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UPOV

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

MILLET

(*Panicum miliaceum* L.)

*

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

to be considered by the
Technical Working Party for Agricultural Crops at its thirty-fifth session,
to be held in Beijing, July 3 to 7, 2006

Alternative Names:*

Latin	*English*	*French*	*German*	*Spanish*
Panicum miliaceum L.	Common Millet	Millet commun, Panic millet, Panic faux millet	Rispenhirse	Mijo común

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 guidelines("Test Guidelines") should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as 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 varieties of *Panicum miliaceum* L. of the family *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 phyto-sanitary requirements are complied with.

2.2 The material is to be supplied in the form of seeds.

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

2.3.1 General: 1kg

2.3.2 Panicles: if requested by the competent authority, at least 100 panicles should also be submitted. The panicles should be well-developed and not obviously affected by any pest or disease. They should contain a sufficient number of viable seeds to establish a satisfactory row of plants for observation.

2.4 The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

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

2.6 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 two independent growing cycles.

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 The optimum stage of development for the assessment of each characteristic is indicated by a number in the second column of the Table of Characteristics. The stages of development denoted by each number are described at the end of Chapter 8.

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:

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

3.3.4 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background.

3.4 Test Design

3.4.1 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.

3.4.2 Each test should be designed to result in a total of at least 1.000 plants, which should be divided between two or more replicates.

3.4.3 Single panicle-rows: if tests on panicle-rows are conducted, at least 100 panicle-rows should be observed.

The first growing cycle: type of plot A (see Table below) with a total number of not less than 100 plants divided into two replicates.

The second growing cycle: four types of plots:

- row plot of type A: is sown with seeds of an applicant;
- row plot of type A-$_1$: is sown with seeds harvested from the row plots of type A of the first growing cycle;
- plots of type B: is sown with seeds of panicles which supplied by an applicant (50 panicles);
- plots of type P: if it is necessary plot is sown with seeds of panicles which are chosen from all off - type plants harvested from all plots of the candidate variety.

Types of plots and assessment

Plot		Kind of test	Notes
Type	Appellation		
A	row	distinctness	the first and the second growing cycles with seeds of each year submitted by an applicant
A1	row	stability	the second growing cycle with seeds obtained from the row plot of type A of the first growing cycle
B	panicle 1	uniformity stability	the second growing cycle with panicles submitted by an applicant (50 panicles)
P	panicle 2 (special)	uniformity	It is sown if necessary to find out the causes of heterogeneity. During the second growing cycle with panicles selected from off-type plants and gathered from all plots of the candidate variety.

Plot parameters

Plot Parameters							
type of plot	number of replications	number of rows	length m	Width m	Area m2	rows width cm	distance between plants in the row cm
The first year of tests							
A	2	6	4,0	2,7	10,8	33-45	=2,0
The second year of tests							
A	2	6	4,0	2,7	10,8	33-45	=2,0
A1	1	6	4,0	2,7	10,8	33-45	=2,0
B	1	50				33-45	10.0
P	1		2,0	2,0	4,0	33-45	10.0

3.5 Number of Plants / Parts of Plants to be Examined

Unless otherwise indicated, all observations should be made on 20 plants or parts taken from each of 20 plants.

Number of plants					
4. Type of plot	to assess				
	Distinctness	Uniformity		Stability	
		QN	QL	QN	QL
The first year of tests					
A	all	25	all	-	-
The second year of tests					
A	all	25	all	-	-
A1	-	-	-	25	all
B	-	25	all	25	all
P	-	25	all	-	-

3.6 Additional Tests

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

5. 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 Row plots: For the assessment of uniformity, a population standard of 95 % and an acceptance probability of at least 0,1% should be applied. In the case of a sample size of 1000 plants, 3 off-types are allowed.

4.2.3 Single panicle rows: For the assessment of uniformity, a population standard of 95% and an acceptance probability of at least 1 % should be applied. In the case of a sample size of 100 panicle rows, 3 off-type rows are 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 seed stock to ensure that it exhibits the same characteristics as those shown by the previous material supplied.

6. 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 are 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) Time of panicle emergence (characteristic 9);
(b) Plant: natural height (characteristic 10);
(c) Panicle: angle of branches (characteristic 11);
(d) Glume: anthocyanin coloration (characteristic 21);

(e) Grain: color (characteristic 25).

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

7. 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 Section 6.1.2

QL Qualitative characteristic – see Section 6.3
QN Quantitative characteristic – see Section 6.3
PQ Pseudo-qualitative characteristic – see Section 6.3

MG: single measurement of a group of plants or parts of plants – see Section 3.3.3
MS: measurement of a number of individual plants or parts of plants – see Section 3.3.3
VG: visual assessment by a single observation of a group of plants or parts of plants – see Section 3.3.3
VS: visual assessment by observation of individual plants or parts of plants – see Section 3.3.3

(+) See Explanations on the Table of Characteristics in Chapter 8.

