must be in writing, in an approved form and lodged in an approved manner and must contain:

1. the particulars of any test growing carried out, to establish that the variety is distinct, uniform and stable (DUS)
2. the particulars of the characteristics that distinguish the variety from other varieties of common knowledge (VCK).

A harmonized variety description is prepared with the data collected from the DUS trial following UPOV TG or national descriptors and with the information provided in PBR part 1 application and is published in the Plant Varieties Journal. After the publication of the variety description, there is a six months waiting period for public comment before the variety can be granted PBR in Australia. In some cases, when deemed suitable, the variety description may be prepared using DUS data from an overseas testing authority.

In Australia, a detailed description of the variety is lodged through a web-based system called "Interactive Variety Description System" (IVDS). All Qualified Persons (QPs) have a personalised login for the IVDS. Once logged in QPs can see the PBR applications under their name in the IVDS. Only QPs have access to IVDS. Applicants or agents do not have access to IVDS.

The detailed variety description is divided into several sections, namely:

1. Details of the application
2. Details of the comparative trial
3. Origin and breeding
4. Choice of comparators
5. Variety description and distinctness.

It is a good idea to compile all the information and data required for each section in a word document. This will allow eyeballing the entire description before starting the lodgement process through the IVDS. The PVJ template can be used for this purpose (add rows or columns as needed).

Click the link to open/download the plant varieties journal (PVJ) Template: [PVJ](#)

Details of the application



This section is prefilled with information generated automatically from the PBR database and contains the Australian PBR application number, name of the variety and botanical name of the plant as well as the name and details of the applicant and the agent.

<u>Details of Application</u>	
Application Number	2006/403
Variety Name	'Candidate'
Genus Species	<i>Triticum aestivum</i>
Common Name	Wheat
Synonym	Nil
Accepted Date	22 Nov 2006
Applicant	Agriculture Services, Bwood, VIC, and Research Corporation, ACT
Agent	Grain Tech Ltd, Rosewood, SA.
Qualified Person	QP Name

Details of the comparative trial



In this section, the QP is required to provide information about the comparative trial including location, Test Guidelines (TG) or national descriptor used, time frame, conditions, trial design, RHS chart and system of measurements used. Information about the growing practices such as irrigation, fertiliser, pesticide regimes and other cultural practices used and information about the trial design is also provided by the QP in this section. IVDS contains more than 300 TGs and over 100 national descriptors. The QP needs to select the appropriate TG/descriptor to use for the variety description.

Details of Comparative Trial	
Location	Rosewood, SA.
Descriptor	Wheat (<i>Triticum aestivum</i>) TG/3/11
Period	2006
Conditions	The trial was direct sown on 24 Jun into moist soil, but there was very little rain for the rest of the growing season. Trial was sprayed with 800ml trifluralin and 1.6L Avadex/ha.
Trial Design	The trial was a randomized block design of 3 blocks arranged in 12 ranges by 10 plots per range. Each plot was 6 rows 18 cm apart with a 36cm space between adjacent plots. Sowing rate was approximately 1000 seeds per plot. The entries in the trial consisted of varieties of common knowledge appropriate to and with a number of potential new varieties.
Measurements	Measurements were taken in the metric system following UPOV
RHS Chart - edition	4th edition

Origin and breeding



Detailed information about the breeding history of the variety such as the breeding method used, the location where the variety development work was done and the details of the breeder who did the actual breeding work of the variety are provided in this section.

Origin and Breeding

Controlled pollination: The initial cross 'Parent-1'/'V252' was made in 1995 and the backcross was made in 1996. The backcross F_1 seed was self pollinated to produce F_2 seed. A single plant was selected (plant 4) based on stripe rust reaction and maturity, from a population of approximately 800 F_2 plants. An F_3 bulk plot was grown in 1998 and selected based mainly on stripe rust reaction, maturity and grain quality. An F_4 a single plant was selected (plant 4) similar to F_2 . An F_4 derived bulk, coded 'V621', was then evaluated in the period 2000-2006 for: Grain yield across medium to high rainfall environments in southern Australia. Diseases were evaluated through appropriate testing protocols in the field and laboratory by Grain Tech. Breeder: Plant Breeder, Department of Plant Breeding, Victoria.

Choice of comparators

In this section, the QP provides the details of characteristics used for grouping of varieties (grouping characteristics) and the name/s of the most similar VCK identified. If any of the identified similar VCKs are not included in the DUS trial, the QP needs to provide justification for those exclusions.

<u>Choice of Comparators</u> Characteristics used for grouping varieties to identify the most similar Variety of Common Knowledge		
Organ/Plant Part	Context	State of Expression in Group of Varieties
Plant	length	medium
Ear	shape in profile	parallel sided
Awns or Scurs	presence	awns present
Straw	pith in cross section	thin
Ear	colour	white
Ear	length	medium
Ear	density	medium
Ear	time of emergence	medium to late

Most Similar Varieties of Common Knowledge identified (VCK)

Name	Comments
'Comparator'	

Varieties of Common Knowledge identified and subsequently excluded

Variety	Distinguishing Characteristics		State of Expression in Candidate Variety	State of Expression in Comparator Variety	Comments
'VCK2'	Ear	ear emergence	259.5 Julian days	249.0 Julian days	LSD, P=1% ,2.2 days
'VCK3'	Ear	ear emergence	259.5 Julian days	249.7 Julian days	LSD, P=1% ,2.2 days

Variety description and distinctness



This section is based on the 'table of characteristic' of UPOV TG or the national descriptor and provides the state of expression of the relevant characteristics in the candidate and comparator variety. The characteristics in which the candidate is distinct from the comparator variety is also indicated in this section. At a minimum, state of expression of characteristics with an * in UPOV TGs must be recorded in the variety description.

