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# INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

**DRAFT**

# LETTUCE

(*Lactuca sativa* L.)

[*]

## GUIDELINES

## FOR THE CONDUCT OF TESTS

## FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative Names:[*]

| *Latin* | *English* | *French* | *German* | *Spanish* |
|---|---|---|---|---|
| *Lactuca sativa* L. | Lettuce | Laitue | Salat | Lechuga |

## ASSOCIATED DOCUMENTS

These guidelines should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as the "General Introduction") and its associated "TGP" documents.

[*] These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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## 1. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Lactica 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:

20 g or at least 20,000 seeds.

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

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

2.6 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

## 3. Method of Examination

### *3.1 Duration of Tests*

The minimum duration of tests should normally be two independent growing cycles.

### *3.2 Testing Place*

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be seen at that place, the variety may be tested at an additional place.

### *3.3 Conditions for Conducting the Examination*

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.

*3.4 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 minimum duration of tests recommended in section 3.1 reflects, in general, the need to ensure that any differences in a characteristic are sufficiently consistent.

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 or plant 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 is 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 at harvest maturity

| | *Examples:* |
|---|---|
| 1. Butterhead Lettuce: | Clarion, Merveille de 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 38).

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 section 6.1.2

(a)-(c) See Explanations on the Table of Characteristics in Chapter 8, Section 8.1