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

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. (+)	**56-59 VG**	**Flag leaf: attitude of blade**					
PQ		erect				Saratovske 8	1
		semi-erect				Kyivske 87, Veselopodilske 16,	3
		horizontal				Kyivske 96, Myronivske 51	5
		semi-drooping				Voronizke 899	7
2.	**56-59 VG**	**Flag leaf: anthocyanin coloration**					
QL		absent				Sonyachne	1
		present				Lilove	9
3.	**56-59 VG**	**Flag leaf: intensity of anthocyanin coloration**					
QN		weak				Lilove, Veselopodolyanske 305	3
		medium				Veselopodolyanske 403	5
		strong				Irtyshske 201	7
4.	**56-59 MS**	**Flag leaf: length**					
QN		short				Charivne, Veselopodilske 16,	3
		medium				Kyivske 87, Myronivske 51	5
		long				Kharkivske 71	7

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
5.	**56-59 MS**	**Flag leaf: width**					
QN		narrow				Kharkivske 10, Omske 9	3
		medium				Novo Kyivske 01, Veselopodolyanske 16	5
		broad				Kharkivske 86, Omriyane	7
6. **(+)**	**70-79 MS**	**Stem: number of nodes**					
QN		very few				Omske 9	1
		few				Kyivske 96, Myronivske 51	3
		medium				Kharkivske 86, Novo Kyivske 01 Veselopodilske 16	5
		many				Kharkivske kormove	7
7. **(+)**	**70-79 VG/ MS**	**Stem: length of upper internode**					
QN		short				Veselopodolyanske 534	3
		medium				Myronivske 51, Novo Kyivske 01, Slobozhanske	5
		long				Charivne, Kharkivske 72	7
8. **(+)**	**70-79 VG/ MS**	**Stem: thickness of node**					
QN		thin				Omske	3
		medium				Veselopodolyanske 632	5
		thick				Myronivske 94, Veselopodilske 16	7

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9. (*) (+)	**VG**	**Time of panicle emergence**					
QN		very early				Omske 9	1
		early				Kyivske 96	3
		medium				Kharkivske 56	5
		late				Kharkivske kormove	7
		very late				Illichovske	9
10. (*) (+)	**81-92 MG**	**Plant**: **natural height**					
QN		short				Karlik 305, Orlovskiy karlik	3
		medium				Kharkivske 86, Kyivske 96	5
		long				Kharkivske 57, Veselopodilske 16	7
11. (*) (+)	**65-69 VG**	**Panicle: angle of branches**					
QN		very acute				Pikulovytske	1
		moderately acute					2
		right angle				Chornomorske	3
		moderately obtuse				Kyivske 87, Veselopodilske 16	4
		very obtuse				Omske 9	5

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
12. **(*)** **(+)**	**65-69 VG**	**Panicle: attitude**					
PQ		erect				Omske 9	1
		semi-erect				Charivne, Veselopodolyanske 305-54	2
		inclined				Kyivske 96	3
		strongly drooping				Kharkivske 57	4
13.	**65-69 MS**	**Panicle: length (excluding peduncle)**					
QN		very short				Pikulovytske	1
		short				Charivne	3
		medium				Kyivske 96	5
		long				Myronivske 94, Novokyivske 01	7
		very long				Kyivske 87, Veselopodolyanske 176	9
14. **(+)**	**81-89 MS**	**Panicle: width**					
QN		narrow				Kharkivske 57, Novokyivske 01	3
		medium				Myronivske 94, Slobozhanske	5
		broad				Kyivske 87, Veselopodolyanske 305-54	7
15. **(*)** **(+)**	**65-79 VG**	**Panicle: density**					
QN		lax				Myronivske 51	3
		medium				Charivne	5
		dense				Pikulovytske	7

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
16. (+)	**65-69 VG**	**Panicle: degree of branches trailing**					
QN		absent or very weak				Charivne	1
		weak				Raduha, Kharkivske 71	3
		medium				Novokyivske 01, Slobozhanske	5
		strong				Kharkivske 31, Myronivske 51	7
		very strong				Veselopodolyanske 38	9
17.	**73-79 VG**	**Panicle: number of pillows**					
PQ		none or very few				Charivne, Omriyane	1
		few				Myronivske 51, Novokyivske 01	3
		medium				Sredneruske	5
		many				Imunne 366, Zoryane	7
		very many				Syayvo, Veselopodolyanske 632	9
18. (+)	**65-79 VG**	**Panicle: length of primary branches**					
QN		very short				Pikulovytske	1
		short				Charivne, Kharkivske 86	3
		medium				Myronivske 51, Veselopodilske 16	5
		long				Slobozhanske, Veselopodolyanske 176	7
		very long				Voronizhske 884	9

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
19. **(+)**	**81-92 VG**	**Spikelet: shape**					
PQ		narrow elliptic				Sonyachne	1
		broad elliptic				Lilove, Veselopodolyanske 176	2
		round				Charivne	3
20.	**80-92 VG**	**Spikelet: intensity of yellow color**					
QN		light				Raduha	3
		medium				Sonyachne	5
		dark				Kyivske 96	7
21. **(*)**	**70-79 VG**	**Glume: anthocyanin coloration**					
QN		absent or very weak				Myronivske 51	1
		weak				Veselopodolyanske 403	3
		medium				Podolyanske 24/273	5
		strong				Lilove	7
22.	**60-65 VG**	**Stigma: color**					
QL		light pink				Kharkivske 31, Kyivske 96	1
		violet				Lilove	3
23. **(*)** **(+)**	**90-92 MS**	**Grain: size**					
QN		small				Omske 9	3
		medium				Myronivske 51, Syayvo	5
		large				Kyivske 96, Veselopodolyanske 176	7
		very large				Horlinka	9

