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Ces principes directeurs d'examen ont été remplacés par une version ultérieure. La version adoptée la plus récente des principes directeurs d'examen figure à l'adresse suivante : http://www.upov.int/test_guidelines/fr/list.jsp

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Las presentes directrices de examen han sido reemplazadas por una versión posterior. La versión de las directrices de examen de más reciente aprobación está disponible en http://www.upov.int/test_guidelines/es/list.jsp.

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA

LETTUCE

UPOV Code: LACTU_SAT

Lactuca sativa L.

*

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names: *

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Lactuca sativa</i> L.	Lettuce	Laitue	Salat	Lechuga

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 varieties of *Lactuca sativa* L.

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 in the form of seed.

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

15 g or 15,000 seeds.

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.

2.4 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 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 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

3.4 *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 60 plants, which should be divided between two or more replicates.

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.

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 60 plants, 2 off-types 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.

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 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 In the first place, the collection should be divided according to the following growth types:

Plant: growth type

Examples:

- | | |
|----------------------------------|--|
| 1. Butterhead Lettuce: | Clarion, Merveille des quatre saisons, Verpia |
| 2. Crisphead Lettuce: | Blonde de Paris (Batavia), Calmar, Saladin (Iceberg) |
| 3. Cos Lettuce (Roman Lettuce): | Blonde maraîchère (Roman types) |
| 4. "Grasse" or Latin Lettuce: | Bibb, Sucrine |
| 5. Cutting or Gathering Lettuce: | Frisée d'Amérique, Lollo rossa, Oakleaf, Salad Bowl |
| 6. Stem Lettuce: | Celtuce |

For further information, see Section 8.1 "Key to Lettuce Types".

5.4 The following have been agreed as useful grouping characteristics:

- (a) Seed: color (characteristic 1)
- (b) Leaf: anthocyanin coloration (characteristic 20)
- (c) Time of beginning of bolting under long day conditions (characteristic 35)
- (d) Resistance to downy mildew (*Bremia lactucae*): Isolate Bl:16 (characteristic 39.7)