(+) See Explanations on the Table of Characteristics in Chapter 8, Section 8.2

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

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

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **6.**<br>**(+)** | | **Leaf blade: division (as for 5)** | **Limbe: division (comme pour 5)** | **Blattspreite: Teilung (wie für 5)** | **Limbo: división (como para 5)** | | |
| | | 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.**<br>**(*)** | **(a)** | **Plant: diameter** | **Plante: diamètre** | **Pflanze: Durchmesser** | **Planta: diámetro** | | |
| | | very small | très petit | sehr klein | muy pequeña | Pavane, Tom Thumb | 1 |
| | | small | petit | klein | pequeña | Bastion,<br>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.**<br>**(*)** | **(a)** | **Plant: head formation** | **Plante: formation d'une pomme** | **Pflanze: Kopfbildung** | **Planta: formación de la cabeza** | | |
| | | no head | pas de pomme | kein Kopf | sin cabeza | Blonde à couper améliorée, Lollo rossa | 1 |
| | | open head | pomme ouverte | offener Kopf | cabeza abierta | Manfred, Monet | 2 |
| | | closed head (overlapping) | pomme fermée (chevauchement) | geschlossener Kopf (Überlappung) | cabeza cerrada (solapándose) | Kelvin, Sunrise | 3 |
| **9.** | **(a)** | **<u>Varieties with closed heads 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 cabeza cerrada</u>: Cabeza: grado de solapación de la parte superior de las hojas** | | |
| | | 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 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **10.** | **(a)** | **Head: density** | **Pomme: densité** | **Kopf: Dichte** | **Cabeza: densidad** | | |
| | | 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.** | **(a)** | **Head: size** | **Pomme: taille** | **Kopf: Größe** | **Cabeza: tamaño** | | |
| | | very small | très petite | sehr klein | muy pequeña | Tom Thumb | 1 |
| | | small | petite | klein | pequeña | Bastion,<br>Gotte à graine blanche | 3 |
| | | medium | moyenne | mittel | media | Fiorella, Soraya | 5 |
| | | large | grande | groß | grande | Great Lakes 659,<br>Musette | 7 |
| | | very large | très grande | sehr groß | muy grande | Blonde maraîchère,<br>El Toro | 9 |
| **12.** | **(a)** | **Butterhead types in glasshouse only: Head: closing of base** | **Laitue de serre pommée seulement: Pomme: fermeture de la base** | **Nur Kopfsalattypen für Unterglasanbau: Kopf: Geschlossenheit der Basis** | **Solamente lechuga flamenga en invernadero: Cabeza: cierre de la base** | | |
| | | weak | faible | gering | débil | Passe Partout | 3 |
| | | medium | moyenne | mittel | medio | Carmelita | 5 |
| | | strong | forte | stark | fuerte | Dustin, Manfred | 7 |
| **13.**<br>**(*)**<br>**(+)** | **(a)** | **Head: shape in longitudinal section** | **Pomme: forme en section longitudinale** | **Kopf: Form im Längsschnitt** | **Cabeza: forma en sección longitudinal** | | |
| | | elliptic | elliptique | elliptisch | elíptica | Verte maraîchère | 1 |
| | | broad elliptic | elliptique large | breit elliptisch | elíptica ancha | Amadeus, Sucrine | 2 |
| | | circular | arrondie | rund | circular | Passe Partout, Verpia | 3 |
| **14.** | **(a)** | **Leaf: thickness** | **Feuille: épaisseur** | **Blatt: Dicke** | **Hoja: grosor** | | |
| | | thin | mince | dünn | delgada | Raisa, Royal Red | 3 |
| | | medium | moyenne | mittel | media | Dustin, Sunrise | 5 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **15.** | **(a)** | **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 la cosecha (hojas externas de lechuga de cabeza u hojas adultas de lechuga frisé y lechuga espárrago)** | | |
| | | erect | dressé | aufrecht | erecto | Feria, Riva | 1 |
| | | semi-erect | demi- dressé | halbaufrecht | semierecto | Amelia, Toronto | 3 |
| | | horizontal | horizontal | waagerecht | horizontal | Chambery, Divina | 5 |
| **16.**<br>**(*)**<br>**(+)** | **(a)** | **Leaf: shape** | **Feuille: forme** | **Blatt: Form** | **Hoja: forma** | | |
