CPVO-TP/162/1 Final
English
Date: 25/03/2004

EUROPEAN UNION

COMMUNITY PLANT VARIETY OFFICE

PROTOCOL FOR DISTINCTNESS, UNIFORMITY AND STABILITY TESTS

***Allium sativum* L.**

GARLIC

UPOV Species Code: ALLIU_SAT

Adopted on 25/03/2004

I SUBJECT OF THE PROTOCOL

The protocol describes the technical procedures to be followed in order to meet the Council Regulation 2100/94 on Community Plant Variety Rights. The technical procedures have been agreed by the Administrative Council and are based on general UPOV Document TG/1/3 and UPOV Guideline TG/162/4 dated 04/04/2001 for the conduct of tests for Distinctness, Uniformity and Stability. This protocol applies to all vegetatively propagated varieties of *Allium sativum* L.

II SUBMISSION OF SEED AND OTHER PLANT MATERIAL

1. The Community Plant Variety Office (CPVO) is responsible for informing the applicant of

   - the closing date for the receipt of plant material;
   - the minimum amount and quality of plant material required;
   - the examination office to which material is to be sent.

   A sub-sample of the material submitted for test will be held in the variety collection as the definitive sample of the candidate variety.

   The applicant is responsible for ensuring compliance with any customs and plant health requirements.

2. Final dates for receipt of documentation and material by the Examination Office

   The final dates for receipt of requests, technical questionnaires and the final date or submission period for plant material will be decided by the CPVO and each Examination Office chosen.

   The Examination Office is responsible for immediately acknowledging the receipt of requests for testing, and technical questionnaires. Immediately after the closing date for the receipt of plant material the Examination Office should inform the CPVO whether acceptable plant material has been received or not. However if unsatisfactory plant material is submitted the CPVO should be informed as soon as possible.

3. Plant material requirements

   The final dates for request for technical examination and sending of Technical Questionnaire by the CPVO as well as submission date of plant material by the applicant can be found in the S2 supplement of the CPVO Official Gazette and the CPVO website (www.cpvo.europa.eu).

Quality of plants:	Should not be less than the standards laid down for plants in EC Directive 92/33 and implementing measures.
Special requirements:	Bulbs must be free from nematodes, white rot, mites, and Onion Yellow Dwarf Virus
Labelling of sample:	- Species - File number of the application allocated by the CPVO - Breeder's reference - Examination reference (if known) - Name of applicant - The phrase "On request of the CPVO"

III CONDUCT OF TESTS

1. Variety collection

A variety collection will be maintained for the purpose of establishing distinctness of the candidate varieties in test. A variety collection may contain both living material and descriptive information. A variety will be included in a variety collection only if plant material is available to make a technical examination.

Pursuant to Article 7 of Council Regulation No. 2100/94, the basis for a collection should be the following:

- varieties listed or protected at the EU level or at least in one of the EEA Member States;
- varieties protected in other UPOV Member States;
- any other variety in common knowledge.

The composition of the variety collection in each Examination Office depends on the environmental conditions in which the Examination Office is located.

Variety collections will be held under conditions which ensure the long term maintenance of each accession. It is the responsibility of Examination Offices to replace reference material which has deteriorated or become depleted. Replacement material can only be introduced if appropriate tests confirm conformity with the existing reference material. If any difficulties arise for the replacement of reference material Examination Offices must inform the CPVO. If authentic plant material of a variety cannot be supplied to an Examination Office the variety will be removed from the variety collection.

2. Material to be examined

Candidate varieties will be directly compared with other candidates for Community plant variety rights tested at the same Examination Office, and with appropriate varieties in the variety collection. When necessary an Examination Office may also include other candidates and varieties. Examination Offices should therefore make efforts to co-ordinate the work with other Offices involved in DUS testing of garlic. There should be at least an exchange of technical questionnaires for each candidate variety, and during the test period, Examination Offices should notify each other and the CPVO of candidate varieties which are likely to present problems in establishing distinctness. In order to solve particular problems Examination Offices may exchange plant material.