5.5 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

QL: Qualitative characteristic – see Chapter 6.3

QN: Quantitative characteristic – see Chapter 6.3

PQ: Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS: See Chapter 3.3.1

(a)-(c) See Explanations on the Table of Characteristics in Chapter 8.2

(+) See Explanations on the Table of Characteristics in Chapter 8.3

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	VG	Seed: color	Semence: couleur	Samen: Farbe	Semilla: color	
QL	white	blanche	weiß	blanco	Verpia	1
	yellow	jaune	gelb	amarillo	Durango	2
	black	noire	schwarz	negro	Kagraner Sommer	3
2. (*)(+)	VG	Seedling: anthocyanin coloration	Plantule: pigmentation anthocyanique	Keimpflanze: Anthocyanfärbung	Plántula: pigmentación antociánica	
QL	absent	absente	fehlend	ausente	Verpia	1
	present	présente	vorhanden	presente	Pirat	9
3.	VG	Seedling: size of cotyledon (fully developed)	Plantule: taille du cotylédon (à complet développement)	Keimpflanze: Größe des Keimblatts (voll entwickelt)	Plántula: tamaño del cotiledón (plenamente desarrollado)	
QN	small	petit	klein	pequeño	Romance	3
	medium	moyen	mittel	medio	Expresse	5
	large	grand	groß	grande	Verpia	7
4.	VG	Seedling: shape of cotyledon	Plantule: forme du cotylédon	Keimpflanze: Form des Keimblatts	Plántula: forma del cotiledón	
QN	narrow elliptic	elliptique étroit	schmal elliptisch	elíptica estrecha	Calmar	3
	medium elliptic	elliptique moyen	mittel elliptisch	elíptica media	Frisette	5
	broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Fiorella, Sunrise	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5.	VG	Leaf: attitude at 10-12 leaf stage	Feuille: port au stade 10-12 feuilles	Blatt: Stellung im 10-12 Blattstadium	Hoja: porte en el estado de 10 a 12 hojas		
QN		erect	dressé	aufrecht	erecto	Baby Star, Romance	1
		semi-erect	demi-dressé	halbaufrecht	semierecto	Great Lakes 118, Soraya	3
		prostrate	étalé	liegend	postrado	Unicum, Vanguard 75	5
6.	VG	Leaf blade: division (as for 5)	Limbe: division (comme pour 5)	Blattspreite: Gliederung (wie bei 5)	Limbo: división (como para 5)		
(+)							
PQ		entire	entier	ungeteilt	entero	Fiorella, Sunrise	1
		lobed	lobé	gelappt	lobulado	A couper à feuille de chêne blonde à graine noire, Salad Bowl	2
		divided	fendu	gespalten	dividido	Lagon, Monet	3
7.	VG	Plant: diameter	Plante: diamètre	Pflanze: Durchmesser	Planta: diámetro		
(*)							
QN	(a)	very small	très petit	sehr klein	muy pequeña	Pavane, Tom Thumb	1
		small	petit	klein	pequeña	Bastion, Gotte à graine blanche	3
		medium	moyen	mittel	media	Clarion, Verpia	5
		large	grand	groß	grande	Great Lakes 659, Musette	7
		very large	très grand	sehr groß	muy grande	El Toro, Yuma	9
8.	VG	Plant: head formation	Plante: formation d'une pomme	Pflanze: Kopfbildung	Planta: formación del cogollo		
(*)							
PQ	(a)	no head	pas de pomme	kein Kopf	sin cogollo	Blonde à couper améliorée, Lollo rossa	1
		open head	pomme ouverte	offener Kopf	cogollo abierto	Manfred, Monet	2
		closed head (overlapping)	pomme fermée (chevauchement)	geschlossener Kopf (Überlappung)	cogollo cerrado (solapándose)	Kelvin, Sunrise	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	VG	<u>Varieties with closed head formation only:</u> Head: degree of overlapping of upper part of leaves	<u>Variétés à pomme fermée seulement:</u> Pomme: degré du chevauchement de la partie supérieure des feuilles	<u>Nur Sorten mit geschlossenem Kopf:</u> Kopf: Stärke des Überlappens des oberen Teils der Blätter	<u>Solamente variedades con cogollo cerrado:</u> Cogollo: grado de solapamiento de la parte superior de las hojas		
QN	(a)	very weak	très faible	sehr gering	muy débil	Colorado	1
		weak	faible	gering	débil	Danilla, Novita	3
		medium	moyen	mittel	medio	Augusta, Fiorella	5
		strong	fort	stark	fuerte	Master, Minas	7
		very strong	très fort	sehr stark	muy fuerte	Kelvin, Roxette	9
10.	VG	Head: density	Pomme: densité	Kopf: Dichte	Cogollo: densidad		
QN	(a)	very loose	très lâche	sehr locker	muy laxa	Ninja	1
		loose	lâche	locker	laxa	Danilla, Nanda	3
		medium	moyenne	mittel	media	Blonde maraîchère	5
		dense	dense	dicht	densa	Hilde II, Kelvin	7
		very dense	très dense	sehr dicht	muy densa	Musette, Toronto	9
11.	VG	Head: size	Pomme: taille	Kopf: Größe	Cogollo: tamaño		
QN	(a)	very small	très petite	sehr klein	muy pequeña	Tom Thumb	1
		small	petite	klein	pequeña	Bastion, Gotte à graine blanche	3
		medium	moyenne	mittel	media	Fiorella, Soraya	5
		large	grande	groß	grande	Great Lakes 659, Musette	7
		very large	très grande	sehr groß	muy grande	Blonde maraîchère, El Toro	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
12.	VG	<u>Butterhead type varieties in glasshouse only:</u> Head: closing of base	<u>Seulement les variétés de type laitue de serre pommée:</u> Pomme: fermeture de la base	<u>Nur Sorten vom Typ Kopfsalat für Unterglasanbau:</u> Kopf: Geschlossenheit der Basis	<u>Solamente para variedades de tipo lechuga Trocadero en invernadero:</u> Cogollo: cierre de la base		
QN	(a)	weak	faible	gering	débil	Passe Partout	3
		medium	moyenne	mittel	medio	Carmelita	5
		strong	forte	stark	fuerte	Dustin, Manfred	7
13.	VG (*) (+)	Head: shape in longitudinal section	Pomme: forme en section longitudinale	Kopf: Form im Längsschnitt	Cogollo: forma en sección longitudinal		
PQ	(a)	narrow elliptic	elliptique étroite	schmal elliptisch	elíptica estrecha	Verte maraîchère	1
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Amadeus, Sucrine	2
		circular	arrondie	rund	circular	Passe Partout, Verpia	3
14.	VG	Leaf: thickness	Feuille: épaisseur	Blatt: Dicke	Hoja: grosor		
QN	(a)	thin	mince	dünn	delgada	Raisa, Royal Red	3
		medium	moyenne	mittel	media	Dustin, Sunrise	5
		thick	épaisse	dick	gruesa	Frisée de Beauregard	7
15.	VG	Leaf: attitude at harvest maturity (outer leaves from head lettuce or adult leaves from cutting and stem lettuce)	Feuille: port à maturité de récolte (feuilles externes de laitue pommée ou feuilles adultes de laitue à couper et de laitue-tige)	Blatt: Stellung im Erntestadium (äußere Blätter bei Kopfsalat bzw. vollentwickelte Blätter bei Schnitt- und Stengelsalat)	Hoja: porte durante la madurez para cosecha (hojas externas de lechuga de cogollo u hojas adultas de lechugas de cortar y de tallo)		
QN	(a)	erect	dressé	aufrecht	erecto	Feria, Riva	1
		semi-erect	demi-dressé	halbaufrecht	semierecto	Amelia, Toronto	3
		horizontal	horizontal	waagrecht	horizontal	Chambéry, Divina	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.	VG	Leaf: shape	Feuille: forme	Blatt: Form	Hoja: forma		
(*)							
(+)							
PQ	(a)	narrow elliptic	elliptique étroite	schmal elliptisch	elíptica estrecha	Riva, Verte maraîchère	1
		medium elliptic	elliptique moyenne	mittel elliptisch	elíptica media	Angela, Xanadu	2
		broad elliptic	elliptique large	breit elliptisch	elíptica ancha	Amadeus, Amelia	3