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
24. (*) (+)	**90-92 VG**	**Grain: shape**					
PQ		narrow elliptic		Missing examples varieties: The identification of example varieties for state of expression (1) is undergoing			1
		broad elliptic				Kyivske 87, Kyivske 96, Myronivske 51, Myronivske 94	2
		round				Charivne, Novokyivske, Veselopodolyanske 63201	3
25. (*)	**90-92 VG**	**Grain: color**					
PQ		white				Tonkoplivchaste 048	1
		whitish				Novokyivske 01	2
		light yellow				Veselopodolyanske 38	3
		medium yellow				Myronivske 51	4
		dark yellow				Saratovske 2	5
		golden				Zolotyste	6
		light red		Missing examples varieties: The identification of example varieties for state of expression (7) is undergoing			7
		medium red				Lilove	8
		dark red				Veselopodolyanske 305-54	9
		red brown				Chornosimyanne 1	10
		brown				Amurske mistseve	11
26.	**90-92 VG**	**Grain: presence of spotting**					
		absent		Missing examples varieties: The identification of example varieties for state of expression (1) is undergoing			1
		present				Charivne	9

Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
27.	**90-92 VG**	**Grain: size of spots**					
QN		small		Missing examples varieties: The identification of example varieties for states of expression (3) and (7) is undergoing			3
		medium					5
		large				Charivne	7
28. (*)	**90-92 MG**	**Weight per 1000 grains**					
QN		very low					1
		low				Ostrohovske 9	3
		medium				Sonyachne	5
		high				Kharkivske 86, Myronivske 51,	7
		very large				Kyivske 96, Veselopodilske 16	9
29.	**90-92 VG**	**Kernel (not polished): color**					
PQ		whitish				Veselopodolyanske 176	1
		light yellow				Kyivske 96	3
		medium yellow				Omriyane	5
		dark yellow					7
		green yellow					9
30. (+)	**92 VG**	**Kernel: intensity of brown color of placental spot**					
QN		light				Sonyachne	3
		medium				Myronivske 51	5
		dark				Novokyivske 01	7

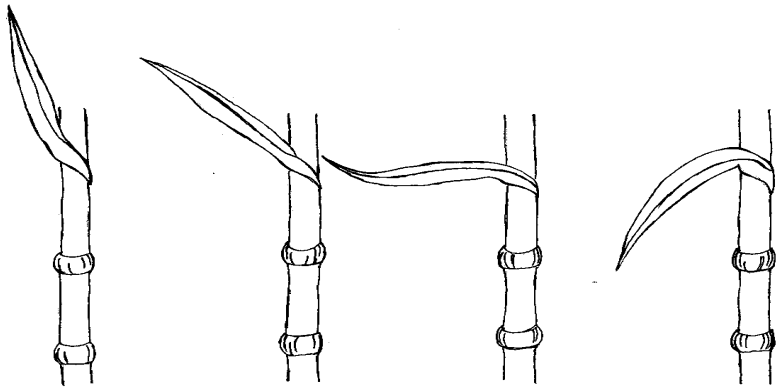
Char. No.		English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
31.	**57-59 VS**	**Resistance to smut (*Sporisorium destruens*: Yank)**					
(+)							
31.1		**Race 1**					
QL		absent				Myronivske 51	1
		present				Raduha	9
31.2		**Race 2**					
(+)							
QL		absent				Myronivske 51	1
		present				Novokyivske 01	9
31.3		**Race 3**					
(+)							
QL		absent				Myronivske 51	1
		present				Kharkivske 56	9
31.4		**Race 4**					
(+)							
QL		absent				Myronivske 51	1
		present				Kyivske 87	9
31.5		**Race 5**					
(+)							
QL		absent				Myronivske 51	1
		present				Kyivske 87	9
31.6		**Race 6**					
(+)							
QL		absent				Myronivske 51	1
		present				Kyivske 87	9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

