

STRAWBERRY (*Fragaria* spp.) DESCRIPTORS

II ACCESSION MANAGEMENT, MULTIPLICATION/REGENERATION DESCRIPTORS

Descriptor code	Descriptor scale (score)	Reference values	Reference varieties	Remarks
II/1	Number of times accession regenerated			
II/2	Patent status			
	0 Non-patented cultivar			
	1 Patented cultivar			
II/3	Number of plants sampled			
				Approximate number of plants collected (sampled) in the field to produce this accession.
II/4	Nature of vegetative sample			
	0 Not vegetative (seed)			
	1 Cuttings - for grafting			
	2 Cuttings - for rooting			
	3 Rooted plants			
	4 Tissue culture			
	5 Other (specify in NOTES descriptor, II/11)			
II/5	Virus disease status (including mycoplasma)			
	1 Virus disease free**			** Record results of virus tests in the NOTES descriptor, II/11 (positive or negative).
	2 Virus disease tested (infected)**			
	3 Not tested			
II/6	End use			
	1 Scion cultivar – dessert			
	2 Scion cultivar – processing			
	3 Dual or multipurpose consumption			
	4 Clonal rootstock			
	5 Clonal interstock			
	6 Seedling rootstock			
	7 Ornamental/pollinator (pollinizer)			
	8 Botanical (wild) species			

	9	Other (specify in NOTES descriptor, II/11) for example 'valuable unnamed selections from a breeding programme'			
II/7	Other notes from collector				
					Collectors should record ecological/cli matic information. For cultivated crops, cultivation practices should be recorded.
II/8	Rootstock				
					Name of rootstock on which accession is grafted, if any.
II/9	Condition of tree				
	1	Dead			
	2	Dying			
	3	Old – declining			
	4	Mature – diseased			
	5	Mature - non-vigorous			
	6	Mature – vigorous			
	7	Young - not yet bearing			
	8	Other (specify in NOTES descriptor, II/11)			
II/10	Propagation method				
	1	Grafting (including budding)			
	2	Hardwood cuttings			
	3	Softwood cuttings			
	4	Stool beds			
	5	Layering			
	6	Micropropagation			
	7	Seed			
	8	Other (specify in NOTES descriptor, II/11)			
II/11	Notes				

III CHARACTERIZATION AND EVALUATION DESCRIPTORS

Strawberry genetic resources evaluation methodology:

For genotype characterization as a minimum 20 young plants should be planted. For detailed evaluation 25-30 plants in 3-4 replicates should be planted. The plant material should be visibly healthy, not lacking in vigour or affected by any important pest or disease. It should preferably not be obtained from in vitro propagation. No waiting beds or cold storage should be used. For comparison two control cultivars with early and late ripening times should be planted at the same time.

The testing is conducted on 3 production seasons. The tests should normally be conducted at one place. If any important characteristics of the accession cannot be seen at that place, the accession may be tested at an additional place.

Additional tests for special purposes may be established.

A descriptor is scored using a 1–9 scale. When the descriptor is inapplicable or the character is not expressed, "0" is used as the descriptor value. If necessary, for descriptors, where full range of scores is not mentioned, notes 1 and 9 and the intermediate notes 2-4-6-8 could be used additionally.

Characterization of testing location:

- a. Country of characterization
- b. Institute name and address
- c. Institute site (latitude, longitude, elevation)
- d. Plot size
- e. Number of plants per plot
- f. Number of evaluated plants
- g. Place of evaluation – field, greenhouse u.s.w.
- h. Number of replications
- i. Fertilizer (types, doses)
- j. Plant protection

ENVIRONMENT CHARACTERISTIC

- k. Soil type
- l. Relief
- m. Soil pH
- n. Soil organic matter content
- o. Soil texture
- p. Temperature range (growing period mean, maximum, minimum)
- q. Precipitation (sum in growing period)
- r. Frost (date and lowest temperature of most recent frost)

Descriptor code	Number of trait in other descriptors	Descriptor scale (score)	Reference values	Remarks
III/1		Growth habit		
	IBPGR 86/66 Nr. 4.1.1.	3 erect 5 intermediate 7 spreading		Evaluate at beginning of flowering
III/2		Vigour of the plant		
	IBPGR 86/66 Nr. 4.1.2., UPOV	3 weak 5 medium- 7 strong		Evaluate at beginning of flowering

