

Draft Descriptor List *Mentha piperita* L.

Highly discriminating descriptors in this descriptor list are marked with an asterisk [★].

Characterization should preferably be done during the second year after establishment to allow plants to fully express their characteristics. Characters should be recorded on an average of minimum 10 plants per accession.

Locality: Country, GPS

Date [YYYYMMDD]:

Specimen No. (In case of *in situ* characterization):

Accession No. (In case of *ex situ* characterization/evaluation):

		<i>In situ</i>	<i>Ex situ</i>
CHARACTERIZATION			
7. Plant descriptors			
7.1 Plant			
Observations should be made on 10 randomly chosen, fully developed plants at inflorescence emergence.			
★	7.1.1 Plant height [mm] Measured on fully grown plants, from ground level to the tip of the plant.	√	√
★	7.1.2 Plant diameter [mm] Measured on fully grown plants.	√	√
7.2 Stem			
Observations should be made on 10 stems per plant.			
★	7.2.1 Branching density 3 Sparse 5 Intermediate 7 Dense	√	√
★	7.2.2 Shoot density 3 Sparse 5 Intermediate 7 Dense	√	√
★	7.2.3 Main stem length [mm] Measured from the root collum to the point of flower insertion.	√	√
★	7.2.4 Main stem diameter [mm]	√	√

Draft Descriptor List *Mentha piperita* L.

		<i>In situ</i>	<i>Ex situ</i>
	7.2.5 Stem colour (as below or using RHS Colour Chart)	√	√
	1 Green		
	2 Dark green		
	3 Purple green		
	4 Purple		
	5 Violet		
	99 Other (remarks)		
*	7.2.6 Stem hairs Observed before flowering.	√	√
	0 Absent		
	1 Present		
*	7.2.7 Stem hairs type	√	√
	1 Pubescent		
	2 Villous		
*	7.2.8 Stem hairs density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
7.3 Leaf			
Observations made on 10 leaves per plant if possible.			
	7.3.1 Leaf density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
	7.3.2 Colour of fully grown leaf (as below or using RHS Colour Chart)	√	√
	1 Light green		
	2 Green		
	3 Dark green		
	4 Purple green		
	5 Purple		
	99 Other (remarks)		
*	7.3.3 Length of fully grown leaf [mm] Measured at the middle of the plant.	√	√
*	7.3.4 Length of petiole [mm] Measured at the middle of the plant.	√	√
*	7.3.5 Width of fully grown leaf [mm] Measured at the middle of the plant.	√	√

Draft Descriptor List *Mentha piperita* L.

			<i>In situ</i>	<i>Ex situ</i>
*	7.3.6	Leaf shape 1 Round 2 Orbicular 3 Ovate 4 Ovate-oblong 5 Ovate-lanceolate 6 Lanceolate 7 Oblong-lanceolate 8 Lanceolate-elliptic 9 Sub-cordiform 99 Other (remarks)	√	√
*	7.3.7	Leaf – shape of apex 1 Acute 2 Pointed 99 Other (remarks)	√	√
*	7.3.8	Leaf – shape of base 1 Acute 2 Attenuate 3 Cordate 4 Sub-cordate 5 Cuneate 6 Rounded 99 Other (remarks)	√	√
*	7.3.9	Leaf – shape of margin 1 Serrate 2 Dentate 99 Other (remarks)	√	√
*	7.3.10	Leaf – configuration of surface 1 At least one surface of leaf hairy 2 Leaves reticulate-veined 3 Lower surface with branched hairs 4 Leaves crisp 5 All hairs simple 6 Leaves sub-glabrous 7 Leaves not crisp 99 Other (remarks)	√	√
*	7.3.11	Position of widest part of leaf 1 Leaf widest at the base 2 Leaf widest in the middle 3 Leaf attenuate at the base	√	√
*	7.3.12	Leaf hairs 0 Absent 1 Present	√	√
*	7.3.13	Leaf hairs type 1 Pubescent 2 Villous 99 Other (remarks)	√	√