8.2 Explanations for individual characteristics

Ad. 1: Flag leaf: attitude of blade

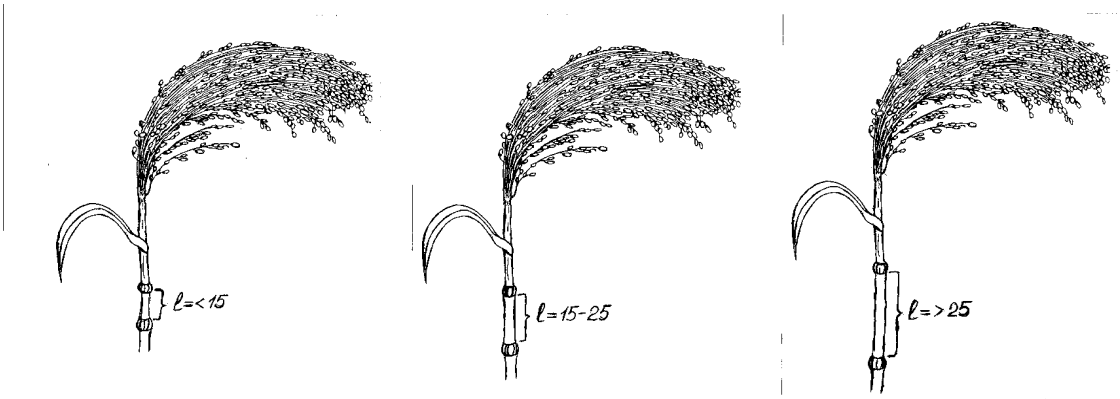


1	3	5	7
erect	semi-erect	horizontal	semi-drooping

Ad. 6: Stem: number of nodes

Very few (1-2) - 1
Few (2-5) - 3
Medium (5-8) - 5
Many (>8) - 7

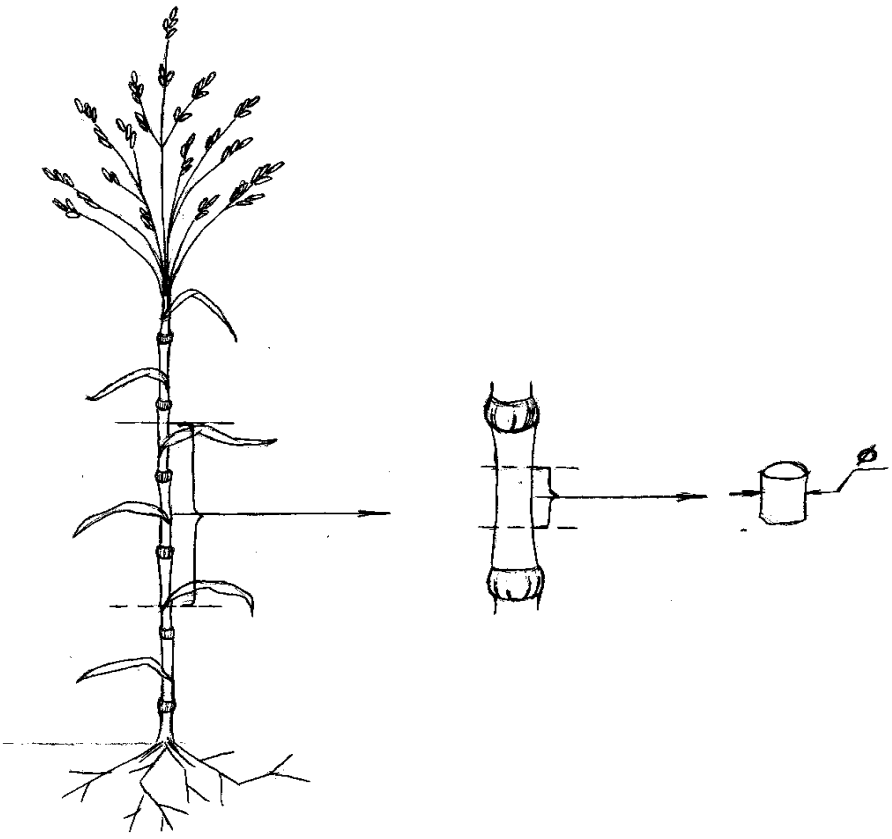
Ad. 7: Stem: length of upper internode



3	5	7
short	medium	long

Ad. 8: Stem: thickness of node

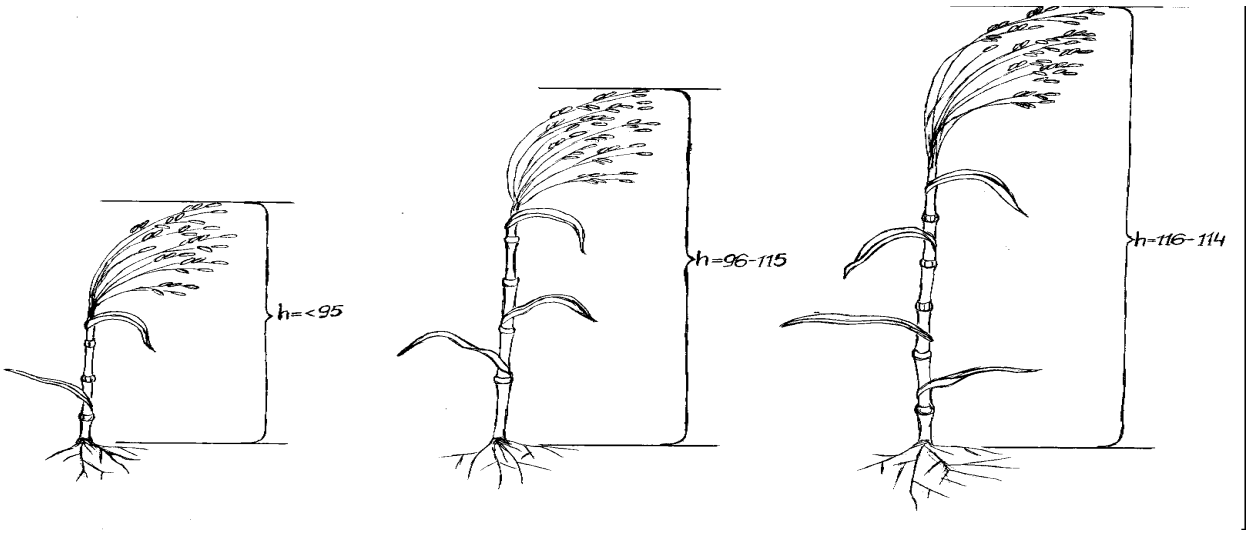
To be observed on the one-third of the plant node, which is conditionally divided into 3 parts



