

**Technical Working Party for Vegetables**

Fifty-Eighth Session

Virtual meeting, April 22 to 25, 2024

TWV/58/4-TWA/53/4

**Original:** English**Date:** March 22, 2024**Technical Working Party for Agricultural Crops**

Fifty-Third Session

Virtual meeting, May 27 to 30, 2024

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**PARTIAL REVISION OF THE TEST GUIDELINES FOR MAIZE***Document prepared by an expert from the Netherlands**Disclaimer: this document does not represent UPOV policies or guidance*

1. The purpose of this document is to present a proposal for a partial revision of the Test Guidelines for Maize (document TG/2/7 Rev.).
2. The Technical Working Party for Vegetables (TWV), at its fifty-seventh session<sup>1</sup>, and The Technical Working Party for Agricultural Crops (TWA), at its fifty-second session<sup>2</sup>, considered a proposal for a partial revision of the Test Guidelines for Maize (*Zea mays* L.) and agreed to continue discussions on the inclusion of new characteristics at the fifty-eighth session<sup>3</sup> of the TWV and the fifty-third session<sup>4</sup> of the TWA (see documents TWV/57/26 Corr. "Report", paragraphs 80 and TWA/52/4 "Report", paragraphs 52).
3. The following changes are proposed:
  - (a) Revision of characteristics 24.1 and 24.2 "Plant: length" (there is a need to separate inbred lines from hybrids varieties for this characteristic. Plants of inbred lines are always clearly shorter than hybrids ones, therefore two different scales are needed).
  - (b) Addition of new characteristics:
    - Tassel: sterility of male flowers
    - Ear: secondary color of grain
    - Grain: type of sweetness
  - (c) Changes to the Technical Questionnaire
4. The proposed changes are presented below in highlight and underline (insertion) and ~~striketrough~~ (deletion).

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<sup>1</sup> organized from May 1 to 5, 2023 in Antalya, Türkiye

<sup>2</sup> Virtual meeting, from May 22 to 26, 2023

<sup>3</sup> Virtual meeting, from April 22 to 25, 2024

<sup>4</sup> Virtual meeting, from May 27 to 30, 2024

Proposed change (a) revision of characteristics 24.1 and 24.2 "Plant: length"

*Current wording*

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielsorten/ Variedades ejemplo	Note/ Nota
<b>24.1</b> (*) (+)	<b>MS</b> 75-85	<u>Only inbred lines and varieties with ear type of grain: sweet or pop:</u> Plant: length	<u>Seulement pour les lignées endogames et les variétés avec type de grain de l'épi: doux ou à éclater:</u> Plante: longueur	<u>Nur Inzuchtlinien und Sorten mit Kolben:</u> <u>Kornotyp: Zuckermais oder Popcorn:</u> Pflanze: Länge	<u>Sólo variedades endógamas y variedades con mazorca con tipo de grano: dulce o palomero:</u> Planta: longitud	
<b>QN</b>	very short	très courte	sehr kurz	muy corta	F7	1
	short	courte	kurz	corta	Spirit (SC), W117	3
	medium	moyenne	mittel	media	F244, Puma (SC)	5
	long	longue	lang	larga	Royalty (SC), WD36	7
	very long	très longue	sehr lang	muy larga	Enterprise (SC)	9
<b>24.2</b> (*) (+)	<b>MS</b> 75-85	<u>Only hybrids and open-pollinated varieties, excluding varieties with ear type of grain: sweet or pop:</u> Plant: length	<u>Seulement pour les hybrides et les variétés à fécondation libre, à l'exclusion des variétés avec type de grain de l'épi: doux ou à éclater:</u> Plante: longueur	<u>Nur Hybriden und freiabblühende Sorten, ohne Sorten mit Kolben:</u> <u>Kornotyp: Zuckermais oder Popcorn:</u> Pflanze: Länge	<u>Sólo híbridos y variedades de polinización libre, excepto variedades con mazorca con tipo de grano: dulce o palomero:</u> Planta: longitud	
<b>QN</b>	very short	très courte	sehr kurz	muy corta		1
	short	courte	kurz	corta	PR39D23	3
	medium	moyenne	mittel	media	PR37Y12	5
	long	longue	lang	larga	DKC5166	7
	very long	très longue	sehr lang	muy larga		9

Proposed new wording

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
24.1 (*) (+)	<b>MS</b> 75-85	<u>Only inbred lines and varieties with ear type of grain: sweet or pop:</u> Plant: length	<u>Seulement pour les lignées endogames et les variétés avec type de grain de l'épi: doux ou à éclater:</u> Plante: longueur	<u>Nur Inzuchtlinien und Sorten mit Kolben:</u> <u>Korntyp: Zuckermais oder Popcorn:</u> Pflanze: Länge	<u>Sólo variedades endógamas y variedades con mazorca con tipo de grano: dulce o palomero:</u> Planta: longitud	
<b>QN</b>	very short	très courte	sehr kurz	muy corta	F7	1
	short	courte	kurz	corta	<u>Spirit (SC)</u> , W117	3
	medium	moyenne	mittel	media	F244, <u>Puma (SC)</u>	5
	long	longue	lang	larga	<u>Royalty (SC)</u> , WD36	7
	very long	très longue	sehr lang	muy larga	<u>Enterprise (SC)</u>	9
24.2 (*) (+)	<b>MS</b> 75-85	<u>Only hybrids and open-pollinated varieties, excluding varieties with ear type of grain: sweet or pop:</u> Plant: length	<u>Seulement pour les hybrides et les variétés à fécondation libre, à l'exclusion des variétés avec type de grain de l'épi: doux ou à éclater:</u> Plante: longueur	<u>Nur Hybriden und freiabblühende Sorten, ohne Sorten mit Kolben:</u> <u>Korntyp: Zuckermais oder Popcorn:</u> Pflanze: Länge	<u>Sólo híbridos y variedades de polinización libre, excepto variedades con mazorca con tipo de grano: dulce o palomero:</u> Planta: longitud	
<b>QN</b>	very short	très courte	sehr kurz	muy corta		1
	short	courte	kurz	corta	PR39D23, <u>Spirit (SC)</u>	3
	medium	moyenne	mittel	media	PR37Y12, <u>Puma (SC)</u>	5
	long	longue	lang	larga	DKC5166, <u>Royalty (SC)</u>	7
	very long	très longue	sehr lang	muy larga	<u>Enterprise (SC)</u>	9

