



# UNIFORMITY ASSESSMENT FOR MAIZE IN VIETNAM

☺ PHAM THAI HA, PVPO, DCP, MARD

☎ Email: [hapt.tt@mard.gov.vn](mailto:hapt.tt@mard.gov.vn)

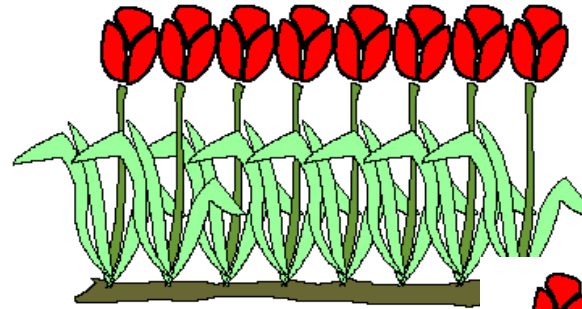


Ha Noi, 25<sup>th</sup> February 2021



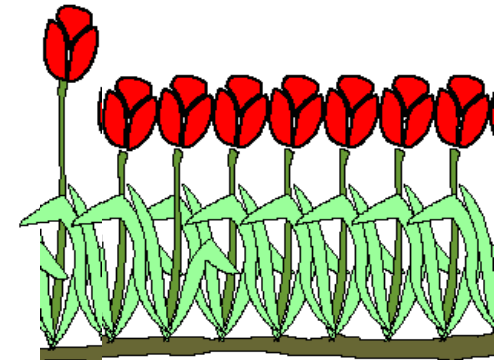
# Uniformity

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



A uniform variety

Non uniform



# Introduction

- The variation in the expression of relevant characteristics within varieties is the basis for the assessment of uniformity.
- The level of variation due to the environment depends on the interaction between individual plants and the environment and is influenced by **the type of expression of the characteristic**.
- The genetic component is mainly influenced by **the features of propagation**.

### **Type of expression of the characteristic**

- For QN and PQ characteristics, the level of variation due to the environment can differ from species to species and from characteristic to characteristic.
- The states of expression of qualitative characteristics are not influenced by the environment

## Features of propagation of the variety

With regard to genetic variation and the particular features of propagation of a variety:

- (a) within vegetatively propagated and truly self-pollinated varieties: Variation in the expression of characteristics within such varieties should result, predominantly, from environmental influences;
- (b) within mainly self-pollinated varieties, a low level of genetic variation caused by some cross pollination is accepted, but variation in the expression of characteristics within such varieties should result, predominantly, from environmental influences. More variation may be tolerated within mainly self-pollinated varieties than for vegetatively propagated and truly self-pollinated varieties;

## Features of propagation of the variety

(c) within cross-pollinated varieties (including synthetic varieties): Variation in the expression of characteristics within such varieties results from both genetic and environmental components. The overall level of variation is, therefore, generally higher within cross-pollinated and synthetic varieties than for self pollinated and vegetatively propagated varieties;

(d) genetic variation within hybrid varieties depends on the type of hybrid (single- or multiplecross), the level of genetic variation in the parental lines (inbred lines or others) and the system for hybrid seed production (mechanical emasculation, system of male sterility etc.). The tolerance limits for uniformity of hybrid varieties are set according to the specific situation resulting from genetic and environmental influences on the variation in the expression of characteristics.

## **Uniformity assessment for maize**

- **Off-type approach**
- **Standard deviations approach**

## Uniformity assessment for maize

### Off-type approach

- Normally, for all QN, QL, PQ characteristics, off-types are determined by visual assessment
- In some cases, measurements may be taken from individual plants in order to assess off-types for QN characteristics (plant: length)



## Uniformity assessment for maize

### Standard deviations approach

for quantitative characteristics: visual observation or measurements:

- (a) visual observations: quicker and cheaper, based on the expert's judgement, visual observations are appropriate if the resultant data fulfill the conditions for calculation of the mean and standard deviation;
- (b) measurements may be required in order to provide the appropriate precision for the assessment of variation.

## UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

1. Determination of Off-types by visual assessment relevant aspects:
  - (a) the standard for distinctness between a candidate variety and any other varieties, taking into consideration the particular features of its propagation; and
  - (b) the expression of any characteristic of the whole or part of the plant used in the testing of distinctness



## UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

### Guidance for determining Off-types

- The same principles used for the determination of distinctness between varieties
- The DUS examiner need to have a good level of experience within the genus or species concerned, or within a similar genus or species.
- Taking into consideration the particular features of its propagation
- The genetic causes of such atypical expression include mutations, chimeras and transposons.



## UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

### 2. Acceptable number of Off-types

- Inbred lines and single hybrids: a population standard of 3% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 40 plants, 3 off-types are allowed (The “population standard” can be expressed as the maximum percentage of off-types to be accepted if all individuals of the variety could be examined. The “acceptance probability” is the minimum probability of accepting as uniform a variety with the population standard of off-types)



## UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

### 2. Acceptable number of Off-types

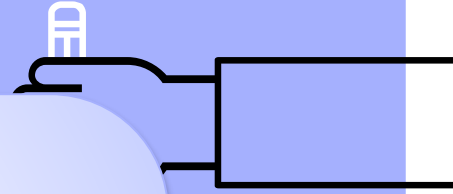
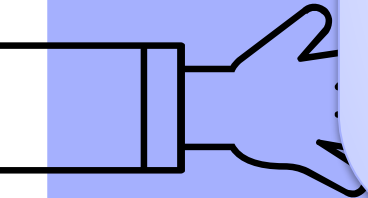
- For three-way cross hybrids, double cross hybrids and open-pollinated varieties, the variability within the variety should not exceed the variability of comparable varieties already known.
- For open-pollinated varieties: In some cases, in particular for QL and PQ characteristics, the off-type procedure is appropriate. The number of off-types of a candidate variety should not significantly exceed the number found in comparable varieties already known.



# UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

## 2. Acceptable number of Off-types

Note: Comparable varieties are varieties of the same type within the same or a closely related species that have been previously examined and considered to be sufficiently uniform.



## UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

3. Plants which are not considered as Off-types external factors which may cause atypical expression include:

- positional effects: light or temperature (e.g. due to different positions in the plot); variations in fertility,
- infection by disease;
- pest infestation;
- physical damage (e.g. due to environmental conditions (sun, wind, precipitation, frost); chemical application (e.g. herbicide scorch) etc. ;
- lack of pollination



## UNIFORMITY ASSESSMENT ON THE BASIS OF STANDARD DEVIATIONS

- The acceptable level of variation calculated from individual plant observations.
- Use the Combined Over Years Uniformity (COYU) method (TGP/8)
- VN cases





# THANKS!

## **Any questions?**

You can find me at:

Hapt.tt@mard.gov.vn

Tel: 0902174184

Website: [pvpo.mard.gov.vn](http://pvpo.mard.gov.vn)



**THANK YOU VERY MUCH  
FOR YOUR ATTENTION!**