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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

SUGARCANE

UPOV code: SACCH

(*Saccharum* L.) *

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Saccharum L.	Sugarcane	Canne à sucre	Zuckerrohr	Caña de azúcar

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.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all vegetatively propagated varieties of *Saccharum* L. of the family *Gramineae (Poaceae)*.

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied from plants which are about 8 to 12 months old.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

12 segments of culm used for vegetative propagation of sugarcane
with 3 buds each, properly packaged to minimize damage to the buds.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

The minimum duration of tests should normally be a single growing cycle.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 All characteristics should be observed on plants aged between 10 to 12 months, in the first vegetative cycle of the crop (from planting to the first harvest).

3.3.3 The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics:

MS: measurement of a number of individual plants or parts of plants

3.4 Test Design

3.4.1 Each test should be designed to result in a total of at least 24 culms, all from different stools, which should be divided between two or more replicates. A stool is a cluster of culms (and their leaves) derived from a single segment of culm used for vegetative propagation of sugarcane. It also includes the underground position of the culms (rhizomes and roots) and is analogous to a single plant.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Number of Plants / Parts of Plants to be Examined

3.5.1 Unless otherwise indicated, all observations for qualitative characteristics should be made on 6 culms or parts taken from 6 culms.

3.5.2 Unless otherwise indicated, all observations for quantitative characteristics should be made on 24 culms or parts taken from each of 24 culms.

3.5.3 Unless otherwise indicated, all observations on single culms should be made on 6 culms or parts taken from each of 6 culms.

3.6 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is

sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.2 Uniformity

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 6 culms 1 off-type is allowed. In the case of a sample size of 24 culms, 1 off-type is allowed.

4.3 Stability

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be tested, either by growing a further generation, or by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness is aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Internode: color where not exposed to sun (characteristic 13)
Gr. 1: yellow
Gr. 2: yellow green
Gr. 3: grey yellow
Gr. 4: grey orange
Gr. 5: grey red
Gr. 6: grey purple

(b) Node: shape of bud, excluding wings (characteristic 21)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

(*) Asterisked characteristic – see Chapter 6.1.2

MS: Measurement of a number of individual plants or parts of plants – see Chapter 3.3.1

(a)-(c) See Explanations on the Table of Characteristics in Chapter 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8.2

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.	**Plant: stool growth habit**	**Plante: port de la souche**	**Pflanze: Wuchstyp der Mutterpflanze**	**Planta: porte de la cepa**		
	erect	dressé	aufrecht	erecto	Q186, Q 121	1
	semi-erect	demi-dressé	halbaufrecht	semierecto	Q96, RB72-454	3
	intermediate	demi-dressé à demi-étalé	mittel	intermedio		5
	semi-prostrate	demi-étalé	halbliegend	semipostrado	H56-752	7
	prostrate	étalé	liegend	postrado		9
2. (*) (+)	**Plant: adherence of leaf sheath**	**Plante: adhérence de la gaine de la feuille**	**Pflanze: Anhaften der Blattscheide**	**Planta: adherencia de la vaina de la hoja**		
	weak	faible	gering	débil	H56-752, Q96	3
	medium	moyenne	mittel	media	Q124, Q186	5
	strong	forte	stark	fuerte	Q120, NC_0 310, Q201	7
3.	**Plant: tillering**	**Plante: tallage**	**Pflanze: Bestockung**	**Planta: macollaje**		
	weak	faible	gering	débil	Q124	3
	medium	moyen	mittel	medio	RB72-454	5
	strong	fort	stark	fuerte	Q138	7
4.	**Plant: number of suckers**	**Plante: nombre de drageons**	**Pflanze: Anzahl Stockausschlag**	**Planta: número de chupones**		
	very few	très faible	sehr wenig	muy pocos	Q117, RB72-454	1
	few	faible	wenig	pocos	Q121	3
	medium	moyen	mittel	medios	BN81-1394	5
	many	fort	viel	muchos		7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	**Plant: leaf canopy**	**Plante: feuillage**	**Pflanze: Blattlaub**	**Planta: follaje**		
	very sparse	très clairsemé	sehr locker	muy abierto	RB72-454	1
	sparse	clairsemé	locker	abierto	H56-752	3
	medium	moyen	mittel	medio	Q96, Q115	5
	dense	dense	dicht	denso		7
6.	**Plant: intensity of green color of leaf canopy**	**Plante: intensité de la couleur verte du feuillage**	**Pflanze: Intensität der Grünfärbung des Blattlaubs**	**Planta: intensidad del color verde del follaje**		
	light	claire	hell	claro		3
	medium	moyenne	mittel	medio		5
	dark	foncée	dunkel	oscuro		7
7. **(+)**	**Culm: height (from the base to the base of the TVD leaf)**	**Tige de canne: hauteur (de la base à la base de la dernière feuille dont l'ochréa est visible)**	**Halm: Höhe (von der Basis bis zur Basis des TVD-Blatts)**	**Tallo: altura (desde la base hasta la base de la hoja TVD)**		
MS	short	courte	kurz	corta	Q117	3
	medium	moyenne	mittel	mediana	Q124, Q138, Q170	5
	long	longue	lang	larga	Q136, RB72-454	7
8. **(+)** **MS**	**Internode: length on the bud side**	**Entre-nœud: longueur du côté du bourgeon**	**Internodium: Länge an der Knospenseite**	**Entrenudo: longitud del lado de la yema**		
(a)	short	court	kurz	corto	Q117	3
	medium	moyen	mittel	mediano	Q138, Q170	5
	long	long	lang	largo	Q124	7
9. **(*)** **(+)** **MS**	**Internode: diameter (as for 8)**	**Entre-nœud: diamètre (comme pour 8)**	**Internodium: Durchmesser (wie für 8)**	**Entrenudo: diámetro (como para 8)**		
(a)	thin	petit	dünn	delgado	Q136	3
	medium	moyen	mittel	medio	Q124, H56-752, Q170	5
	thick	grand	dick	grueso	Q117	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
10. **(*)** **(+)**	**Internode: shape**	**Entre-nœud: forme**	**Internodium: Form**	**Entrenudo: forma**		
(a)	cylindrical	cylindrique	zylindrisch	cilíndrico	Q169, RB72-454	1
	tumescent	renflé	geschwollen	hinchado		2
	bobbin-shaped	en forme de bobine	spulenförmig	abobinado	H56-752	3
	conoidal	conoïde	kegelförmig	conoidal		4
	obconoidal	obconique	verkehrt kegelförmig	conoidal invertido	H60-3802	5
	concave-convex	concave-convexe	konkav-konvex	cóncavo-convexo	Q115	6
11. **(+)**	**Internode: cross-section**	**Entre-nœud: section transversale**	**Internodium: Querschnitt**	**Entrenudo: sección transversal**		
(a)	circular	circulaire	rund	circular	Q121, RB72-454	1
	ovate	ovoïde	eiförmig	ovada	Q96, Q186, Q152	2
12. **(*)** **(+)**	**Internode: color where <u>exposed</u> to sun**	**Entre-nœud: couleur du côté <u>exposé</u> au soleil**	**Internodium: Farbe an den der Sonne <u>ausgesetzten</u> Stellen**	**Entrenudo: color de la parte <u>expuesta</u> al sol**		
(a)	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)		
13. **(*)** **(+)**	**Internode: color where <u>not exposed</u> to sun**	**Entre-nœud: couleur du côté <u>non exposé</u> au soleil**	**Internodium: Farbe an den der Sonne <u>nicht ausgesetzten</u> Stellen**	**Entrenudo: color de la parte <u>no expuesta</u> al sol**		
(a)	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)		