| | | narrow elliptic | elliptique étroite | schmal elliptisch | elíptica estrecha | Riva, Verte maraîchère | 1 |
| | | elliptic | elliptique | elliptisch | elíptica | 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 elliptic | elliptique transverse | quer elliptisch | elíptica transversal | Elvira, Madison | 6 |
| | | obovate | obovale | verkehrt eiformig | 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.** | **(a)** | **Leaf: tip of leaf blade** | **Feuille: sommet du limbe des feuilles** | **Blatt: Spitze der Blattspreite** | **Hoja: ápice del limbo** | | |
| | | rounded | arrondi | abgerundet | redondeado | Blonde Maraîchère, Maserati | 1 |
| | | acute | aigu | spitz | agudo | Celtuce, Dear Tongue, Karola, Tempra | 2 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **18.<br>(*)<br>(+)** | **(a)** | **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** | | |
| | | 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<br><br>(see also Ad. 18) | 4 |
| **19.<br>(*)<br>(+)** | **(a)** | **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** | | |
| | | very light | très claire | sehr hell | muy claro | (see Ad. 18) | 1 |
| | | light | claire | hell | claro | (see Ad. 18) | 3 |
| | | medium | moyenne | mittel | medio | (see Ad. 18) | 5 |
| | | dark | foncée | dunkel | oscuro | (see Ad. 18) | 7 |
| | | very dark | très foncée | sehr dunkel | muy oscuro | (see Ad. 18) | 9 |
| **20.<br>(*)** | **(a)** | **Leaf: anthocyanin coloration** | **Feuille: pigmentation anthocyanique** | **Blatt: Anthocyan-färbung** | **Hoja: pigmentación antociánica** | | |
| | | absent | absente | fehlend | ausente | Fiorella, Sunrise | 1 |
| | | present | présente | vorhanden | presente | Commodore, Pirat | 9 |
| **21.<br>(*)** | **(a)** | **Leaf: intensity of anthocyanin coloration** | **Feuille: intensité de la pigmentation anthocyanique** | **Blatt: Intensität der Anthocyanfärbung** | **Hoja: intensidad de la pigmentación antociánica** | | |
| | | 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 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **22.** | **(a)** | **Leaf: distribution of anthocyanin** | **Feuille: répartition de l'anthocyane** | **Blatt: Verteilung des Anthocyans** | **Hoja: distribución de la antocianina** | | |
| | | 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.** | **(a)** | **Leaf: kind of anthocyanin distribution** | **Feuille: type de répartition de l'anthocyane** | **Blatt: Art der Anthocyan-verteilung** | **Hoja: tipo de distribución de la antocianina** | | |
| | | 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 |
| **24.** | **(a)** | **Leaf: glossiness of upper side** | **Feuille: brillance de la face supérieure** | **Blatt: Glanz der Oberseite** | **Hoja: brillo del haz** | | |
| | | 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. (*)** | **(a)** | **Leaf: blistering** | **Feuille: cloqûre** | **Blatt: Blasigkeit** | **Hoja: abullonado** | | |
| | | 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.** | **(a)** | **Leaf: size of blisters** | **Feuille: taille des cloques** | **Blatt: Größe der Blasen** | **Hoja: tamaño de las vejigas** | | |
| | | small | petites | klein | pequeñas | Dorée de printemps | 3 |
| | | medium | moyennes | mittel | medianas | Dustin, Sunrise | 5 |
| | | large | grandes | groß | grandes | Fiorella, Massilia | 7 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **27. (*)** | **(a)** | **Leaf blade: degree of undulation of margin** | **Limbe: importance de l'ondulation du bord** | **Blattspreite: Grad der Randwellung** | **Limbo: grado de ondulación del borde** | | |
| | | 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 |
| **28.** | **(a)** | **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** | | |
| | | absent | absentes | fehlend | ausentes | Verpia | 1 |
| | | present | présentes | vorhanden | presentes | Calmar, Gloire du Dauphiné, Unicum | 9 |
| **29. (*)** | **(a)** | **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** | | |
| | | 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.** | **(a)** | **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** | | |
