UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY FOR VEGETABLES

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

REVISED ADDENDUM TO

REVISION OF DOCUMENT TGP/10: NEW SECTION: ASSESSING UNIFORMITY BY OFF-TYPES ON THE BASIS OF MORE THAN ONE GROWING CYCLE OR ON THE BASIS OF SUB-SAMPLES

Document prepared by an expert from France

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The Annex to this document contains a copy of the presentation "Practical experience of assessing Uniformity assessment by off-types Reject after the 1st cycle on the official DUS seed lot" made by an expert from France at the fiftieth session of the Technical Working Party for Vegetables (TWV).

[Annex follows]

ANNEX

PRACTICAL EXPERIENCE OF ASSESSING - UNIFORMITY ASSESSMENT BY OFF-TYPES
REJECT AFTER THE FIRST CYCLE ON THE OFFICIAL DUS SEED LOT
BY AN EXPERT FROM FRANCE

U assement - Resulats

– **80 observed plants**
– **7 clear off-type plants**, showing the same phentoypical typology

● METHOD OF UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

  ▪ **Population Standard = 2%, Acceptance Probability ≥95%**

n=sample size	k=maximum number of off-types
1 to 2	0
3 to 18	1
19 to 41	2
42 to 69	3
70 to 99 (80 plants)	ONLY 4 off-type tolerated
100 to 131	5
132 to 165	6
166 to 200	7
201 to 236	8
237 to 273	9

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U assessment – Reject of a variety for lack of Uniformity after the 1st cycle

TGP/8/2: PART II : 8 :
THE METHOD OF UNIFORMITY ASSESSMENT ON THE BASIS OF OFF-TYPES

8.1.7 Method for more than one single test (year)
8.1.7.1 Introduction
[...]
(b) Use the result of the first year to see if the data suggests a clear decision (reject or accept). If the decision is not clear then proceed with the second year and decide after the second year. (A two-stage test).
[...]
8.1.7.4 Sequential tests
The two-stage test mentioned above is a type of sequential test where the result of the first stage determines whether the test needs to be continued for a second stage.

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U assement – Reject of a variety for lack of Uniformity after the 1st cycle

- **Enforcement of the Decision recorded in the minutes of the French Registration Authority (2015)**
  - case of a species studied
    - in potentielly two cycles with the same DUS seed sample
    - whose uniformity is assessed on the basis of the off- types number

    - if the number of HT after the 1st cycle is "**well above**" the norm,
    - ➢ **possibility** to reject from the 1st cycle .

    -FR meaning of "well above" the norm
  - *above the norm of a **simulated second DUS trial**,*
  - *with the simulated **strength of a single trial***
  - *which corresponds to a **doubled number of observed plants**.*

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U assement – Some theoretical rules…

*The use of **INDEPENDANT GROWING CYCLES** is strategic to assess the Distinction of a application and define its closest example varieties. We need to identify the interaction G x E, incuded in the observed Phenotype, at an identified place and date.*

- The assement of Uniformity (*when it is not RELATIVE uniformity*) based on the **counting of the Off-types**, has no link with the Environement but to the expression of a different Genotype. An « easy » way to reach a « better » uniformity assessment is to act on the **number of assessed plants**, with as good as possible **statistical models.**

- The use of the **statistical tables** included in the **TGP/8/2** , defined on the base of a **Population standard** and **Acceptance probabitility**, allows to take a decision regarding the Uniformity of a **SINGLE sample**, which has to be representative of a variety in its holeness.

- The interest here, is **NOT** in the **REPETETION** of an other cycle (*which is not statistically independent, because realised on the same seed sample*), **BUT** in assessing the Uniformity in a **THEORETICAL BIGGER SAMPLE**, potentially more representative of the variety.

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U assement - Conclusions

- **Theoretical sample size = twice the size of the 1st cycle**
  - In this case = 80 plants x 2 = 160 plants

- Number of tolerated off-type in this case
  - **Population Standard = 2%, Acceptance Probability ≥95%**

n=sample size	k=maximum number of off-types
132 to 165 (160 theoretical plants)	6

➤ Even in this **theoretical circumstances**, the actual number of off-types (7 plants) **is higher than** the tolerated threshold (6 plants).

➤ So, at this stage, **a second DUS cycle** *(even without off-types)* would have no impact on the conclusion. T**he variety can be rejected for lack of uniformity.**

➤ *if the applicant **appealed this decision**, a 2nd cycle could be completed possibly a third cycle ...).*

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Example of oilseed rape – 2014 data

Candidates : parental lines (thresold 2%/ 95%) + hybrid varieties (thresold 10%/ 95%)

182 varieties were in 1st year of study, among them, **170 were uniform** and **12** were concerned by uniformity problems:

Type	Plants nb cycle 1	Nb Off-types 1st cycle	Thresold 1st cycle	Plants nb cycle 2	Nb Off-types 2nd cycle	Thresold 2nd cycle	Σ plants nb 1st and 2nd cycles	Σ off-types 1st and 2nd cycle	Threshold (Σ plants nb 1st and 2nd cycles)	Approach 1 FR current rules	Approach 3: FR former rules
HYB	300	55	39	282	55	37	582	110	70	Refusal for lack of U on the basis of 2 independant cycles	Refusal for lack of U on the basis of 2 combined cycles
HYB	301	50	39	298	71	39	599	121	72		
HYB	351	46	45	311	50	40	662	96	79		
LI	337	29	11	225	25	8	562	54	17		
LI	338	21	11	233	14	8	571	35	17		
LI		Global heterogeneity			Global heterogeneity			***	***		
HYB	263	43	35	171	18	24	434	61	54	3rd cycle	
HYB	330	37	42	286	50	37	616	87	74		
LI	315	10	11	252	13	9	567	23	17		
LI	356	12	12	276	11	10	632	23	19		
LI	298	5	10	237	11	9	535	16	16	Uniform	
LI	287	3	10	183	9	7	470	12	15		

- 6 varieties out of 182 : **different decision** according the **chosen approach**.after 2nd c

- The others (176 var.) : **same decision** (6 non-uniform and 170 uniform varieties)

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Example of oilseed rape – 2014 data: after 1st cycle?

Type	Plants nb (cycle1)	Theoretical Plants nb (cycle1 x 2)	Nb observed Off-types 1st cycle	Thresold for (Plants nb cycle1 x 2)	Conclusion AFTER 1st cycle	Approach 1 FR current rules	Approach 3: FR former rules
HYB	300	600	55	72	2nd cycle	Refusal for lack of U on the basis of 2 independant cycles	Refusal for lack of U on the basis of 2 combined cycles
HYB	301	602	50	73	2nd cycle		
HYB	351	702	46	83	2nd cycle		
LI	337	674	29	20	Refusal for lack of U		
LI	338	676	21	20	Refusal for lack of U		
LI	330	660	Global heterogeneity	19	2nd cycle		
HYB	263	526	43	64	2nd cycle	3rd cycle	
HYB	330	660	37	79	2nd cycle		
LI	315	630	10	19	2nd cycle		
LI	356	712	12	21	2nd cycle		
LI	298	596	5	18	2nd cycle		Uniform
LI	287	574	3	17	2nd cycle		

● **2 possible refusals after the 1st cycle.**

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Example of oilseed rape – 2015 data: after 1st cycle?

195 varieties were in 1st year of study, among them, **179 were uniform** and, **16** were concerned by **uniformity problems**:

Type	Plants nb cycle 1	Nb Off-types 1st cycle	Thresold 1st cycle	Plants nb cycle 2	Nb Off-types 2nd cycle	Thresold 2nd cycle	Σ plants nb 1st and 2nd cycles	Σ off-types 1st and 2nd cycle	Threshold (Σ plants nb 1st and 2nd)	Approach 1 FR current rules	Approach 3: FR former rules
HYB	228	45	30	144	30	21	372	75	47	Refusal for lack of U on the basis of 2 independant cycles	Refusal for lack of U on the basis of 2 combined cycles
HYB	273	48	36	195	29	27	468	77	58		
LI	234	10	8	171	10	7	405	20	13		
LI	247	12	9	201	9	8	448	21	14		
LI	244	13	9	175	8	7	419	21	13		
LI		Global heterogeneity			Global heterogeneity			***	***		
LI	272	39	9	202	25	8	474	64	15		
LI	213	14	8	176	10	7	389	24	13		
HYB	301	33	39	143	24	20	444	57	55	3rd cycle	
HYB	283	39	37	186	22	26	469	61	58		
LI	230	19	8	165	1	6	395	20	13		
LI	319	12	11	208	6	8	527	18	16		
LI	257	7	9	212	10	8	469	17	15		
HYB	275	34	36	160	23	22	435	57	54		
HYB	289	14	37	138	21	20	427	35	53		Uniform
HYB	259	26	34	217	30	29	476	56	59		

- 8 varieties out of 195 : a different answer according the chosen approach.
- For the others (187 out of 195) : same decision (8 non uniform, 179 uniform varieties)

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Example of oilseed rape – 2015 data: after 1st cycle?

Type	Plants nb (cycle1)	Theoretical Plants nb (cycle1 x 2)	Nb observed Off-types 1st cycle	Thresold for (Plants nb cycle1 x 2)	Conclusion AFTER 1st cycle	Approach 1 FR current rules	Approach 3: FR former rules
HYB	228	456	45	56	2nd cycle		
HYB	273	546	48	66	2nd cycle		
LI	234	468	10	15	2nd cycle	Refusal for lack of U on the basis of 2 independant cycles	
LI	247	494	12	15	2nd cycle		
LI	244	488	13	15	2nd cycle		
LI	275	550	Global heterogeneity	17	2nd cycle		Refusal for lack of U on the basis of 2 combined cycles
LI	272	544	39	16	Refusal for lack of U		
LI	213	426	14	14	2nd cycle		
HYB	301	602	33	73	2nd cycle		
HYB	283	566	39	69	2nd cycle		
LI	230	460	19	14	Refusal for lack of U	3rd cycle	
LI	319	638	12	19	2nd cycle		
LI	257	514	7	16	2nd cycle		
HYB	275	550	34	67	2nd cycle		
HYB	289	578	14	70	2nd cycle		Uniform
HYB	259	518	26	63	2nd cycle		

- 2 possible refusals after the 1st cycle.

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Thank you
for attention

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[End of Annex and of document]