CALIBRATION MANUAL

Harmonized with

Naktuinbouw and NCSS(/NARO)

DUS Test for Lettuce

Lactuca sativa L.

Ver. 2

Established in March 7th, 2023

Comply with UPOV TG/13/11 Rev. 2

CALIBRATION MANUAL
DUS Test for Lettuce

Contents

1. Purpose
   This Calibration Manual was established by collaborative activities between Naktuinbouw (Netherlands) and NCSS (/NARO) (Japan).
   The purpose of this Calibration Manual is to harmonize technique of DUS examination in the two countries and use it also internationally.

2. Use of this Calibration Manual
   This Calibration Manual indicates only methods of observation for morphological characteristics included in UPOV Test Guidelines.

3. Explanations covering several characteristics
   Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 20 plants or parts of plants taken from each of 20 plants and any other observations made on all plants in the test, disregarding any off-type plants.

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

   (a) Plant, head and stem: Observations should be made at harvest maturity. For varieties with degree of overlapping of upper part of leaves absent or weak observations should be made just before deterioration and before bolting.

   (b) Leaf: For varieties with degree of overlapping of upper part of leaves medium or strong observations should be made on the largest outer leaves, at harvest maturity. For varieties with degree of overlapping of upper part of leaves absent or weak observations should be made on the largest leaves, just before deterioration and before bolting. For Stem type varieties observations should be made on leaves at the middle third of the stem, just before deterioration and before bolting.

4. Growth types of varieties
   In a first step, the collection should be divided according to types as described under Chapter 4: Growth types of varieties. In cases of doubt to which type a variety belongs to, it should be tested under consideration of all relevant types.

Heading; thin to rather thick, tender leaves with a clear midrib; leaf shape circular to transverse broad elliptic; in general no incised margin; head shape ranging from broad elliptic to transvers elliptic.

Butterhead type

Cross between Butterhead and Iceberg type for glasshouse growing.

Open heading; leaf structure like Butterhead, incisions of the margin as Iceberg.

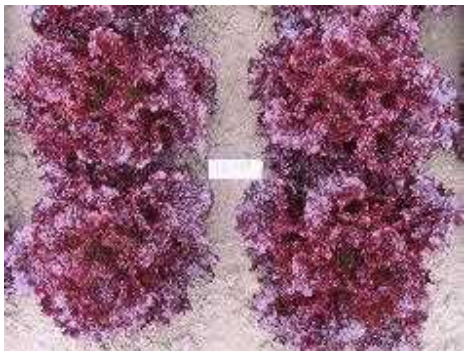
Novita type

Heading with strong or very strong overlapping of upper part of leaves; thick and crispy leaves, predominantly green and greyish green, leaf margin hardly to rather strongly incised, no clear midrib but with flabellate venation.

Iceberg type

Open to strong heading; generally medium thick, rather strongly blistered leaves, predominantly yellowish or medium green; leaf margin with weak to strong undulation.

Batavia type



Non-heading, loose, generally quite large plant; thin leaves. Compared to Lollo type in general less undulating margin and showing more leaf blade. Compared to Batavia type, leaves are thinner. Mainly used for babyleaf production.

Frisée d'Amérique type

Non-heading; thin leaves with strongly undulated leaf margin. The plant as a whole shows mainly the undulating leaf margins. In general strongly blistered leaves, blisters are rather small.

Lollo type

Thin, divided leaves; divisions have an oakleaf or lobed shape with in general a rounded tip. Radichetta or Catalogna with acute tip of the division. Heart can be loose to dense.

Oakleaf type

Non-heading; thin, medium to very strong divided leaves. Tip of divisons can be undulated and incised. Plant may look as a Lollo type, but leaves are always divided.

Multi-divided type

Non-heading; thick, crispy leaves, sometimes weakly divided. Clearly incised leaf margin.

Frillice type

Elongated and rather tough leaves with a clear midrib, head shape in longitudinal section elliptic, length of head >1.5 x diameter; heading can be very late.

Cos type

Tough 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 type. Suitable for semi-arid conditions.

Gem type

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

Stem type

5. Grouping characteristics:

The following have been agreed as useful grouping characteristics:

(a) Seed: color (characteristic 1)

(b) Leaf: anthocyanin coloration (characteristic 11)

(c) Time of beginning of bolting (characteristic 35)

(d) Resistance to *Bremia lactucae* (BI) Isolate BI:16EU (characteristic 38)

6. Disclaimer

The information contained in this Calibration Manual is for general information purposes only. The information is provided by Naktuinbouw and NCSS(/NARO) and while we endeavor to keep the information up to date and correct, we make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the Calibration Manual or the information contained on the Calibration Manual for any purpose. Any reliance you place on such information is therefore strictly at your own risk.

7. Method of Observation

Legend

Method of Observation

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

Type of observation: visual (V) or measurement (M)

“Visual” observation (V) is an observation made on the basis of the expert’s judgment. For the purposes of this document, “visual” observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g.

diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

Types of Expression of Characteristics

To enable the appropriate use of characteristics in DUS testing, it is important to understand the different ways in which characteristics can be expressed. The following section identifies the different types of expression and considers their application in DUS testing.