(Alternatively, you can download the word document.)

Variety Description and Distinctness - Characteristics which distinguish the candidate from one or more of the comparators are marked with a cross.

Organ/Plant Part: Context	'Candidate'	'Comparator'
☐ *Plant: growth habit	intermediate	intermediate
☐ Flag leaf: anthocyanin colouration of auricles	absent or very weak	absent or very weak
☐ *Time of: ear emergence	medium to late	medium
☐ *Flag leaf: glaucosity of sheath	very weak to weak	weak
☐ *Ear: glaucosity	weak	weak to medium
☐ Culm: glaucosity of neck	weak	weak
☐ *Plant: length	medium	medium
☐ *Straw: pith in cross section	thin	thin
☐ *Ear: shape in profile	parallel sided	parallel sided
☐ *Ear: density	medium	medium
☐ Ear: length	medium	medium
☐ *Awns or scurs: presence	awns present	awns present
☐ *Awns of scurs at tip of ear: length	very long	long
☐ *Ear: colour	white	white
☐ Apical rachis segment: hairiness of convex surface	absent or very weak	very weak to weak
☐ Lower glume: shoulder width	narrow	narrow to medium
☒ Lower glume: shoulder shape	sloping	straight
☐ Lower glume: beak length	medium	medium
☐ Lower glume: beak shape	slightly curved	slightly curved
☒ Lower glume: extent of internal hair	weak	medium
☐ Lowest lemma: beak shape	slightly curved	straight to slightly curved
☐ *Grain: colour	white	white
☐ Grain: colouration with phenol	dark to very dark	dark
☐ *Seasonal type:	spring type	spring type
☐ Glutenin composition: allele expression at locus Glu-A1	band 2	band 2
☐ Glutenin composition: allele expression at locus Glu-D1	bands 2+12	bands 2+12

Characteristics additional to the TG and statistical analysis



State of expression information of any additional characteristics used in the DUS trial and any statistical analysis performed on the DUS data is also presented in this section.

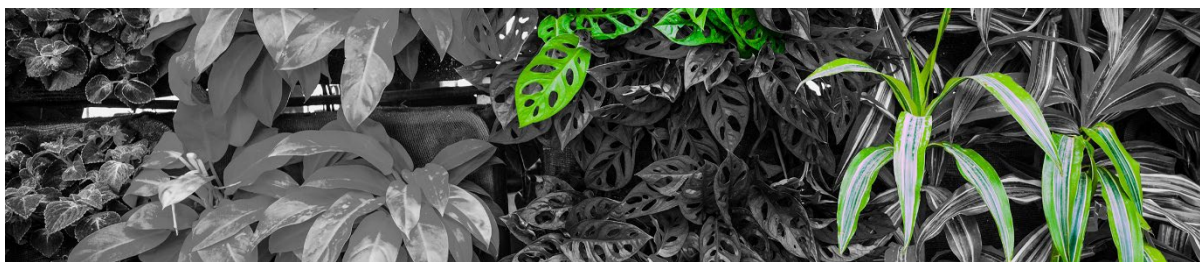
The information presented in the variety description and distinctness section taken together should be capable of precise delimitation of the variety under consideration and should establish the distinctness of the candidate from the comparator variety. One important point to remember is that **grouping characteristics cannot be used for claiming distinctness from the comparator variety**.

(Alternatively, you can download the word document)

Characteristics Additional to the Descriptor/TG		
Organ/Plant Part: Context	'Candidate'	'Comparator'
☐ Glutenin composition: allele expression at Glu-A3	b	b
☒ Glutenin composition: allele expression at Glu-B1	i (17+18)	al (over expressed B1x7)
☒ Roots: reaction to Cereal Cyst Nematode	susceptible	resistant
☒ Leaves: reaction to stripe rust pathotype 134E16A+	Resistant	moderately susceptible to susceptible

Statistical Table		
Organ/Plant Part: Context	'Candidate'	'Comparator'
☒ Flag leaf: blade width (mm)		
Mean	14.40	12.90
Std. Deviation	1.30	0.80
LSD/sig	1.5	P≤0.01

Preparing descriptions based on overseas test report



Official DUS test report from another UPOV member country can be used to complete the detailed variety description provided that the following conditions are met:

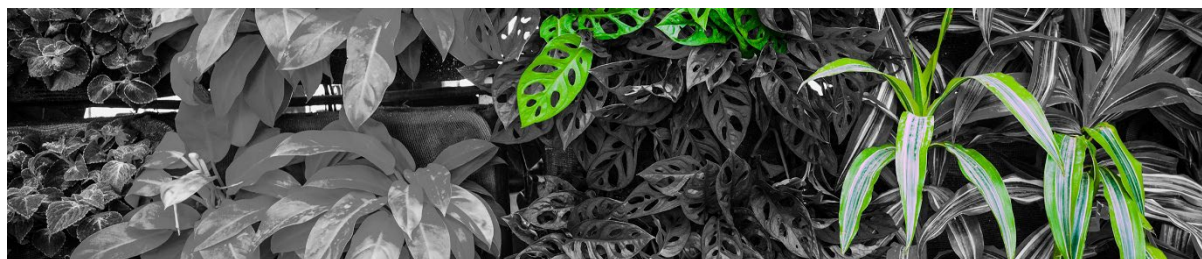
1. PBR application is made in another UPOV member country before an application for PBR is made (and subsequently accepted) in Australia
2. the test growing of the variety outside Australia has demonstrated that the variety has the particular characteristic (i.e establishes the DUS of the variety)
3. the overseas test growing is **equivalent** to a (DUS) test growing of the variety in Australia.