Addition of 3 new characteristics

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>NEW (after 8.) (*) (+)</b>	<b>MS/VS 65-69</b>	<b>Tassel: sterility of male flowers</b>				
<b>QN</b>	absent				Tasty Sweet (SC)	1
	partially present				GH4927S (SC)	2
	totally present					3
<b>NEW (after 35.) (*) (+)</b>	<b>VG 75-79</b>	<b><u>Only varieties with ear type sweet:</u> Grain: type of sweetness</b>				
<b>QL</b>	sweet				Golden Bantam (SC), Jubilee (SC), Royalty (SC), My Fair Lady (SC)	1
	extra sweet				Tasty Sweet (SC), SSActivate (SC), Glacial (SC)	2
<b>NEW (after 38.) (*) (+)</b>	<b>VG 92-93</b>	<b><u>Only for sweet, pop or waxy varieties with Ear: number of colors of grains: two:</u> Ear: secondary color of top of grain</b>				
<b>QL</b>	yellow					1
	white				SSActivate (SC), Wild Violet (SC)	2
	purple				Sugar Purple (SC)	3

Ad. NEW (after 8.): Tassel: sterility of male flowers

Observations should be made on anthers of fresh, fully open flowers.

Male sterile flowers do not have pollen.

A partially male sterile variety consists of 50% plants with male sterile flowers and 50% of plants with male fertile flowers. This segregation is a result of the method of production of the variety and behaves in the predicted manner.

Absent = > 70% of the plants fertile (e.g. open-pollinated varieties or hybrid varieties produced without cytoplasmic male sterility).

Partial = 30% to 70% of the plants fertile (hybrid varieties produced with approximately 50% of plants with male sterile plasma and 50% of plants with male fertile plasma).

Total = < 30% of the plants fertile (hybrid varieties produced with 100% cytoplasmic male sterility).

Ad. NEW (after 35.): Only varieties with ear type sweet: Grain: type of sweetness

In sweet corn different types exist with different genes for sugar content. These are sugary (su1), shrunken 2 (sh2), sugary enhancer (se), brittle 1 (bt) and recently also combinations of these genes like synergistic, triplesweet and augmented sweet.

See e.g. [https://www.academia.edu/25620796/Breeding\\_for\\_Increased\\_Sweetness\\_in\\_Sweet\\_Corn](https://www.academia.edu/25620796/Breeding_for_Increased_Sweetness_in_Sweet_Corn)

The different genes have different effects, but it can be tasted if varieties taste sweet or extra sweet.

Extra sweet varieties taste much sweeter than sweet varieties.

In general varieties with the su1 or se gene taste sweet, whilst varieties with the sh2 gene taste extra sweet.

Also varieties with combinations like synergistic, triplesweet and augmented sweet have an extra sweet taste.

It should be noted that tasting should be done shortly after harvest, as the sugar will be converted into starch and the extra sweet taste will disappear.

Ad. NEW (after 38.): Only for sweet, pop or waxy varieties with Ear: number of colors of grains: two: Ear: secondary color of top of grain

The color with the largest surface area is the main color; the one with the second largest area is the secondary color.

In cases where the areas of the main and secondary color are too similar to reliably decide which color has the largest area, [the darkest color] is considered to be the main color.

Note: caution should be taken if no full isolation of varieties with different colors in the trial is practiced. Cross pollination from other samples can in that case cause small amounts of grain with a different color which do not belong to the variety. Hence the variety is not a variety with two colors (bicolor variety) of itself!

Revision of the Technical Questionnaire

*Section 5 “Characteristics of the variety to be indicated”*

The following new characteristics are proposed for inclusion in Section 5 of the Technical Questionnaire:

- NEW (after 35.): Only varieties with ear type sweet: Grain: type of sweetness
- NEW (after 38.): Only for sweet, pop or waxy varieties with Ear: number of colors of grains: two: Ear: secondary color of top of grain

*Section 7.8 “Other Information”*

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
7.3 Other information		
<del>Sweetcorn varieties only: type</del>		
<u>Only varieties with ear type sweet: Sweetness genes present:</u>		
normal sweet (su1)	Jubilee (SC)	1 [ ]
sugary enhanced (se)	Gyöngymazsola (SC)	2 [ ]
<del>super</del> <u>extra</u> sweet (sh2)	Zenith (SC)	3 [ ]
<u>Brittle-1 (bt1)</u>		<u>4</u> [ ]
other (please specify)		<u>4 5</u> [ ]
Other information		

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