

Technical Working Party on Testing Methods and Techniques

TWM/3/5

Third Session
Beijing, China, April 28 to May 1, 2025

Original: English
Date: March 26, 2025

COYU DEVELOPMENT UPDATE 2025

Document prepared by experts from the United Kingdom

Disclaimer: this document does not represent UPOV policies or guidance

The annex to this document contains a copy of a presentation “COYU Development Update 2025”, to be made by experts from the United Kingdom, at the third session of the TWM.

[Annex follows]

COYU Development Update 2025

Adrian Roberts, David Nutter, Tess Vernon,
Trudyann Kelly, Haidee Philpott

United Kingdom



afbi

AGRI-FOOD
& BIOSCIENCES
INSTITUTE



1

1

Overview

- A recap on COYU and the proposed change
- Development timeline
- Update on Current state
- Access to software

2

2

A recap on COYU

Combined Over-Year Uniformity criterion (COYU)

A method for determining uniformity of candidate variety

- Mostly used for agricultural crops, but also some vegetables
- Characteristic-by-characteristic
- Quantitative characteristics, measured on single plants
- Works over two or more cycles
- More information in document TGP/8

An improved version of COYU, called COYU with splines (COYUs), has been produced

- [Here we discuss progress on implementing COYUs](#)

3

3

COYU key concepts

Compares uniformity with similar varieties

- TG/1/3 General Introduction
6.4.2.2.1 For measured characteristics, the acceptable level of variation for the variety should not significantly exceed the level of variation found in comparable varieties already known. UPOV has proposed several statistical methods for dealing with uniformity in measured quantitative characteristics. One method, which takes into account variations between years, is the Combined Over Years Uniformity (COYU) method.

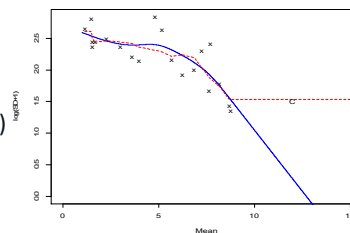
Measures uniformity through standard deviation (SD) of measurements within plots

- $\text{Log}(\text{SD}+1)$

Adjusts for any relationship between variability (SD) and level of expression (mean)

- This is main element that is changed

Moving-average → Spline

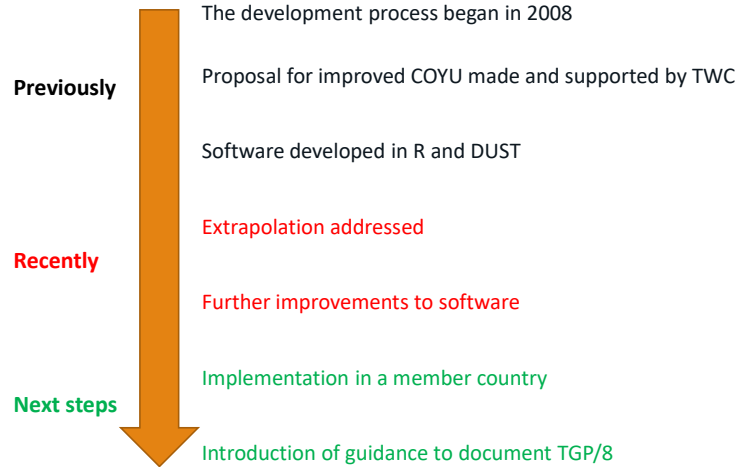


See TWM/2/3 for more information on COYUs, including software and extrapolation

4

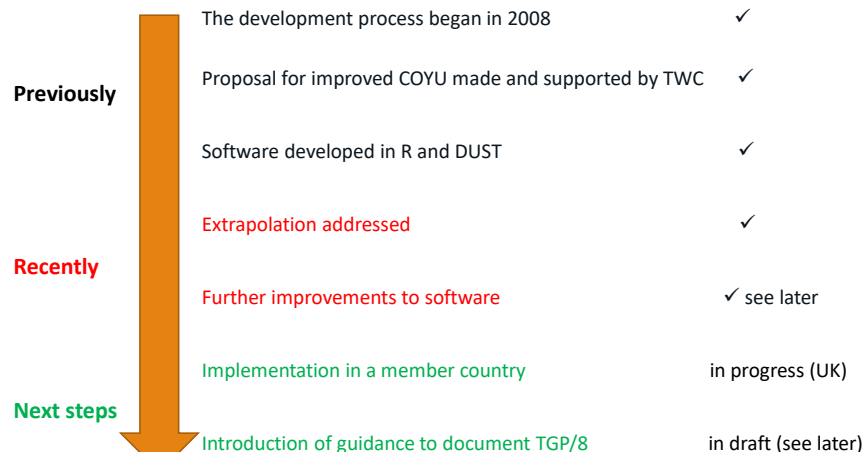
4

Development timeline



5

Development timeline



6

Update 2025

Software

- COYUs is implemented in R and DUST9NT
- This year, DUST9NT has been improved:
 - Improved outputs from the new COYUs module
 - A new installation process for DUST9NT to modern standards
- The new version of DUST9NT has been tested by UPOV members
 - Thanks to the UK, Netherlands (Kingdom of), and Finland!
 - All works correctly apart from the EXCEL conversion function
 - This works in the UK but not Netherlands (Kingdom of) or Finland
- We aim to resolve this issue and then release the new version to UPOV members

Extrapolation

- Extrapolation is when a candidate has a higher or lower mean score than all of the reference varieties
 - The adjustment made by COYU is less valid
- This issue existed before COYUs, for COYU
 - But not recognised
- The UK statisticians have drafted a guideline on extrapolation
 - Being considered in the UK
- We can present this to the next session of the TWM

7

7

Update 2025

Implementation

- The UK is starting the process of implementation in DUS decisions
- We can report on this in a future TWM session

Guidance

- Draft guidance has previously been presented to TWC (see TWC/38/6 https://www.upov.int/edocs/mdocs/upov/en/twc_38/twc_38_6.pdf)
- At the right time, this text can be reviewed before inclusion in document TGP/8

8

8

Accessing software for COYUs

DUST9NT

- The current available version of DUST9NT does not include COYUs yet
- It is available from AFBI at <https://www.afbini.gov.uk/articles/distinctness-uniformity-and-stability-trials-dust-software>
- The new version with COYUs will be made available from AFBI once issue corrected
- If you wish to try the current test version, contact Adrian Roberts (adrian.roberts@bioss.ac.uk)

R

- A package has been produced for the free statistical programming software R
- This includes functions to carry out COYUs
- Suitable for those wanting to integrate into their own systems
- The COYU package is freely available, including source code: <https://github.com/BiomathematicsAndStatisticsScotland/coyus>

9

9

Thank you for your attention!



Department
for Environment,
Food & Rural Affairs



Animal &
Plant Health
Agency



afbi

AGRI-FOOD
& BIOSCIENCES
INSTITUTE



10

10