3. Characteristics to be used

The characteristics to be used in DUS tests and preparation of descriptions shall be those referred to in the Annex 2. All the characteristics shall be used, providing that observation of a characteristic is not rendered impossible by the expression of any other characteristic, or the expression of a characteristic is prevented by the environmental conditions under which the test is conducted. In the latter case, the CPVO should be informed. In addition the existence of some other regulation e.g. plant health, may make the observation of the characteristic impossible.

The Administrative Council empowers the President, in accordance with Article 23 of Commission Regulation N° 1239/95, to insert additional characteristics and their expressions in respect of a variety.

4. Grouping of varieties

The varieties and candidates to be compared will be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety and which in their various states of expression are fairly evenly distributed throughout the collection. In the case of continuous grouping characteristics overlapping states of expression between adjacent groups is required to reduce the risks of incorrect allocation of candidates to groups. The characteristics which may be used for grouping are the following:

(a) Pseudostem: flowering stem (characteristic 10)

(b) Clove: colour of scale (characteristic 29)

(c) Time of harvest maturity (characteristic 33)

(d) End of dormancy of clove in bulb (characteristic 34)

5. Trial designs and growing conditions

The minimum duration of tests will normally be two independent growing cycles. For vegetatively propagated varieties, the duration of the testing may be reduced to one growing cycle if the results on distinctness and uniformity are conclusive. Tests will be carried out under conditions ensuring normal growth. The size of the plots will be such that plants or parts of plants may be removed for measuring and counting without prejudice to the observations which must be made up to the end of the growing period.

The test design is as follows

As a minimum, each test should include a total of 60 plants which should be divided between two or more replicates.

All observations determined by measurements or counting should be made on 30 plants or parts of 30 plants.

All observations on the leaf, foliage and flowering stem should be made before foliage fall-over.

All observations on the bulbs should be made on bulbs harvested in the trial.

6. Special tests

In accordance with Article 83(3) of Council Regulation No. 2100/94 an applicant may claim either in the Technical Questionnaire or during the test that a candidate has a characteristic which would be helpful in establishing distinctness. If such a claim is made and is supported by reliable technical data, a special test may be undertaken providing that a technically acceptable test procedure can be devised.

Special tests will be undertaken, with the agreement of the President of CPVO, where distinctness is unlikely to be shown using the characters listed in the protocol.

7. Standards for decisions

a) **Distinctness**

A candidate variety will be considered to be distinct if it meets the requirements of Article 7 of Council Regulation No. 2100/94.

b) **Uniformity**

For the assessment of uniformity of vegetatively propagated varieties, a population standard of 1% with an acceptance probability at least 95% should be applied.

Table of maximum numbers of off-types allowed for uniformity standards.

Number of plants	off-types allowed
6-35	1
36-82	2
83-137	3

c) **Stability**

A candidate will be considered to be sufficiently stable when there is no evidence to indicate that it lacks uniformity.

IV REPORTING OF RESULTS

After each recording season the results will be summarised and reported to the CPVO in the form of a UPOV model interim report in which any problems will be indicated under the headings distinctness, uniformity and stability. Candidates may meet the DUS standards after two growing periods but in some cases three growing periods may be required. When tests are completed the results will be sent by the Examination Office to the CPVO in the form of a UPOV model final report.

If it is considered that the candidate complies with the DUS standards, the final report will be accompanied by a variety description in the format recommended by UPOV. If not the reasons for failure and a summary of the test results will be included with the final report.

The CPVO must receive interim reports and final reports by the date agreed between the CPVO and the examination office.

Interim reports and final examination reports shall be signed by the responsible member of the staff of the Examination Office and shall expressly acknowledge the exclusive rights of disposal of CPVO.