The intention to use an overseas test report and a putative date when the official test report will be available to Australian PBR office for review must be provided at the time of part 1 application. In some species such as potato, the expressions of characteristics are greatly influenced by gene-environment interactions and descriptions based on overseas testing are not acceptable.

Obtaining overseas DUS test reports

The overseas PBR offices require a formal request from the Australian PBR office and will send the test reports directly to the Australian PBR office. Few countries such as Israel, New Zealand and Japan provide the test report free of charge. Normally a 350 Swiss francs fee is required to obtain an overseas test report and the overseas PBR office sends the invoices directly to the applicant or their Australian agent.

Assessment of overseas test report by PBR Office



The use of overseas data in lieu of comparative DUS trial in Australia is not an automatic process. After receiving an official copy of the overseas DUS test report, the PBR examiner checks the test report for sufficiency and decides if it is suitable for completing the variety description (and part two-stage) of the PBR application in Australia.

If the applicant or the agent already has a copy of the overseas DUS report, it is a good idea to provide it to the Australian PBR office for assessing its suitability (for preparing the description and to complete part two-stage of the PBR application) before requesting an official copy from the overseas authority.

At a minimum, the overseas test report should provide the name of the most similar variety/varieties of common knowledge and show a clear difference between the candidate variety and the most similar VCK.

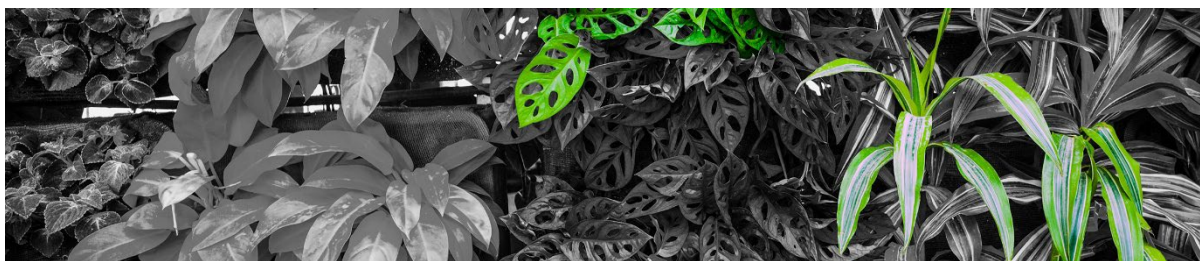
What constitutes a clear difference for applications based on overseas DUS test report

Generally, for qualitative characteristics, one note difference between the candidate and most similar VCK shows a clear difference.

For quantitative characteristics, generally, a difference of at least two notes is required. If the difference is only one note, both varieties could be very close to the same borderline (for example, the high end of note six and low end of note seven) and the difference might not be clear. However, when the comparison is performed at the level of measured values using statistical analysis (MG, mean of MS) a difference smaller than two notes might represent a clear difference and be acceptable. Pseudo-qualitative characteristics needs to be assessed on a case by case basis but a two-note difference usually shows a clear difference between the candidate and the VCK.

The ultimate decision about the sufficiency of the OS data for completing PBR part-2 stage rests with the PBR examiner and the Australian PBR office.

Verification trial in Australia

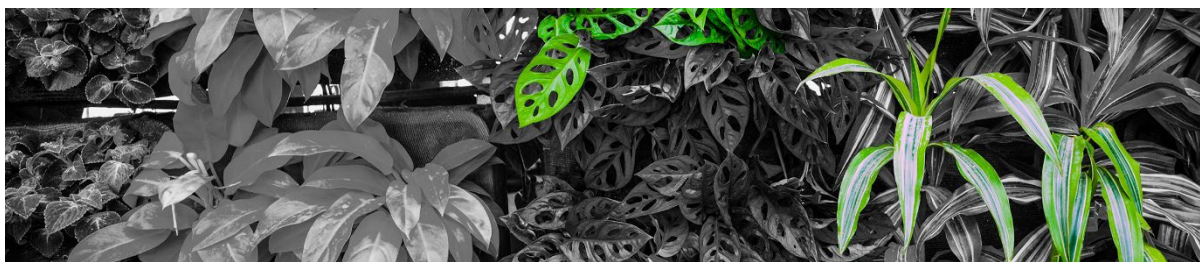


Verification trial is done, usually with only the candidate variety grown, to confirm that the relevant characteristics of the variety described in the overseas test report is observed in Australia.

Verification trial may be required when the overseas test report does not provide sufficient information on uniformity and stability of the variety. A verification trial must contain a sufficient number of plants as required by the UPOV TG or by the Australian PBR office. The PBR office usually inspects verification trials when the essential/distinct characteristics of the variety is observable.

Generally, applications using suitable US plant patent data requires a verification trial in Australia to confirm the essential characteristics of the variety contained in the US plant patent.

Preparing descriptions based on overseas data and verification trial



QPs are responsible for Preparing descriptions based on overseas data and verification trial.

The name of the overseas testing authority, overseas data reference number, details of the descriptor used, location and time period of the trial together with any other information available should be provided in the 'details of comparative trial' section of the variety description. If a verification trial is done in Australia, information about the location, condition and trial design also needs to be provided.

The overseas test report usually does not provide any information about grouping characteristics used to identify the most similar VCKs and whether any of the identified similar VCK was excluded. However, QPs are responsible for completing the 'choice of comparators' section by providing this information. QP is also responsible for converting the data contained in the US plant patent into the UPOVs harmonised format before lodging it through the IVDS.

Overseas, Testing, Authority	GEVES, France
Overseas, Data, Reference, Number	DEE 1011625
Location	INRA Avignon
Descriptor	<i>Prunus armeniaca</i> UPOV TG/70/4 Rev
Period	2003-2006

Lodging Variety Description through IVDS

Interactive Variety Description System (IVDS) is an easy to use web-based system that allows QPs to submit the detailed variety description to the PBR office. Click the downloadable below to see the process of lodging a detailed variety description through the IVDS.