	TG/22/9 Nr.3				
III/3		Foliation density			
	IBPGR 86/66 Nr. 4.1.4., UPOV TG/22/9 Nr.2	3 5 7	open medium- dense		Evaluate at beginning of flowering
III/4		Coloration of upper side of leaf			
	UPOV TG/22/9 Nr.4	1 2 3 4 5	yellow green light green medium green dark green blue green		Evaluate at beginning of flowering
III/5		Position of inflorescence relative to foliage			
	IBPGR 86/66 Nr. 4.1.7., UPOV TG/22/9 Nr.16	3 5 7	beneath level with above		Evaluate at maximum of flowering
III/6		Fruit position at harvest			
	IBPGR 86/66 Nr. 6.2.1.	3 5 7	on ground intermediate upright		Evaluate at maximum of harvesting
III/7		Time of appearance of first stolons			
	IBPGR 86/66 Nr. 4.1.9.	3 5 7	early intermediate late		Evaluate in comparison to standard cultivars
III/8		Ability to produce stolons			
	IBPGR 86/66 Nr. 4.1.8.	3 5 7	weak intermediate strong	<5 stolons per plant 5-10 >10	Evaluate during maximum of runnering
III/9		Time of flowering (50% of plants at first flower)			
	IBPGR 86/66 Nr. 4.1.11., UPOV TG/22/9 Nr.39	1 3 5 7 9	very early early medium late very late		Evaluate in comparison to standard cultivars
III/10		Type of flower			
	IBPGR 86/66 Nr. 4.3.2.	1 2 3	only male only female hermaphrodite		
III/11		Flower size			
	UPOV TG/22/9 Nr.17	3 5 7	small medium large	>2 cm Ø 2.0-3.5 cm >3.5 cm	Evaluate at the maximum of flowering by measuring of flower diameter for 10 secondary flowers.
III/12		Time of fruit ripening (50% of plants with ripe fruits)			
	IBPGR	1 3	very early early		Evaluate in comparison to standard cultivars

	86/66 Nr. 4.1.12., UPOV TG/22/9 Nr.40	5 7 9	intermediate late very late		
III/13		Length of picking season			
	IBPGR 86/66 Nr. 6.2.2.	3 5 7	short intermediate long		Evaluate in comparison to standard cultivars
III/14		Fruit size			
	IBPGR 86/66 Nr. 4.4.1.	1 3 5 7 9	very small small intermediate large very large	<2 g 2-5 g 5-10 g 10-15 g >15 g	Average weight of a minimum 20 fruits at the beginning, in the middle and at the end of harvest
III/15		Uniformity of fruit size (same pick)			
	IBPGR 86/66 Nr. 6.2.6.	3 5 7	low intermediate high		Evaluate 3-4 picking times. Within a minimum of 10 fruits
III/16		Fruit size maintenance (successive picks)			
	IBPGR 86/66 Nr. 6.2.7.	3 5 7	low intermediate high		
III/17		Fruit predominant shape			
	UPOV TG/22/9 Nr.23	1 2 3 4 5 6 7 8 9	reiniform oblate round conical bi-conical ovoid almost cylindrical wedged cordiform	Appendix, Figure 1	Evaluate at beginning of harvest for 5 typical fruits.
III/18		Uniformity of fruit shape			
	IBPGR 86/66 Nr. 6.2.8.	1 3 5 7 9	very low low intermediate high very high		Evaluate 3-4 picking times. Within a minimum of 10 fruits
III/19		Fruit band without achenes			
	UPOV TG/22/9 Nr.25	1 3 5 7 9	absent or very narrow narrow medium broad very broad	Appendix, Figure 2	Evaluate at beginning of harvest on secondary fruits
III/20		Insertion of calyx			
	IBPGR 86/66 Nr. 4.4.4., UPOV TG/22/9 Nr.31	1 2 3	in a basin level set above fruit	Appendix, Figure 3	Evaluate at beginning of harvest on secondary fruits.
III/21		Size of calyx in relation to fruit diameter			
	IBPGR	3	smaller		Evaluate at beginning of

	86/66 Nr. 6.1.5.	5 7	same size larger		harvest on secondary fruits.
III/22		Fruit capping easiness			
	IBPGR 86/66 Nr. 4.4.11.	1 3 5 7 9	very poor poor intermediate good very good		Evaluate 3-4 picking times within 5- 10 fruits
III/23		Pedicle brittleness			
	IBPGR 86/66 Nr. 4.4.5.	3 5 7	low intermediate high		Evaluate 3-4 picking times within 5- 10 fruits
III/24		Fruit colour			
	UPOV TG/22/9 Nr.27	1 2 3 4 5 6 7	whitish yellow light orange orange orange red red dark red red black		Evaluate at maximum of harvest.
III/25		Flesh colour			
	UPOV TG/22/9 Nr.36	1 2 3 4 5 6	whitish pale pink orange red light red medium red dark red		Evaluate at maximum of harvest.
III/26		Uniformity of flesh colour			
	IBPGR 86/66 Nr. 6.2.13.	3 5 7	low intermediate high		Evaluate at maximum of harvest for 5 cut berries.
III/27		Uniformity of fruit ripening			
	IBPGR 86/66 Nr. 6.2.12.	3 5 7	low intermediate high		
III/28		Fruit glossiness			
	UPOV TG/22/9 Nr.29	3 5 7	weak medium strong		Evaluate at maximum of harvest.
III/29		Fruit firmness			
	IBPGR 86/66 Nr. 4.4.8., UPOV TG/22/9 Nr.35	1 3 5 7 9	very soft soft intermediate firm very firm		Evaluate at maximum of harvest.
III/30		Fruit skin resistance			
	COST 836*	3 5 7	low intermediate high		Evaluate at maximum of harvest.
III/31		Achene density			
	IBPGR 86/66 Nr. 4.4.9.	3 5 7	low intermediate high		Evaluate at maximum of harvest.
III/32		Achene position			