V LIAISON WITH THE APPLICANT

If problems arise during the course of the test the CPVO should be informed immediately so that the information can be passed on to the applicant. Subject to prior agreement, the applicant may be directly informed at the same time as the CPVO particularly if a visit to the trial is advisable.

The interim report as well as the final report shall be sent by the Examination Office to the CPVO.

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ANNEXES TO FOLLOW

ANNEX I

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ANNEX II

ANNEX I

TABLE OF CHARACTERISTICS TO BE USED IN DUS-TEST AND PREPARATION OF DESCRIPTIONS

CPVO N°	UPOV N°	Characteristics	Examples	Note
1.	**1.**	**Foliage: density**		
		loose	Ramses	3
		medium	Printanor	5
		dense	Germidour	7
2.	**2.**	**Foliage: attitude**		
(+)		erect	Jolimont	1
		erect to semi-erect	Printanor	2
		semi-erect	Jardinor	3
3.	**3.**	**Leaf: green colour**		
		light		3
		medium	Messidrome	5
		dark	Germidour	7
4.	**4.**	**Leaf: waxiness**		
		absent or very weak		1
		weak	Sprint	3
		medium	Messidrome	5
		strong	Germidour, Moratop	7
		very strong	Gayant, Printanor	9
5.	**5.**	**Leaf: length (longest leaf)**		
		short	Jardinor	3
		medium	Moraluz, Morasur	5
		long	Sultop	7

CPVO N°	UPOV N°	Characteristics	Examples	Note
6.	**6.**	**Leaf: width (as for 5)**		
		narrow	Ramses	3
		medium	Printanor	5
		broad	Germidour	7
7.	**7.**	**Leaf: shape in cross section**		
		strongly concave		1
		slightly concave	Ramses	2
		flat	Germidour	3
8.	**8.**	**Pseudostem: intensity of anthocyanin coloration at base**		
		absent or very weak	Printanor	1
		weak	Messidrome	3
		medium		5
		strong	Germidour	7
		very strong		9
9.	**9.**	**Pseudostem: width of the base**		
		narrow	Ramses	3
		medium	Printanor	5
		broad	Germidour	7
10.	**10.**	**Pseudostem: flowering stem**		
		absent	Germidour	1
G		present	Rose de Lautrec	9
11.	**11.**	**Flowering stem: curvature**		
(+)		absent	Morasur, Sultop	1
		present	Iberose	9

CPVO N°	UPOV N°	Characteristics	Examples	Note
12.	**12.**	**Flowering stem: length**		
(+)		short	Rose de Lautrec	3
		medium	Morasol	5
		long	Sultop	7
13.	**13.**	**Flowering stem: bulblets**		
(+)		absent	Rose de Lautrec	1
		present	Germidour	9
14.	**14.**	**Bulb: size**		
		small	Fructidor	3
		medium	Printanor	5
		large	Messidrome	7
15.	**15.**	**Bulb: shape in longitudinal section**		
(+)		transverse narrow elliptic	Sprint	1
		transverse broad elliptic	Germidour	2
		circular	De Roumanie	3
16.	**16.**	**Bulb: shape in cross section**		
		elliptic	Fructidor	1
		circular	Sprint	2
17.	**17.**	**Bulb: position of cloves at tip of bulb**		
(+)		inserted	Sprint	1
		at same level	Corail	2
		exerted	Germidour	3
18.	**18.**	**Bulb: position of root disc**		
		depressed	Germidour	1
		flat	Rose de Lautrec	2
		raised		3