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
14. **(+)**	**Internode: depth of growth crack**	**Entre-nœud: profondeur de la fente de croissance**	**Internodium: Tiefe des Wachstumsrisses**	**Entrenudo: profundidad de la rajadura de crecimiento**		
(a)	absent or very shallow	absente ou très peu profonde	fehlend oder sehr flach	ausente o muy poco profunda	RB72-454, H56-752	1
	shallow	peu profonde	flach	poco profunda	Q124	3
	medium	moyenne	mittel	media	Q121	5
	deep	profonde	tief	profunda	Q179	7
15. **(*)** **(+)**	**Internode: expression of zigzag alignment**	**Entre-nœud: expression de l'alignement en zigzag**	**Internodium: Ausprägung der Zickzackausrichtung**	**Entrenudo: expresión de la alineación en zig zag**		
(a)	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Q124	1
	weak	faible	gering	débil	Q135, Q152	3
	moderate	moyenne	mittel	moderada	Q117	5
	strong	forte	stark	fuerte	H56-752	7
16. **(+)**	**Internode: appearance (rind surface)**	**Entre-nœud: apparence (surface de l'écorce)**	**Internodium: Aussehen (Oberfläche der Schale)**	**Entrenudo: aspecto (superficie de la corteza)**		
(a)	smooth	lisse	glatt	lisa		3
	medium	moyenne	mittel	media		5
	rough (corky)	rugueuse (subéreuse)	rauh (korkartig)	rugosa (suberosa)		7
17. **(+)**	**Internode: waxiness**	**Entre-nœud: pruine**	**Internodium: Wachsschicht**	**Entrenudo: cerosidad**		
(a)	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Q179	1
	weak	faible	gering	débil	Q138	3
	medium	moyenne	mittel	media	Q121, RB72-454	5
	strong	forte	stark	fuerte	H56-752, Q117	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. **(+)**	**Node: width of root band**	**Nœud: largeur de la zone radiculaire**	**Nodium: Breite der Wurzelzone**	**Nudo: anchura de la zona radicular**		
(a)	narrow	étroite	schmal	estrecha	Q121	3
	medium	moyenne	mittel	mediana	Q124	5
	broad	large	breit	ancha	H56-752	7
19. **(+)**	**Node: color of root band**	**Nœud: couleur de la zone radiculaire**	**Nodium: Farbe der Wurzelzone**	**Nudo: color de la zona radicular**		
(a)	RHS Colour Chart (indicate reference number)	Code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)		
20. **(+)**	**Node: wax ring**	**Nœud: zone cireuse**	**Nodium: Wachsring**	**Nudo: anillo ceroso**		
(a)	absent or very narrow	absente ou très étroite	fehlend oder sehr schmal	ausente o muy estrecho	Q179	1
	narrow	étroite	schmal	estrecho		3
	medium	moyenne	mittel	mediano	Q113, Q96, RB72-454	5
	wide	large	breit	ancho	Q115, Q138	7
	very wide	très large	sehr breit	muy ancho		9
21. **(*)** **(+)**	**Node: shape of bud, excluding wings**	**Nœud: forme du bourgeon, à l'exclusion des ailes**	**Nodium: Form der Knospe, ohne Flügel**	**Nudo: forma de la yema, excluyendo las alas**		
(a)	triangular-pointed	triangulaire-pointue	dreieckig-spitz	triangular-puntiaguda	RB72-454	1
	oval	ovale	elliptisch	oval	Q138	2
	obovate	obovale	verkehrt eiförmig	trasovada		3
	pentagonal	pentagonale	fünfeckig	pentagonal		4
	rhomboid	rhomboïdale	rhomboid	romboide		5
	round	ronde	rund	redonda	Q179, Q124	6
	ovate	ovoïde	eiförmig	ovada	Q170, Q115, Q186	7
	rectangular	rectangulaire	rechteckig	rectangular		8
	beaked	becquée	schnabelförmig	en pico		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
22. **(+)**	**Node: width of bud, excluding wings**	**Nœud: largeur du bourgeon, à l'exclusion des ailes**	**Nodium: Breite der Knospe, ohne Flügel**	**Nudo: anchura de la yema, excluyendo las alas**		
(a)	very narrow	très étroit	sehr schmal	muy estrecha		1
	narrow	étroit	schmal	estrecha	Q138	3
	medium	moyen	mittel	mediana		5
	wide	large	breit	ancha	Q121, Q124	7
	very wide	très large	sehr breit	muy ancha	Q136, H56-752	9
23. **(+)**	**Node: bud prominence (on second senescent leaf from the top)**	**Nœud: proéminence du bourgeon (sur la deuxième feuille sénescente à partir du sommet)**	**Nodium: Knospenausbildung (am zweiten alternden Blatt von oben)**	**Nudo: prominencia de la yema (en la segunda hoja senescente a partir de la parte superior)**		
(a)	very weak	très faible	sehr gering	muy débil	Q152	1
	weak	faible	gering	débil	RB72-454	3
	medium	moyenne	mittel	media	Q121, H56-752	5
	strong	forte	stark	fuerte	Q136	7