| | | 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<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **31.** | **(a)** | **<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** | | |
| | | sinuate | sinueuses | gebuchtet | sinuosas | Gloire du Dauphiné | 1 |
| | | dentate | dentées | gezähnt | dentadas | Calmar | 2 |
| **32.** | **(a)** | **Leaf blade: venation** | **Limbe: nervation** | **Blattspreite: Aderung** | **Limbo: venación** | | |
| | | not flabellate | non flabelliforme | nicht fächerförmig | no flabeliforme | Donatella, Verpia, Xanadu | 1 |
| | | flabellate | flabelliforme | fächerförmig | flabeliforme | Gloire du Dauphiné, Locarno, Monet | 2 |
| **33.** | **(a)** | **Axillary sprouting** | **Bourgeons axillaires** | **Seitentriebbildung** | **Brotes axilares** | | |
| | | absent or very weak | absents ou très faibles | fehlend oder sehr gering | ausentes o muy débiles | Valmaine | 1 |
| | | weak | faibles | gering | débiles | Aprilia, Sunrise | 3 |
| | | medium | moyens | mittel | medios | | 5 |
| | | strong | forts | stark | fuertes | Riva | 7 |
| | | very strong | très forts | sehr stark | muy fuertes | Doncella | 9 |
| **34.** | **(a)** | **Time of harvest maturity** | **Epoque de maturité de récolte** | **Zeitpunkt der Erntereife** | **Época de madurez para la cosecha** | | |
| | | 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<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|
| **35. (*)** | **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 salida a flor en condiciones de días largos** | | |
| | 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.** | **Plant: height (flowering plant)** | **Plante: hauteur (plante à floraison)** | **Pflanze: Höhe (im Blühstadium)** | **Planta: altura (planta fanerógama)** | | |
| | short | courte | niedrig | baja | Gotte à graine blanche | 3 |
| | medium | moyenne | mittel | media | Samourai | 5 |
| | tall | haute | hoch | alta | Danilla, Hilde II | 7 |
| **37.** | **Plant: fasciation (flowering plant)** | **Plante: fasciation (plante à floraison)** | **Pflanze: Verbänderung (im Blühstadium)** | **Planta: fasciación (planta fanerógama)** | | |
| | absent | absente | fehlend | ausente | Calmar, Romance | 1 |
| | present | présente | vorhanden | presente | Gotte jaune d'or | 9 |
| **38.** | **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 fanerógama)** | | |
| | 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<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **39. (+)** | **(b)** | **Resistance to downy mildew (*Bremia lactucae*)** | **Résistance au mildiou (*Bremia lactucae*)** | **Resistenz gegen Falschen Mehltau (*Bremia lactucae*)** | **Resistencia al mildiú (*Bremia lactucae*)** | | |
| **39.1** | **(c)** | **Isolate Bl 2** | **Isolat Bl 2** | **Isolat Bl 2** | **Aislado Bl 2** | | |
| | | absent | absente | fehlend | ausente | Hilde II | 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 | Hilde II | 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 | Hilde II | 1 |
| | | present | présente | vorhanden | presente | Verpia | 9 |
| **39.4** | **(c)** | **Isolate Bl 12** | **Isolat Bl 12** | **Isolat Bl 12** | **Aislado Bl 12** | | |
| | | absent | absente | fehlend | ausente | Hilde II | 1 |
| | | present | présente | vorhanden | presente | Danilla, Geisha | 9 |
| **39.5** | **(c)** | **Isolate Bl 15** | **Isolat Bl 15** | **Isolat Bl 15** | **Aislado Bl 15** | | |
| | | absent | absente | fehlend | ausente | Hilde II | 1 |
| | | present | présente | vorhanden | presente | Mirian | 9 |
| **39.6** | **(c)** | **Isolate Bl-16** | **Isolat Bl-16** | **Isolat Bl-16** | **Aislado BI-16** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Argelès, Ninja | 9 |
| **39.7** | **(c)** | **Isolate Bl-17** | **Isolat Bl-17** | **Isolat Bl-17** | **Aislado Bl-17** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Argelès, Ninja | 9 |
| **39.8** | **(c)** | **Isolate Bl-18** | **Isolat Bl-18** | **Isolat Bl-18** | **Aislado BI-18** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Argelès, Ninja | 9 |

