

**UPOV**

**TG/HOP(proj.1)**  
**ORIGINAL:** English  
**DATE:** June 9, 2004

**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
 GENEVA

**DRAFT**

**HOP**

UPOV code: HUMUL\_LUP

*Humulus lupulus* L.

**GUIDELINES**

**FOR THE CONDUCT OF TESTS**

**FOR DISTINCTNESS, UNIFORMITY AND STABILITY**

*prepared by an expert from Germany*

*to be considered by the  
 Technical Working Party for Agricultural Crops at its thirty-third session,  
 to be held in Poznań, Poland, June 28 to July 2, 2004*

Alternative Names:\*

<i>Latin</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Humulus lupulus</i> L.	Hop	Houblon	Hopfen	Lúpulo

The purpose of these guidelines (“Test Guidelines”) is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

**ASSOCIATED DOCUMENTS**

These guidelines 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.

{Other associated UPOV documents:}

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

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## 1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Humulus lupulus* 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 dormant roots.

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

10 dormant roots

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

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

## 3. Method of Examination

### 3.1 *Number of growing cycles*

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

### 3.2 *Testing Place*

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 "Examining Distinctness".

### 3.3 *Conditions for Conducting the Examination*

The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

#### 3.3.1 Stage of development for the assessment

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

### 3.3.2 Type of observation

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics:

MG: single measurement of a group of plants or parts of plants

VG: visual assessment by a single observation of a group of plants or parts of plants

## 3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 10 plants.

3.4.2 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.

## 3.5 *Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations should be made on 10 plants or parts taken from each of 10 plants.

## 3.6 *Additional Tests*

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

## 4. Assessment of Distinctness, Uniformity and Stability

### 4.1 *Distinctness*

#### 4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

#### 4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

#### 4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the

recommendations contained in the General Introduction prior to making decisions regarding distinctness.

#### 4.2 *Uniformity*

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 For the assessment of uniformity, a population standard of 1 % and an acceptance probability of at least 95 % should be applied. In the case of a sample size of 10 plants, 1 off-type is 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 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 The following have been agreed as useful grouping characteristics:

- (a) Main shoot: anthocyanin coloration (characteristic 1)
- (b) Plant: growth type (characteristic 6)
- (c) Time of picking maturity of cones (characteristic 15)
- (d) Cone: degree of opening of bracts (characteristic 18)

5.4 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

QL Qualitative characteristic – see Section 6.3

QN Quantitative characteristic – see Section 6.3

PQ Pseudo-qualitative characteristic – see Section 6.3

MG: single measurement of a group of plants or parts of plants – see Section 3.3.2

VG: visual assessment by a single observation of a group of plants or parts of plants  
– see Section 3.3.2

(a)-(b) 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/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>1. 37-38 Main shoot: (* VG anthocyanin (+) coloration</b>			<b>Haupttrieb: Anthocyan-färbung</b>			
<b>QN</b>	absent or very weak		fehlend oder sehr gering		Perle	1
	weak		gering		Willamette	3
	medium		mittel		Spalter	5
	strong		stark		Northern Brewer	7
	very strong		sehr stark		Wye Target	9
<b>2. 37-38 Mature leaf: size of (* VG blade</b>			<b>Ausgewachsenes Blatt: Größe der Spreite</b>			
<b>QN (a)</b>	very small		sehr klein			1
	small		klein		First Gold	3
	medium		mittel		Northern Brewer	5
	large		groß		Nugget	7
	very large		sehr groß			9
<b>3. 37-38 Mature leaf: (* VG blistering of upper side of blade</b>			<b>Ausgewachsenes Blatt: Blasigkeit der Oberseite der Spreite</b>			
<b>QN (a)</b>	absent or very weak		fehlend oder sehr gering			1
	weak		gering		Columbus	3
	medium		mittel		Perle	5
	strong		stark			7
	very strong		sehr stark			9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>4. 37-38</b>	<b>Mature leaf: green</b>		<b>Ausgewachsenes</b>			
<b>(*) VG</b>	<b>color of upper side of blade</b>		<b>Blatt: Grünfärbung der Oberseite der Spreite</b>			
<b>QN (a)</b>	light		hell		Brewers Gold	3
	medium		mittel		Nugget	5
	dark		dunkel		Wye Target	7
<b>5. 67</b>	<b>Time of flowering</b>		<b>Zeitpunkt der Blüte</b>			
<b>(*) MG</b>						
<b>(+)</b>						
<b>QN</b>	very early		sehr früh			1
	early		früh		Northern Brewer	3
	medium		mittel		Wye Target	5
	late		spät		Hersbrucker Spät	7
	very late		sehr spät			9
<b>6. 87-89</b>	<b>Plant: growth type</b>		<b>Pflanze: Wuchstyp</b>			
<b>(*) VG</b>						
<b>PQ</b>	dwarf		Zwerg		First Gold	1
	semi-dwarf		Halbzweig			2
	normal		Normal		Hallertauer Magnum	3