24. **(+)**	**Node: depth of bud groove**	**Nœud: profondeur du sillon du bourgeon**	**Nodium: Tiefe der Knospenfurche**	**Nudo: profundidad del canal de la yema**		
(a)	absent or very shallow	absent ou très peu profond	fehlend oder sehr flach	ausente o muy poco profundo	Q121, Q186, Q117	1
	shallow	peu profond	flach	poco profundo	RB72-454, Q170, Q138	3
	medium	moyen	mittel	medio	Q179	5
	deep	profond	tief	profundo		7
25. **(+)**	**Node: length of bud groove**	**Nœud: longueur du sillon du bourgeon**	**Nodium: Länge der Knospenfurche**	**Nudo: longitud del canal de la yema**		
(a)	short	court	kurz	corta	Q121	3
	medium	moyen	mittel	media	Q135, Q138	5
	long	long	lang	larga	Q179, Q96, H56-752	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
26. **(+)**	**Node: position of bud tip in relation to growth ring**	**Nœud: position du sommet du bourgeon par rapport à l'anneau de croissance**	**Nodium: Stellung der Knospenspitze im Verhältnis zum Wachstumsring**	**Nudo: posición del ápice de la yema en relación con el anillo de crecimiento**		
(a)	clearly below	nettement en-dessous	deutlich unterhalb	claramente por debajo		1
	intermediate	intermédiaire	in der Mitte	intermedio	RB72-454, Q179	2
	clearly above	nettement en-dessus	deutlich oberhalb	claramente por encima	Q121	3
27. **(+)**	**Node: pubescence on the bud**	**Nœud: pilosité sur le bourgeon**	**Nodium: Behaarung an der Knospe**	**Nudo: pubescencia en la yema**		
(a)	absent	absente	fehlend	ausente		1
	present	présente	vorhanden	presente		9
28. **(+)**	**Node: position of the pubescence on the bud**	**Nœud: position des poils sur le bourgeon**	**Nodium: Lage der Behaarung an der Knospe**	**Nudo: posición de la pubescencia en la yema**		
(a)	basal	basale	an der Basis	basal		1
	apical	apicale	an der Spitze	apical		2
	lateral	latérale	seitlich	lateral		3
29. **(+)**	**Node: bud cushion (space between base of bud and leaf scar)**	**Nœud: coussinet du bourgeon (espace entre la base du bourgeon et la cicatrice foliaire)**	**Nodium: Knospenwulst (Abstand zwischen der Knospenbasis und der Blattnarbe)**	**Nudo: cojín de la yema (espacio entre la base de la yema y la cicatriz foliar)**		
(a)	absent or very narrow	absent ou très étroit	fehlend oder sehr schmal	ausente o muy estrecho	Q121, Q186	1
	narrow	étroit	schmal	estrecho	Q96	3
	medium	moyen	mittel	mediano	RB72-454, Q181	5
	wide	large	breit	ancho	Q170	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. **(+)**	**Node: width of bud wing**	**Nœud: largeur de l'aile du bourgeon**	**Nodium: Breite des Knospenflügels**	**Nudo: anchura del ala de la yema**		
(a)	narrow	étroite	schmal	estrecha	RB72-454	3
	medium	moyenne	mittel	mediana	Q121	5
	wide	large	breit	ancha	BN81-1394	7
31. **(+)** **MS**	**Leaf sheath: length**	**Gaine de la feuille: longueur**	**Blattscheide: Länge**	**Vaina de la hoja: longitud**		
(b)	short	courte	kurz	corta	Q117	3
	medium	moyenne	mittel	mediana	Q136, Q170	5
	long	longue	lang	larga	Q121, Q124	7
32. **(+)**	**Leaf sheath: number of hairs (groups 57 and 60)**	**Gaine de la feuille: nombre de poils (groupes 57 et 60)**	**Blattscheide: Anzahl Haare (Gruppen 57 und 60)**	**Vaina de la hoja: número de pelos (grupos 57 y 60)**		
(b)	absent or very few	absent ou très petit	fehlend oder sehr gering	ausente o muy pocos	RB72-454, Q186	1
	few	petit	gering	pocos	Q170	3
	medium	moyen	mittel	medio	Q117, Q179	5
	many	grand	groß	numerosos	Q124	7
	very many	très grand	sehr groß	muy numerosos	Q169	9
33. **(+)**	**Leaf sheath: length of hairs (groups 57 and 60)**	**Gaine de la feuille: longueur des poils (groupes 57 et 60)**	**Blattscheide: Länge der Haare (Gruppen 57 und 60)**	**Vaina de la hoja: longitud de los pelos (grupos 57 y 60)**		
(b)	short	courts	kurz	cortos	Q186	3
	medium	moyens	mittel	medianos	Q117, Q179, Q138	5
	long	longs	lang	largos	Q121	7
34. **(+)**	**Leaf sheath: distribution of hairs**	**Gaine de la feuille: distribution des poils**	**Blattscheide: Verteilung der Haare**	**Vaina de la hoja: distribución de los pelos**		
(b)	only dorsal	uniquement dorsale	dorsal	únicamente dorsal	Q138, Q170	1
	lateral and dorsal	latérale et dorsale	lateral und dorsal	lateral y dorsal		2