		<i>In situ</i>	<i>Ex situ</i>
★	7.3.14 Leaf hairs density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
	7.3.15 Leaf hairs – location on the upper surface of limb	√	√
	1 Throughout the leaf		
	2 On the leaf nervure		
	3 On the leaf margin		
	99 Other (remarks)		
	7.3.16 Leaf hairs – location on the lower surface of limb	√	√
	1 Throughout the leaf		
	2 On the leaf nervure		
	3 On the leaf margin		
	99 Other (remarks)		
★	7.3.17 Glands density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
7.4 Bracts			
Observations made on 10 bracts per plant if possible.			
	7.4.1 Bracts colour (as below or using RHS Colour Chart)	√	√
	1 Light green		
	2 Green		
	3 Dark green		
	4 Purple green		
	5 Purple		
	99 Other (remarks)		
	7.4.2 Bracts shape	√	√
	1 Ovate		
	2 Lanceolate		
	3 Ovate-elliptic		
	4 Ovate-lanceolate		
	5 Elliptic-lanceolate		
	99 Other (remarks)		
	7.4.3 Bracts – shape of margin	√	√
	1 Entire		
	2 Dentate		
	99 Other (remarks)		
★	7.4.4 Length of bract [mm]	√	√
★	7.4.5 Length of petiole [mm]	√	√
★	7.4.6 Width of bract [mm]	√	√
★	7.4.7 Bract hairs	√	√
	0 Absent		
	1 Present		

Draft Descriptor List *Mentha piperita* L.

		<i>In situ</i>	<i>Ex situ</i>
*	7.4.8 Bract hairs type 1 Pubescent 2 Villous 99 Other (remarks)	√	√
*	7.4.9 Bract hairs density 3 Sparse 5 Intermediate 7 Dense	√	√
7.5 Inflorescence Observations made on 10 inflorescences per plant if possible.			
*	7.5.1 Length of inflorescence [mm]	√	√
*	7.5.2 Width of inflorescence [mm]	√	√
*	7.5.3 Terminal inflorescence shape 1 Capitulum 2 Spike-like 3 Pseudo-spike 99 Other (remarks)	√	√
*	7.5.4 Inflorescence position 1 Terminal 2 Verticillate	√	√
	7.5.5 Verticillasters 1 Evenly distributed along the flowering stem 2 Spike-like inflorescence 3 Globose-capitate 4 Spiciform 5 Sub-globose-capitate 99 Other (remarks)	√	√
*	7.5.6 Number of flowers per inflorescence Average of 3 randomly selected inflorescences.	√	√
*	7.5.7 Date of flowering [YYYYMMDD] Recorded when 50% of flowers are completely open.		√
*	7.5.8 Date of full flowering [YYYYMMDD] Recorded when 50% of seeds are ripe.		√
7.6 Flower Observations made on 10 flowers per plant if possible.			
*	7.6.1 Male sterility 0 Absent 1 Present	√	√

Draft Descriptor List *Mentha piperita* L.

		<i>In situ</i>	<i>Ex situ</i>
	7.6.2 Corolla colour (as below or using RHS Colour Chart)	√	√
	1 White		
	2 Pink		
	3 Lilac-pink		
	4 Lilac		
	5 Light purple		
	6 Purple		
	7 Purple		
	8 Violet pinkish		
	9 Pale violet		
	10 Violet		
	99 Other (remarks)		
	7.6.3 Corolla shape	√	√
	1 Campanulate		
	2 Tubular		
	99 Other (remarks)		
*	7.6.4 Corolla hairs	√	√
	0 Absent		
	1 Present		
*	7.6.5 Corolla hairs type	√	√
	1 Pubescent		
	2 Villous		
	7.6.6 Corolla hairs density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
*	7.6.7 Type of stamens	√	√
	1 Included		
	2 Exserted		
	3 Both included and exserted		
*	7.6.8 Type of pistils	√	√
	1 Included		
	2 Exserted		
	7.6.9 Calix colour (as below or using RHS Colour Chart)	√	√
	1 Light green		
	2 Green		
	3 Dark green		
	4 Purple		
	5 Violet		
	99 Other (remarks)		
	7.6.10 Calyx shape	√	√
	1 Campanulate		
	2 Tubular		
	99 Other (remarks)		
	7.6.11 Calix margin	√	√
	1 Serrate		
	2 Dentate		
	99 Other (remarks)		