Ad. 9: Time of panicle emergence

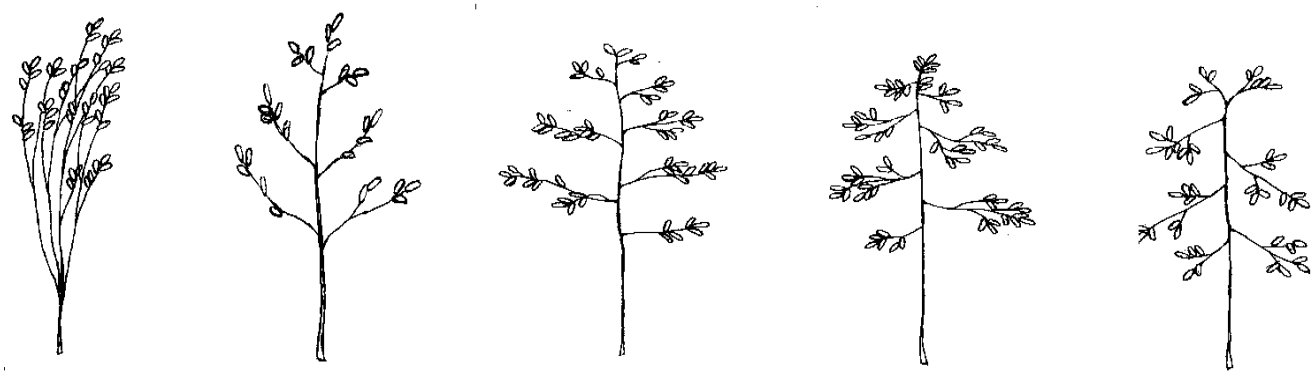
In 50% of the plants, the first spikelet is visible:

Ad. 10: Plant: natural height



3	5	7
short	medium	long

Ad. 11: Panicle: angle of branches

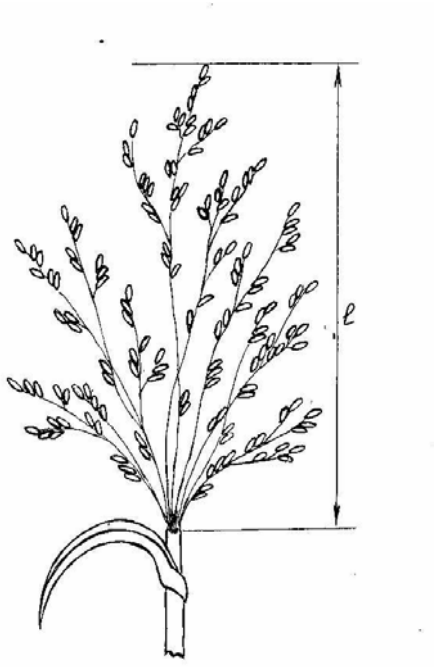


1	2	3	4	5
very acute	moderately acute	right angle	moderately obtuse	very obtuse

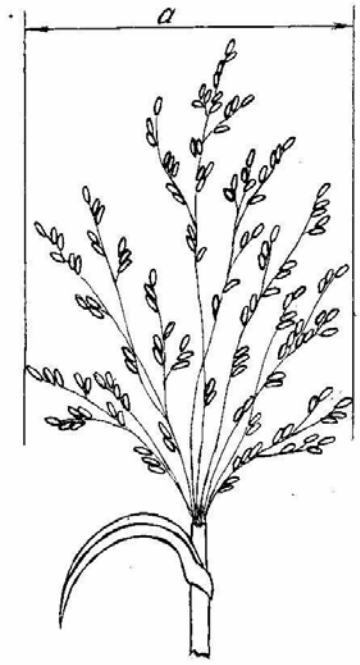
Ad. 12: Panicle: attitude

1	2	3	4
erect	semi-erect	inclined	strongly drooping

Ad. 13: Panicle: length (excluding peduncle)



Ad. 14: Panicle: width



Ad. 15: Panicle: density

The density of the panicle is determined by the division of the number of primary branches into the length of a principal axis of panicle.