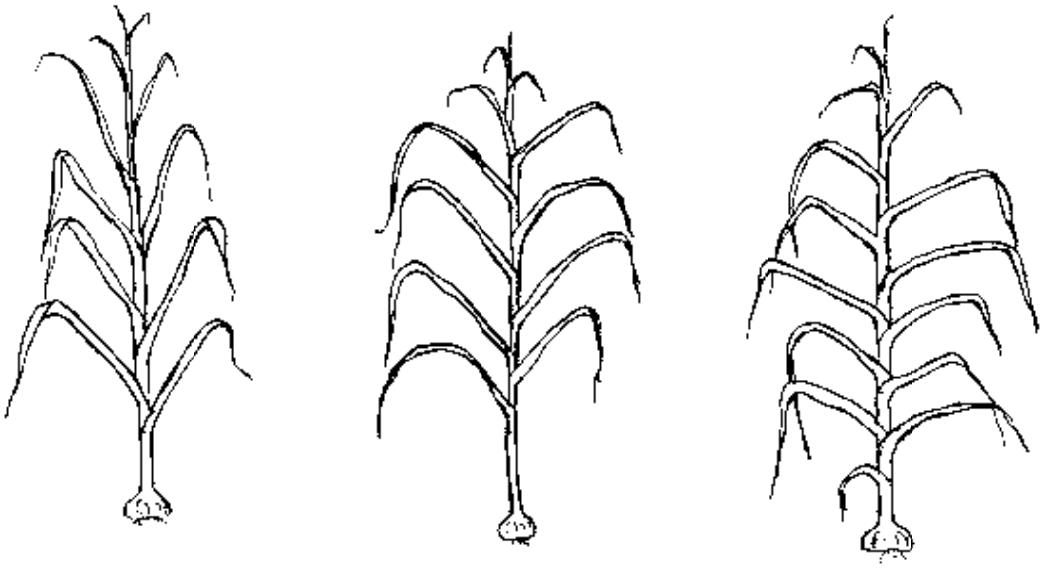
CPVO N°	UPOV N°	Characteristics	Examples	Note
19.	**19.**	**Bulb: shape of base**		
(+)		recessed	Germidour, Ramses	1
		flat	Printanor	2
		rounded	De Roumanie	3
20.	**20.**	**Bulb: compactness of cloves**		
		loose	Sprint	3
		medium	Germidour	5
		compact	Printanor	7
21.	**21.**	**Bulb: ground colour of dry external scales**		
		white	Printanor, Ramses	1
		yellowish white	Vigor Max, Vigor Supreme	2
		reddish white	Germidour	3
22.	**22.**	**Bulb: anthocyanin stripes on dry external scales**		
		absent	Printanor, Ramses	1
		present	Germidour, Sprint	9
23.	**23.**	**Bulb: skin adherence of dry external scales**		
		weak	Sprint	3
		medium	Messidrome	5
		strong	Printanor, Gayant	7
24.	**24.**	**Bulb: thickness of dry external scales**		
		thin	Ramses	3
		medium	Morasur	5
		thick	Jolimont	7
25.	**25.**	**Bulb: number of cloves**		
		few	Mondor	3
		medium	Printanor	5
		many	Ramses	7

CPVO N°	UPOV N°	Characteristics	Examples	Note
26.	**26.**	**Bulb: distribution of cloves**		
(+)		radial	Rose de Lautrec, Sprint	1
		non-radial	Blanc de Beaumont, Messidrome, Rougeatre de Vendée	2
27.	**27.**	**Bulb: external cloves**		
(+)		absent	Sprint, Sultop	1
		present	Blanc de Beaumont, Morasol	9
28.	**28.**	**Clove: size**		
		small	Rose de Lautrec	3
		medium	Printanor	5
		large	Germidour	7
29.	**29.**	**Clove: colour of scale**		
		white	Ramses	1
		cream	Messidrome	2
		pink	Printanor	3
		purple	Morasol, Sprint	4
G		brown	Corail	5
30.	**30.**	**Clove: intensity of colour of scale**		
		weak	Printanor	3
		medium	Ibérose, Sultop	5
		strong	Morasol, Morasur, Moratop	7
31.	**31.**	**Clove: anthocyanin stripes on scale**		
		absent	Ramses	1
		present	Morasur	9
32.	**32.**	**Clove: colour of flesh**		
		white	Printanor	1
		yellowish	Germidour	2