QL: Qualitative Characteristics

"Qualitative characteristics" are those that are expressed in discontinuous states (e.g. sex of plant: dioecious female (1), dioecious male (2), monoecious unisexual (3), monoecious hermaphrodite(4)). These states are self-explanatory and independently meaningful. All states are necessary to describe the full range of the characteristic, and every form of expression can be described by a single state. The order of states is not important. As a rule, the characteristics are not influenced by environment.

QN: Quantitative Characteristics

"Quantitative characteristics" are those where the expression covers the full range of variation from one extreme to the other. The expression can be recorded on a one-dimensional, continuous or discrete, linear scale. The range of expression is divided into a number of states for the purpose of description (e.g. length of stem: very short (1), short (3), medium (5), long (7), very long (9)). The division seeks to provide, as far as is practical, an even distribution across the scale. The Test Guidelines do not specify the difference needed for distinctness. The states of expression should, however, be meaningful for DUS assessment.

PQ: Pseudo-Qualitative Characteristics

In the case of "pseudo-qualitative characteristics," the range of expression is at least partly continuous, but varies in more than one dimension (e.g. shape: ovate (1),

elliptic (2), circular (3),obovate (4)) and cannot be adequately described by just defining two ends of a linear range. In a similar way to qualitative (discontinuous) characteristics – hence the term “pseudo-qualitative” – each individual state of expression needs to be identified to adequately describe the range of the characteristic.

(*) Asterisked characteristic

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.

(+) Explanations on the Table of Characteristics is indicated by TG/13/11 Rev.2 Chapter 8.2.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
1. (*)	**VG**	**Seed: color**				
PQ		white	Verpia		Olympia	1
		yellow	Durango			2
		brown	Oaklin		Cisco, V lettuce	3
		black	Kagraner Sommer 2		Logic	4

Remarks

Stage of observation: Submitted seeds

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

Observation should be conducted on submitted seeds.

1 white

2 yellow

3 brown

4 black

White color is including yellowish white

However, pelleted seeds should be not accepted for application varieties. In case of similar varieties with pelleted seeds, observations should be done on seeds with coating peeled off.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
2. (*)	**MS/ VG**	**Plant: diameter**				
QN	**(a)**	very small	Tom Thumb			1
		small	Gotte à graine blanche		Okayama Saradana	3
		medium	Clarion, Verpia		Olympia	5
		large	Great Lakes 659			7
		very large	El Toro			9

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

VG method: Visual observation of the diameter of the plant. These photographs only give an indication of plant diameter at a planting distance of 40 cm by 27 cm and should not be used as an absolute reference.

1 very small

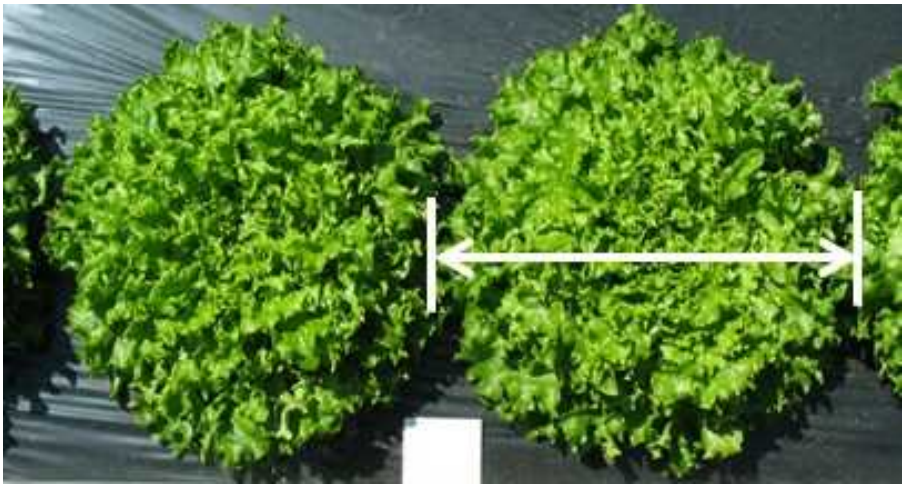
3 small

5 medium

7 large

9 very large

MS method: When there are not enough example varieties in the trial, observations can be conducted by measurement (see following photographs)



		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
3. (*) (+)	**VG**	**Plant: degree of overlapping of upper part of leaves**				
QN	**(a)**	absent or weak	Actarus, Aquarel, Blonde à couper améliorée, Curtis, Lollo rossa		Prize Head	1
		medium	Augusta, Clarion, Fiorella		Costa Rica No.4	2
		strong	Roxette, Vanguard 75		Olympia, Vanguard75	3

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Observations should be made on leaves at the heart of the plant to form a head.