	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>7. 87-89 Plant: growth shape</b> <b>(*) VG</b> <b>(+)</b>			<b>Pflanze: Wuchsform</b>			
<b>PQ</b>	spindle-shaped		spindelförmig		Northern Brewer	1
	spindle-shaped to cylindrical		spindelförmig bis zylinderförmig		Hallertauer Taurus	2
	cylindrical		zylinderförmig		Hallertauer Magnum	3
	cylindrical to club-shaped		zylinderförmig bis keulenförmig		Willamette	4
	club-shaped		keulenförmig		Spalter Select	5
	cylindrical to conical		zylinderförmig bis kegelförmig		Galena	6
	conical		kegelförmig		Glacier	7
<b>8. 87-89 Plant: volume of</b> <b>(*) VG head</b> <b>(+)</b>			<b>Pflanze: Kopfvolumen</b>			
<b>QN</b>	very low		sehr gering		First Gold	1
	low		gering		Spalter	3
	medium		mittel		Saphir	5
	high		hoch		Nugget	7
	very high		sehr hoch		Spalter Select	9
<b>9. 87-89 Side shoot: length in</b> <b>(*) VG middle third of plant</b>			<b>Seitentrieb: Länge im mittleren Pflanzendrittel</b>			
<b>QN</b>	very short		sehr kurz			1
	short		kurz		First Gold	3
	medium		mittel		Northern Brewer	5
	long		lang		Tettnanger Früher	7
	very long		sehr lang		Late Cluster	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>10. 87-89</b>	<b>Side shoot: length in</b>		<b>Seitentrieb: Länge</b>			
<b>(*) VG</b>	<b>upper third of plant</b>		<b>im oberen</b>			
			<b>Pflanzendrittel</b>			
<b>QN</b>	very short		sehr kurz			1
	short		kurz		Northern Brewer	3
	medium		mittel		Columbus	5
	long		lang		Brewers Gold	7
	very long		sehr lang			9
<b>11. 87-89</b>	<b>Side shoot: density</b>		<b>Seitentrieb: Dichte</b>			
<b>(*) VG</b>	<b>of leaves</b>		<b>der Belaubung</b>			
<b>(+)</b>						
<b>QN</b>	very weak		sehr gering			1
	weak		gering			3
	medium		mittel		Fuggle	5
	high		hoch		Northern Brewer	7
	very high		sehr hoch			9
<b>12. 87-89</b>	<b>Side shoot: mean</b>		<b>Seitentrieb: mittlere</b>			
<b>(*) VG</b>	<b>number of cones on</b>		<b>Anzahl der Zapfen</b>			
<b>(+)</b>	<b>ramifications</b>		<b>an den</b>			
			<b>Verzweigungen</b>			
<b>QN</b>	very weak		sehr gering			1
	weak		gering		Spalter	3
	medium		mittel		Hallertauer Merkur	5
	many		groß		Perle	7
	very many		sehr groß			9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>13. 87-89</b>	<b>Plant: number of</b>		<b>Pflanze: Anzahl der</b>			
<b>(*) VG</b>	<b>cones on side shoots</b>		<b>Zapfen an</b>			
	<b>of middle third of</b>		<b>Seitentrieben des</b>			
	<b>plant</b>		<b>mittleren</b>			
			<b>Pflanzendrittels</b>			
<b>QN</b>	very weak		sehr gering			1
	weak		gering		Herald	3