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35. **(+)**	**Leaf sheath: shape of ligule**	**Gaine de la feuille: forme de la ligule**	**Blattscheide: Form der Ligula**	**Vaina de la hoja: forma de la lígula**		
(b)	strap-shaped	en forme de bande	bandförmig	en forma de correa		1
	deltoid	deltoïde	deltaförmig	deltoide	H56-752, Q170	2
	crescent-shaped	en forme de croissant	halbmondförmig	en forma de cuarto creciente	Q121, Q96, Q179	3
	bow-shaped	en forme d'arceau	bogenförmig	arqueada		4
	asymmetrical, steeply sloping	asymétrique, fortement inclinée	asymmetrisch steil abfallend	asimétrica con una inclinación pronunciada		5
	assymmetrical, horizontal	asymétrique, horizontale	asymmetrisch waagerecht	asimétrica horizontal		6
36. **(+)**	**Leaf sheath: ligule width**	**Gaine de la feuille: largeur de la ligule**	**Blattscheide: Breite der Ligula**	**Vaina de la hoja: anchura de la lígula**		
(b)	narrow	étroite	schmal	estrecha		1
	medium	moyenne	mittel	mediana	Q186, Q115, Q179	2
	wide	large	breit	ancha	H56-752, Q170	3
37. **(+)**	**Leaf sheath: length of ligule hairs (group 61)**	**Gaine de la feuille: longueur des poils de la ligule (groupe 61)**	**Blattscheide: Länge der Ligulahaare (Gruppe 61)**	**Vaina de la hoja: longitud de los pelos de la lígula (grupo 61)**		
(b)	short	courts	kurz	cortos	Q96, Q170, Q152	3
	medium	moyens	mittel	medianos	RB72-454, Q179	5
	long	longs	lang	largos	BN81-1394, Q124	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38. **(+)**	**Leaf sheath: density of ligule hairs (group 61)**	**Gaine de la feuille: densité des poils de la ligule (groupe 61)**	**Blattscheide: Dichte der Ligulahaare (Gruppe 61)**	**Vaina de la hoja: densidad de los pelos de la lígula (grupo 61)**		
(b)	absent or very sparse	nulle ou très lâche	fehlend oder sehr locker	ausente o muy laxa		1
	sparse	lâche	locker	laxa		3
	medium	moyenne	mittel	mediana	Q152	5
	dense	dense	dicht	densa	Q121, RB72-454	7
	very dense	très dense	sehr dicht	muy densa	Q179	9
39. **(+)**	**Leaf sheath: shape of underlapping auricle**	**Gaine de la feuille: forme de l'auricule sous-jacente**	**Blattscheide: Form des unterlappenden Blattöhrchens**	**Vaina de la hoja: forma de la aurícula subyacente**		
(b)	transitional	transitoire	durchgehend	transicional	Q121	1
	deltoid	deltoïde	deltaförmig	deltoide	Q186	2
	dentoid	en forme de dent	zahnförmig	dentoide		3
	unciform	unciforme	hakenförmig	unciforme		4
	calcarifom	en forme d'éperon	spornförmig	calcariforme		5
	lanceolate	lancéolée	lanzettlich	lanceolada	RB72-454, H56-752	6
	falcate	falciforme	sichelförmig	falcada		7
40. **(+)**	**Leaf sheath: size of underlapping auricle**	**Gaine de la feuille: taille de l'auricule sous-jacente**	**Blattscheide: Größe des unterlappenden Blattöhrchens**	**Vaina de la hoja: tamaño de la aurícula subyacente**		
(b)	small	petite	klein	pequeña	Q96	3
	medium	moyenne	mittel	mediana	Q201	5
	large	grande	groß	grande	Q135	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41. **(+)**	**Leaf sheath: shape of overlapping auricle**	**Gaine de la feuille: forme de l'auricule de chevauchement**	**Blattscheide: Form des überlappenden Blattöhrchens**	**Vaina de la hoja: forma de la aurícula superpuesta**		
(b)	transitional	transitoire	durchgehend	transicional	Q121, Q152	1
	deltoid	deltoïde	deltaförmig	deltoide	RB72-454, Q117	2
	dentoid	en forme de dent	zahnförmig	dentoide		3
	unciform	unciforme	hakenförmig	unciforme		4
	calcariform	en forme d'éperon	spornförmig	calcariforme		5
	lanceolate	lancéolée	lanzettlich	lanceolada	Q138	6
	falcate	falciforme	sichelförmig	falcada		7
42. **(+)**	**Leaf sheath: size of overlapping auricle**	**Gaine de la feuille: taille de l'auricule de chevauchement**	**Blattscheide: Größe des überlappenden Blattöhrchens**	**Vaina de la hoja: tamaño de la aurícula superpuesta**		
(b)	small	petite	klein	pequeña		3
	medium	moyenne	mittel	mediana		5
	large	grande	groß	grande		7
43. **(*)** **(+)**	**Leaf sheath: color of dewlap**	**Gaine de la feuille: couleur de l'ochréa**	**Blattscheide: Farbe des Nackens**	**Vaina de la hoja: color del collar**		
(b)	RHS Colour Chart (indicate reference number)	code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)		
44.	**Leaf blade: curvature**	**Limbe: courbure**	**Blattspreite: Biegung**	**Limbo de la hoja: curvado**		
(b)	straight	droit	gerade	recto	Q138	1
	curved tips	sommets incurvés	gebogene Spitzen	ápices curvados	H56-752, Q115, Q124	2
	arched	arqué	gebogen	arqueado		3
	curved at base	incurvé à la base	an der Basis gebogen	curvado a la base		4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
45. **(*)** **MS**	**Leaf blade: width at the longitudinal mid-point**	**Limbe: largeur à mi-longueur**	**Blattspreite: Breite in der Mitte der Länge**	**Limbo de la hoja: anchura en el punto medio de la longitud**		
(b)	narrow	étroit	schmal	estrecho	Q113, Q186	3
	medium	moyen	mittel	mediano	Q121, Q124	5
	broad	large	breit	ancho	Q138, Q179	7
46. **MS**	**Leaf: midrib width (as for 46)**	**Feuille: largeur de la nervure principale (comme pour 46)**	**Blatt: Breite der Mittelrippe (wie für 46)**	**Hoja: anchura de la nervadura principal (como para 46)**		
(b)	very narrow	très étroite	sehr schmal	muy estrecha		1
	narrow	étroite	schmal	estrecha	Q121	3
	medium	moyenne	mittel	mediana	Q124, Q170	5
	wide	large	breit	ancha		7
	very wide	très large	sehr breit	muy ancha	Q138	9
47.	**Leaf: ratio leaf blade width/midrib width**	**Feuille: rapport largeur du limbe/épaisseur de la nervure principale**	**Blatt: Verhältnis der Breite der Blattspreite/Breite der Mittelrippe**	**Hoja: relación entre la anchura del limbo de la hoja y la anchura de la nervadura principal**		
(b)	low	faible	niedrig	baja		3
	medium	moyen	mittel	media	Q124, H56-752	5
	high	important	hoch	alta		7
48. **(+)** **MS**	**Leaf blade: length**	**Limbe: longueur**	**Blattspreite: Länge**	**Limbo de la hoja: longitud**		
(b)	short	court	kurz	corta	Q124	3
	medium	moyen	mittel	mediana	Q136	5
	long	long	lang	larga	Q170	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
49. **(+)**	**Leaf blade: pubescence on margin**	**Limbe: pilosité sur le bord**	**Blattspreite: Behaarung am Rand**	**Limbo de la hoja: pubescencia en el borde**		
(b)	absent or very sparse	absente ou très faible	fehlend oder sehr locker	ausente o muy rala	Q121, Q170, Q117	1
	sparse	faible	locker	rala	H56-752	3
	medium	moyenne	mittel	media	Q152	5
	dense	forte	dicht	densa	Q169	7
50. **(+)**	**Leaf blade: serration of margin**	**Limbe: dentelure du bord**	**Blattspreite: Randzähnung**	**Limbo de la hoja: aserrado del borde**		
(b)	absent	absente	fehlend	ausente		1
	present	présente	vorhanden	presente	Q121, Q170, H56-752	9
51.	**Cane top: length**	**Sommet de la canne: longueur**	**Rohrspitze: Länge**	**Parte superior de la caña: longitud**		
(c)	short	courte	kurz	corta		3
	medium	moyenne	mittel	mediana		5
	long	longue	lang	larga		7
52.	**Cane top: shape of cross-section**	**Sommet de la canne: forme de la section transversale**	**Rohrspitze: Form des Querschnitts**	**Parte superior de la caña: forma de la sección transversal**		
(c)	circular	circulaire	rund	circular		1
	ovate	ovoïde	eiförmig	ovada		2
53.	**Cane top: color**	**Sommet de la canne: couleur**	**Rohrspitze: Farbe**	**Parte superior de la caña: color**		
(c)	RHS Colour Chart (indicate reference number)	code RHS des couleurs (indiquer le numéro de référence)	RHS-Farbkarte (Nummer angeben)	Carta de colores RHS (indíquese el número de referencia)		
54.	**Cane top: waxiness**	**Sommet de la canne: pruine**	**Rohrspitze: Wachsschicht**	**Parte superior de la caña: cerosidad**		
(c)	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil		1
	weak	faible	gering	débil		3
	medium	moyenne	mittel	media		5
	strong	forte	stark	fuerte		7