1 absent or weak

2 medium

3 strong

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
4. **(+)**	**MS/ VG**	**<u>Only varieties with Plant: degree of overlapping of upper part of leaves: absent or weak:</u> Plant: number of leaves**				
QN	**(a)**	few	Lollo rossa			3
		medium	Muraï		Akakichisya	5
		many	Felucca, Sartre, Xandra			7

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

VG method: Visual observation of the number of leaves.

MS method: Measurement observation can be made by counting the number of leaves.

UPOV explanation: In case of doubt, observations can be made by cutting the plant in half.

3 few

5 medium

7 many

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
5. (+)	**VG**	**Leaf: attitude**				
QN	**(b)**	erect	Feria, Pinokkio		Costa Rica No.4	1
		semi-erect	Expedition, Sartre		Olympia, Cisco	3
		horizontal	Divina			5

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following illustrations and photos.

Erect can be characterized as a leaf attitude with an angle between 60 and 90 degrees. Semi-erect can be characterized as a leaf attitude with an angle between 30-60 degrees. Horizontal can be characterized as a leaf attitude with an angle below 30 degrees.

1 erect

3 semi-erect

5 horizontal

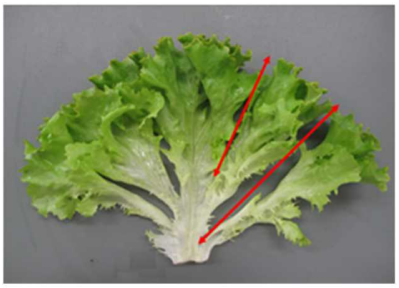
		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
6. **(*)** **(+)**	**VG**	**Leaf: number of divisions**				
QN	**(b)**	absent or very few	Fiorella, Lollo rossa		Olympia	1
		few	Curletta, Rodagio			3
		medium	Ezabel, Jadigon			5
		many	Expedition, Multired 54			7
		very many	Excite, Ezfrill, Telex			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Observations should be made only on the incisions more than halfway to the midrib of the whole leaf.



1 absent or very few

3 few

5 medium

7 many

9 very many

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
7. (+)	**VG**	**Only varieties with Leaf: number of divisions: absent or very few: Leaf: shape**				
PQ	**(b)**	triangular				1
		lanceolate	Qingyuanyewoju			2
		medium oblate	Stylist		Olympia	3
		narrow oblate	Commodore, Fiorella			4
		circular	Verpia		White Boston	5
		broad elliptic	Amadeus			6
		medium elliptic	Xanadu		Costa Rica No.4	7
		narrow elliptic	Verte maraîchère		Akakakichisya	8
		linear	Hongwoju			9
		broad obtrullate				10
		obovate	Raisa		Prize Head	11
		oblanceolate	Xiangshengcai			12

Remarks

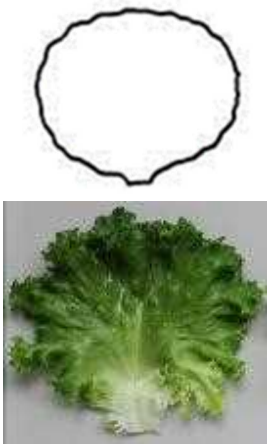
Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate.

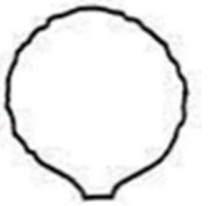
1 triangular

2 lanceolate

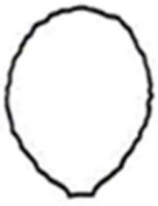
3 medium oblate



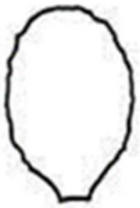
4 narrow oblate



5 circular



6 broad elliptic

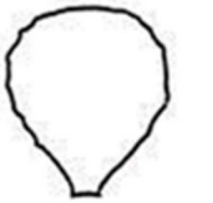


7 medium elliptic

8 narrow elliptic

9 linear

10 broad obtrullate



11 obovate

12 oblanceolate

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
8. (+)	**VG**	**Only varieties with Leaf: number of divisions: absent or very few: Leaf: shape of apex**				
PQ	**(b)**	acute	Celtuce		Celtuce	1
		obtuse	Actarus			2
		rounded	Blonde maraîchère, Maserati			3
		obcordate	PS 6545691			4