	medium		mittel		Hallertauer Magnum	5
	large		groß		Brewers Gold	7
	very large		sehr groß			9
<b>14. 87-89</b>	<b>Plant: number of</b>		<b>Pflanze: Anzahl der</b>			
<b>(*) VG</b>	<b>cones on side shoots</b>		<b>Zapfen an</b>			
	<b>of upper third of</b>		<b>Seitentrieben des</b>			
	<b>plant</b>		<b>oberen</b>			
			<b>Pflanzendrittels</b>			
<b>QN</b>	very weak		sehr gering		Herald	1
	weak		gering		Spalter	3
	medium		mittel		Tettnanger Früher	5
	large		groß		Aurora	7
	very large		sehr groß		Hersbrucker Spät	9
<b>15. 89</b>	<b>Time of picking</b>		<b>Zeitpunkt der</b>			
<b>(*) MG</b>	<b>maturity of cones</b>		<b>Pflückreife der</b>			
<b>(+)</b>			<b>Zapfen</b>			
<b>QN</b>	very early		sehr früh			1
	early		früh		Northern Brewer	3
	medium		mittel		Hallertauer Merkur	5
	late		spät		Nugget	7
	very late		sehr spät			9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>16. (*)</b>	<b>89 VG</b>	<b>Cone: size</b>	<b>Zapfen: Größe</b>			
<b>QN</b>	<b>(b)</b>	very small	sehr klein			1
		small	klein		Saphir	3
		medium	mittel		Hersbrucker Spät	5
		large	groß		Tettnanger Früher	7
		very large	sehr groß			9
<b>17. (*)(+)</b>	<b>89 VG</b>	<b>Cone: shape</b>	<b>Zapfen: Form</b>			
<b>PQ</b>	<b>(b)</b>	cylindrical	zylindrisch		Wye Target	1
		cylindrical to ovate	zylindrisch bis eiförmig		Northern Brewer	2
		ovate	eiförmig		Nugget	3
		ovate to spherical	eiförmig bis kugelförmig		Brewers Gold	4
		spherical	kugelförmig			5
<b>18. (*)</b>	<b>89 VG</b>	<b>Cone: degree of opening of bracts</b>	<b>Zapfen: Öffnungsgrad der Deckblätter</b>			
<b>QN</b>	<b>(b)</b>	closed	geschlossen		Wye Target	1
		slightly open	leicht geöffnet		Perle	2
		clearly open	deutlich geöffnet		Brewers Gold	3
<b>19. (*)</b>	<b>89 VG</b>	<b>Cone: size of bracts</b>	<b>Zapfen: Größe der Deckblätter</b>			
<b>QN</b>	<b>(b)</b>	very small	sehr klein			1
		small	klein		Saphir	3
		medium	mittel		Northern Brewer	5
		large	groß		Herald	7
		very large	sehr groß			9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
<b>20.</b>	<b>89</b>	<b>Cone: width of bracts relative to length</b>		<b>Zapfen: Breite der Deckblätter relativ zur Länge</b>		
(*)	VG					
(+)						
<b>QN</b>	<b>(b)</b>	narrow	schmal			3
		medium	mittel		Aurora	5
		wide	breit		Wye Target	7
<b>21.</b>	<b>89</b>	<b>Cone: expression of tip of bracts</b>		<b>Zapfen: Ausprägung der Deckblattspitzen</b>		
(*)	VG					
(+)						
<b>QN</b>	<b>(b)</b>	very weak	sehr gering			1
		weak	gering		Wye Target	3
		medium	mittel		Perle	5
		strong	stark		Brewers Gold	7
		very strong	sehr stark			9