	IBPGR 86/66 Nr. 4.4.10.	3 5 7	sunken level raised		Evaluate at maximum of harvest.
III/33		Fruit sweetness			
	IBPGR 86/66 Nr. 4.4.12.	3 5 7	weak intermediate strong		Evaluate at maximum of harvest organoleptically or by refractometer, reading the soluble solids of the fruit, show value in brackets.
III/34		Fruit acidity			
	IBPGR 86/66 Nr. 4.4.13.	3 5 7	weak intermediate strong		Evaluate at maximum of harvest organoleptically or by pH reading of the fruit, show value in brackets.
III/35		Fruit flavour			
	COST 836*	1 3 5 7 9	very weak poor medium good very good		Evaluate at maximum of harvest.
III/36		Yielding capacity			
	IBPGR 86/66 Nr. 6.2.5.	1 3 5 7 9	very low low intermediate high very high		
III/37		Type of bearing			
	UPOV TG/22/9 Nr.41	1 2 3 4	not remontant partially remontant fully remontant (non- flowering runners) day neutral (flowering runners		
III/38		Post-harvest retention of glossiness			
	IBPGR 86/66 Nr. 6.2.14.	3 5 7	weak intermediate strong		Sample size- 500 g, storing at room temperature 20-25 °C during 24 h
III/39		Post-harvest stability of fruit colour			
	IBPGR 86/66 Nr. 6.2.15.	3 5 7	poor intermediate good		Sample size- 500 g, storing at room temperature 20-25 °C during 24 h
III/40		Calyx freshness after storage			
	COST 836*	3 5 7	low intermediate high		Sample size- 500 g, storing at room temperature 20-25 °C during 24 h
III/41		Resistance to fruit rot during storage			
	COST 836*	3 5 7	low intermediate high		Sample size- 500 g, storing at room temperature 20-25 °C during 24 h
III/42		Susceptibility to spring frosts			
		0	no visible damages		Evaluate 2-3 days after

		1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high, all flowers damaged		spring frosts, counting damaged flowers on 10 inflorescences.
III/43		Plant winter hardiness			
		1 3 5 7 9	no visible damages low damages intermediate high damages all plants dead		Evaluate in spring, during period of intensive growing
III/44		Susceptibility to draught			
	IBPGR 86/66 Nr. 7.1.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		
III/45		Susceptibility to spider mite (<i>Tetranychus urticae</i>)			
	IBPGR 86/66 Nr. 8.1.1.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate after fruit harvesting.
III/46		Susceptibility to strawberry mite (<i>Tarsonemus pallidus</i>)			
	IBPGR 86/66 Nr. 8.1.2.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate after fruit harvesting.
III/47		Susceptibility to strawberry blossom weevil (<i>Anthonomus rubi</i>)			
	IBPGR 86/66 Nr. 8.1.6.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate during flowering counting damaged flowers (buds) on 10 inflorescences.
III/48		Susceptibility to grey mold (<i>Botrytis cinerea pers.</i>)			
	IBPGR 86/66 Nr. 8.2.1.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate during fruit harvesting, recording damaged fruits in % from total yield.
III/49		Susceptibility to mildew (<i>Sphaerotheca macularis f. fragariae</i>)			
	IBPGR 86/66 Nr. 8.2.2.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate during fruit harvesting.
III/50		Susceptibility to root and crown diseases (can be caused by <i>Cylindrocarpon spp.</i>, <i>Fusarium spp.</i>, <i>Verticillium spp.</i>, <i>Rhizoctonia spp.</i> and others)			
	IBPGR 86/66 Nr. 8.2.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate after fruit harvesting. If possible, the causing agents should be specified in laboratory.