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

1
acute

2
obtuse

3
rounded

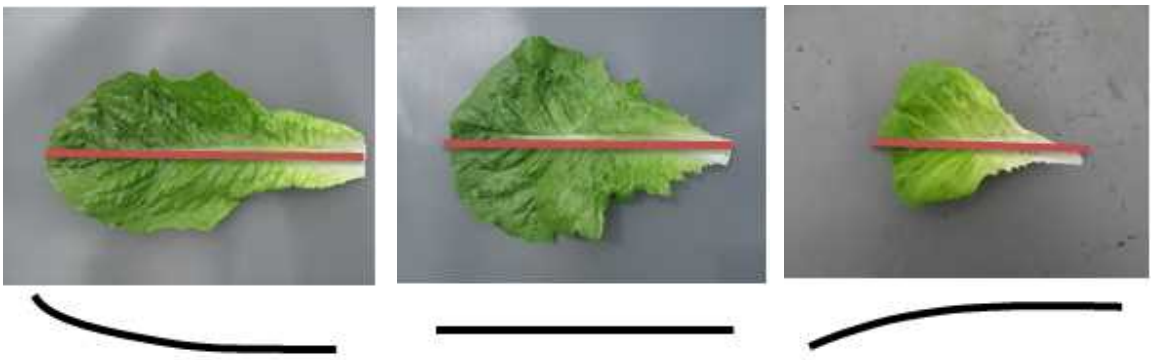
4
obcordate

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
9. (+)	**VG**	**Only varieties with Leaf: number of divisions: absent or very few: Leaf: longitudinal section**				
QN	**(b)**	concave	Sunstar			1
		flat	Clarion, Lollo rossa			3
		convex	Tiago			5

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following illustrations and photos.



1 concave

3 flat

5 convex

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
10. (+)	**VG**	**Only Oakleaf type varieties: Leaf: width of lobes**				
QN	**(b)**	narrow	Kibrille, Rougini			3
		medium	Bandolin, Ribaï			5
		broad	Horix, Starix, Vizir		Rouge	7

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following illustrations and photos.

3
narrow

5
medium

7
broad

Explanation of Oakleaf type see chapter 4.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
11. (*) (+)	**VG**	**Leaf: anthocyanin coloration**				
QN	**(b)**	absent or very weak	Clarion			1
		weak	Du bon jardinier			3
		medium	Lollo rossa, Luana		Prize Head	5
		strong	Merveille des quatre saisons			7
		very strong	Iride, Revolution			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

1 very weak

3 weak

5 medium

7 strong

9 very strong

Anthocyanin coloration (Char. 11)	Hue of anthocyanin coloration (Char. 12)		
	1 reddish	2 purplish	3 brownish
1 absent or very weak			
3 weak			
5 medium			
7 strong			
9 very strong			

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
12. (*)	**VG**	**Leaf: hue of anthocyanin coloration**				
PQ	**(b)**	reddish	Lollo rossa			1
		purplish	Iride			2
		brownish	Luana, Maravilla de Verano			3

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

1 reddish

2 purplish

3 brownish

Anthocyanin coloration (Char. 11)	Hue of anthocyanin coloration (Char. 12)		
	1 reddish	2 purplish	3 brownish
1 absent or very weak	Clarion		
3 weak	Du bon jardinier, Steirer Krauthauptel		Brauner Trotzkopf, Diablo, Maravilla de Verano
5 medium	Lollo rossa		Frisée d'Amérique, Luana, New Red Fire, Salad bowl rossa
7 strong	Jadigon		Duplex, Merveille des quatre saisons
9 very strong	Revolution	Iride	Multired 54

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
13. (+)	**VG**	**Leaf: area covered by anthocyanin coloration**				
QN	**(b)**	very small	Steirer Krauthauptel			1
		small	Diablo			3
		medium	Luana			5
		large	Merveille des quatre saisons			7
		very large	Bijou, Revolution			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Observations should be made on the total area of diffused and/or localised anthocyanin coloration.

3	5	7	9
small	medium	large	very large

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
14. (*) (+)	**VG**	**Leaf: color**				
PQ	**(b)**	green	Verpia			1
		yellowish green	Dorée de printemps			2
		greyish green	Celtuce, Du bon jardinier		Celtuce	3

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Only to observe for green varieties and for two-colored varieties with 'Leaf: area covered by anthocyanin coloration' less than large (less than note 7 to 9), so the green color of the leaf can be observed without picking a leaf from the plant.

1 green | 2 yellowish green | 3 greyish green

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
15. (*) (+)	**VG**	**Leaf: intensity of green color**				
QN	**(b)**	very light				1
		light	Blonde maraîchère, Lollo Bionda			3
		medium	Aquarel, Clarion			5
		dark	Expedition, Verpia			7
		very dark	Pascal, Verdetrix			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate.

UPOV explanation: Only to observe for green varieties and for two-colored varieties with 'Leaf: area covered by anthocyanin coloration' less than large (less than note 7 to 9), so the green color of the leaf can be observed without picking a leaf from the plant.

Intensity of green color (Char. 15)	Color (Char. 14)		
	1 green	2 yellowish green	3 greyish green
1 very light			
3 light	Blonde maraîchère, New Red Fire	Lollo Bionda, Steirer Krauthauptel	Celtuce
5 medium	Ballerina	Aquarel, Australische Gele, Dorée de printemps	Clarion, Du bon jardinier, Durango
7 dark	Actarus, Baby Star, Expedition, Verpia		Webbs Wonderful
9 very dark	Pascal, Verdetrix		

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
16.	**VG**	**Leaf: glossiness of upper side**				
QN	**(b)**	absent or very weak	Divina, Du bon jardinier			1
		weak	Duplex, Fiorella, Sartre		Okayama Saradana	3
		medium	Funnice		Olympia	5
		strong	Noisette, Redair		Nishina Beni	7
		very strong	Bijou			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
17. (*)	**VG**	**Leaf: thickness**				
QN	**(b)**	very thin	Stefano			1
		thin	Bijou, Lollo rossa, Raisa		Prize Head	2
		medium	Curtis, Expedition		Olympia	3
		thick	Frilett, Roxette			4
		very thick			Frill Ice	5