## 8. Explanations on the Table of Characteristics

### 8.1 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) Mature leaves: All observations on mature leaves should be made on leaves of the main shoot.

(b) Cones: All observations on cones should be made on fully developed cones of the largest third of cones from the head of plant.

### 8.2 Explanations for individual characteristics

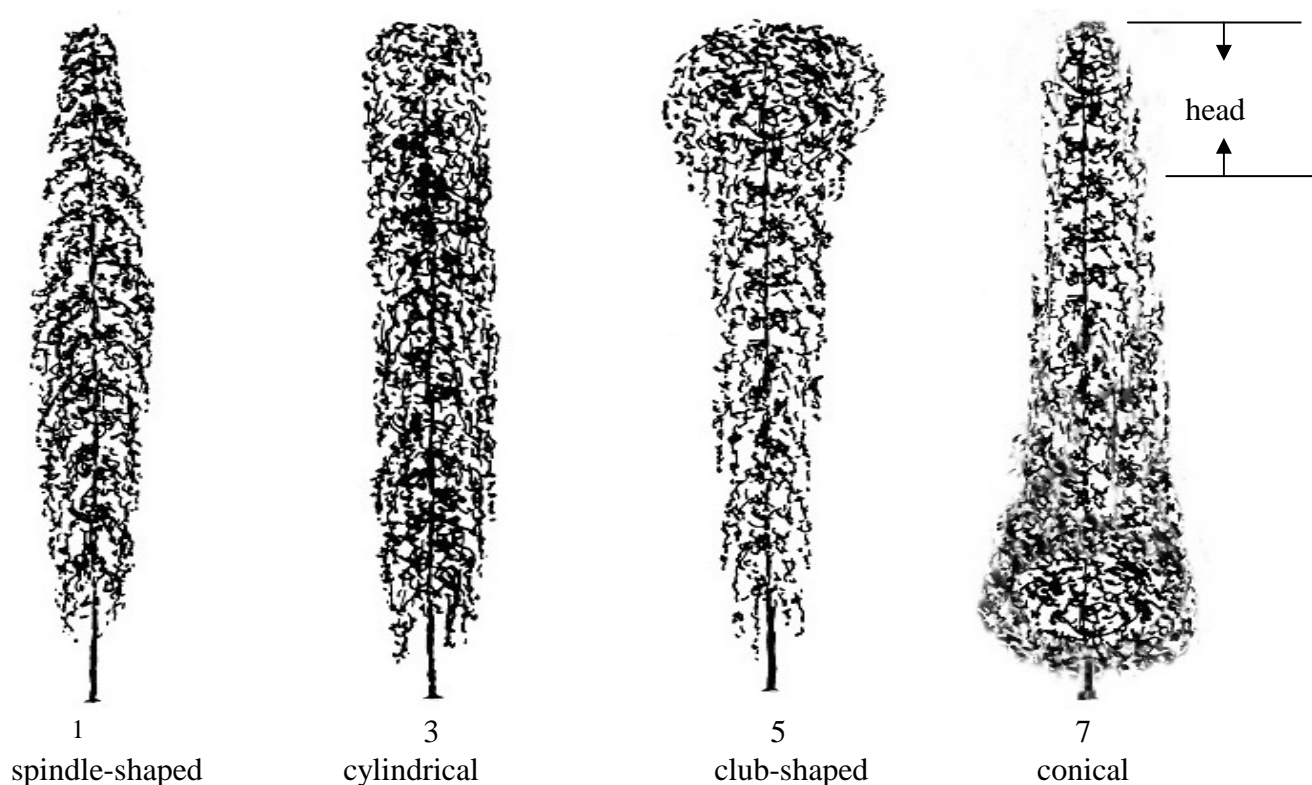
#### Ad. 1: Main shoot: anthocyanin coloration

In the case of normal growth type observation should be done when the main shoots have reached 75 %-100 % of top wire height of about 7 m. Semi-dwarfs and dwarfs should be observed in a corresponding stage of development.

#### Ad. 5: Plant: time of flowering

About 70 % of flowers open (50 % of plants).

Ad. 7: Plant: growth type and Ad. 8: Plant: volume of head



Ad. 11: Side shoot: density of leaves

Observation in the middle third of side shoots of the middle third of plant.

Ad 12: Side shoot: mean number of cones on ramifications

Observation in the middle third of side shoots of the middle third of plant.