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Observation on the node and internode to be made on the largest internode of a representative culm.

(b) Observation on the leaf blade and leaf sheath to be made on the top visible dewlap (TVD) leaf.

(c) The cane top is the region between the youngest exposed visible dewlap and the insertion of the fourth youngest fully extended leave (leaf + 4) in the culm.

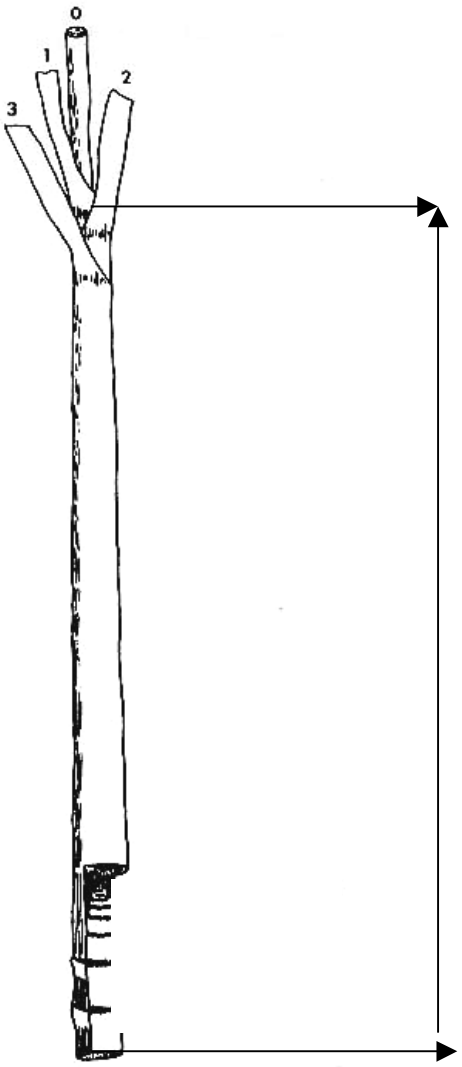
8.2 Explanations for individual characteristics

Ad. 2: Plant: adherence of leaf sheath

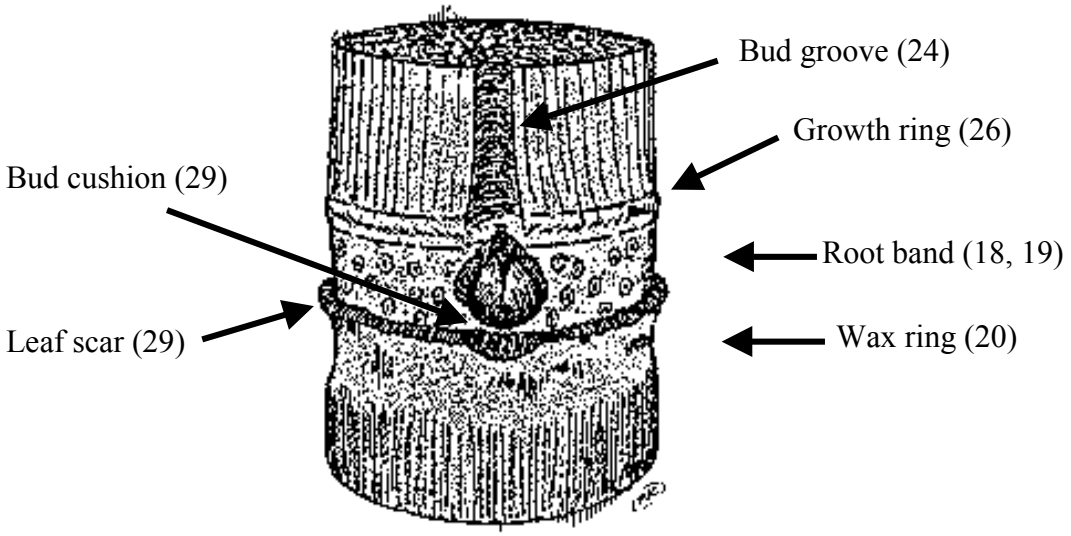
To be observed on the lower half of the stool on the senescing leaves.