| | | English | français | Deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **39.9** | **(c)** | **Isolate Bl-20** | **Isolat Bl-20** | **Isolat Bl-20** | **Aislado BI-20** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Argelès, Ninja | 9 |
| **39.10** | **(c)** | **Isolate Bl-21** | **Isolat Bl-21** | **Isolat Bl-21** | **Aislado BI-21** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Colorado, Ninja | 9 |
| **39.11** | **(c)** | **Isolate B1-22** | **Isolat Bl-22** | **Isolat Bl-22** | **Aislado BI-22** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Coralis, Torpedo | 9 |
| **39.12** | **(c)** | **Isolate B1-23** | **Isolat Bl-23** | **Isolat Bl-23** | **Aislado BI-23** | | |
| | | absent | absente | fehlend | ausente | Cobham Green, Hilde II | 1 |
| | | present | présente | vorhanden | presente | Colorado | 9 |
| **40.** | **(b)** | **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)** | | |
| | **(c)** | **Strain Ls-1** | **Souche Ls-1** | **Pathotyp Ls-1** | **Cepa Ls-1** | | |
| | | absent | absente | fehlend | ausente | Hilde II, Salvina | 1 |
| | | present | présente | Vorhanden | presente | Corsica | 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 condtions; 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.

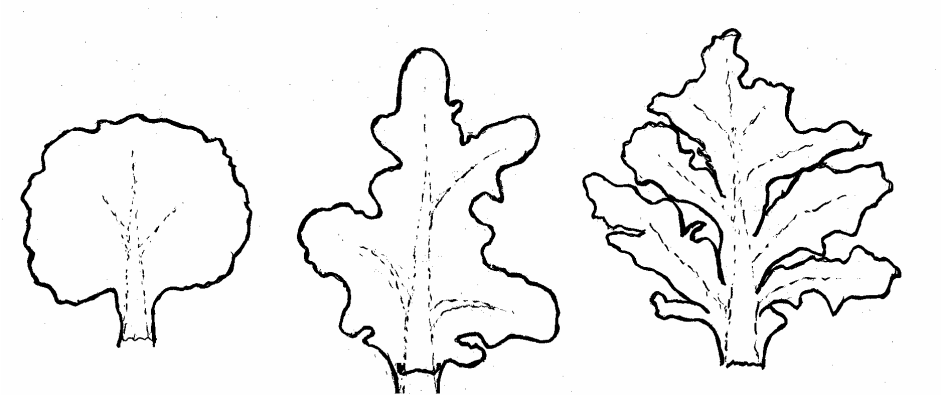
(c) Resistance to downy mildew: Each race should be tested separately and the results should also be indicated separately.