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. Observation should be made on the largest outer leaf, estimating by rubbing between the fingers. When there are not enough example varieties in the trial, observations can be conducted by measurement.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
18. (*)	**VG**	**Leaf: blistering**				
QN	**(b)**	absent or very weak	Duplex, Sartre		Cisco	1
		weak	Fiorella		Olympia	3
		medium	Commodore		Early Impulse	5
		strong	Blonde de Paris, Xanadu		Nishina Beni	7
		very strong	Blonde de Doulon, Iride, Karioka		Black Seeded Simpson	9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

1 absent or very weak

3 weak

5 medium

7 strong

9 very strong

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
19. (+)	**VG/ VS**	**Leaf: size of blisters**				
QN	**(b)**	small	Dorée de printemps, Rodagio		Black Seeded Simpson	3
		medium	Clarion		Early Impulse	5
		large	Fiorella		Okayama Saradana	7

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. Size of blisters should be assessed on the representative blisters considering their size, number and area. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Observations should be made on the whole leaf.









3 small 5 medium 7 large

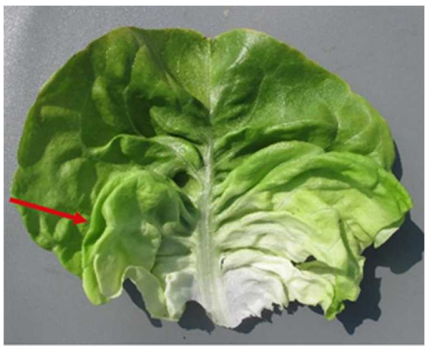
		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
20. (*) (+)	**VG/ VS**	**Leaf: undulation of margin**				
QN	**(b)**	absent or very weak	Tiago			1
		weak	Commodore			3
		medium	Noisette, Pentared		Mikado Great3204	5
		strong	Calmar, Invicta		Calmar, Grand Rapids	7
		very strong	Lollo rossa			9

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos. Please note that the undulation should not be mistaken with creasing. Creasing is when the entire leaf starts to fold at the midrib.

UPOV explanation: Observations should be made on undulation of margin of apical part; also apical part in case of divided leaves.



The red arrow points to the creasing.

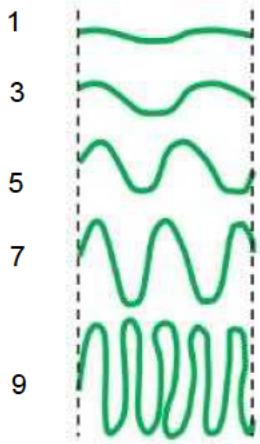
1
absent or very weak

3
weak

5
medium

7
strong

9
very strong



3
weak

5
medium

7
strong

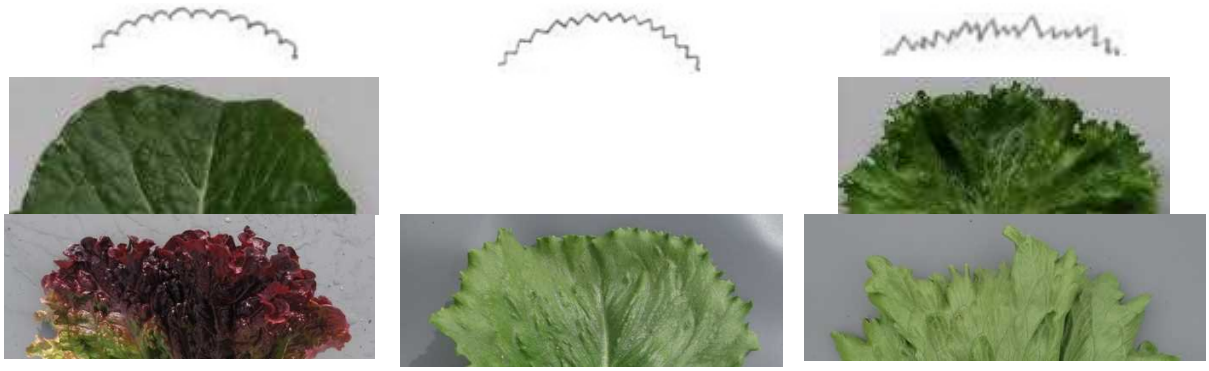
		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
21. (+)	**VG**	**Leaf: type of incisions of margin**				
PQ	**(b)**	crenate	Gloire du Dauphiné			1
		regularly dentate	Soliflore			2
		irregularly dentate	Rodagio			3
		bidentate	Great Lakes 118			4
		tridentate	Expedition			5

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following illustrations and photos.

UPOV explanation: Observations should be made on incisions of the margin at the distal half of the leaf.