[Lodging Variety description through IVDS](#)

8 - DUS trial examination in Australia

DUS trial examination in Australia



PBR systems based on UPOV model, in principle, is same across all UPOV member countries. However, the administrative process and practicality of the PBR system varies from country to country. In this module we will provide a short outline of the practicalities involved in the PBR DUS examination process in Australia and provide tips and advice to help the QPs better navigate the DUS examination process.

The PBR system in Australia relies heavily on the technical capabilities of the QPs and ideally, QPs should be actively involved in a PBR application process from the beginning. QPs are responsible for selecting the most similar VCKs, trial design, data collection and development of a harmonised variety description of the candidate variety using data from the DUS trial. PBR examiners verifies the work done by QPs to ensure that the description of the new variety and the claimed difference from the VCKs meets the standard required under the PBR Act 1994 and the UPOV guidelines. The success of the PBR system in Australia requires that QPs and the PBR examiners work closely in a complementary fashion.

Plant breeder's rights pre-examination questionnaire



The pre-examination form is a written agreement between the QP and the PBR office formalising the details of the proposed DUS trial. QPs will be required to complete this form just after the acceptance of the PBR application in Australia.

In the first section of the pre-examination form QPs will be asked to provide information about the design of the trial:

2. Description of the trial

Location of the trial:

Description of the trial: [please tick]

- | | |
|---------------------------------------|---|
| ☐ in field | ☐ in glasshouse |
| ☐ in open beds | ☐ in pots |
| ☐ as rows | ☐ as spaced plants |
| ☐ irrigated | ☐ dryland |
| ☐ in full sun | ☐ shaded |

Design of the trial: [please tick]

- | | |
|--|---|
| ☐ Completely <u>Randomised</u> Design | ☐ <u>Randomised</u> Block Design |
| ☐ Pairwise Design | ☐ Split Plot Design |
| ☐ Other: [please specify] | |

Number of replications:

Number of plants per replicate or length of row:

Row spacing:

Plant spacing:

Pot diameter:

Date sown/propagated:

Anticipated date of field examination:

Stage of development at the time of the field examination (must be at the stage when the key distinguishing characteristics are most evident): [please tick]

- | | | | |
|--|------------------------------------|-----------------------------------|---|
| ☐ Vegetative | ☐ Flowering | ☐ Fruiting | ☐ Harvest Maturity |
| ☐ Other: [please specify] | | | |

Trial based on: [please tick]

- | | | |
|----------------------------------|---|--|
| ☐ UPOV TG | ☐ Modified UPOV TG | ☐ National Descriptor |
|----------------------------------|---|--|

TG Reference Number:

2. Description of the trial

Location of the trial:

Description of the trial: [please tick]

- | | |
|---------------------------------------|---|
| ☐ in field | ☐ in glasshouse |
| ☐ in open beds | ☐ in pots |
| ☐ as rows | ☐ as spaced plants |
| ☐ irrigated | ☐ dryland |
| ☐ in full sun | ☐ shaded |

Design of the trial: [please tick]

- | | |
|---|--|
| ☐ Completely Randomised Design | ☐ Randomised Block Design |
| ☐ Pairwise Design | ☐ Split Plot Design |
| ☐ Other: [please specify] | |

Number of replications:

Number of plants per replicate or length of row:

Row spacing:

Plant spacing:

Pot diameter:

Date sown/propagated:

Anticipated date of field examination:

Stage of development at the time of the field examination (must be at the stage when the key distinguishing characteristics are most evident): [please tick]

- | | | | |
|--|------------------------------------|-----------------------------------|---|
| ☐ Vegetative | ☐ Flowering | ☐ Fruiting | ☐ Harvest Maturity |
| ☐ Other: [please specify] | | | |

Trial based on: [please tick]

- | | | |
|----------------------------------|---|--|
| ☐ UPOV TG | ☐ Modified UPOV TG | ☐ National Descriptor |
|----------------------------------|---|--|

TG Reference Number:

QPs will also need to provide information about the selection of the most similar VCKs proposed to be included in the DUS trial and list the grouping characteristics used to identify the VCKs.

2.2 Grouping characteristics to identify (preferable from TG) the most similar varieties of common knowledge (VCK)

Organ/Plant Part	Context	State of Expression in Group of Varieties

2.3 Most similar varieties of common knowledge identified (VCK)

Variety Name	Comments

2.4 Varieties of common knowledge identified and subsequently excluded (if any)

Variety Name	Distinguishing Characteristics	State of Expression in Candidate Variety	State of Expression in Comparator Variety

DUS trial examination by the PBR examiner



DUS trial is examined by PBR examiners to verify QP's claim of distinctness of the candidate variety and other relevant characteristics (such as grouping characteristics) of the candidate and the comparator varieties included in the trial. Generally, QPs will need to collect data from the DUS trial at different growth stages of the plants following UPOV TG (data sheets for data collection can be downloaded from the IVDS). However, it is not necessary nor possible for PBR examiners to inspect the trial multiple times at different growth stages of the plants. So, it is QPs responsibility to organise DUS trial examination by PBR examiners at a time when the distinct characteristics of candidate variety will be visible in the trial. QPs can take the following steps to ensure that DUS trial examination proceeds smoothly without any problem:

1. QPs should download the relevant UPOV test guideline (TG) at the start of the PBR application process and review the TG thoroughly before planning the DUS trial. Test guidelines are available at the [UPOV website](#). **If no UPOV TG is available for the taxon under consideration, QPs should contact the PBR office for guidance** before planning the DUS trial.
2. QPs must ensure that a sufficient number of plants of the candidate and comparators varieties as required by the UPOV TG (or by the PBR office) is included in the trial. **Failing to have the minimum number of plants required at the time of examination by the PBR examiner will lead to a rejection of the trial.** So, as an added security against any accidental loss of plants, it is a good idea to include more plants than the minimum number required.
3. **In case of seed propagated varieties** QPs must ensure that **a second generation of the candidate variety** is included in the trial. Failing to do so will require a new trial with only the candidate variety.
4. QPs must ensure that all varieties included in the trial are planted (or transplanted or grafted) at the same time and that the growing conditions of the trial meets the required standard and trial plants are not affected by any stress (biotic or abiotic). If the plants are grafted, then same rootstock must be used for candidate and comparator varieties.
5. Both candidate and comparator varieties in the trial must receive identical treatments such as watering, fertiliser and insect and pest control. In case of potted trials, both candidate and comparators must be of same age, grown in same-sized pots in identical soils with similar pH and fertilizers. PBR examiners will verify this during examination.
6. QPs must ensure that the trial plants are not pruned or plant parts such as fruits or flowers are not harvested as this may adversely affect the quality of the comparative trial.

7. QPs must get regular updates on the progression of the trial and any problems with the trials must be communicated to the PBR office as soon as possible. Failing to do so may lead to a rejection of the PBR application.

8. QPs must **contact the relevant PBR examiner at least two weeks before the putative date for the trial examination**. This time is required for PBR examiners to make their travel arrangements and get the required approvals.

9. If there is any deviation between the DUS trial proposed at the acceptance stage and DUS trial in the ground, the QP must have a strong justification for those deviations. **Failing to do so may lead to a rejection of the PBR application.**

10. QPs should download datasheets (based UPOV TGs) from the IVDS and must use them for data collection from the beginning of the DUS trial.

11. When scoring the DUS trial plants using UPOV scales, QP must remember that these notes (1-9 or 1-5 or 1-3) cover the entire phenotypic variation present within the taxon under consideration. Also, when scoring the DUS trial plants, all varieties of that taxon worldwide must be considered, not just the ones present in Australia.

12. For measured characteristics, if the plan is to use statistical analysis, QP must keep records of individual measurements which is required for the calculation of LSD values.

13. QPs should keep photographic records of the trial at different growth stages. QPs are responsible for providing a comparative photo of the candidate and comparator variety for publication in the plant variety journal.

14. QPs must be present at the time of the DUS trial examination. This is to ensure that any inconsistencies in observations made by the QP and the examiner can be resolved at the time of the examination.

15. DUS trial is examined at a time when the distinct features of the candidate variety are observable in the Trial. The QP and PBR Examiner negotiate a suitable date and time to conduct the examination.

16. It is always a good idea to send a copy of the collected data to the examiner either by email or through the IVDS before the actual DUS examination.

17. If the QP has previously completed the pre-examination agreement with the examiner and there are no deviations from the plan then there should be no surprises. However, at the time of the examination, the examiner may consider necessary to check or confirm some details. During the DUS trial examination, QPs should be prepared to justify their use of grouping characteristics and the selection of VCKs included in the trial. The first task of the PBR examiner is to verify that appropriate grouping characters and VCKs has been used in the DUS trial and that the state of expression of the grouping characteristics is similar between the candidate and comparator variety. A significant number of trials fail because the most similar variety has not been included in the trial.

18. Once the PBR examiner is satisfied with QPs selection of VCK included in the trial, they will verify QP's claim of distinctness and check the state of expression of the distinct characteristic in the candidate and comparator varieties to confirm that QPs observations are objective and accurate

19. Whether the observed differences between the candidate and comparator varieties represent a clear difference depends on the type of characteristics (qualitative, quantitative or pseudo quantitative) and the PBR examiner will verify QPs observations and confirm if the observed difference is sufficient to establish that the candidate variety is clearly distinct from the comparator variety (i.e. the most similar VCK).

20. It is a good idea for the QPs to get a copy of the data collected by PBR examiners for future reference. These days it can be easily done by taking photos of the datasheets with mobile phones.

21. Before the conclusion of the examination, QP should discuss with the PBR examiner whether further data collection is required from the trial. For example, if the trial was examined at the flowering stage, further data collection might be needed at the fruiting stage. QP should check if any samples of the later growth stages need to be sent to the examiner for verification of the data collected by the QP.

22. QPs must submit a draft detailed description of the variety as soon as all the required data has been collected from the DUS trial. Failure to submit the variety description within an acceptable timeframe after DUS examination may lead to a rejection of the PBR application by the PBR office.

23. QPs should submit the relevant part-2 forms at the time of submitting the draft description of the variety for publication. This is to ensure the characteristics in which distinctness has been claimed also meets the uniformity and stability criteria.

24. For Australian native plants, QPs must ensure that an acceptable herbarium specimen of the candidate together with the completed ACRA form and required fees is submitted to ACRA before the trial is completed. Generally, acceptable herbarium sample means a flowering specimen.