		circular	arrondie	rund	circular	Elsa, Sunrise, Verpia	4
		transverse broad elliptic	elliptique transverse large	quer breit elliptisch	elíptica transversal ancha	Commodore, Fiorella	5
		transverse narrow elliptic	elliptique transverse étroite	quer schmal elliptisch	elíptica transversal estrecha	Elvira, Madison	6
		obovate	obovale	verkehrt eiförmig	oboval	Raisa, Toronto	7
		broad obtrullate	losangique transverse large	verkehrt breit rautenförmig	rómbica ancha	Delicato, Monet	8
		triangular	triangulaire	dreieckig	triangular	Deer Tongue	9
17.	VG	Leaf: shape of tip	Feuille: forme du sommet	Blatt: Form der Spitze	Hoja: forma del ápice		
PQ	(a)	acute	aigu	spitz	agudo	Celtuce, Deer Tongue, Karola, Tempura	1
		obtuse	obtus	stumpf	obtus	Chicon des Charentes, Grise maraîchère	2
		rounded	arrondi	abgerundet	redondeado	Blonde Maraîchère, Maserati	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18.	VG	Leaf: hue of green color of outer leaves	Feuille: teinte de la couleur verte des feuilles externes	Blatt: Ton der Grünfärbung der äußeren Blätter	Hoja: tonalidad del color verde de las hojas externas		
PQ	(a)	absent	absente	fehlend	ausente	Donatello, Verpia	1
		yellowish	jaunâtre	gelblich	amarillento	Dorée de printemps	2
		greyish	grisâtre	gräulich	grisáceo	Celtuce, Du bon jardinier	3
		reddish	rougeâtre	rötlich	rojizo	Lollo rossa, Revolution, Rosa (see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	4
19.	VG	Leaf: intensity of color of outer leaves	Feuille: intensité de la couleur des feuilles externes	Blatt: Intensität der Farbe der äußeren Blätter	Hoja: intensidad del color de las hojas externas		
QN	(a)	very light	très claire	sehr hell	muy claro	(see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	1
		light	claire	hell	claro	(see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	3
		medium	moyenne	mittel	medio	(see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	5
		dark	foncée	dunkel	oscuro	(see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	7
		very dark	très foncée	sehr dunkel	muy oscuro	(see also Ad. 18/ voir aussi Ad. 18/ siehe auch zu 18/ véase también Ad. 18)	9
20.	VG	Leaf: anthocyanin coloration	Feuille: pigmentation anthocyanique	Blatt: Anthocyan-färbung	Hoja: pigmentación antocianica		
QL	(a)	absent	absente	fehlend	ausente	Fiorella, Sunrise	1
		present	présente	vorhanden	presente	Commodore, Pirat	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. (*)	VG	Leaf: intensity of anthocyanin coloration	Feuille: intensité de la pigmentation anthocyanique	Blatt: Intensität der Anthocyanfärbung	Hoja: intensidad de la pigmentación antociánica		
QN	(a)	very weak	très faible	sehr gering	muy débil	Chicon de Charentes, Muranta, Rumina	1
		weak	faible	gering	débil	Du bon jardinier	3
		medium	moyenne	mittel	media	Trocadéro à graine noire	5
		strong	forte	stark	fuerte	Amandine, Merveille des quatre saisons	7
		very strong	très forte	sehr stark	muy fuerte	Little Leprechaun, Revolution	9
22.	VG	Leaf: distribution of anthocyanin	Feuille: répartition de l'anthocyane	Blatt: Verteilung des Anthocyan	Hoja: distribución de la antocianina		
QL	(a)	localised	localisée	lokal begrenzt	localizada	Muranta, Rumina	1
		entire	répartie sur toute la surface	auf der gesamten Blattfläche	en toda la superficie	Delicato, Liberty	2
23.	VG	Leaf: kind of anthocyanin distribution	Feuille: type de répartition de l'anthocyane	Blatt: Art der Anthocyan-verteilung	Hoja: tipo de distribución de la antocianina		
QL	(a)	diffused only	seulement diffuse	nur diffus	únicamente difusa	Amandine, Pirat, Sanguine	1
		in spots only	seulement en taches	nur in Flecken	únicamente en manchas	Passion blonde à graine blanche, Unicum	2
		diffused and in spots	diffuse et en taches	diffus und in Flecken	difusa y en manchas	Lovina, Rougette du Midi	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24.	VG	Leaf: glossiness of upper side	Feuille: brillance de la face supérieure	Blatt: Glanz der Oberseite	Hoja: brillo del haz		
QN	(a)	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Divina, Du bon jardinier	1
		weak	faible	gering	débil	Elsa, Fiorella	3
		medium	moyenne	mittel	medio	Feria, Sunrise	5
		strong	forte	stark	fuerte	Ibis, Noisette	7
25.	VG	Leaf: blistering	Feuille: cloqure	Blatt: Blasigkeit	Hoja: abullonado		
(*)							
QN	(a)	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Donia, Frillblond	1
		weak	faible	gering	débil	Fiorella, Minas	3
		medium	moyenne	mittel	medio	Commodore	5
		strong	forte	stark	fuerte	Blonde de Paris, Smile	7
		very strong	très forte	sehr stark	muy fuerte	Blonde de Doulon	9
26.	VG	Leaf: size of blisters	Feuille: taille des cloques	Blatt: Größe der Blasen	Hoja: tamaño del abullonado		
QN	(a)	small	petites	klein	pequeñas	Dorée de printemps	3
		medium	moyennes	mittel	medianas	Dustin, Sunrise	5
		large	grandes	groß	grandes	Fiorella, Massilia	7
27.	VG	Leaf blade: degree of undulation of margin	Limbe: importance de l'ondulation du bord	Blattspreite: Grad der Randwellung	Limbo: grado de ondulación del borde		
(*)							
QN	(a)	absent or very weak	nulle ou très faible	fehlend oder sehr gering	ausente o muy débil	Dustin, Manfred	1
		weak	faible	gering	débil	Commodore, Sunrise	3
		medium	moyenne	mittel	medio	Noisette, Pentared	5
		strong	forte	stark	fuerte	Calmar, Invicta	7
		very strong	très forte	sehr stark	muy fuerte	Lollo rossa, Madison	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
28.	VG	Leaf blade: incisions of margin on apical part	Limbe:découpures du bord de la partie apicale	Blattspreite: Einschnitte am Rand der oberen Hälfte	Limbo: incisiones del borde de la zona apical		
QL	(a)	absent	absentes	fehlend	ausentes	Verpia	1
		present	présentes	vorhanden	presentes	Calmar, Gloire du Dauphiné, Unicum	9
29. (*)	VG	Leaf blade: depth of incisions on margin on apical part	Limbe: profondeur des découpures sur le bord de la partie apicale	Blattspreite: Tiefe der Einschnitte am Rand der oberen Hälfte	Limbo: profundidad de las incisiones del borde de la zona apical		
QN	(a)	shallow	peu profondes	flach	poco profundas	Pentared, Unicum	3
		medium	moyennes	mittel	medias	Ithaca Great Lakes	5
		deep	profondes	tief	profundas	Lagon, Monet	7
30.	VG	Leaf blade: density of incisions on margin on apical part	Limbe: densité des découpures sur le bord de la partie apicale	Blattspreite: Dichte der Einschnitte am Rand der oberen Hälfte	Limbo: densidad de las incisiones del borde de la zona apical		
QN	(a)	sparse	lâches	locker	laxa	Maravilla de Verano	3
		medium	moyennes	mittel	media	Calmar, De Pierre Benite	5
		dense	denses	dicht	densa	Grand Rapids, Ithaca Great Lakes	7