1 crenate 2 regularly dentate 3 Irregularly dentate

4 bidentate

5 tridentate

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
22. (+)	**VG**	**Leaf: depth of incisions of margin**				
QN	**(b)**	absent or very shallow	Actarus, Clarion, Tiago			1
		shallow	Pentared, Unicum			3
		medium	Santarinas		Olympia	5
		deep	Expedition			7
		very deep				9

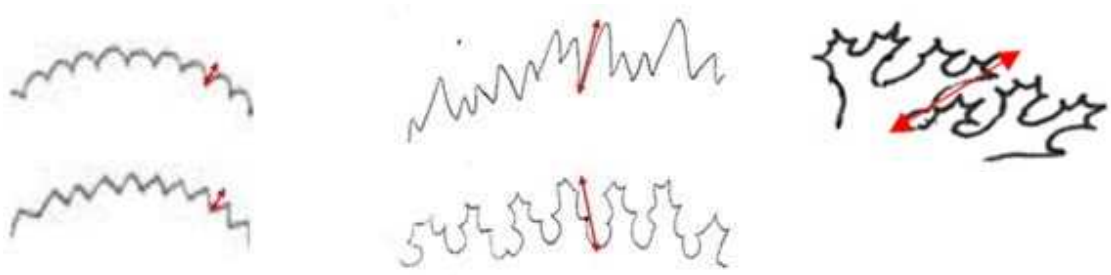
Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

UPOV explanation: Observations should be made on incisions of the margin at the distal half of the leaf. For varieties with irregularly dentate, bidentate or tridentate incisions describe the deepest incisions and use Char. 23 for the secondary incisions.

The following drawings illustrate how to observe this characteristic for the different types of incisions.



3 shallow

5 medium

7 deep

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
23. (+)	**VG**	**Only varieties with Leaf: type of incisions of margin: irregularly dentate, bi- or tridentate: Leaf: depth of secondary incisions of margin**				
QN	**(b)**	shallow	Great Lakes 659			3
		medium	Expedition			5
		deep				7

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate.

UPOV explanation: Observations should be made on secondary incisions of the margin at the distal half of the leaf. In case of tridentate incisions observations should not be made on tertiary incisions of the margin (the most shallow ones).

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
24. (+)	**VG**	**Leaf: density of incisions of margin**				
QN	**(a)**	very sparse				1
		sparse	Maravilla de Verano			3
		medium	Calmar		Calmar	5
		dense	Grand Rapids			7
		very dense	Locarno			9

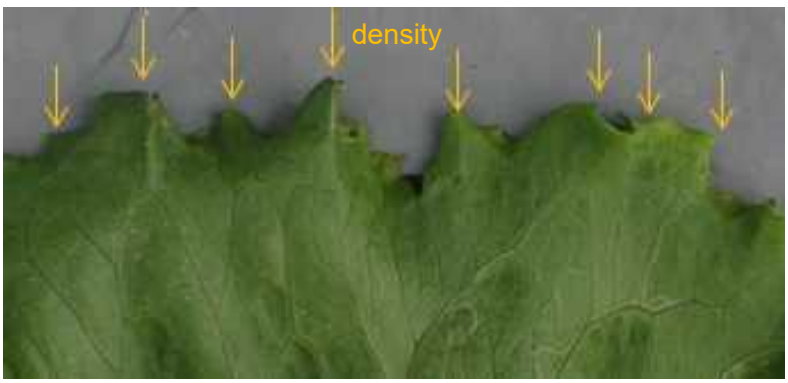
Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate.

This characteristic involves the incision of the margin at the top, not the incision of the whole leaf. Therefore, it does not concern the lobing or division of the leaf. Sometimes the depth of incision of the leaf margin at the top varies. In that case, all incisions (both deep and shallow) should be taken into account.

UPOV explanation: Observations should be made on all incisions of the margin at the distal half of the leaf, so in case of irregularly dentate or bidentate both primary and secondary incisions, in case or tridentate also tertiary incisions.



		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
25. (+)	**VG**	**Leaf : venation**				
QN	**(b)**	not flabellate	Verpia, Xanadu		Costa Rica No.4	1
		semi-flabellate	Kibrille, Muraï		Early Impulse	2
		flabellate	Locarno, Roxette		Olympia, Cisco	3

Remarks

Stage of observation: See Chapter 3, paragraph (b)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following photos.

1 not flabellate

It has a clear midrib, and venations grow from it.