3	5	7
lax	medium	dense

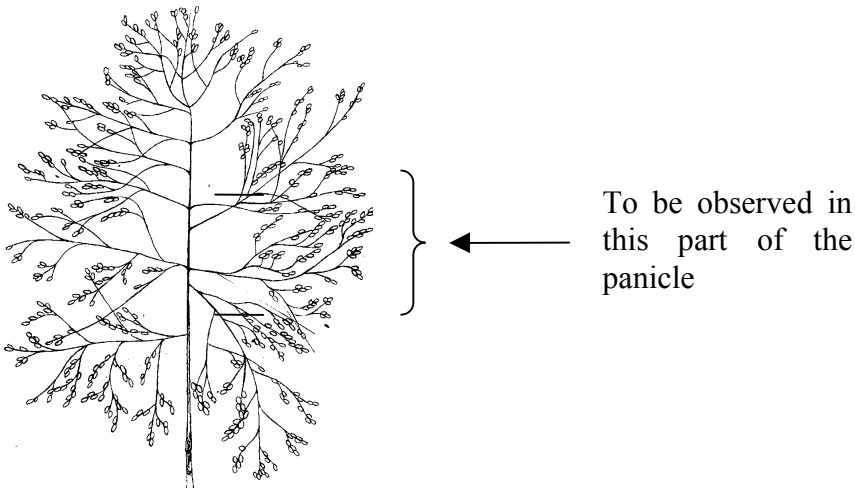
Ad. 16: Panicle: degree of branches trailing

1	3	5	7	9
absent or very weak	weak	medium	strong	very strong

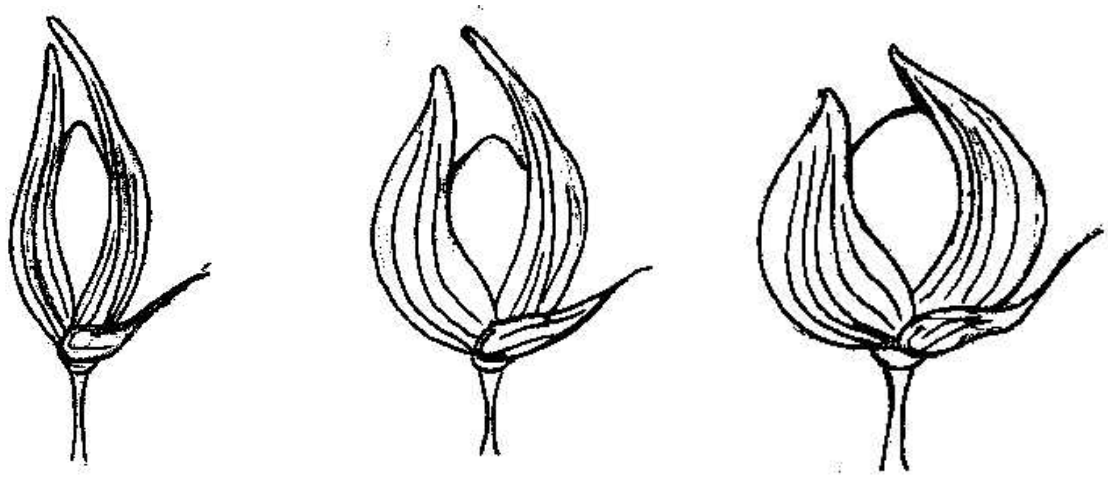
Ad. 17: Panicle: number of pillows

1	2	3	4	5
none or very few	few	medium	many	very many

Ad. 18: Panicle: length of primary branches



Ad. 19: Spikelet: shape



1	2	3
narrow elliptic	broad elliptic	round

Ad. 23: Grain: size

The grain size is its geometrical quantity (GQC), which is determined by a formula:

$$\mathbf{GQC} = \sqrt{\ } \boldsymbol{l \, x \, w \, x \, t,}$$

where

l = length
t = thickness
w = width of grain.

- small	(3)	<2,0mm.
- medium	(5)	2,01-2,5mm.
- large	(7)	2,51-2,7mm.
- very large	(9)	>2,7mm.

Ad. 24: Grain: shape

The shape of grain (V gc) is calculated as a part of real grain volume from theoretical one of globe

$$\boldsymbol{V} = \frac{Vfact}{Vthe} \qquad \mathbf{(1)}$$

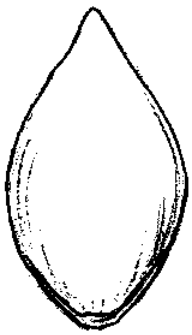
$\boldsymbol{V}$ *theor*. = 1×0,5236, where **(2)**

L = length of grain

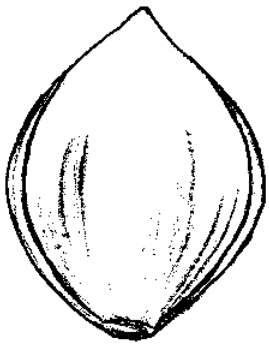
V*fact* = 0,5236 × (1/w/w/t), where **(3)**

where

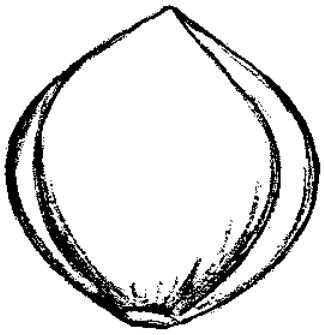
l = length
t = thickness
w = width of grain.