		very dense	très denses	sehr dicht	muy densa	Locarno, Madison	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	VG	<u>Varieties with shallow incisions on margin on apical part only:</u> Leaf blade: type of incisions on apical part	<u>Variétés avec des découpures peu profondes sur le bord de la partie apicale seulement:</u> Limbe: type d’incisions sur la partie apicale	<u>Nur Sorten mit flachen Einschnitten am Rand der oberen Hälfte:</u> Blattspreite: Typ der Einschnitte an der oberen Hälfte	<u>Solamente variedades con incisiones poco profundas del borde de la zona apical:</u> Limbo: tipo de incisiones en la zona apical		
QL	(a)	sinuate	sinueuses	gebuchtet	sinuosas	Gloire du Dauphiné	1
		dentate	dentées	gezähnt	dentadas	Calmar	2
32.	VG	Leaf blade: venation	Limbe: nervation	Blattspreite: Aderung	Limbo: nervaduras		
QL	(a)	not flabellate	non flabelliforme	nicht fächerförmig	no flabeliforme	Donatella, Verpia, Xanadu	1
		flabellate	flabelliforme	fächerförmig	flabeliforme	Gloire du Dauphiné, Locarno, Monet	2
33.	VG	Axillary sprouting	Développement des bourgeons axillaires	Seitentriebbildung	Brotación axilar		
QN		absent or very weak	absent ou très faible	fehlend oder sehr gering	ausentes o muy débiles	Valmaine	1
		weak	faible	gering	débiles	Aprilia, Sunrise	3
		medium	moyen	mittel	medios		5
		strong	fort	stark	fuertes	Riva	7
		very strong	très fort	sehr stark	muy fuertes	Doncella	9
34.	MG	Time of harvest maturity	Epoque de maturité de récolte	Zeitpunkt der Erntereife	Época de madurez para cosecha		
QN	(a)	very early	très précoce	sehr früh	muy temprana	Blonde à couper améliorée	1
		early	précoce	früh	temprana	Attraction	3
		medium	moyenne	mittel	media	Newton	5
		late	tardive	spät	tardía	Calmar	7
		very late	très tardive	sehr spät	muy tardía	El Toro	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
35. MG (*)	Time of beginning of bolting under long day conditions	Epoque de début de montaison en jours longs	Zeitpunkt des Schossbeginns unter Langtagsbedingungen	Época del comienzo de la subida a flor en condiciones de día largo		
QN	very early	très précoce	sehr früh	muy temprana	Blonde à couper améliorée	1
	early	précoce	früh	temprana	Gotte à graine blanche	3
	medium	moyenne	mittel	media	Carelia	5
	late	tardive	spät	tardía	Hilde II	7
	very late	très tardive	sehr spät	muy tardía	Erika, Kinemontepas, Rex	9
36. VG/ MG	Plant: height (flowering plant)	Plante: hauteur (plante à floraison)	Pflanze: Höhe (im Blühstadium)	Planta: altura (planta en floración)		
QN	short	courte	niedrig	baja	Gotte à graine blanche	3
	medium	moyenne	mittel	media	Samourai	5
	tall	haute	hoch	alta	Danilla, Hilde II	7
37. VG	Plant: fasciation (at flowering stage)	Plante: fasciation (à la floraison)	Pflanze: Verbänderung (im Blühstadium)	Planta: fasciación (en floración)		
QL	absent	absente	fehlend	ausente	Calmar, Romance	1
	present	présente	vorhanden	presente	Gotte jaune d'or	9
38. VG	Plant: intensity of fasciation (flowering plant)	Plante: intensité de la fasciation (plante à floraison)	Pflanze: Stärke der Verbänderung (im Blühstadium)	Planta: intensidad de la fasciación (planta en floración)		
QN	very weak	très faible	sehr gering	muy débil	Gotte à graine blanche	1
	weak	faible	gering	débil	Verte maraîchère	3
	medium	moyenne	mittel	media	Amadeus	5
	strong	forte	stark	fuerte	Gotte jaune d'or	7
	very strong	très forte	sehr stark	muy fuerte	Chicon des Charentes	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39. VG	Resistance to downy mildew (<i>Bremia lactucae</i>)	Résistance au mildiou (<i>Bremia lactucae</i>)	Resistenz gegen Falschen Mehltau (<i>Bremia lactucae</i>)	Resistencia al mildiú (<i>Bremia lactucae</i>)		
(+)						
QL						
39.1	(b)	Isolate Bl: 2	Isolat Bl: 2	Isolat Bl: 2	Aislado Bl: 2	
	(c)					
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Ninja	9
39.2	(c)	Isolate Bl: 5	Isolat Bl: 5	Isolat Bl: 5	Aislado Bl: 5	
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Sabine	9
39.3	(c)	Isolate Bl: 7	Isolat Bl: 7	Isolat Bl: 7	Aislado Bl: 7	
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Valmaine	9
39.4	(c)	Isolate Bl: 12	Isolat Bl: 12	Isolat Bl: 12	Aislado Bl: 12	
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Dandie, UCDM2	9
39.5	(c)	Isolate Bl: 14	Isolat Bl: 14	Isolat Bl: 14	Aislado Bl: 14	
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Colorado, Ninja	9
39.6	(c)	Isolate Bl: 15	Isolat Bl: 15	Isolat Bl: 15	Aislado Bl: 15	
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Colorado, Sabine	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39.7 (*)	(c) Isolate Bl: 16	Isolat Bl: 16	Isolat Bl: 16	Aislado Bl: 16		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Argelès, Ninja	9
39.8	(c) Isolate Bl: 17	Isolat Bl: 17	Isolat Bl: 17	Aislado Bl: 17		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Argelès, Ninja	9
39.9	(c) Isolate Bl: 18	Isolat Bl: 18	Isolat Bl: 18	Aislado Bl: 18		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Argelès, Ninja	9
39.10	(c) Isolate Bl: 20	Isolat Bl: 20	Isolat Bl: 20	Aislado Bl: 20		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Argelès, Ninja	9
39.11	(c) Isolate Bl: 21	Isolat Bl: 21	Isolat Bl: 21	Aislado Bl: 21		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Argelès, Colorado	9
39.12	(c) Isolate Bl: 22	Isolat Bl: 22	Isolat Bl: 22	Aislado Bl: 22		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Discovery, Ninja	9
39.13	(c) Isolate Bl: 23	Isolat Bl: 23	Isolat Bl: 23	Aislado Bl: 23		
	absent	absente	fehlend	ausente	Cobham Green, Green Towers	1
	present	présente	vorhanden	presente	Colorado, Discovery, Ninja	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39.14	(c) Isolate Bl: 24	Isolat Bl: 24	Isolat Bl: 24	Aislado Bl: 24		
	absent	absente	fehlend	ausente	Argelès, Colorado	1
	present	présente	vorhanden	presente	Dandie, UC DM14, PIVT 1309	9
39.15	(c) Isolate Bl: 25	Isolat Bl: 25	Isolat Bl: 25	Aislado Bl: 25		
	absent	absente	fehlend	ausente	Colorado, Pennlake	1
	present	présente	vorhanden	presente	Argelès, Ninja	9
39.16	(c) Isolate Bl: 26	Isolat Bl: 26	Isolat Bl: 26	Aislado Bl: 26		
	absent	absente	fehlend	ausente	Colorado, Discovery	1
	present	présente	vorhanden	presente	Balesta, Bedford	9
39.17	(c) Isolate Bl: 27	Isolat Bl: 27	Isolat Bl: 27	Aislado Bl: 27		
	absent	absente	fehlend	ausente	Balesta, Green Towers	1
	present	présente	vorhanden	presente	Bedford	9
40.	VG Resistance to (+) lettuce mosaic virus (LMV)	Résistance au virus de la mosaïque de la laitue (LMV)	Resistenz gegen Salatmosaikvirus (LMV)	Resistencia al virus del mosaico de la lechuga (LMV)		
QL	(b) Strain Ls 1 (c)	Souche Ls 1	Pathotyp Ls 1	Cepa Ls 1		
	absent	absente	fehlend	ausente	Hilde II, Salvina	1
	present	présente	vorhanden	presente	Corsica	9
41.	VG Resistance to (+) <i>Nasonovia ribisnigri</i> biotype Nr: 0	Résistance au <i>Nasonovia ribisnigri</i> biotype Nr: 0	Resistenz gegen <i>Nasonovia ribisnigri</i> Biotyp Nr: 0	Resistencia al <i>Nasonovia ribisnigri</i> biotype Nr: 0		
	absent	absente	fehlend	ausente	Green Towers, Abel, Nadine	1
	present	présente	vorhanden	presente	Silvinas, Barcelona, Dynamite	9