2 semi-flabellate

3 flabellate

Venations grow radially from the base.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
26.	**MS/ VG**	**Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong: Head: size**				
QN	**(a)**	very small	Tom Thumb			1
		small	Xanadu			3
		medium	Fiorella, Soraya		Olympia	5
		large	Great Lakes 659			7
		very large	Blonde maraîchère, El Toro			9

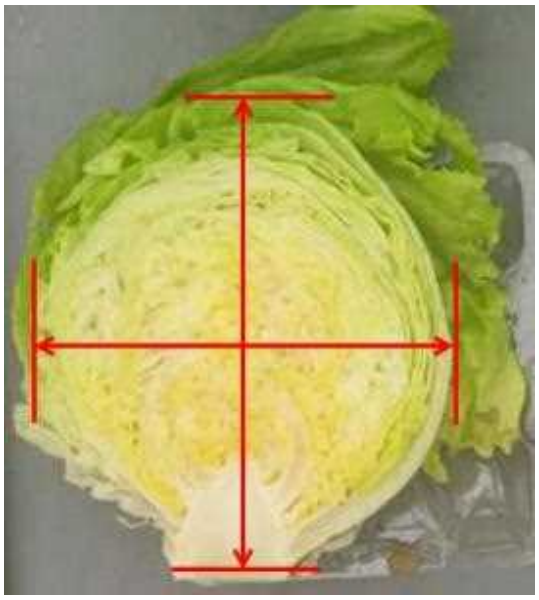
Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

VG method: This characteristic involves the actual size of the head, not in relation to the plant diameter.

MS method: When there are not enough example varieties in the trial, observations can be conducted by measurement (see following photographs)

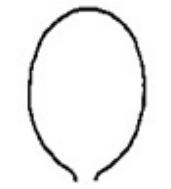


		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
27. (*) (+)	**MS/ VG**	**<u>Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong</u>: Head: shape in longitudinal section**				
QN	**(a)**	narrow elliptic	Verte maraîchère			1
		broad elliptic	Amadeus, Sucrine			2
		circular	Verpia		Excel Head Glass	3
		narrow oblate	Ametist		Cisco	4

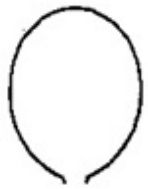
Remarks

Stage of observation: See Chapter 3, paragraph (a)

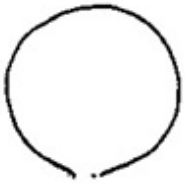
Method of observation: Measurement or visual observation. Use example varieties to calibrate. Visual observation by cutting the head longitudinally in two equal halves.



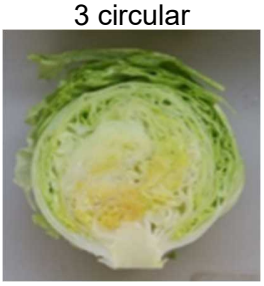
1 narrow elliptic

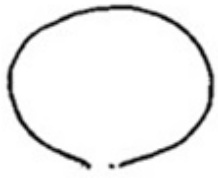


2 broad elliptic



3 circular





4 narrow oblate

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
28.	**VG**	**<u>Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong:</u> <u>Head</u>: density**				
QN	**(a)**	very loose				1
		loose	Nanda			3
		medium	Delice, Daguan		Cisco	5
		dense	Atella, Islandia		Fine	7
		dense to very dense			Olympia	8
		very dense	Rubette			9

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Visual observation. Use example varieties to calibrate. Press with your hand on the head and observe the degree of resistance. Be sure that the head is in harvest stage (before this stage the head is looser). When the head is in slightly overripe stage, the observation can also be made. Make sure that the observation takes place before the internal bolting stem is causing resistance. These photographs only give an indication of density to the head and should not be used as an absolute reference.

3 loose

4 loose to medium

5 medium

6 medium to dense

7 dense

8 dense to very dense

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
29. (+)	**MS/ VG**	**<u>Only Stem type varieties:</u> Stem: length**				
QN	**(a)**	short	Wuweijianye			3
		medium	Zipixiang		Celtuce	5
		long	Guasihong			7

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
30. (+)	**MS/ VG**	**<u>Only Stem type varieties: Stem: width</u>**				
QN	**(a)**	narrow	Ailaowoju			1
		medium	Guasihong, Zipixiang		Celtuce	2
		broad	Guasihong			3

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

UPOV explanation: Observations should be made on the broadest part of the stem.

Width

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
31. (+)	**VG**	**<u>Only Stem type varieties:</u> Stem: shape in longitudinal section**				
PQ	**(a)**	cylindrical	Chiwoju			1
		conical	Guasihong		Celtuce	2
		fusiform	Zipixiang			3

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Visual observation. Use example varieties to calibrate. In the absence of example varieties, observations can be done using the following illustrations.

1 cylindrical

2 conical

3 fusiform

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
32.	**VG**	**<u>Only Stem type varieties:</u> Stem: color**				
PQ	**(a)**	whitish green	Wuweijianye			1
		light green	Chiwoju		Celtuce	2
		medium green	Yangwoju			3
		greenish purple	Guasihong			4
		purplish red	Hongwosun			5

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Visual observation. Use example varieties to calibrate.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
33.	**VG**	**<u>Only Stem type varieties:</u> Stem: color of flesh**				
PQ	**(a)**	yellowish white	Wuweijianye			1
		whitish green	Chiwoju			2
		light green	Yangwoju		Celtuce	3
		medium green	Guasihong			4
		dark green	Chiwosun			5