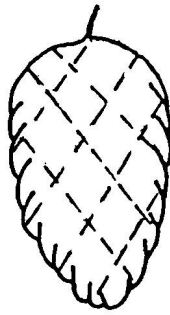
Ad 15: Time of picking maturity of cones

Observation when almost all cones have reached their final degree of opening of bracts and have produced golden lupulin and fully developed aroma. Cones are rustling when slightly pressed between fingers.

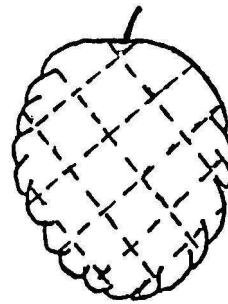
Ad. 17: Cone: shape



1  
cylindrical

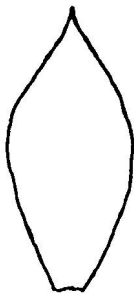


3  
ovate

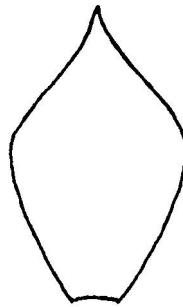


5  
spherical

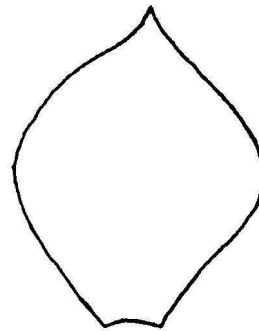
Ad. 20: Cone: width of bracts relative to length



3  
narrow

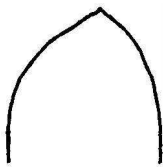


5  
medium

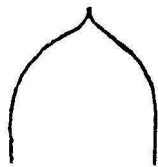


7  
wide

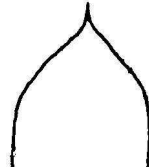
Ad. 21: Cone: expression of tip of bracts



1  
very weak



3  
weak



5  
medium



7  
strong



9  
very strong



8.3 Phenological growth stages and BBCH-identification keys of *Humulus lupulus* L. (Meier, 1997)

Code	Description
<b>Principal growth stage 0</b>	<b>Sprouting</b>
00	Dormancy: Rootstock without shoots (uncut)
01	Dormancy: Rootstock without shoots (cut)
07	Rootstock with shoots (uncut)
08	Beginning of shoot-growth (rootstock cut)
09	Emergence: First shoots emerge at the soil surface
<b>Principal growth stage 1</b>	<b>Leaf development</b>
11	First pair of leaves unfolded
12	Second pair of leaves unfolded (Beginning of twining)
	stages continuous till ...
19	Nine and more pairs of leaves unfolded
<b>Principal growth stage 2</b>	<b>Formation of side shoots</b>
21	First pair of side shoots visible
22	Second pair of side shoots visible
	stages continuous till ...
29	Nine and more pairs of side shoots visible (secondary side shoots occur)
<b>Principal growth stage 3</b>	<b>Elongation of bines</b>
31	Bines have reached 10 % of top wire height
32	Bines have reached 20 % of top wire height
	stages continuous till ...
38	Plants have reached the top wire
39	End of bine elongation
<b>Principal growth stage 4</b>	-
<b>Principal growth stage 5</b>	<b>Inflorescence emergence</b>
51	Inflorescence buds visible
55	Inflorescence buds enlarged
<b>Principal growth stage 6</b>	<b>Flowering</b>
61	Beginning of flowering: about 10 % of flowers open
65	Full flowering: about 50 % of flowers open
69	End of flowering
<b>Principal growth stage 7</b>	<b>Development of cones</b>
71	Beginning of cone development: 10 % of inflorescences are cones
75	Cone development half way: All cones are visible, cones are soft, stigmas still present
79	Cone development complete: Cones have reached full size
<b>Principal growth stage 8</b>	<b>Maturity of cones</b>
81	Beginning of maturity: 10 % of cones are compact
85	Advanced maturity: 50 % of cones are compact
87	70 % of cones are compact
89	Cones ripe for picking: cones closed; lupulin golden; aroma potential fully developed
<b>Principal growth stage 9</b>	<b>Senescence, entry into dormancy</b>
92	Overripeness: Cones yellow-brown discoloured, aroma deterioration
97	Dormancy: leaves and stems dead