*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

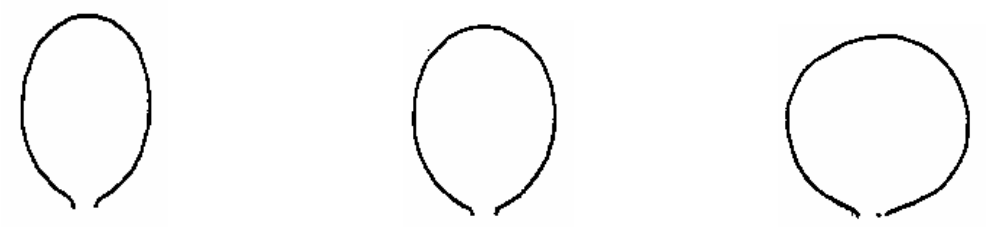


1
entire

2
lobed

3
divided

Ad. 13: Head: shape in longitudinal section

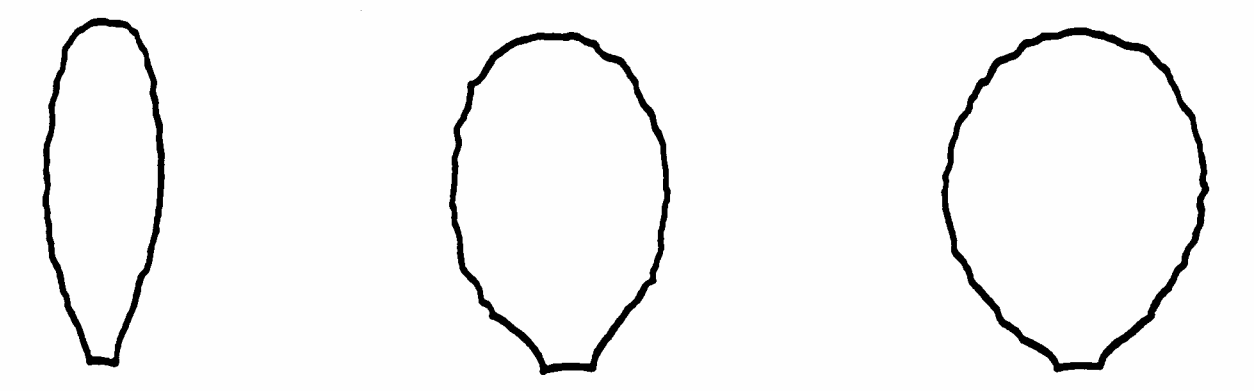


1
elliptic

2
broad elliptic

3
circular

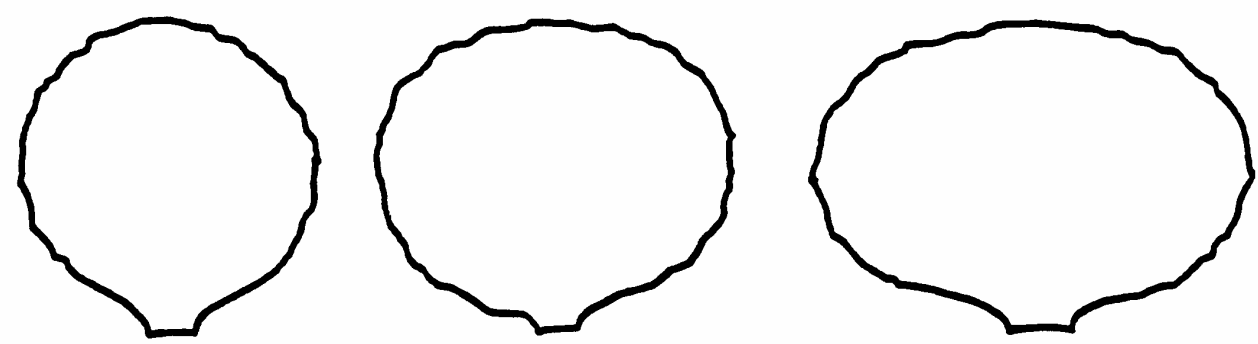
Ad. 16: Leaf: shape



1
narrow elliptic

2
elliptic

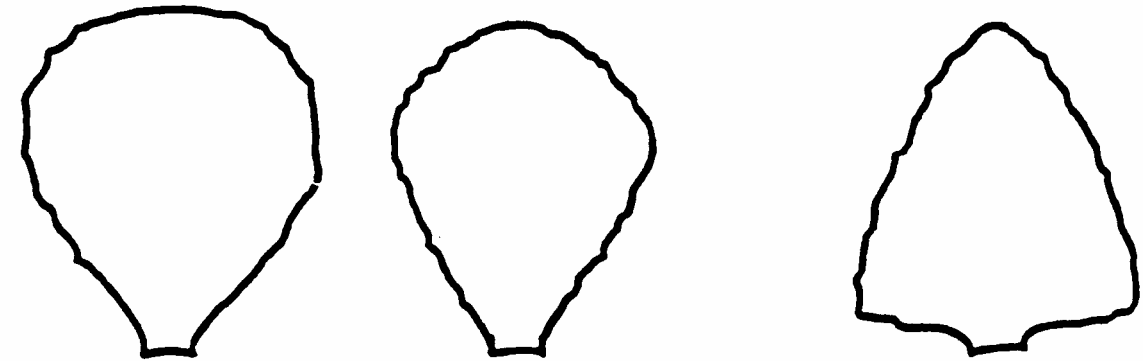
3
broad elliptic



4
circular

5
transverse broad elliptic

6
transverse elliptic



7
obovate

8
broad obtrullate

9
triangular

Ad. 18 + 19: Leaf: hue of green color (18) and intensity of color (19) 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 Trotskopf, 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, 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 |

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

Isolates with at least one Dm gene component

Lettuce varieties should be described as being either resistant to isolates defined by known Dm virulence component(s) or as having in their genetic make-up at least the Dm genes. This takes into account the possibility of Dm-genes, both known and unknown, whose absence or presence has not been tested.

The system of Dm-gene nomenclature developed by Dr. I.R. Crute, A.G. Johnson, B.F. Farrara, T.W. Ilott and R.W. Michelmore should be accepted as the internationally agreed system to describe the Dm-gene components of lettuce varieties. (For more details see the article by 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 and further articles listed in Chapter 9.) More recent information can be found in Ettekoven, K. van, and Arend, A.J.M. van der, 1999 (see Chapter 9).

Useful Dm-Genes

DUS examiners should test for Dm-genes of practical value which are directly involved in giving useful resistance in lettuce varieties, and obscure or irrelevant Dm-genes need not routinely be tested.

The currently useful Dm-genes are: 2, 3, 5/8, 6, 7, 11, 16 and 18*, as well as R17*, R36*, R37* and R38* factors. Only these should be tested on a routine basis. The role of new Dm-genes (*) should be constantly reviewed.

Special Tests

Special tests may be required for Dml, Dm4, Dm15 and Dm10 (useful in the United States of America and Australia).

If breeders claim the presence of Dm-genes other than those mentioned above, then they should state in the Technical Questionnaires how the presence of these genes could be detected and, if appropriate, submit the relevant *Bremia* isolate to the testing centre to verify the claim. Special tests may be carried out for other Dm-genes if claimed by breeders as being appropriate for DUS examination.