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Visual observation. Use example varieties to calibrate.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
34.	**MG/ VG**	**Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong: Time of harvest maturity**				
QN	**(a)**	very early	Gotte jaune d'or			1
		early	Pantlika, Sucrine			3
		medium	Clarion		Olympia	5
		late	Blonde maraîchère, Calmar		Calmar	7
		very late	El Toro, Pinokkio			9

Remarks

Stage of observation: See Chapter 3, paragraph (a)

Method of observation: Measurement or visual observation. Use example varieties to calibrate.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
35. (*) (+)	**MG/ VG**	**Time of beginning of bolting**				
QN		very early	Blonde à couper améliorée		Green Leaf	1
		early	Gotte à graine blanche		Prize Head	3
		medium	Pantlika		Get, Falcon	5
		late	Hilde II		Olympia	7
		very late	Erika, Roxette			9

Remarks

Stage of observation: Bolting stage

Method of observation: Measurement or visual observation. Use example varieties to calibrate. Observation on all individual plants of a sample, preferably three times a week in same trial or separate trial with example varieties. Record the date when individual plant is starting to bolt. Compare with the set of example varieties, to give the final note.

UPOV explanation: Observations should be made in a trial with more than 12 hours of day light as lettuce varieties need a long photo period to induce bolting.

Observations should be made when 50% of the plants start to bolt. The top of the bolting stem can be seen or felt at the top of the plant.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
36. (+)	**VG**	**Axillary sprouting**				
QN		absent or weak	Claridia, Shotter, Valmaine, Xanadu			1
		medium	Actarus			2
		strong	Amible, Bassoon			3

Remarks

Stage of observation: Overripe stage, just before bolting.

Method of observation: Visual observation. Use example varieties to calibrate.

UPOV explanation: Formation of secondary sprouts beside the main head. Arrow points at one of the secondary sprouts.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
37. (+)	**VG**	**Bolting stem: fasciation**				
QN		absent or very weak	Aquarel, Gotte à graine blanche			1
		weak	Verte maraîchère			3
		medium	Amadeus			5
		strong	Rougini			7
		very strong	Sartre, Verdetrix			9

Remarks

Stage of observation: Just after the first flowers are open.

Method of observation: Visual observation. Use example varieties to calibrate.

UPOV explanation: Observations should be made on the stem of bolted plants after the first flowers are open. For varieties with very late time of beginning of bolting and with strong degree of overlapping of leaves, the cover leaves of the head may be incised just before deterioration in order to be able to observe fasciation.


1 absent or
very weak


3 weak


5 medium


7 strong



9 very strong

Characteristic 38-55 are physiological characteristics.

See explanation of UPOV test guideline.

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
38. (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 16EU**				
QL		absent	Green Towers			1
		present	Argelès			9
39 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 17EU**				
QL		absent	Green Towers			1
		present	Argelès			9
40 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 20EU**				
QL		absent	Green Towers			1
		present	FrRsal-1			9
41 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 21EU**				
QL		absent	Green Towers			1
		present	Argelès, Colorado			9

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
42 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 22EU**				
QL		absent	Green Towers			1
		present	FrRsal-1			9
43 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 23EU**				
QL		absent	Green Towers			1
		present	Colorado			9
44 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 24EU**				
QL		absent	Argelès, Colorado			1
		present	Dandie, NunDm15, UCDm14			9
45 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 25EU**				
QL		absent	Colorado			1
		present	Argelès			9
46 (+)	**VG**	**Resistance to Bremia lactucae (Bl) Isolate Bl: 26EU**				
QL		absent	Colorado			1
		present	Balesta, Bedford			9

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
47 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 27EU**				
QL		absent	Balesta, Colorado			1
		present	FrRsal-1			9
48 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 29EU**				
QL		absent	Argelès			1
		present	Balesta			9
49 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 30EU**				
QL		absent	Argelès, Colorado			1
		present	Balesta			9
50 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 31EU**				
QL		absent	Colorado, RYZ910457			1
		present	Argelès, Balesta			9
51 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 33EU**				
QL		absent	Kibrille, RYZ2164			1
		present	RYZ910457			9

		English	UPOV Example Varieties	Netherlands Example Varieties	Japan Example Varieties	Note
52 (+)	**VG**	**Resistance to Bremia lactucae (Bl)** **Isolate Bl: 35EU**				
QL		absent	Design, Kibrille			1
		present	Bartoli			9
53 (+)	**VG**	**Resistance to Lettuce mosaic virus (LMV) Pathotype II**				
QL		absent	Bijou, Hilde II, Sprinter, Sucrine			1
		present	Capitan, Corsica			9
54 (+)	**MS/ VG**	**Resistance to Nasonovia ribisnigri (Nr)** **Biotype Nr: 0**				
QL		absent	Abel, Green Towers, Nadine			1
		present	Barcelona, Bedford, Dynamite, Silvinas			9
55 (+)	**MS/ VG**	**Resistance to Fusarium oxysporum f.sp. lactucae (Fol) Race 1**				
QN		susceptible	Cobham Green, Patriot			1
		moderately resistant	Affic, Fuzila, Natexis			2
		highly resistant	Costa Rica No. 4, Romasol			3