9. Literature

Meier, U. (Editor), 1997: Growth Stages of Mono- and Dicotyledonous Plants. BBCH-Monograph. Blackwell Wissenschafts-Verlag, Berlin, Wien.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
		Application date: (not to be filled in by the applicant)
<b>TECHNICAL QUESTIONNAIRE</b> to be completed in connection with an application for plant breeders' rights		
1. Subject of the Technical Questionnaire		
1.1 Botanical name	<input type="text" value="Humulus lupulus L."/>	
1.2 Common Name	<input type="text" value="HOP"/>	
2. Applicant		
Name	<input type="text"/>	
Address	<input type="text"/>	
Telephone No.	<input type="text"/>	
Fax No.	<input type="text"/>	
E-mail address	<input type="text"/>	
Breeder (if different from applicant)	<input type="text"/>	
3. Proposed denomination and breeder's reference		
Proposed denomination (if available)	<input type="text"/>	
Breeder's reference	<input type="text"/>	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross  [ ]  
(please state parent varieties)  
.....

(b) partially known cross  [ ]  
(please state known parent variety(ies))  
.....

(c) unknown cross  [ ]

4.1.2 Mutation  [ ]  
(please state parent variety)  
.....

4.1.3 Discovery and development  [ ]  
(please state where and when discovered and how developed)  
.....

4.1.4 Other  [ ]  
(please provide details)  
.....

4.2 Method of propagating the variety

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# Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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
<b>5.1 Main shoot: anthocyanin coloration</b> (1)		
absent or very weak	Perle	1[ ]
weak	Willamette	3[ ]
medium	Spalter	5[ ]
strong	Northern Brewer	7[ ]
very strong	Wye Target	9[ ]
<b>5.2 Plant: growth type</b> (6)		
dwarf	First Gold	1[ ]
semi-dwarf		2[ ]
normal	Hallertauer Magnum	3[ ]
<b>5.3 Side shoot: length in middle third of plant</b> (9)		
very short		1[ ]
short	First Gold	3[ ]
medium	Northern Brewer	5[ ]
long	Tettnanger Früher	7[ ]
very long	Late Cluster	9[ ]
<b>5.4 Plant: number of cones on side shoots of upper third of plant</b> (14)		
very weak	Herald	1[ ]
weak	Spalter	3[ ]
medium	Tettnanger Früher	5[ ]
large	Aurora	7[ ]
very large	Hersbrucker Spät	9[ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
<b>5.5 Time of picking maturity of cones (15)</b>		
very early		1[ ]
early	Northern Brewer	3[ ]
medium	Hallertauer Merkur	5[ ]
late	Nugget	7[ ]
very late		9[ ]
<b>5.6 Cone: size (16)</b>		
very small		1[ ]
small	Saphir	3[ ]
medium	Hersbrucker Spät	5[ ]
large	Tettnanger Früher	7[ ]
very large		9[ ]
<b>5.7 Cone: degree of opening of bracts (18)</b>		
closed	Wye Target	1[ ]
slightly open	Perle	2[ ]
clearly open	Brewers Gold	3[ ]
<b>5.8 Cone: expression of tip of bracts (21)</b>		
very weak		1[ ]
weak	Wye Target	3[ ]
medium	Perle	5[ ]
strong	Brewers Gold	7[ ]
very strong		9[ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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6. Similar varieties and differences from these varieties

*Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.*

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the <b>similar</b> variety(ies)	Describe the expression of the characteristic(s) for <b>your</b> candidate variety
Comments:			





TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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. Information on plant material to be examined.

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

- |   |         |        |
|---|---------|--------|
| (a) Microorganisms (e.g. virus, bacteria, phytoplasma)      | Yes [ ] | No [ ] |
| (b) Chemical treatment (e.g. growth retardant or pesticide) | Yes [ ] | No [ ] |
| (c) Tissue culture  | Yes [ ] | No [ ] |
| (d) Other factors   | Yes [ ] | No [ ] |

Please provide details of where you have indicated "yes".

.....

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant's name

Signature

Date

[End of document]