8. Explanations on the Table of Characteristics

8.1 *Key to Lettuce Types (under Section 5.3)*

Cultivated lettuce varieties (vegetables) can be grouped into the following growth types:

(1) Butterhead Lettuce

Heading or with a tightly filled heart, thin to medium thick tender leaves with a clear midrib; head shape ranging from broad elliptic to transverse elliptic.

(2) Crisphead Lettuce (including the Iceberg, Batavia and Maravilla types)

Weak to very strong heading, rather thin to very thick and tough leaves, no clear midrib but with flabellate venation.

Iceberg types (like Calmar and Saladin) are mainly thick and tough-leaved, predominantly green and greygreen, leaf margin hardly to rather strongly incised.

Batavia types are generally medium thick-leaved and with rather strongly blistered leaves, predominantly yellowish or medium green; under cold conditions not always clearly heading.

Maravilla types have rather thick and tough leaves, only slightly or not blistered.

(3) Cos Lettuce (Roman Lettuce)

Heading or semi-heading, elongated and rather tough leaves with a clear midrib, head shape in longitudinal section elliptic, length of head >1.5 x diameter.

(4) “Grasse” or Latin Lettuce (sometimes included under Cos Lettuce)

Heading or semi-heading, tough thick leaves with clear midrib, head shape short elliptic to slightly obovate. Some types only have a tightly filled heart, others are more similar to a short Cos Lettuce. Suitable for semi-arid conditions.

(5) Cutting or Gathering Lettuce

Rather heterogeneous group ranging from non-heading butterhead-like, non-heading Batavia-like, non-heading crisp types to Oakleaf and Catalogna (lobed) types with deeply dissected leaves (Monet) and types with strongly undulated leaf margin (Lollo). Varieties partly with a clear midrib and partly with flabellate venation of the leaves. Common characteristic: loose-leaved rosette.

(6) Stem Lettuce

Forms a fleshy stem before bolting, at least under (semi-) short day conditions; leaves are mainly tough and have a clear midrib. Leaves and/or stem are consumed.

8.2 *Explanations covering several characteristics*

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

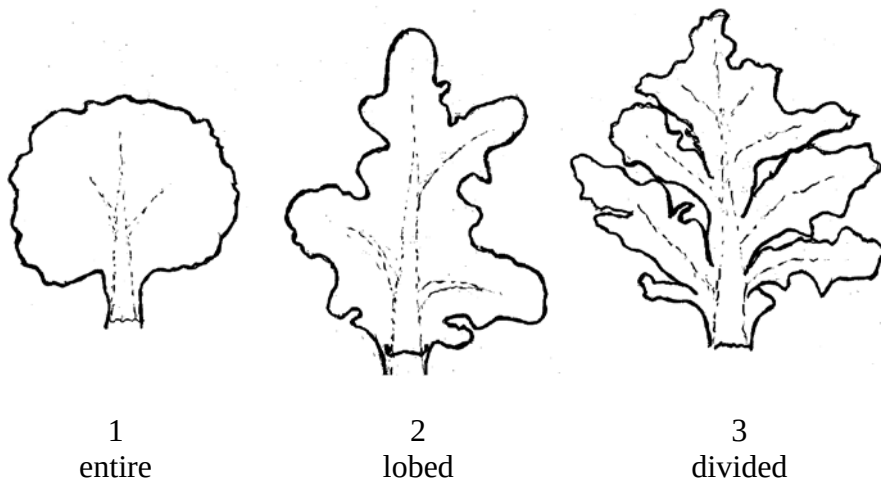
- (a) Plant, head, leaf, leaf blade: Observations on the plant, head, leaf and leaf blade should be made at harvest maturity.
- (b) Disease resistance: When disease resistance characteristics are used for assessing distinctness, uniformity and stability, records should be taken under conditions of controlled infection with a defined pathotypes.
- (c) Resistance to downy mildew: Each race should be tested separately and the results should also be indicated separately.