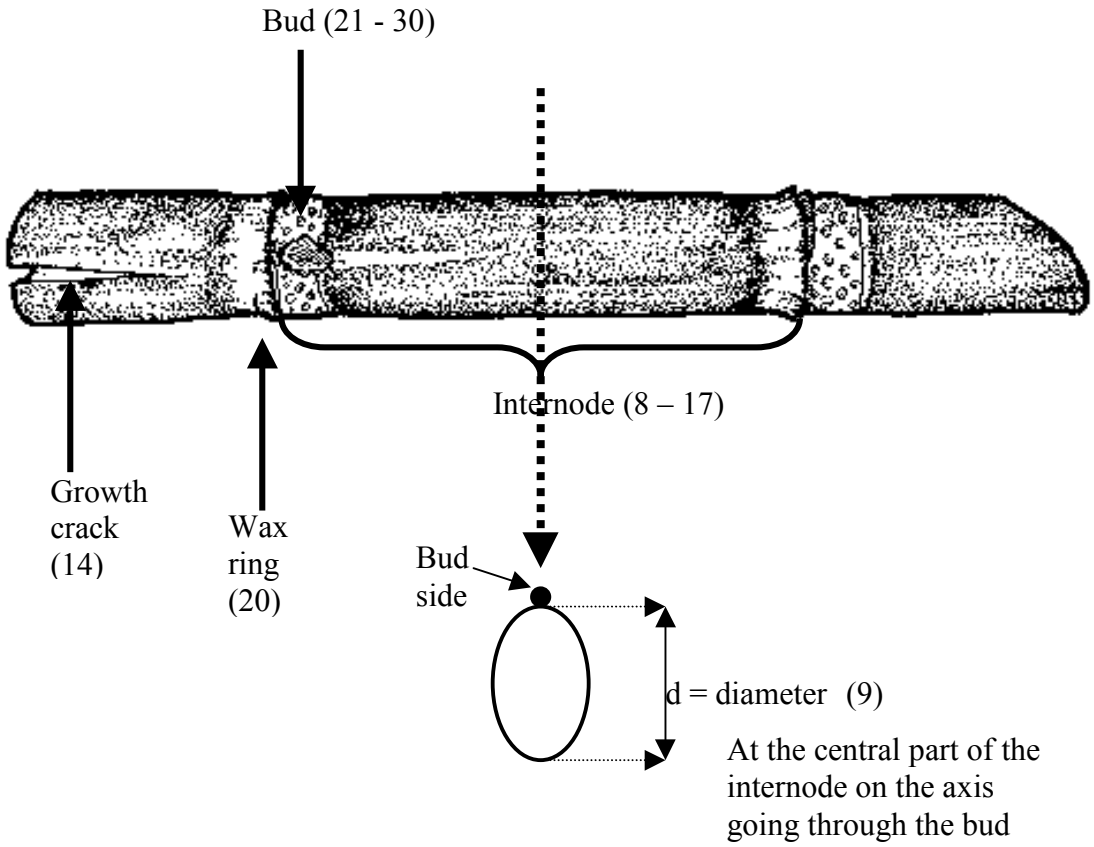
Ad. 7: Culm: height ((from the base to the base of the TVD leaf)

Based on measurements of 24 culms.
TVD leaf = top visible dewlap leaf = 1

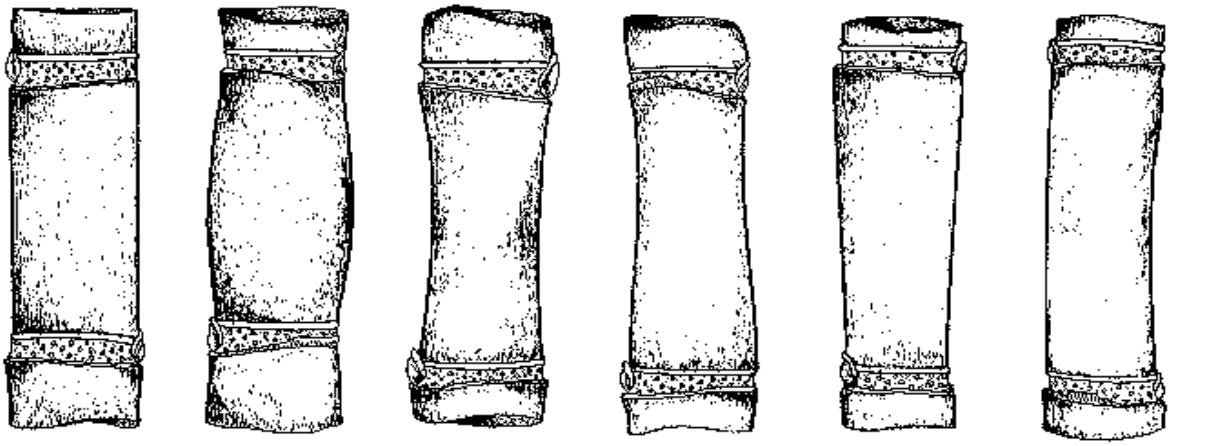


Ad. 8 to 17: Internode and 18 to 30: Node





Ad. 10: Internode shape



1	2	3	4	5	6
cylindrical	tumescent	bobbin-shaped	conoidal	obconoidal	concave-convex

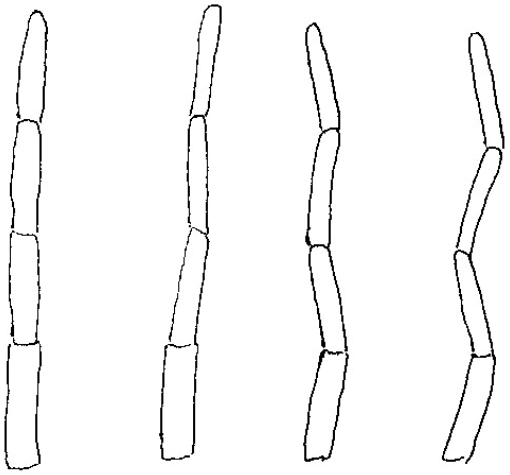
Ad. 12: Internode: color where exposed to sun

After three days of exposure to the sun on a culm on which the wax has been removed.

Ad. 13: Internode: color where not exposed to sun

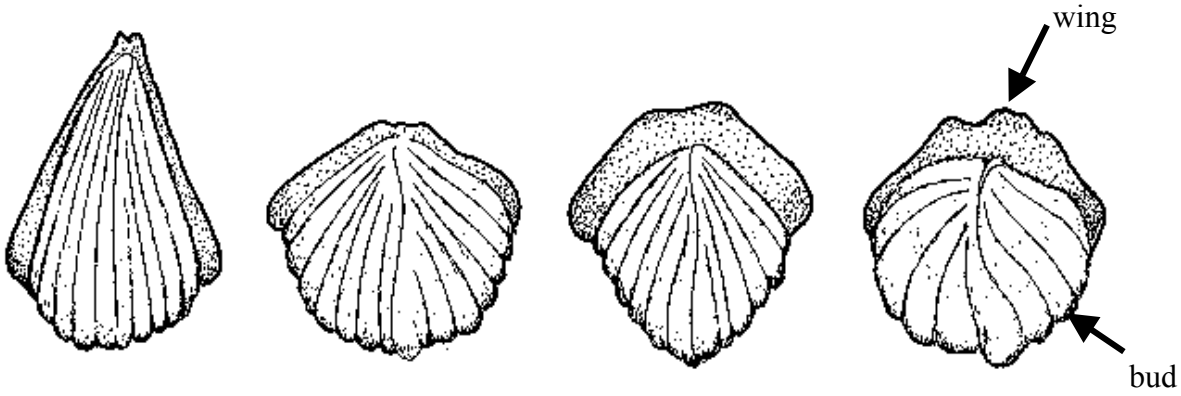
On a culm protected from the sun, on which the wax has been removed.