*Bremia* Races

The following *Bremia* races should be used to determine whether a lettuce variety possesses the Dm-genes listed above: Bl-2, Bl-5, Bl-7, Bl-12, Bl-15, Bl-16, Bl-17, Bl-18, Bl-20, Bl-21, Bl-22 and Bl-23. For special discrimination between Dm 5/8 and Dm 7, Bl-7 is proposed.

These isolates possess a wide range of virulences. For details, please refer to relevant literature.

New Isolates

Additional isolates could be added to test for any useful new Dm-genes that might arise.

If new isolates of *Bremia* arise that can either detect novel Dm-genes in lettuce varieties or effectively replace an isolate listed above, then these isolates should be added to those listed.

Testing of *Bremia* Isolates

There are two centres, the “Station nationale d’essais de semences” (SNES) in France and the NAK Tuinbouw in the Netherlands, which would verify and test the isolates listed above and any new isolates that are used in routine tests. These centres should make these verified isolates available, against payment of prescribed fees, to the testing centres of other UPOV members.

The addresses of the centres are as follows:

SNES
Rue Georges Morel
P.O. Box 24
49071 Beaucouzé Cedex
France
Tel: +33 (0) 2 42 22 58 00
Fax: +33 (0) 2 41 22 58 01
E-mail: michel.guenard@geves.fr

NAK Tuinbouw
Sotaweg 20
P.O. Box 40
2370 AA Roelofarendsveen
Netherlands
Tel: + 31 (0) 71 332 62 62
Fax: + 31 (0) 71 332 63 63
E-mail: info@naktuinbouw.nl

Table of *Bremia* differentials:

| Variety | Cobham Green | Lednicky | UC DM2 | Dandie | R4T57D | Valmaine | Sabine | LSE 57/15 | UC DM10 | Capitan | Hilde II | Pennlake | UC DM14 | PIVT 1309 | LSE /18 | LS-102 | Colorado | Ninja | Discovery | Argeles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dm nr / R nr** | 0 | 1 | 2 | 3 | 4 | 5/8 | 6 | 7 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18/ | 36 | 37 | 38 |
| Bl 2 | + | + | + | + | + | + | + | - | + | (-) | + | + | + | - | - | - | (-) | - | - | - |
| Bl 5 | + | + | - | + | - | - | - | + | - | - | + | + | - | + | + | - | - | - | - | - |
| Bl 7 | + | + | + | + | + | - | + | + | + | - | + | + | + | - | - | - | - | - | - | - |
| Bl 12 | + | + | - | - | + | + | + | + | + | + | + | + | + | + | + | - | - | - | - | - |
| Bl 15 | + | + | + | + | + | + | - | + | + | + | + | + | - | - | - | - | - | - | - | - |
| Bl 16 | + | + | + | + | + | + | + | + | + | + | + | + | - | - | + | - | - | - | - | - |
| Bl 17 | + | - | + | + | - | + | - | + | + | - | + | + | + | + | - | - | + | - | + | - |
| Bl 18 | + | + | + | - | + | + | + | + | + | + | + | + | - | - | + | - | + | - | - | - |
| Bl 20 | + | + | + | + | + | + | + | + | + | + | + | + | - | - | + | - | + | - | - | - |
| Bl 21 | + | + | + | + | + | + | + | + | + | + | + | + | - | + | + | - | - | + | + | - |
| Bl 22 | + | + | + | - | + | + | + | + | + | + | + | + | + | + | - | - | + | - | - | - |
| Bl 23 | + | + | + | + | + | + | + | + | + | + | + | + | - | - | + | - | - | - | - | + |

Resistance Testing Methods

The following guidelines are suggested for *Bremia* testing:

(a) Maintenance: *Bremia* races should be maintained on varieties possessing no known Dm-genes, or only obscure Dm-genes, e.g. Cobham Green, Lobjoits Green Cos, Hilde (Dm12), Olof. An alternative would be to use lines which are selective for each particular isolate. The purity and quality of these maintenance varieties is important and it may be necessary to commission a seed producer to produce an adequate supply of good quality seed.