8.3 *Explanations for individual characteristics*

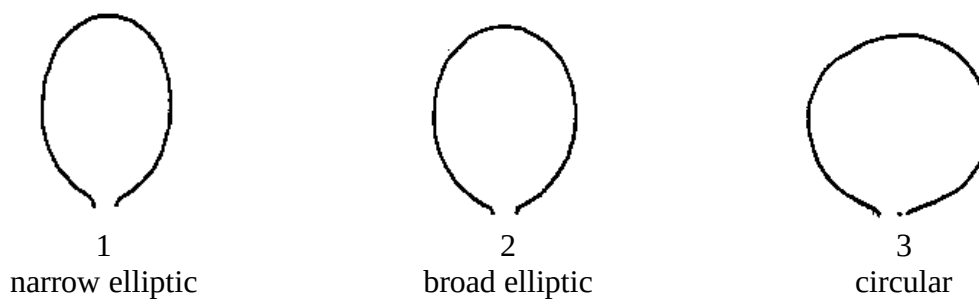
Ad. 2: Seedling: anthocyanin coloration

This characteristic can easily be observed by keeping the remaining seedlings after pricking out in the seeding tray without watering and under cold(er) conditions. Within two or three days all seedlings of varieties with anthocyanin will show this characteristic.

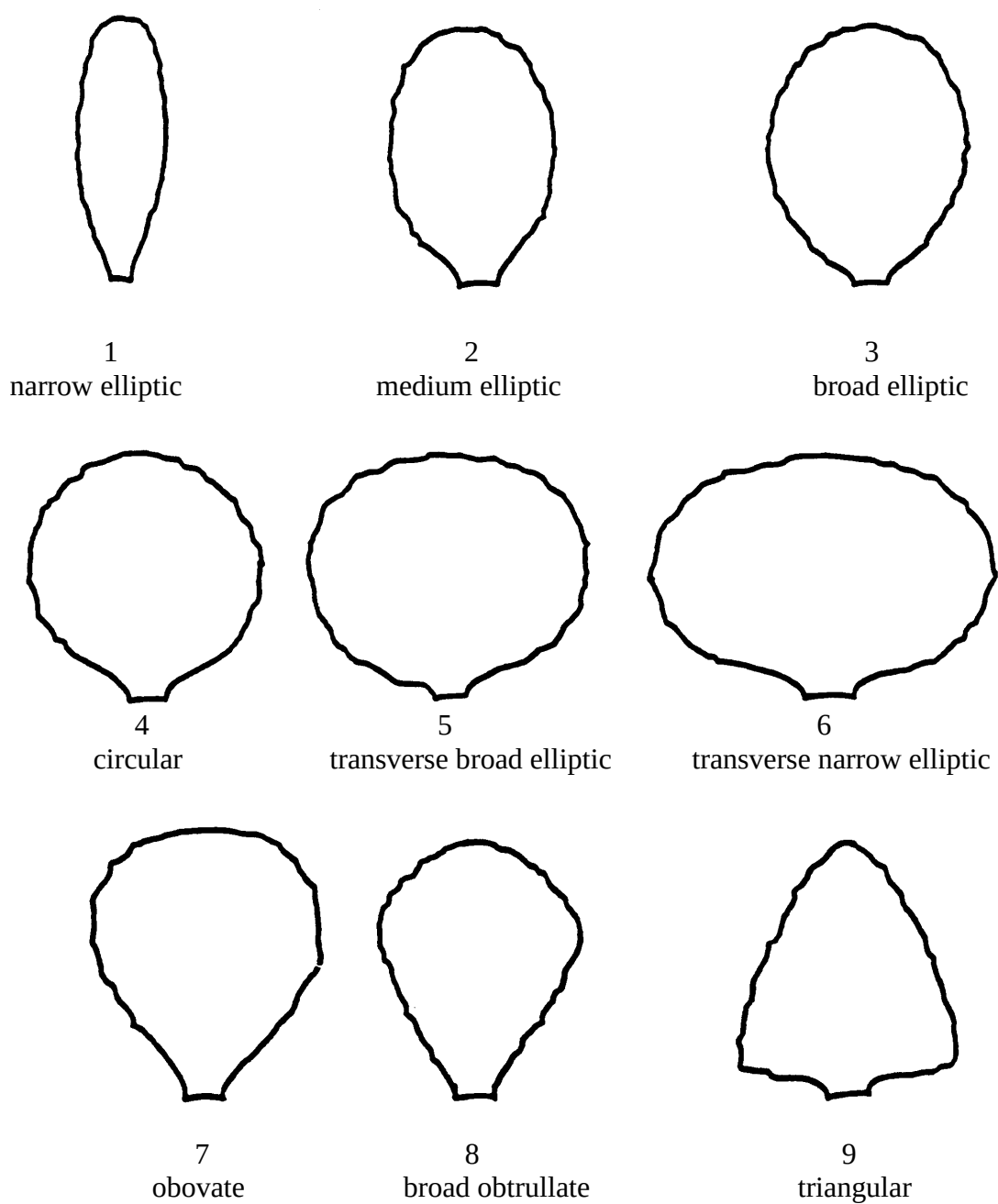
Ad. 6: Leaf blade: division



Ad. 13: Head: shape in longitudinal section



Ad. 16: Leaf: shape



Ad. 18: Leaf: hue of green color of outer leaves

Ad. 19: Leaf: intensity of color of outer leaves

Intensity of color (Ch. 19)	Hue of green color (Ch. 18)			
	1 absent	2 yellowish	3 greyish	4 reddish
1 very light	Krizet	Marbello Black Seeded Simpson	Hohlblättriger Butter	
3 light	Blonde maraîchère, Mondial, Reskia	Blondine (= Viktoria), Locarno, Pia	Celtuce, Kinemontepas, Natina	Brauner Troztkopf, Maravilla de Verano
5 medium	Florian, Frillblond, Sunrise, Têtue de Nîmes	Australische Gele, Dorée de printemps, Gotte jaune d'or	Clarion, Du bon jardinier, Durango, Kelvin	Lollo rossa, Pirat, Prizehead (= Frisée d'Amérique)
7 dark	Baby Star, Donatello, Verpia, Waldemann Dark Green	Batavia, Chicon	Chou de Naples (= Webb's Wonderful), Galaxy, Toledo	Merveille des quatre saisons, Rosa, Rouge d'Hiver
9 very dark	Pavane		(Sudia)	Liberty, Malibu, Pentared, Revolution

Ad. 39: Resistance to downy mildew (*Bremia lactucae*)

Availability of *Bremia* isolates and differentials

The GEVES in France and Naktuinbouw in the Netherlands verify and test *Bremia* isolates as defined and denominated by the International *Bremia* Evaluation Board (IBEB). GEVES and Naktuinbouw are responsible for delivery of denominated isolates to the testing centres of other UPOV members against payment of prescribed fees.