Ad. 15: Internode: expression of zigzag alignment

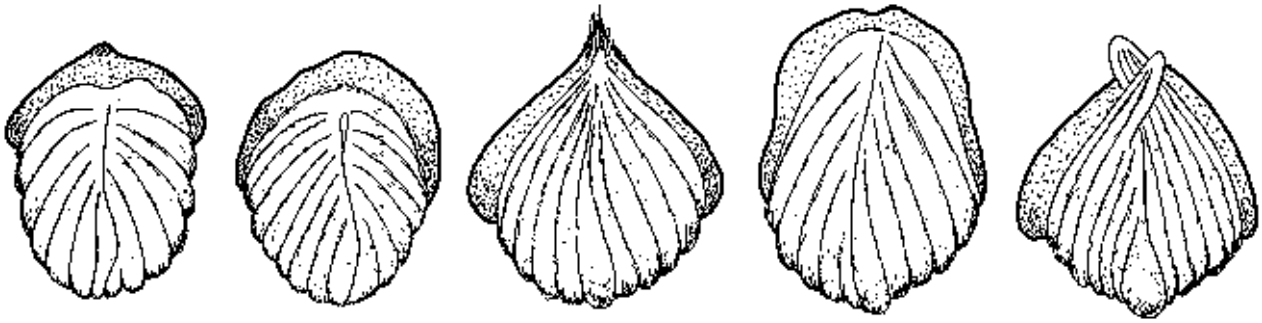


1	3	5	7
absent or very weak	weak	moderate	strong

Ad. 21: Node: shape of bud, excluding wings



1	2	3	4
triangular pointed	oval	obovate	pentagonal

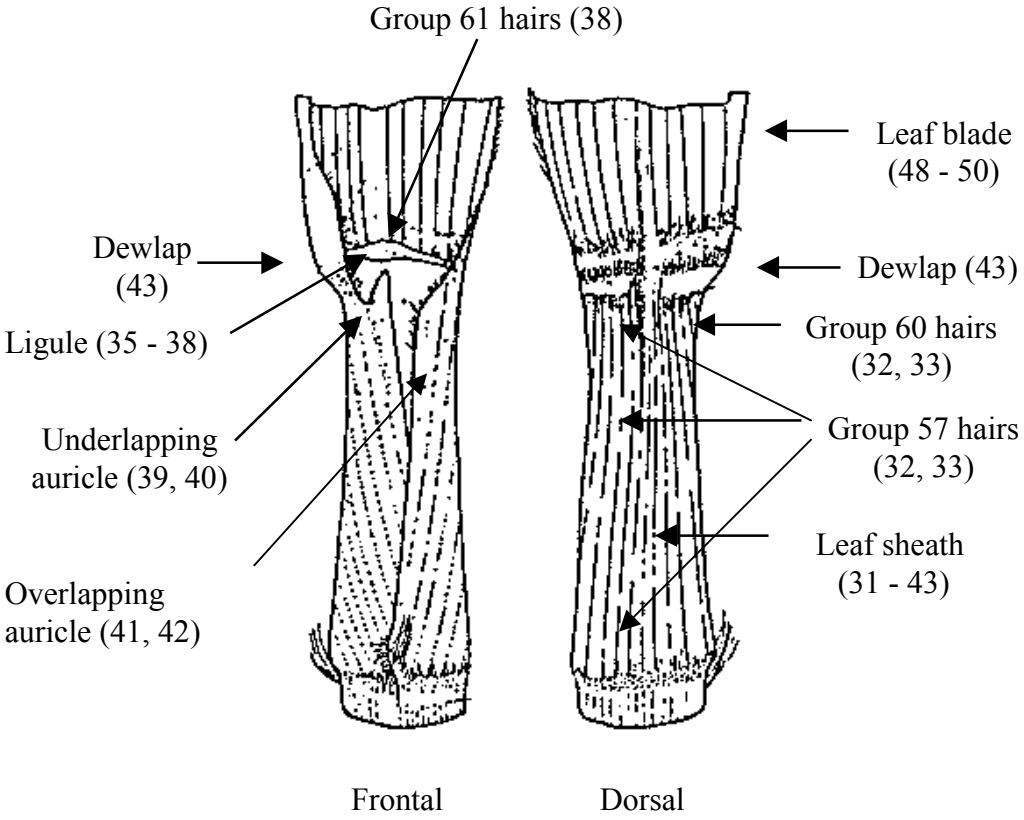


5	6	7	8	9
rhomboid	round	ovate	rectangular	beaked

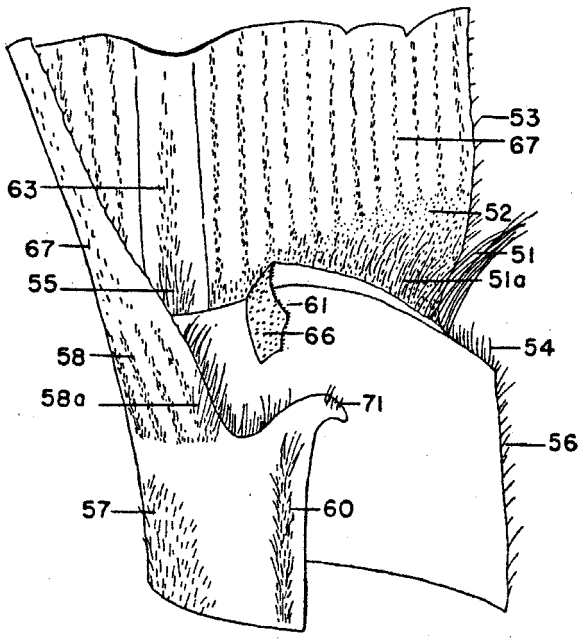
Ad. 31: Leaf sheath: length

The leaf sheath is measured from the sheath base (point of attachment to the culm) to the dewlap (the junction between the leaf blade and the leaf sheath).

