



TWA/29/18

ORIGINAL: English

DATE: June 7, 2000

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

**TECHNICAL WORKING PARTY
FOR
AGRICULTURAL CROPS**

**Twenty-Ninth Session
Uppsala, Sweden, June 27 to 30, 2000**

WORKING PAPER ON TEST GUIDELINES FOR SUGAR CANE (*Saccharum L.*)

Document prepared by experts from Brazil

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I. Subject of these Guidelines

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

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material required for testing the variety is to be delivered. Applicants submitting material from State other than that in which the testing takes place must make sure that all customs formalities are complied with. As a minimum, the following quantity of plant material is recommended:

12 seed pieces with 3 buds each, properly packaged to minimize damage to the buds.

2. The seed pieces should be supplied from plants about 8 to 12 months old, visibly healthy, not lacking in vigor or affected by any important pests or diseases. It should preferably not be obtained from *in vitro* propagation.

3. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

1. A test should normally be conducted for one growing period. If distinctness and/or uniformity cannot be sufficiently established in one growing period, the test should be extended for a second growing period.

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The test should be carried out under natural growing conditions. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. Each test should include a total of 4 plants divided in two or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions.

4. Additional test for special purposed may be established.

IV. Methods and Observations

1. All observations should be made on 4 plants. Plants should be observed in first growth (plant cane) and all characteristics should be described on plants between 10 to 12 months of age. Plants should be grown under normal growing conditions with no water or nutritional stress.

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 4 plants, the maximum number of off-types allowed would be 0.
3. All observations on the stem should be made on the primary stem.
4. All observations on the node and internode should be made at mid height of the fully developed primary stem.
5. All observations on the leaf blade and leaf sheath should be made on fully extended leaves.
6. Canes tops are defined as the region between the youngest exposed visible dewlap and the insertion of the fourth youngest fully extended leaf (leaf + 4) in the stem.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics that are suitable for grouping purposes are those that are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression of expression should be fairly evenly distributed throughout the collection.
2. It is recommended that the competent authorities use the following characteristics for grouping varieties:
 - (a) Plant: stool growth habit (characteristic 1)
 - (b) Plant: adherence of leaf sheath (characteristic 2)
 - (c) Leaf blade: architecture (characteristic 29)
 - (d) Leaf sheath: distribution of auricles (characteristic 37)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.
2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.
3. Legend:
 - (*) Characteristics that should be used on all varieties in every growing period over which examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.
 - (+) See Explanations on the Table of Characteristics in chapter VIII.

VII. 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 (*)					
erect					1
semi-erect					2
prostrate					3
2. Plant: adherence of leaf sheath (*)					
weak					3
medium					5
strong					7
3. Plant: tillering					
low					3
medium					5
high					7
4. Internode: length at mid height					
short					3
medium					5
long					7
5. Internode: diameter (as for 7)					
thin					3
medium					5
thick					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
6. Internode: shape					
(*)					
(+)					
cylindrical					1
tumescent					2
bobbin-shaped					3
conoidal					4
obconoidal					5
concave-convex					6
7. Internode: cross-section					
circular					1
ovate					9
8. Internode: color <u>exposed</u> to sun					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9. Internode: color					
(*) <u>not exposed to sun</u>					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9
10. Internode: depth of growth crack					
absent or very shallow					1
shallow					3
deep					5
11. Internode: zigzag alignment					
(*)					
absent or very weakly expressed					1
weakly expressed					2
strongly expressed					3
12. Internode: appearance (rind surface)					
smooth					1
mottled					3
rough (corky)					5

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. Internode: waxiness					
absent or very weak					1
medium					3
strong					5
14. Node: width of growth ring					
narrow					3
medium					5
broad					7
15. Node: color of growth ring (+)					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9
16. Node: prominence of growth ring					
weak					3
medium					5
strong					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
17. Node: width of root band					
narrow					3
medium					5
broad					7
18. Node: color of root band					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9
19. Node: aerial rooting					
absent or very weak					1
weak					3
medium					5
strong					7
very strong					9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20. Node: wax ring					
absent or very small					1
small					3
medium					5
large					7
very large					9
21. Node: shape of bud					
(*)					
(+)					
tall deltoid					1
ovate					2
narrow ovate					3
pentagonal					4
squarish					5
round					6
ovate					7
rectangular					8
pointed					9
22. Node: bud groove					
absent or very shallow					1
shallow					3
deep					5