		<i>In situ</i>	<i>Ex situ</i>
	7.6.12 Shape of calyx teeth	√	√
	1 Triangular		
	2 Triangular subulate		
	3 Triangular lanceolate		
	4 Linear		
	99 Other (remarks)		
*	7.6.13 Calyx hairs	√	√
	0 Absent		
	1 Present		
*	7.6.14 Calyx hairs type	√	√
	1 Pubescent		
	2 Villous		
*	7.6.15 Calyx hairs density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
*	7.6.16 Glands density	√	√
	3 Sparse		
	5 Intermediate		
	7 Dense		
7.7 Fruit			
Observations made on 10 fruits per plant if possible.			
	7.7.1 Tegument	√	√
	1 Smooth		
	2 Reticulate		
	99 Other (remarks)		
	7.7.2 Fruit colour	√	√
	1 Light brown		
	2 Brown		
	3 Dark brown		
	99 Other (remarks)		
7.8 Seed			
	7.8.1 100-fruit weight [g]	√	√
	Harvested from each plant or per population.		
*	7.8.2 1000-seed weight [g]	√	√
	Harvested from each plant or per population.		
	7.8.3 Seed colour	√	√
	1 Light brown		
	2 Brown		
	3 Dark brown		
	99 Other (remarks)		

	<i>In situ</i>	<i>Ex situ</i>
7.9 Remarks Any additional information, especially in the category "99 = Other" under various descriptors above, may be specified here.		√
EVALUATION		
8. Plant descriptors		
8.1 Vegetative		
8.1.1 Fresh biomass per plant [FWg]	√	√
8.1.2 Leaves dry matter content [DWg] In an oven set (artificial drying) at 30-35°C ± 48 h until material breakable.	√	√
8.1.3 Dry biomass per plant [DWg] In an oven set (artificial drying) at 30-35°C ± 48 h until plant breakable.	√	√
8.2 Chemical composition		
* 8.2.1 Essential oil content in dry leaves [% DW] [v/w] Main compound in the essential oil [%] (components>10%)	√	√
8.2.1.1 Menthol content [%]		
8.2.1.2 Menthone content [%]		
8.2.1.3 Menthyl-acetate content [%]		
8.2.1.4 1,8-Cineol content [%]		
8.2.1.5 Isomenthone content [%]		
8.2.1.6 Menthofuran content [%]		
8.2.1.7 Limonene content [%]		
8.2.1.8 Carvone content [%]		
8.2.1.9 Pulegone content [%]		
* 8.2.2 Polyphenol content in dry leaves [% DW] [v/w]	√	√
8.2.2.1 Apigenin content [%]		
8.2.2.2 Luteolin content [%]		
8.2.2.3 Eriodictyol content [%]		
8.2.2.4 Ursolic acid content [%]		

		<i>In situ</i>	<i>Ex situ</i>
8.2.2.5	Oleanolic acid content [%]		
8.2.2.6	Fenilic acid content [%]		
8.2.2.7	p-Coumaric acid content [%]		
8.2.2.8	Caffeic acid content [%]		
8.2.2.9	Chlorogenic acid content [%]		
8.2.2.10	Rosmarinic acid content [%]		
8.3 Cytological characters			
*	8.3.1 Chromosome number	√	√