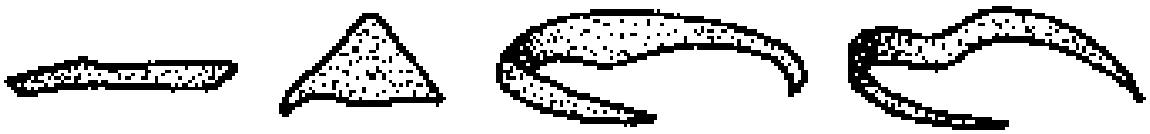
Ad. 31 to 43: Leaf sheath and Ad. 48 to 50: Leaf blade



Ad. 32 and 33: Leaf sheath: number of hairs (32) (groups 57 and 60) and length of hairs (33) (groups 57 and 60)



Ad. 35 and 36: Leaf sheath: shape of ligule (35) and ligule width (36)



1
strap-shaped

2
deltoid

3
crescent-shaped

4
bow-shaped

5
asymmetrical,
steeply sloping

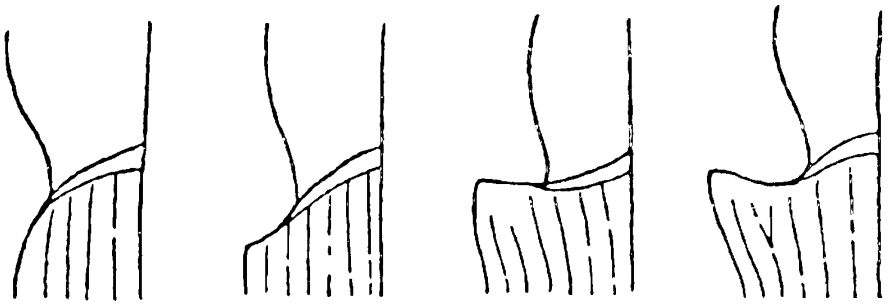
6
asymmetrical,
horizontal

States strap-shaped (1) and deltoid (2) do not curl round the sheath.

Ligule width is the distance from the point of attachment at the junction of the leaf blade and the leaf sheath and the upper margin of the ligule at the widest point (middle of ligule).

narrow	< 3 mm
medium	3 – 5 mm
wide	> 5 mm

Ad. 39 and 41: Leaf sheath: shape of auricle

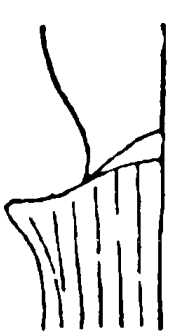


1
transitional

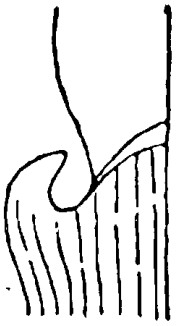
1
transitional

1
transitional

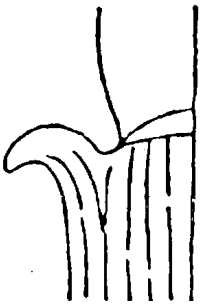
2
deltoid



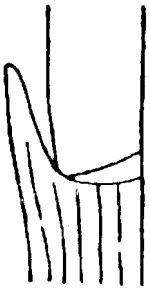
3
dentoid



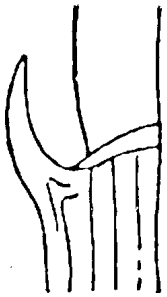
4
unciform



5
calcariform



6
lanceolate



7
falcate

9. Literature

Artschwager, E., 1940: Journal of Agricultural Research, v. 60, n. 8, pp. 503-508.

Gallacher, D.J., 1994: Development of a minimum descriptor set for individuals of *Saccharum* spp. Hybrid germplasm. Thesis submitted for Ph.D., Department of Botany and Tropical Agriculture, James Cook University of North Queensland, AU.

Gallacher, D.J. and Berding, N. 1997: Purpose selection and application of descriptors for sugarcane germplasm. *Aust. J. Agric. Res* 48: 759-67.

Gallacher, D.J., 1997: Evaluation of sugarcane morphological descriptors using variance components analysis. *Aust. J. Agric. Res* 48: 769-73.

Gallacher, D.J., 1997: Optimised descriptors recommended for Australian sugarcane germplasm (*Saccharum* spp. hybrid) *Aust. J. Agric. Res* 48: 775-79.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name	*Saccharum* L.
1.2 Common name	Sugarcane

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	

Breeder (if different from applicant)

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)
(b) partially known cross [ ]
(please state known parent variety(ies))
(c) unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.4 Other [ ]
(please provide details)

4.2 Method of propagating the variety

4.2.1 Vegetative propagation [ ]

4.2.2 Other [ ]
(please provide details)

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (2)	**Plant: adherence of leaf sheath**		
	weak	H56-752, Q96	3 [ ]
	medium	Q124, Q186	5 [ ]
	strong	Q120, NC_0 310, Q201	7 [ ]
5.2 (10)	**Internode: shape**		
	cylindrical	Q169, RB72-454	1 [ ]
	tumescent		2 [ ]
	bobbin-shaped	H56-752	3 [ ]
	conoidal		4 [ ]
	obconoidal	H60-3802	5 [ ]
	concave-convex	Q115	6 [ ]
5.3 (12)	**Internode: color where <u>exposed</u> to sun**		
	RHS Colour Chart (indicate reference number)		
	.....		
5.4i (13)	**Internode: color where <u>not exposed</u> to sun**		
	RHS Colour Chart (indicate reference number)		
	.....		

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Characteristics	Example Varieties	Note
5.4ii (13)	**Internode: color where <u>not exposed</u> to sun**		
	yellow		1 [ ]
	yellow green		2 [ ]
	grey yellow		3 [ ]
	grey orange		4 [ ]
	grey red		5 [ ]
	grey purple		6 [ ]
5.5 (15)	**Internode: expression of zigzag alignment**		
	absent or very weak	Q124	1 [ ]
	weak	Q135, Q152	3 [ ]
	moderate	Q117	5 [ ]
	strong	H56-752	7 [ ]
5.6 (21)	**Node: shape of bud, excluding wings**		
	triangular-pointed	RB72-454	1 [ ]
	oval	Q138	2 [ ]
	obovate		3 [ ]
	pentagonal		4 [ ]
	rhomboid		5 [ ]
	round	Q179, Q124	6 [ ]
	ovate	Q170, Q115, Q186	7 [ ]
	rectangular		8 [ ]
	beaked		9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

Characteristics	Example Varieties	Note
5.7 (43) Leaf sheath: color of dewlap		
RHS Colour Chart (indicate reference number)		
5.8 (45) Leaf blade: width at the longitudinal mid-point		
narrow	Q113, Q186	3 [ ]
medium	Q121, Q124	5 [ ]
broad	Q138, Q179	7 [ ]

6. Similar varieties and differences from these varieties

Please use the table, and space provided for comments, below to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the **similar** variety(ies)	Describe the expression of the characteristic(s) for **your** candidate variety
Example	*Internode: shape*	*cylindrical*	*tumescent*

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

[#] Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

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9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a) Microorganisms (e.g. virus, bacteria, phytoplasma) Yes [ ] No [ ]

(b) Chemical treatment (e.g. growth retardant, pesticide) Yes [ ] No [ ]

(c) Tissue culture Yes [ ] No [ ]

(d) Other factors Yes [ ] No [ ]

Please provide details of where you have indicated "yes":

……

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature Date

[End of document]