(b) Host differentials: Standard control varieties, that express the resistance genes that are being tested for, should always be used in tests, as a check. These standard varieties are available from GEVES Brion in France and NAK Tuinbouw, Netherlands:

| | |
|---|---|
| GEVES Brion | NAK Tuinbouw |
| Domaine de la Boisselière | Sotaweg 20, P.O. Box 40 |
| 49250 Brion | 2370 AA Roelofarendsveen |
| France | Netherlands |

(c) Sample Size: At least 30 separate plants of each variety should be tested to establish the uniformity of the variety's Dm-gene component.

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

(e) Inoculum Concentration: The optimum is around $1 \times 10^5$ spores per ml; at least $3 \times 10^4$ should be used. If inoculated seedlings are used, they may be inoculated prior to the emergence of the first leaf.

(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 as follows:

- First recording: when the control has maximum sporulation;
- Second recording: 3 days after first recording;
- Third recording: 3 days after second recording.

(In case of resistant varieties some plants may show leaf necrosis at the first recording.)

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 4ºC. 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 16ºC during night (N) and of 22ºC during day (D) or, alternatively, temperature of 20ºC N, 25ºC D during 5 days after inoculation followed by 12ºC N and 18ºC 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 $Na_2HPO_4$-buffer containing 0.2% DIECA(*). Prior to inoculation 75 mg/ml carborundum and 75 mg/ml activated charcoal should be added. |
| 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<br>- From inoculation to reading: about 2 to 3 weeks; first reading after 15 days |
| Number of plants tested: | 30 plants and 6 repetitions |

(*) Composition of buffer: per 100 ml: 1.07 g $Na_2HPO_4\,12H_2O$, 0.2 g DIECA

*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.

## 9. Literature

Bowring, J.D.C., 1969: "The identification of varieties of lettuce," National Institute of Agricultural Botany, XI, pp 499-520.

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10. Technical Questionnaire

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

| | Application date:<br>(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 *Latin Name* | *Lactica 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: |
|---|---|---|

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 unknown cross [ ]
(please state known parent variety(ies))

(c) totally unknown cross [ ]

4.1.2 Mutation [ ]
(please state parent variety)

4.1.3 Discovery [ ]
(please state where, when 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)

| 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 de 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 (1)** | **Seed: color** | | |
| | white | Verpia | 1[ ] |
| | yellow | Durango | 2[ ] |
| | black | Kagraner Sommer | 3[ ] |
| **5.3 (18)** | **Leaf: hue of green color of outer leaves** | | |
| | absent | Donatello, Verpia | 1[ ] |
| | yellowish | Dorée de printemps | 2[ ] |
| | greyish | Celtuce, Du bon jardinier | 3[ ] |
| | reddish | Lollo rossa, Revolution, Rosa | 4[ ] |
| **5.4 (20)** | **Leaf: anthocyanin coloration** | | |
| | absent | Fiorella, Sunrise | 1[ ] |
| | present | Commodore, Pirat | 9[ ] |

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

| | Characteristics | Example Varieties | Note |
|---|---|---|---|
| **5.5 (35)** | **Time of beginning of bolting under long day conditions** | | |
| | 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[ ] |

6. Similar varieties and differences from these varieties

| Denomination(s) of variety(ies) similar to your candidate variety | Characteristic(s) in which your candidate variety differs from the similar variety(ies) | Describe the expression of the characteristic(s) for the **similar** variety(ies) | Describe the expression of the characteristic(s) for **your** candidate variety |
|---|---|---|---|
| *(Example)* | *Leaf: intensity of color of outer leaves* | *medium* | *dark* |
| | | | |
| | | | |
| | | | |
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| 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 Special conditions for the examination of the variety

7.2.1 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

7.2.2 If yes, please give 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.

9. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature Date

[End of document]