Reference list

Reference list

© EAPVP Forum

- EAPVP forum workshops held on 22nd Jan 2018 in Myanmar http://eapvp.org/files/report/docs/myanmar/20180122/Topic3_General%20Introduction%20to%20the%20Examination%20of%20DUS.pdf
- EAPVP forum workshops held on 20th Jan 2017 in Thailand <http://eapvp.org/files/report/docs/thailand/01%20Basic%20Rules%20for%20DUS%20Testing.pdf>

UPOV Website

- <https://www.upov.int/edocs/tgdocs/en/tg215.pdf>
- <https://www.upov.int/edocs/tgdocs/en/tg003.pdf>
- <https://www.upov.int/edocs/tgdocs/en/tg044.pdf>
- https://www.upov.int/edocs/tgpdocs/en/tgp_14.pdf
- <https://www.upov.int/edocs/tgdocs/en/tg118.pdf>
- <https://www.upov.int/edocs/tgdocs/en/tg025.pdf>



Request for Further Period to Provide Detailed Description Under Section 34



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- How you may seek access to and correction of the personal information we hold;
- How you may make a complaint about a breach of the Privacy Act and how we deal with your complaint; and
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You should also be aware that under the International Union for Protection of New Varieties of Plants (UPOV) (www.upov.int/portal/index.html.en) Convention, IP Australia is required to disclose information regarding plant breeder's rights applications (including the name of the applicant) to the UPOV in Geneva, Switzerland. Once information is provided to UPOV, IP Australia has no control over its subsequent use and disclosure.

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Request for Further Period to Provide Detailed Description Under Section 34

1. **Are you:** ☐ Applicant ☐ Agent ☐ Qualified Person

2. **Applicant Details**

Name: _____

Address: _____

2nd name (if required): _____

Address: _____

3. **Address for service** (if it has changed since previous contact with IP Australia):

4. **Agent details (if Agent is making request)**

Name: _____

Address: _____

Phone: _____

Email: _____

5. **Qualified Person details (if Qualified Person is making request)**

Name: _____

Address: _____

Phone: _____

Email: _____

Part 1 – Formality Details

1. Variety name:
2. Application number:

Part 2 – Status of Application

To be allowed a further period to submit your detailed description, please provide the details below and attach supporting material which demonstrates that satisfactory progress is being made towards the granting of PBR.

1. Is your PBR application:
 - ☐ Based on an Australian DUS trial? (continue to question 2)
 - ☐ Based solely on an overseas DUS report? (continue to question 3)
 - ☐ Based on a comparative or verification trial in Australia? (continue to question 4)
2. For an Australian DUS trial:
 - a. What stage is Australian DUS testing of the variety currently at?
 - ☐ Still overseas
 - ☐ In quarantine
 - ☐ DUS trial planted
 - ☐ Planted but not sufficiently mature
 - ☐ Description incomplete
 - ☐ Yet to submit Part 2 forms
 - ☐ Other:

 - b. What is the date of commencement for the trial? __/__/____
 - c. What is the estimated date for DUS examination: __/__/____
3. For an Overseas DUS report:
 - a. What is the testing country? _____
 - b. What is the estimated date for DUS examination? __/__/____
 - c. What is the estimated date for the DUS report to be available? __/__/____
4. For a comparative or verification trial in Australia, provide:
 - a. What is the location of the trial? _____
 - b. What is the date of commencement for the trial? __/__/____
 - c. What is the estimated date for DUS examination? __/__/____

Part 3 – Extension Request

1. I am requesting a further period of _____ months. If granted, the new due date for the detailed description will be __/__/____.
2. Declaration:

☐ I have attached supporting material which demonstrates that satisfactory progress is being made towards the granting of PBR and outlines why an extension is required (extension requests will not be considered without supporting material)

[Name]

[Signature]

[Date]



Australian Government

IP Australia



Certification by a Qualified Person (QP)

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IP Australia will publish the:

- Applicant name;
- Agent name;
- Qualified Person name and contact details; and
- Town, State and Country of the applicant's address

in the Register of Plant Varieties, the Plant Varieties Journal, the Plant Breeder's Rights Database and/or on our website. Once information is available on the internet, IP Australia has no control over its subsequent use and disclosure. You should be aware that the information (including personal information) held in IP Australia's online IP Rights databases is also available on request, subject to our terms and conditions.

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Certification by a Qualified Person (QP)

- To be completed by the applicant or the applicant's agent and the Qualified Person.
- The Qualified Person must be officially accredited for the species, in writing, by the PBR Office (PBRO).
- This completed form should be attached to, and submitted with, Part 2 of the application form PBR/00/002.

Name of variety:	
Application number:	
Applicant's or Agent's name:	
Qualified Person's name:	

Answer all questions by ticking the appropriate box

I am accredited with the Plant Breeders Rights Office for this taxon as a:

- ☐ consultant Qualified Person
- ☐ non-consultant Qualified Person

As the Qualified Person I have:

reviewed the application documents related to the above variety first filed in another UPOV member country and recommend to the PBRO that they are suitable for examination without a comparative test growing in Australia, and/or

Yes ☐ No ☐

performed those functions ticked in the box below as part of the application process, the results of which are reported in Part 2 of the application form

Yes ☐ No ☐

Tick only those functions that the QP performed in relation to this application

Completion of Part 1 of the application form.	☐	Certification of the Part 2 application form.	☒
Determine the most similar varieties of common knowledge and the need to include source or parental material in trial.	☒	Provide observations, data and statistical analysis of the DUS trial for the applicant to complete Part 2 of the application form.	☐
Planning the test growing trial.....	☐	Completion of Part 2 of the PBR application.	☒
Recommending the most appropriate trial site for the varieties in trial.	☐	Verification of the field trial, observations, data and statistical analysis.	☐
Choice of trial site.....	☐	Perform the necessary statistical analysis of the measurements to determine DUS.	☐
Supervision of the layout and planting of the trial	☐	Provide a detailed description of variety in the PBR approved format.	☒
Care and maintenance of the trial.....	☐	Provide a comparative slide or a colour print of the variety showing distinctness characters.	☐
Instruction to applicant on the timing and nature of observations/measurements needed.	☐	Make observations/take measurements to comply with approved DUS test guidelines.	☐

Declaration by Qualified Person

☐ By ticking this box I declare myself to be the Qualified Person identified in this form and the information supplied to be true and correct.*

Name (please print): Date:
(DD/MM/YYYY)

The applicant or agent for the applicant should complete the section below to confirm that there is an agreed understanding on the respective roles of the applicant/agent and QP in this application.