The addresses of the centres are as follows:

GEVES
Rue Georges Morel
B.P. 24
49071 Beaucouzé Cedex
France
Tél.: +33 (0) 2 41 22 58 00
Tlcp.: +33 (0) 2 41 22 58 01
Mél.: service.clients@geves.fr

Naktuinbouw
Sotaweg 22
P.O. Box 40
2370 AA Roelofarendsveen
Netherlands
Tel.: + 31 (0) 71 332 62 62
Fax.: + 31 (0) 71 332 63 63
Email: info@naktuinbouw.nl

The common differential set of lettuce varieties and lines for determination of *Bremia* isolates is available from Naktuinbouw in the Netherlands (address as above) and GEVES in France at the following address:

GEVES Brion
Domaine de la Boisselière
49250 Brion
France

Resistance Testing Methods

(a) Maintenance: *Bremia* races may be maintained on varieties or breeding lines which are more or less selective for each particular isolate. It is essential to multiply Bl: 27 on selective plant material e.g. NunDm17.

(b) Host differentials: The host differential set that can distinguish all important *Bremia* races should always be used in tests, as a check on the identity of the isolate.

(c) Sample Size: minimum 30 plants

(d) Temperature: Incubation of inoculated seedlings or leaf discs should be at 15-18°C.

(e) Inoculum Concentration: The optimum is around 1×10^5 spores per ml; at least 3×10^4 should be used.

(f) Illumination: Adequate illumination should be provided for good plant growth. Seedlings should have fully expanded cotyledons and the plants should not be etiolated.

(g) Recording: The recording time should be after 7, 10 and 13 days, or two of these three times. The time of maximum sporulation should occur in this period.

(h) Substrate: Seedling tests may be conducted on potting soil substrate or a substrate of paper wetted with a suitable mineral nutrient solution. Leaf disc tests may be conducted on wet paper without nutrients. Generally, the test on soil substrate will give a better discrimination of resistance and susceptibility.

(i) Observation and interpretation:

<u>Table legend</u>	<u>Observation</u>	<u>Interpretation</u>
+	Abundant or normal sporulation on cotyledons	Susceptible
(+)	Normal sporulation and necrotic spots	Susceptible
(-)	Necrosis and (sometimes) sparse sporulation on cotyledons	Resistant
-	no symptoms	Resistant

Table of *Bremia* differentials and races:

Isolates	Differentials	Green Towers	Lednický	UC DM2	Dandie	R4T57D	Valmaine	Sabine	LSE 57/15	UC DM10	Capitan	Hilde II	Pennlake	UC DM14	NunDm15	LSE/18	NunDm17	Colorado	Ninja	Discovery	Argelès	RYZ 2164	RYZ 910457	Bedford	Balesta	Bellissimo
Bl: 1	+	+	+	+	-	+	-	-	-	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Bl: 2	+	+	+	+	+	+	+	+	-	+	(-)	+	+	+	-	-	-	(-)	-	-	+	-	-	-	+	+
Bl: 3	+	-	-	-	+	+	+	+	+	+	-	+	+	(+)	+	-	-	-	-	(-)	-	-	-	-	-	+
Bl: 4	+	+	+	-	+	+	+	(-)	+	+	(-)	+	+	+	-	(-)	-	(-)	-	-	-	-	-	-	-	-
Bl: 5	+	+	-	+	-	-	-	-	+	+	-	+	+	-	+	-	-	-	-	-	-	-	(-)	-	-	-
Bl: 6	+	+	+	-	+	+	+	(-)	-	+	+	+	+	+	-	-	-	-	-	-	-	-	(-)	-	-	-
Bl: 7	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Bl: 10	+	+	+	+	+	+	+	+	+	+	(-)	+	+	(+)	-	-	-	-	-	-	-	-	(-)	-	-	-
Bl: 11	+	+	-	-	+	+	+	+	+	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Bl: 12	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-
Bl: 13	+	+	-	+	-	+	+	(-)	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Bl: 14	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
Bl: 15	+	+	+	+	+	+	+	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Bl: 16	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	-	-	-	-	-	-	-	-	-	-
Bl: 17	+	-	+	+	-	+	+	-	+	+	-	+	+	+	+	-	-	+	-	+	-	-	-	(+)	-	-
Bl: 18	+	+	+	-	+	+	+	+	+	+	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-
Bl: 20	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	-	+	-	-	-	-	-	-	-	-
Bl: 21	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	-	+	+	-	-	(-)	-	-	-
Bl: 22	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-	-	+	-	-	-	-	(-)	+	-	-
Bl: 23	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	-	-	-	-	+	-	-	-	-	-
Bl: 24	+	+	+	-	+	+	+	+	+	+	+	+	+	-	-	+	-	+	-	-	+	-	-	-	-	-
Bl: 25	+	+	+	-	+	+	+	+	+	+	+	+	+	-	-	+	-	+	-	+	-	-	-	-	-	-
Bl: 26	+	+	+	+	+	+	+	(+)	+	+	+	+	+	-	-	+	-	+	+	+	+	-	-	-	-	-
Bl: 27	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	-	+	+	-	-	+	-

Note on table of *Bremia* differentials

The differential NunDm17 is a replacement for Ls102. The differential NunDm15 is a replacement for PIVT 1309. Ls102 and PIVT1309 have the same resistance pattern but poor germinability. More detailed information about the use of the table can be found in the relevant literature in chapter 9.

Ad. 40: Resistance to Lettuce Mosaic Virus (LMV)

Maintenance of strains

Maintenance: After 15-20 days of incubation infected tissue should be sliced and desiccated over calcium chloride and stored at 4°C. Infectivity may last 1 to 3 years. Contamination can be avoided in this way.

Multiplication: Pre-multiplication of the virus on a susceptible variety (e.g. Hilde or Trocadero) prior to testing under normal conditions. Only virus-free seed samples should be used for this purpose.

Execution of test

Growth stage of plants: First inoculation at 2 to 3 leaves stage.