1
narrow elliptic

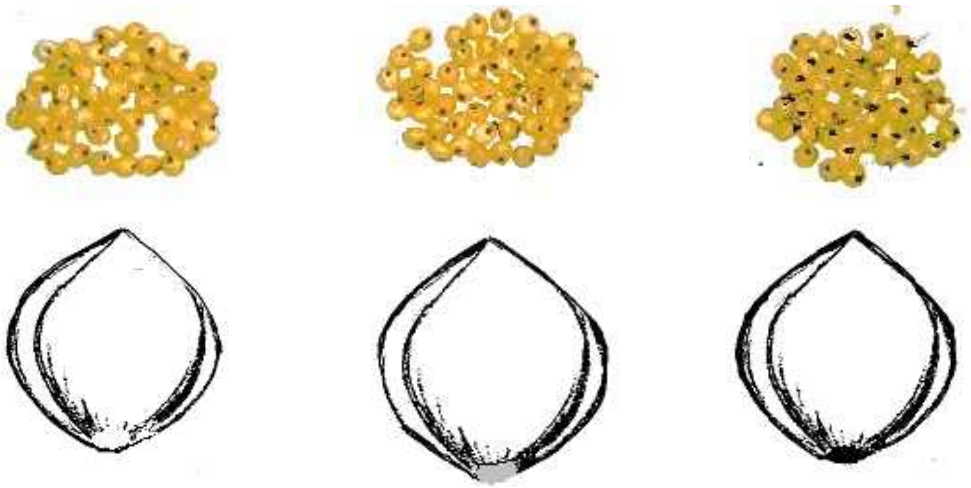


2
broad elliptic



3
round

Ad. 30: Kernel: intensity of brown color of placental spot



3	5	7
light	medium	dark

Ad. 31.1– 31.6: Resistance to affection by smut races (*Sporisorium destruens*: Yank)

Method for determination of resistance to affection by smut races:

Type of medium:	
Conditions for inoculation:	
Smut races for use:	1, 2, 3, 4, 5, 6
Inoculum:	The spores must be viable and ripe for using of each race separately
Method of inoculation:	Mechanical one: before sowing grains and smut spores carefully are mixed either hands or in paper packets, heavily shaking 100 seeds are infected with each race
Infectious load:	Non less than 0,2% spores to seed weight
Place of growing:	Field or hothouse conditions
Observations:	Evaluation (resistance, susceptibility) and description of a response 9 normal or pathomorphous, dwarf plants) are carried out in a full heading phase at typical healthy plants. On each strain sample against each race specific background the number of healthy (R) and affected (S) plants is calculated the degree of affection in percent is determined. If the affected plants are not revealed (of the single affected plants are revealed), the variety is evaluated as resistant to specific race. All other results a response “susceptibility” (non-resistance) from affected plants, which tested and attributed to the spore material of smut.
Remark:	It is possible to receive races for testing at the Institute of Agriculture (Chabany, Kyevo-Svyatoshynskyi district, Kyiv region 08162,Ukraine).

DECIMAL CODE FOR THE GROWTH STAGES OF CEREALS

2-digit Code (Zadok's Scale)	General Description	Feekes Scale
1	2	
Germination		
00	Dry seed	
01	Start of imbibition	
02		
03	Imbibition complete	
04		
05	Radicle emerged from caryopsis	
06		
07	Coleoptile emerged from caryopsis	
08		
09	Leaf just at coleoptile tip	
Seedling growth		
10	First leaf through coleoptile	1
11	First leaf unfolded	1
12	2 leaves unfolded	
13	3 leaves unfolded	
14	4 leaves unfolded	
15	5 leaves unfolded	
16	6 leaves unfolded	
17	7 leaves unfolded	
18	8 leaves unfolded	
19	9 or more leaves unfolded	
Tillering		
20	Main shoot only	
21	Main shoot and 1 tiller	
22	Main shoot and 2 tillers	
23	Main shoot and 3 tillers	3
24	Main shoot and 4 tillers	3
25	Main shoot and 5 tillers	3
26	Main shoot and 6 tillers	3
27	Main shoot and 7 tillers	3
28	Main shoot and 8 tillers	3
29	Main shoot and 9 or more tillers	
Stem elongation		
30	Pseudo stem erection (2)	4-5
31	1st node detectable	6
32	2nd node detectable	7
33	3rd node detectable	
34	4th node detectable	
35	5th node detectable	
36	6th node detectable	
37	Flag leaf just visible	8
38		

2-digit Code (Zadok's Scale)	General Description	Feekes Scale
39	Flag leaf/collor just visible	9
Booting		
40		
41	Flag leaf sheath extending	
42		
43	Boots just visible swollen	10
44		10
45	Boots swollen	10
46		
47	Flag leaf sheath	10,1
48		-//-
49	First awns visible	-//-
Inflorescence emergence		
50	First spikelet of inflorescence just visible	-//-
51	-//- -//- -//-	-//-
52	1/4 of inflorescence emerged	10,2
53	-//- -//- -//-	-//-
54	1/2 of inflorescence emerged	10,3
55	-//- -//- -//-	-//-
56	3/4 of inflorescence emerged	10,4
57	-//- -//- -//-	-//-
58	Emergence of inflorescence completed	10,5
59	-//- -//- -//-	-//-
Anthesis		
60	Beginning of anthesis	10,51
61	-//- -//- -//-	-//-
62		
63		
64	Anthesis half-way	10,52
65	-//- -//- -//-	-//-
66		
67		
68	Anthesis complete	10,53
69	-//- -//- -//-	-//-
Milk development		
70		
71	Caryopsis watery ripe	
72		
73	Early milk	11,1
74		
75	Medium milk	11,1
76		
77	Late milk	11,1
78		
79		