CPVO N°	UPOV N°	Characteristics	Examples	Note
33.	**33.**	**Time of harvest maturity**		
		very early	Ramses	1
		early	Sprint	3
		medium	Germidour, Messidrome	5
		late	Printanor	7
G		very late	Gayant	9
34.	**34.**	**End of dormancy of clove in bulb**		
(+)		very early	Ramses	1
		early	Sprint	3
		medium	Rose de Lautrec	5
		late	Fructidor	7
G		very late	Gayant	9

EXPLANATIONS AND METHODS

Ad. 2: Foliage: attitude



1
erect

2
erect to semi-erect

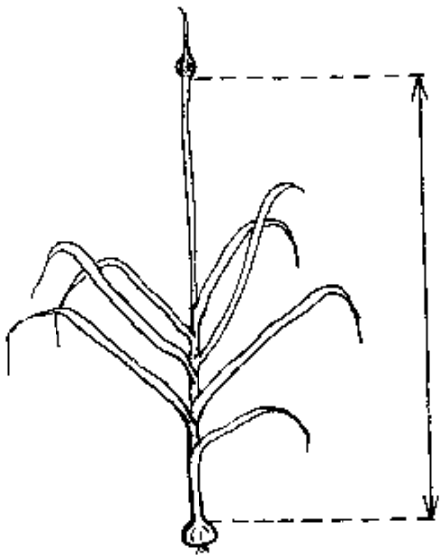
3
semi-erect

Ad. 11: Flowering stem: curvature

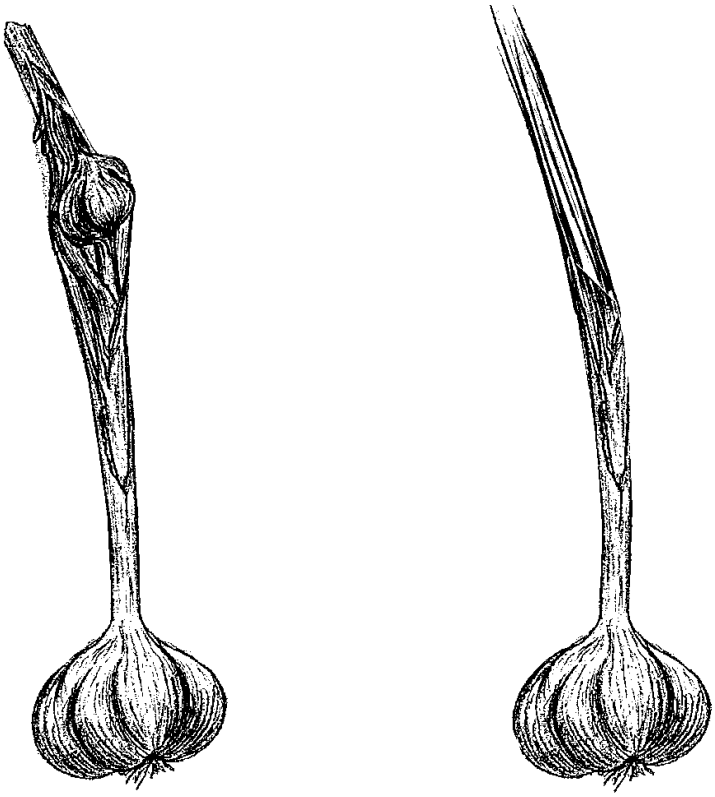
1
absent

9
present

Ad. 12: Flowering stem: length



Ad. 13: Flowering stem: bulblets



1
absent

9
present

Ad. 15: Bulb: shape in longitudinal section

1
transverse narrow elliptic

2
transverse broad elliptic

3
circular

Ad. 17: Bulb: position of cloves at tip of bulb

1
inserted

2
at same level

3
exerted

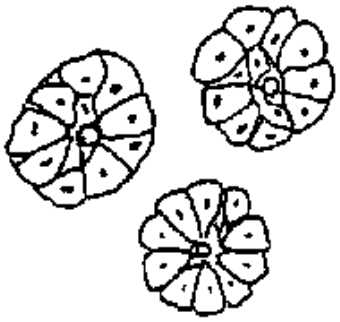
Ad. 19: Bulb: shape of base

1
recessed

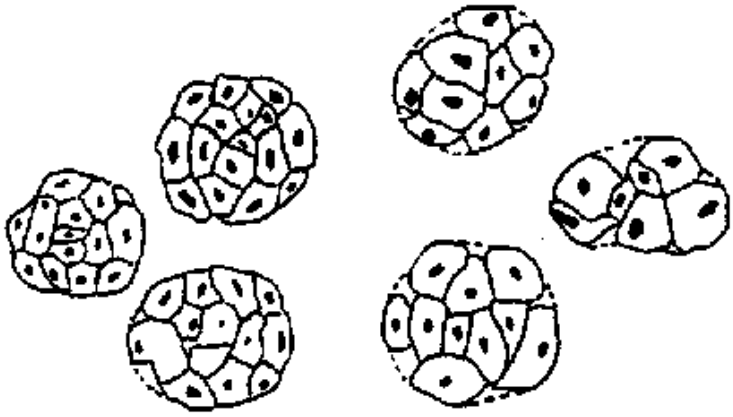
2
flat

3
rounded

Ad. 26: Bulb: distribution of cloves

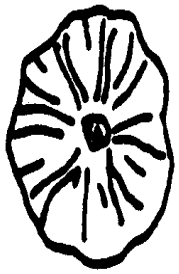


1
radial

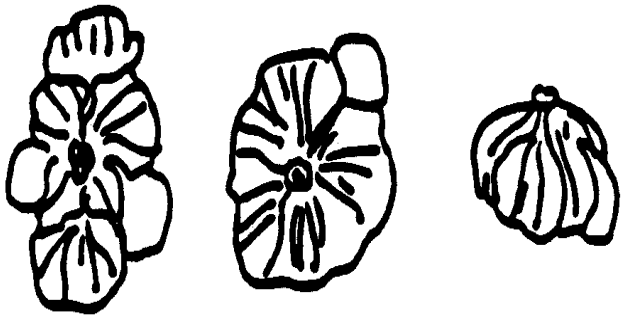


2
non-radial

Ad. 27: Bulb: external cloves



1
absent



9
present

Ad. 34: End of dormancy of clove in bulb

The optimum humidity to be identified.

The end of dormancy is evaluated by observing the percentage of sprouted bulbs.

LITERATURE

C. M. Messiaen, J. Cohat, J. P. Leroux, M. Pichon, A. Beyries, 1993: “Vegetatively Propagated Edible Alliums”. Edition INRA, 222 pp.

ANNEX II

European Union
Community Plant Variety Office

TECHNICAL QUESTIONNAIRE

to be completed in connection with an application for Community Plant Variety Rights
Please answer all questions. A question without any answer will lead to a non-attribution of an application date. In cases where a field / question is not applicable, please state so.

1. **Botanical taxon:** Name of the genus, species or sub-species to which the variety belongs and common name

***Allium sativum* L.**

GARLIC

2. **Applicant(s):** Name(s) and address(es), phone and fax number(s), Email address, and where appropriate name and address of the procedural representative

3. **Variety denomination**

a) Where appropriate proposal for a variety denomination:

b) Provisional designation (breeder's reference):

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

4.1 Method of maintenance and reproduction

(a)

(i) natural clone ..... [ ]

(ii) clone from in vitro culture ..... [ ]

(iii) clone from seedlings ..... [ ]

(iv) others (please indicate) ..... [ ]

(b)

(i) vegetatively propagated variety ..... [ ]

(ii) others (please indicate) ..... [ ]

(c) Other information on genetic origin and breeding method

4.2 Geographical origin of the variety: the region and the country in which the variety was bred or discovered and developed

4.3 Shall the information on data relating to components of hybrid varieties including data related to their cultivation be treated as confidential?