Temperature: Constant temperature of 16°C during night (N) and of 22°C during day (D) or, alternatively, temperature of 20°C N, 25°C D during 5 days after inoculation followed by 12°C N and 18°C D.

Light conditions: From emergence: 16 hours per day, at least 15,000 Lux.

Preparation of inoculum: Young leaves of diseased lettuce plants showing clear LMV symptoms (after 15-25 days of incubation) should be ground (1 g fresh leaves per 4 ml) in a mortar adding a 0.03 M Na₂HPO₄-buffer containing 0.2% DIECA^(*). Prior to inoculation 75 mg/ml carborundum and 75 mg/ml activated charcoal should be added.

^(*) Composition of buffer: per 100 ml: 1.07 g Na₂HPO₄ 12H₂O, 0.2 g DIECA

Method of inoculation: Mechanical inoculation by rubbing on the two first leaves, followed by a second inoculation 2-3 days afterwards. The inoculum is kept in an ice bucket during inoculation.

Duration of test:

- From sowing to inoculation: about 2 weeks
- From inoculation to reading: about 2 to 3 weeks; first reading after 15 days

Number of plants tested: 30 plants and 6 repetitions

Remarks:

Strains: Other strains of LMV have been isolated in Europe (France, Greece, Spain) by Dinant and Lot (1992), Plant Pathology 41:528-542. The naming of the strains is not yet internationally accepted; but names of pathotypes have been proposed (Pink, Lot and Johnson (1992), Euphytica 63:169-174).

Symptoms (under test conditions): The expression of the symptoms depends on the strains and the lettuce genotypes. For the old Ls-1 strain used for testing the 'Gallega'-gene, the typical reactions can be summarized as follows:

- Butterhead cultivars show essentially vein clearing and mosaic;
- Crisp or Iceberg cultivars show chlorosis along the veins and faint mosaic;
- Cos cultivars show reduced growth of the inner leaves and blistering;
- In red varieties symptoms are particularly difficult to observe.

Ad. 41: Resistance to *Nasonovia ribisnigri* biotype Nr: 0

Maintenance of biotype

Nasonovia ribisnigri is a leaf aphid and may be maintained alive on susceptible lettuce plants in aphid-proof chambers or tents in a glasshouse. *N. ribisnigri* is usually green, but some biotypes are red. A red aphid is easier to see on a green leaf. Therefore red biotypes are usually preferable. The aphid's body size is 1.5-2.5 mm. The body has 7 dark spots. The ends of the legs are black.

The common biotype Nr: 0 can be distinguished from resistance-breaking biotypes by means of a biotest using a suitable resistant control variety, for example Silvinas.

Multiplication:

On a susceptible variety at 20-22°C for 10-14 days. Aphids are shaken off into a Petri-dish.

Sowing:

12°C for germination and early growth; plant distance at least 5 cm.

Number of plants to be tested: 28.

Inoculation method:

Careful transfer of 5 aphids per plant using a fine paintbrush.

Plant stage at inoculation: 15 days.

Temperature: 20-22°C.

Observation:

First observation: 10 days after inoculation.

Second observation: daily check whether newborn aphids are mature (= red).

End of test: max. 15 days after inoculation.

Observation at end of test: Count the number of mature (= red) aphids on each plant.

<u>Scale for observations:</u>		<u>Interpretation of data</u>
0	no aphids	Resistant
1	1-5 aphids per plant	Resistant
2	6-10 aphids per plant	Undecided
3	> 10 aphids per plant	Susceptible

Remarks

Resistant control varieties and susceptible control varieties should have at least 95% (26/28) resistant plants and susceptible plants, respectively.

If more than 2 of 28 plants of the control varieties are undecided or off type, the experiment should be repeated.

9. Literature

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Farrara, B.F., et al., 1987: "Genetic Analysis Factors for Resistance to Downy Mildew (*Bremia Lactucae*) in Species of Lettuce (*Lactuca sativa* and *L. serriola*)," Plant Pathology 36, pp 499-514.

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Michelmore, R.W., Norwood, J.M., Ingram, D.S., Crute, I.R., Nicholson, P., 1984: "The inheritance of virulence in *Bremia lactucae* to match resistance factors 3, 4, 5, 6, 8, 9, 10 and 11 in lettuce (*Lactuca sativa*)," Plant Pathology 33, pp 301-315.

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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	Lactuca sativa L.	
1.2 Common Name	Lettuce	
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:
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#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

- (a) Self-pollination []
- (b) 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 Growth types (according to Section 8.1 of the Test Guidelines)		
Butterhead lettuce	Clarion, Merveille des quatre saisons, Verpia	[]
Crisphead lettuce	Blonde de Paris (Batavia), Calmar, Saladin (Iceberg)	[]
Cos lettuce (Roman lettuce)	Blonde maraîchère (Roman types)	[]
“Grasse” or Latin lettuce	Bibb, Sucrine	[]
Cutting or Gathering lettuce	Frisée d’Amérique, Lollo rossa, Oakleaf, Salad Bowl	[]
Stem lettuce	Celtuce	[]
5.2 Seed: color (1)		
white	Verpia	1[]
yellow	Durango	2[]
black	Kagraner Sommer	3[]
5.3 Leaf: hue of green color of outer leaves (18)		
absent	Donatello, Verpia	1[]
yellowish	Dorée de printemps	2[]
greyish	Celtuce, Du bon jardinier	3[]
reddish	Lollo rossa, Revolution, Rosa	4[]
5.4 Leaf: anthocyanin coloration (20)		
absent	Fiorella, Sunrise	1[]
present	Commodore, Pirat	9[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties		Note
5.5 Time of beginning of bolting under long day conditions (35)			
very early	Blonde à couper améliorée		1[]
early	Gotte à graine blanche		3[]
medium	Carelia		5[]
late	Hilde II		7[]
very late	Erika, Kinemontepas, Rex		9[]
5.6 Resistance to downy mildew (39.7) (<i>Bremia lactucae</i>) Isolate Bl: 16			
absent	Cobham Green, Hilde II		1[]
present	Argelès, Ninja		9[]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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
<i>Example</i>	<i>Leaf: intensity of color of outer leaves</i>	<i>medium</i>	<i>dark</i>

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:
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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 for 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			

[End of document]