2-digit Code (Zadok's Scale)	General Description	Feekes Scale
Dough development		
80		
81		
82		
83	Early dough	11,2
84		
85	Soft dough	11,2
86		
87	Hard dough	11,2
88		
89		
	Ripening	
90		
91	Caryopsis hard (difficult to divide by thumbnail) (3)	11,3
92	Caryopsis hard (can no longer be dented by thumbnail) (4)	11,4
93	Caryopsis loosening in daytime	
94	Over-ripe, straw dead and collapsing	
95	Seed dormant	
96	Viable seed giving 50% germination	
97	Seed not dormant	
98	Secondary dormancy induced	
99	Secondary dormancy lost	
T1	Unrooting of seedlings	
T2		
T3	Rooting	
T4		
T5		
T6		
T7	Recovery of shoots	
T8		
T9	Resumption of vegetative growth	

9. Literature:

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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	*Panicum miliaceum* L.
1.2 Common name	Common Millet

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

(i) 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 (pro domo: see GN 31 and GN 32)

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 (3)	**Flag leaf: intensity of anthocyanin coloration**		
	weak	Lilove, Veselopodolyanske 305	3[ ]
	medium	Veselopodolyanske 403	5[ ]
	strong	Irtyshske 201	7[ ]

[#] 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:

	Characteristics	Example Varieties	Note
5.2 (7)	**Stem: length of upper internode**		
	short	Veselopodolyanske 534	3[ ]
	medium	Myronivske 51, Novo Kyivske 01, Slobozhanske	5[ ]
	long	Charivne, Kharkivske 72	7[ ]
5.3 (11)	**Panicle: angle of branches**		
	very acute	Pikulovytske	1
	moderately acute		2
	right angle	Chornomorske	3
	moderately obtuse	Kyivske 87, Veselopodilske 16	4
	very obtuse	Omske 9	5
5.4 (12)	**Panicle: attitude**		
	erect	Omske 9	1
	semi-erect	Charivne, Veselopodolyanske 305-54	2
	inclined	Kyivske 96	3
	strongly drooping	Kharkivske 57	4
5.5 (15)	**Panicle: density**		
	lax	Myronivske 51	3
	medium	Charivne	5
	dense	Pikulovytske	7

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

	Characteristics	Example Varieties	Note
5.6 (16)	**Panicle: degree of branches trailing**		
	absent or very weak	Charivne	1
	weak	Raduha, Kharkivske 71	3
	medium	Novokyivske 01, Slobozhanske	5
	strong	Kharkivske 31, Myronivske 51	7
	very strong	Veselopodolyanske 38	9
5.7 (19)	**Spikelet: shape**		
	oblong elliptic	Sonyachne	1
	elliptic	Lilove, Veselopodolyanske 176	2
	round	Charivne	3
5.8 (21)	**Glume: anthocyanin coloration**		
	absent or very weak	Myronivske 51	1
	weak	Veselopodolyanske 403	3
	medium	Podolyanske 24/273	5
	strong	Lilove	7
5.9 (23)	**Grain: size**		
	small	Omske 9	3
	medium	Myronivske 51, Syayvo	5
	large	Kyivske 96, Veselopodolyanske 176	7
	very large	Horlinka	9

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

	Characteristics	Example Varieties	Note
5.10 (24)	**Grain: shape**		
	narrow elliptic		1
	broad elliptic	Kyivske 87, Kyivske 96, Myronivske 51, Myronivske 94	2
	round	Charivne, Novokyivske, Veselopodolyanske 63201	3
5.11 (25)	**Grain: color**		
	white	Tonkoplivchaste 048	1
	whitish	Novokyivske 01	2
	light yellow	Veselopodolyanske 38	3
	medium yellow	Myronivske 51	4
	dark yellow	Saratovske 2	5
	golden	Zolotyste	6
	light red		7
	medium red	Lilove	8
	dark red	Veselopodolyanske 305-54	9
	red brown	Chornosimyanne 1	10
	brown	Amurske mistseve	11
5.12 (26)	**Grain: presence of spotting**		
	absent		1
	present	Charivne	9

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

	Characteristics	Example Varieties	Note
5.13 (28)	**Weight per 1000 grains**		
	very low		1
	low	Ostrohovske 9	3
	medium	Sonyachne	5
	high	Kharkivske 86, Myronivske 51,	7
	very large	Kyivske 96, Veselopodilske 16	9
5.14 (29)	**Kernel (not polished): color**		
	whitish	Veselopodolyanske 176	1
	light yellow	Kyivske 96	3
	medium yellow	Omriyane	5
	dark yellow		7
	green yellow		9

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

6. Similar varieties and differences from these varieties

Please use the following table and box for comments 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			

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.

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

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]