[ ] YES [ ] NO

If yes, please give this information on the attached form for confidential information.

If no, please give information on data relating to components of hybrid varieties including data related to their cultivation:

Breeding scheme (indicate female component first)

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

Characteristics		Example varieties	Note
5.1 (2)	**Foliage: attitude**		
	erect	Jolimont	1 [ ]
	erect to semi-erect	Printanor	2 [ ]
	semi-erect	Jardinor	3 [ ]
5.2 (3)	**Leaf: green colour**		
	light		3 [ ]
	medium	Messidrome	5 [ ]
	dark	Germidour	7 [ ]
5.3 (10)	**Pseudostem: flowering stem**		
	absent	Germidour	1 [ ]
	present	Rose de Lautrec	9 [ ]
5.4 (14)	**Bulb: size**		
	small	Fructidor	3 [ ]
	medium	Printador	5 [ ]
	large	Messidrome	7 [ ]
5.5 (15)	**Bulb: shape in longitudinal section**		
	transverse narrow elliptic	Sprint	1 [ ]
	transverse broad elliptic	Germidour	2 [ ]
	circular	De Roumanie	3 [ ]
5.6 (21)	**Bulb: ground colour of dry external scales**		
	white	Printanor, Ramses	1 [ ]
	yellowish white	Vigor Max, Vigor Supreme	2 [ ]
	reddish white	Germidour	3 [ ]

	Characteristics	Example varieties	Note
5.7 (27)	**Bulb: external cloves**		
	absent	Sprint, Sultop	1 [ ]
	present	Blanc de Beaumont, Morasol	9 [ ]
5.8 (28)	**Clove: size**		
	small	Rose de Lautrec	3 [ ]
	medium	Printador	5 [ ]
	large	Germidour	7 [ ]
5.9 (29)	**Clove: colour of scale**		
	white	Ramses	1 [ ]
	cream	Messidrome	2 [ ]
	pink	Printador	3 [ ]
	purple	Morasol, Sprint	4 [ ]
	brown	Corail	5 [ ]
5.10 (32)	**Clove: colour of flesh**		
	white	Printador	1 [ ]
	yellowish	Germidour	2 [ ]
5.11 (33)	**Time of harvest maturity**		
	very early	Ramses	1 [ ]
	early	Sprint	3 [ ]
	medium	Germidour, Messidrome	5 [ ]
	late	Printador	7 [ ]
	very late	Gayant	9 [ ]

Characteristics		Example varieties	Note
5.12 (34)	**End of dormancy of clove in bulb**		
	very early	Ramses	1 [ ]
	early	Sprint	3 [ ]
	medium	Rose de Lautrec	5 [ ]
	late	Fructidor	7 [ ]
	very late	Gayant	9 [ ]

6. Similar varieties and differences from these varieties:

Denomination of similar variety	Characteristic in which the similar variety is different[1)]	State of expression of similar variety	State of expression of candidate variety

[1)] 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

7.2.1 Type

(a) Long-day type autumn [ ]

(b) Short-day type spring [ ]

7.2.2 Special conditions

[ ] YES, please specify

[ ] NO

7.3 Other information

[ ] YES, please specify

[ ] NO

8. GMO-information required

The variety represents a Genetically Modified Organism within the meaning of Article 2(2) of Council Directive EC/2001/18 of 12/03/2001.

[ ] YES [ ] NO

If yes, please add a copy of the written attestation of the responsible authorities stating that a technical examination of the variety under Articles 55 and 56 of the Basic Regulation does not pose risks to the environment according to the norms of the above-mentioned Directive.

9. Information on plant material to be examined

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 or pesticide)	[ ] Yes	[ ] No
(c) Tissue culture	[ ] Yes	[ ] No
(d) Other factors	[ ] Yes	[ ] No

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

I/we hereby declare that to the best of my/our knowledge the information given in this form is complete and correct.

Date Signature Name

[End of document]