Applicant/Agent

☐ By ticking this box I declare myself to be an authorised signatory for the Applicant/Agent identified in this form and the information supplied to be true and correct.*

Name (please print): Date:
(DD/MM/YYYY)

Name of Company or Department
(if applicable)

For joint applicants where an agent has not been authorised, the name of each of the joint applicants is required.

☐ By ticking this box I declare myself to be the person identified below and am authorised to sign. The information is true and correct.*

Name (please print): Date:
(DD/MM/YYYY)

Name of Company or Department
(if applicable)

***THE PENALTY UNDER SECTION 75(1) FOR MAKING A FALSE STATEMENT IN SUPPORT OF AN APPLICATION IS SIX MONTHS IMPRISONMENT.**

If you are submitting this form to IP Australia via email, please print to PDF prior to attaching to your email. If not printed to PDF prior to attachment, your email may be blocked by ICT security policy.



Australian Government
IP Australia

Application for Plant Breeder's Rights

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IP Australia will publish the:

- Applicant name;
- Agent name;
- Qualified Person name; and
- Town, State and Country of the applicant's address

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Australian Government
IP Australia



Application for Plant Breeder's Rights

DESCRIPTION OF NEW VARIETY (the candidate variety)

The purpose of Part 2 is to present the results from the growing trial and/or information arising from a certified overseas test report - and in particular to present evidence of **Distinctness, Uniformity and Stability**.

The evidence of **Distinctness** will be published on the web in *Plant Varieties Journal* and must be submitted through the online **Interactive Variety Description System (IVDS)**.

The evidence of **Uniformity** and **Stability** is generally not for publication and can be presented in the format outlined on the following pages. Where necessary attach additional pages. Uniformity and Stability information can be provided on disk or hard copy. Please read this form before entering information.

Part 2 must be accompanied by completed forms PBR/00/006 - Certification by a Qualified Person and PBR/00/009 - Confirmation of submission of propagating material to a genetic resource centre (GRC).

1. Application number

2. Name and synonym of the candidate variety as accepted by the PBR Office Australia

Name	synonym
------	---------

3. Botanical name

4. The candidate variety will be maintained by (Tick)

☐ Seed ☐ Vegetative propagation

If it is also a grafted/budded variety, please provide the name of the rootstock to which the candidate is grafted/budded

5. Stress Status of candidate variety (Tick)

(Tick 'n/a' only for varieties subject to post entry quarantine)

☐ Pathogen/pest free	☐ Not free	☐ n/a
☐ Virus indexed	☐ Not indexed	☐ n/a
☐ Stress free	☐ Not free	☐ n/a

Stress Status of comparator varieties (Tick)

☐ Pathogen/pest free	☐ Not free
☐ Virus indexed	☐ Not indexed
☐ Stress free	☐ Not free

Important: If disease, pest or stress observed, provide a full explanation of the factors and effects on a separate page.

DECLARATION BY ACCREDITED QUALIFIED PERSON

The information in and attached to this form was obtained from: a) a scientifically conducted trial, collated and analysed under my supervision, and faithfully represents the expressions of the characteristics of these varieties; and/or b) a certified overseas test report obtained from a International Union for the Protection of New Varieties of Plants (UPOV) member state with any additional data presented being used to supplement and verify the overseas test report.

A list of my functions as agreed with the applicant/agent is set out in the attached form PBR/00/006. In addition, I certify that this variety is distinct from the most similar varieties of common knowledge and meets the criteria of uniformity and stability appropriate for propagation of the variety.

☐ By ticking this box I declare myself to be the person identified in this form and the information supplied to be true and correct.*

Name (please print)

Date

(DD/MM/YYYY)

*THE PENALTY UNDER SECTION 75(1) FOR MAKING A FALSE STATEMENT IN SUPPORT OF AN APPLICATION IS SIX MONTHS IMPRISONMENT.

Distinctness

Evidence for distinctness is included in the detailed description of the variety and is usually based on a comparative trial grown in Australia. In some cases and subject to conditions*, the detailed description can be drawn from an official overseas test report, obtained from a UPOV member state.

- While preparing a description based on an overseas test report the distinctive characteristics of the variety must be confirmed under Australian conditions and appropriate Australian comparators should be considered and included in the description. Details of how the confirmation was conducted should be included in the 'Conditions' section of the detailed description.

The Qualified Person uses information from the comparative trial (or from the overseas test report) to prepare a Detailed Description of the variety. This detailed description **must** be submitted through the Interactive Variety Description System (IVDS). The IVDS is a secure system which needs individual username and password for access. All PBR accredited Qualified Persons are provided with their individual username and password. Please contact the PBR office if you do not have a username and password. IVDS can be accessed from PBR website at (www.ipaustralia.gov.au/pbr).

The IVDS allows Qualified Persons to complete and submit detailed descriptions online by accessing relevant test guidelines and selecting specific characteristics with their various states of expressions from the options provided. The IVDS incorporates all of the approved UPOV test guidelines (and some additional national equivalents where a UPOV test guideline is not available) in interactive forms with easy to use drop-down menus. Qualified Persons can "build" their own additional/special characteristics if suitable options are not available in the guideline. The IVDS also accepts statistical information.

The IVDS emphasises the use of "grouping characteristics" in selecting comparator varieties. It allows Qualified Persons to lodge the completed variety descriptions with minimum typing.

To claim distinctness, the Qualified Person must nominate one or more characteristic(s) which distinguishes the candidate from the comparator variety(ies). Inbuilt check boxes are provided for this purpose.