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23. Node: bud tip in relation to growth ring					
never surpassing					1
occasionally surpassing					2
always surpassing					3
24. Node: position of bud pore					
apical					1
sub apical					9
25. Node: pubescence on bud					
absent					1
basal					2
apical					3
lateral					4
26. Node: bud cushion (space between base of bud and leaf scan)					
absent or very narrow					1
narrow					3
medium					5
broad					7
very broad					9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27. Node: distribution of bud wing					
apical					1
median					3
sub-median					5
28. Node: width of bud wing					
narrow					3
medium					5
wide					7
29. Leaf sheath: hairiness					
absent or very slightly hairy					1
slightly hairy					2
strongly hairy					3
30. Leaf sheath: distribution of hairs					
only dorsal					1
only lateral					2
lateral and dorsal					3
31. Leaf sheath: adherence of hairs					
absent or very weak					1
weak					3
medium					5
strong					7
very strong					9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
32. Leaf sheath: shape of ligule					
(+)					
ribbon					1
deltoid					2
crescent					3
arch					4
asymmetric vertical					5
asymmetric horizontal					6
33. Leaf sheath: shape of primary auricle					
(+)					
incipient					1
deltoid					2
dentoid					3
unciform					4
calcarifom					5
lanceolate					6
falcate					7
34. Leaf sheath: size of primary auricle					
small					3
medium					5
large					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35. Leaf sheath: shape (+) of secondary auricle					
incipient					1
deltoid					2
dentoid					3
unciform					4
calcariform					5
lanceolate					6
falcate					7
36. Leaf sheath: size of (+) secondary auricle					
small					3
medium					5
large					7
37. Leaf sheath: shape (+) of dewlap					
squarish subcrescent					1
broad double crescent					2
squarish deltoid					3
tal squarish					4
flaring deltoid					5
descending deltoid					6
deltoid					7
ascending squarish					8
ascending ligulate					9

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
38. Leaf sheath: color of dewlap (*)					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9
39. Leaf blade: attitude					
erect					1
curved tips					2
arched					3
curved at base					4
40. Leaf blade: width (*)					
narrow					3
medium					5
broad					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41. Leaf blade: pubescence on margin					
absent or very sparse					1
sparse					3
abundant					5
42. Leaf blade: serration of margin					
slight					3
medium					5
strong					7
43. Plant: leaf canopy					
sparse					3
medium					5
dense					7
44. Plant: green color shade of leaf canopy					
light					3
intermediate					5
dark					7
45. Cane top: length (+)					
short					3
medium					5
long					7

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
46. Cane top: shape of cross-section					
circular					1
ovate					9
47. Cane top: color					
green white					1
green yellow					2
purple yellow					3
yellow green					4
green					5
purple green					6
yellow purple					7
green purple					8
purple					9
48. Cane top: waxiness					
absent or very weak					1
weak					3
medium					5
strong					7
very strong					9

(+) Characteristic # 45. Cane top length: short (up to 50 cm); medium (from 50 to 65 cm); long (more than 65 cm)

IX. Literature

ARTSCHWAGER E, Journal of Agricultural Research, v. 60, n. 8, p. 503-508, 1940.

X. Technical Questionnaire

	<p>Reference Number (not to be filled in by the applicant)</p>
<p style="text-align: center;">TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p>	
1.1 Genus	<p style="text-align: center;"><i>Saccharum L.</i> SUGAR CANE</p>
1.2 Species	<p style="text-align: center;">..... (indicate species)</p>
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin

(a) Seedling (indicate parent varieties)

..... []

(b) Mutation (indicate parent variety)

..... []

(c) Discovery (indicate where and when)

..... []

4.2 Other information

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

Characteristics	Example Varieties	Note
Plant :stool growth habit		
(1)		
erect		1 []
semi-erect		2 []
prostrate		3 []
Plant: leaf sheath adherence		
(2)		
weak		3 []
medium		5 []
strong		7 []
Internode : length at mid height		
(4)		
short		3 []
medium		5 []
long		7 []
Internode : shape		
(6)		
cylindrical		1 []
tumescant		2 []
bobbin shaped		3 []
conoidal		4 []
obconoidal		5 []
concave-convex		6 []
Internode: zigzag alignment		
(11)		
absent or very weakly expressed		1 []
weakly expressed		2 []
strongly expressed		3 []

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

Characteristics	Example Varieties	Note
Node: shape of bud (21)		
tall deltoid		1 []
ovate		2 []
narrow ovate		3 []
pentagonal		4 []
squarish		5 []
round		6 []
ovate		7 []
rectangular		8 []
pointed		9 []
Leaf blade: attitude (39)		
erect		1 []
curved tips		2 []
arched		3 []
curved at base		4 []

6. Similar varieties and differences from these varieties

Denomination of similar variety	Characteristic in which the similar variety is different ^{o)}	State of expression of similar variety	State of expression of candidate variety

^{o)} In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Special conditions for the examination of the variety

(a) Conditions for planting

(b) Other conditions

7.3 Other information

A representative color photo of the variety should be added to the Technical Questionnaire

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 that question is yes, please attach a copy of such an authorization.

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