BIBLIOGRAPHY

- Bioversity International. 2007. Guidelines for the development of crop descriptor lists. Bioversity Technical Bulletin Series no.13. Bioversity International, Rome, Italy.
- Coutinho AXP. 1939. Flora de Portugal (Plantas Vasculares). Disposta em Chaves Dicotómicas. 2nd edition. Bertrand Ltd., Lisboa.
- Cunha AP, Silva AP, Roque OR. 2003. Plantas e produtos vegetais em fitoterapia. Serviço de Educação e Bolsas. Fundação Calouste Gulbenkian, Lisboa.
- Duke JA, Beckstrom-Sternberg SM. 1996. Handbook of Medicinal Mints (Aromathematics) Phytochemicals and Biological Activities. CRC Press.
- EDQM. 2007. European Pharmacopoeia. 6th edition. European Directorate for the Quality of Medicines and Health Care (EDQM), Council of Europe, Strasbourg.
- Franco JA. 1984. Nova Flora de Portugal (Continente e Açores). Vol. II. Clethraceae – Compositae. Escolar Editora, Lisboa.
- Infarmed. 2002. Farmacopeia Portuguesa Vol. VII. Edição oficial. Lisboa.
- Infarmed. 2005. Farmacopeia Portuguesa Vol. VIII. Edição oficial. Lisboa.
- ISO. 2005. ISO 3033-1:2005. Oil of spearmint – Part 1: Native type (*Mentha spicata* L.). International Organization for Standardization (http://www.iso.org/iso/catalogue_detail.htm?csnumber=34580).
- Lawrence BM. 2007. Mint: The genus *Mentha*. Medicinal and Aromatic Plants – Industrial Profiles. Taylor and Francis, London.
- Morales R, Quintanar A, Cabezas F, Pujadas AJ, Cirujano S. 2010. Flora Ibérica. Plantas Vasculares de la Península Ibérica e Islas Baleares. Vol. XII. Verbenaceae - Labiatae – Callitrichaceae. Real Jardín Botánico, C.S.I.C. Madrid. (http://www.floraiberica.es/miscelania/noticias/Volumen_XII.php).
- Radford AE, Dickison WC, Massey JR, Bell CR. 1974. Vascular Plant Systematics. Harper & Row, New York.
- RHS [The Royal Horticultural Society]. 2001. RHS Colour Chart. The Royal Horticultural Society, London.
- Tutin TG, Heywood VH, Burges NA, Moore DM, Valentine DH, Walters SM, Webb DA. 1972. Flora Europaea. "Diapensiaceae to Myoporaceae". Vol. 3. Cambridge University Press.
- Zviniene N. 1998. Numerical Taxonomy of Lithuanian mints (*Mentha* L.). Botanica Lithuanica 4(1):3-20.

CONTRIBUTORS

INRB/Unidade de Recursos Genéticos, Ecofisiologia e Melhoramento de Plantas

Ana Maria Barata
Instituto Nacional de Recursos Biológicos, Banco Português de Germoplasma Vegetal
Quinta de S. José, S. Pedro de Merelim
4700-859 Braga
Email: ana.barata@inrb.pt

Eliseu Bettencourt (*currently on leave of absence*)
INRB/Unidade de Recursos Genéticos, Ecofisiologia e Melhoramento de Plantas
L-INIA, Quinta do Marquês, Av. da República, 2784-505 Oeiras
Email: eliseu.bettencourt@gmail.com

Violeta Lopes
Instituto Nacional de Recursos Biológicos, Banco Português de Germoplasma Vegetal
Quinta de S. José, S. Pedro de Merelim
4700-859 Braga
Email: violeta.lopes@inrb.pt

Filomena Rocha
Instituto Nacional de Recursos Biológicos, Banco Português de Germoplasma Vegetal
Quinta de S. José, S. Pedro de Merelim
4700-859 Braga
Email: filomena.rocha@inrb.pt

Bioversity International

Alercia Adriana and Aixa del Greco¹
Bioversity International
Via dei Tre Denari, 472/a
00057 Maccarese
Rome, Italy
Email: a.alercia@cgiar.org

REVIEWER

Ana Cristina Figueiredo
Instituto de Biotecnologia e Bioengenharia, Centro de Biotecnologia Vegetal C2,
Departamento de Biologia Vegetal, Universidade de Lisboa
Campo Grande
1749-016 Lisboa
Tel: 00351 21 7500257
Fax: 00351 21 7500048
Email: acsf@fc.ul.pt

¹ has now left the Institute