There are **step by step on-screen instructions with examples in each step of IVDS**, which will assist the Qualified Person to complete the process smoothly. In addition, PBR Office (PBRO) is ready to help Qualified Persons, if they encounter any problems. Please send an email to pbr@ipaustralia.gov.au if there is a problem in completing the description using IVDS.

Requirement to supply a photograph

A photograph must be provided for publication purposes. A good quality digital image depicting one or more distinguishing features of the candidate variety along with the comparators is preferred. The digital image should be well-labelled to avoid any confusion with the variety names. Please upload your digital photograph in the attachments section within online services (<https://portal.ipaustralia.gov.au/login/>).

In absence of a digital photograph you can also supply a good quality colour transparency or a colour print. In special cases, composite photographs can be produced by the PBR office.

Briefly describe the subject of your photograph. Indicate the position of the candidate and the comparators.

Indicate the distinct characters of the candidate variety that can be observed in the photograph.

Uniformity

Each candidate variety must be uniform. A variety is taken to be uniform, if subject to the variation that may be expected from the particular features of its propagation, it is uniform in its distinctive characteristics. For many species the level of uniformity required is specified in the relevant UPOV Technical Guideline (UPOV Technical guidelines are available at (www.upov.int/en/publications/tg-rom/index.html)).

Observed characteristics

For observed characteristics (ie not measured characteristics), uniformity is usually assessed using the off-type method. Qualified Persons should submit information recording the number of off-types (ie number of plants or samples which have a state of expression different from that claimed for the candidate) for the relevant distinctive characteristics. For example the candidate variety might be distinctively red flowered but occasionally there is a yellow flower (in the example below, one yellow flower in each ten flowers sampled).

*Please contact the PBR office to discuss any detailed requirements

OFF TYPE METHOD TABLE

Characteristic	Normal state for candidate	Total number of plants/samples assessed for this characteristic	Total number of off-types for this characteristic	Abnormal expressions observed
----------------	----------------------------	---	---	-------------------------------

Example:
Flower colour

Red

10

1

Yellow

Requirement to supply uniformity information for each distinct characteristic

Usually off-type or relative variance data must be provided for each distinctive characteristic claimed for the candidate variety. However, where the Qualified Person has not recorded any off-types for distinctive characteristics assessed by observation, then a statement to that effect can be made by checking the box (see under) in lieu of completing the off-type data table. For distinctive characteristics assessed by measurement, relative variance information should always be provided, (see under).

☐ No off-types have been recorded for any of the distinctive characteristics of the candidate variety assessed by observation.

Measured characteristics

When assessing and recording uniformity for measured characteristics (where it is often difficult to clearly identify what is or is not an off-type), Qualified Persons can use the relative variance method. Here, the variance for a measured distinctive characteristic of the candidate is compared with the mean variance of the comparator varieties for the same characteristic.

Using the following table, for each distinctive measured characteristic, calculate the "combined mean variance" by averaging the individual variances of the comparator varieties. Then calculate the "variance ratio" by dividing the variance of the candidate by the combined mean variance of the comparators (see example). All measured characteristics used to show distinctness must be included in this table unless otherwise agreed with the PBRO. **The table may need to be expanded for trials with a large number of comparators or where the candidate has many distinctive characteristics.**

continue on Page 4 of 5 for Relative Variance Table

RELATIVE VARIANCE TABLE

Characteristic	Variance of candidate variety	Variance of comparator variety	Variance of comparator variety	Variance of comparator variety	Variance of comparator variety	Variance of reference variety	Combined mean variances of comparator varieties	Ratio candidate/ mean of comparators
<i>Example:</i> <i>Plant: height (cm)</i>	5.1	6.5	5.5	4.3	5.3	6.2	5.56	0.917

Stability

A variety is taken to be stable if its distinctive characteristics remain unchanged after repeated propagation. There is no need to provide stability data for comparator varieties.

Stability - for candidate varieties maintained by seed

Plants grown from a minimum of two seed generations of the candidate variety should be so alike that they could not be declared distinct from each other for any characteristic used to show distinctness of the candidate variety from the comparator or varieties.

- 'state' refers to the state of expression of a characteristic recorded in words
- for observed characteristics (ie not measured characteristics), leave columns 4 and 5 blank

STABILITY TABLE

Characteristic	Mean or state Generation 1	for	Mean or state Generation 2	for	Difference between the means	LSD* (P ≤ 0.01) (measured characteristics only)	Same (S) or Different (D)?
<i>Example:</i> <i>Plant: height (cm)</i>	127.1		130.2		3.1	3.5	S

*Least Significant Difference (LSD) test preferred though other appropriate statistical tests can also be used.

Stability - for candidate varieties maintained by vegetative means

Where no instability between generations for distinctive characteristics has been observed, then it is generally sufficient for the Qualified Person to make a statement to that effect by checking the box (see under) in lieu of completing a stability table.

☐ The distinctive characteristics of the candidate variety are stable (ie have remained unchanged) after repeated propagation.

Where instability of distinctive characteristics is present in a vegetatively propagated candidate variety, the Qualified Person will need to contact the PBRO.

Checklist of Attachments - Part 2 Application

Have you included the following?

- ☐ One completed original Part 2 Application form (PBR/00/002) for Plant Breeder's Rights
- ☐ A completed Certification by a Qualified Person form (PBR/00/006)
- ☐ A completed Confirmation of submission of propagating material to a genetic resource centre form (PBR/00/009)
- ☐ Has evidence of distinctness been submitted via the online Interactive Variety Description System (IVDS)?
- ☐ Photograph or photographs showing the distinguishing characteristics of the new variety
- ☐ Have ALL questions been answered?
- ☐ Has the Qualified Person completed the declaration on page 1 of this form?

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