III/51		Susceptibility to white spot disease (<i>Mycosphaerella fragariae</i> Tul.)			
	IBPGR 86/66 Nr. 8.2.7.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate after fruit harvesting.
III/52		Susceptibility to leaf scorch (<i>Diplocarpon earlianum</i>)			
	IBPGR 86/66 Nr. 8.2.10.	1 3 5 7 9	extremely low low susceptibility intermediate high susceptibility extremely high		Evaluate after fruit harvesting.
III/53		Notes			
III/54		Cytological characteristics and identified genes			
III/55		Ploidy level			
III/56		Molecular markers			
III/57		Pictures			

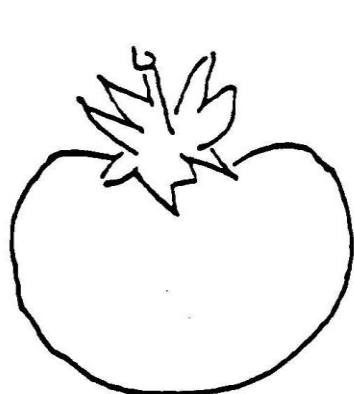
Reference:

IBPGR 86/66

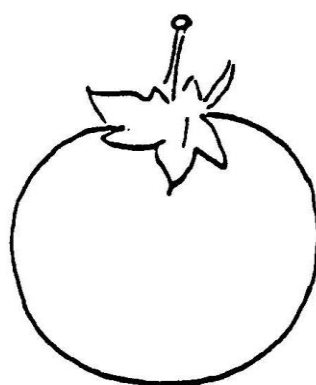
*COST 836. European network for strawberry cultivar evaluation. Descriptor for the questionnaire

UPOV TG/22/9

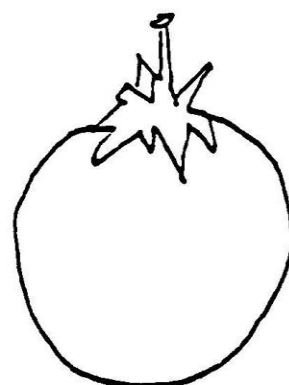
Appendix



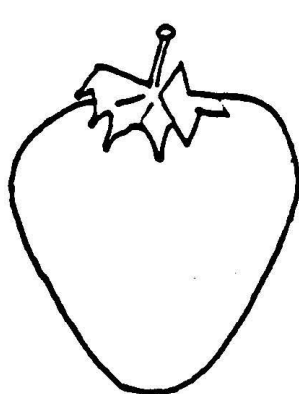
1- reiniform



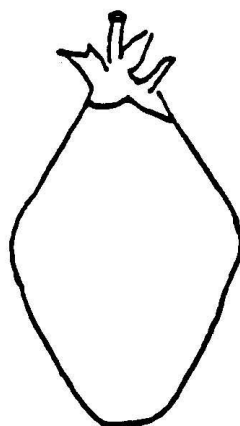
2- oblate



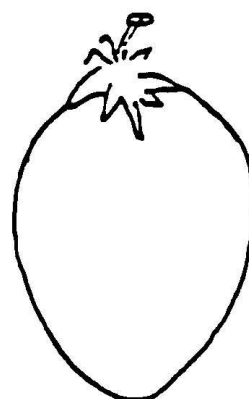
3- round



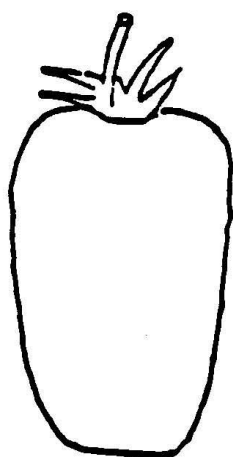
4- conical



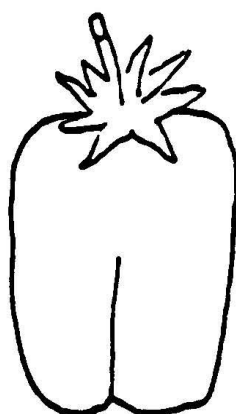
5- bi-conical



6- ovoid

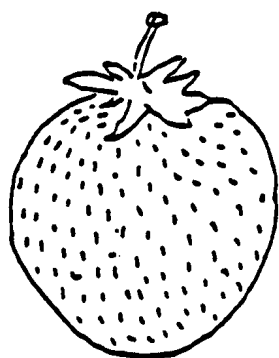


7 almost cylindrical

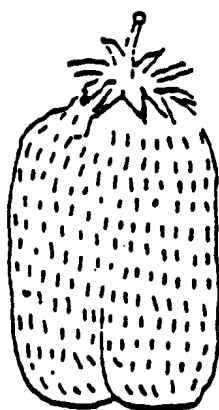


8 wedged

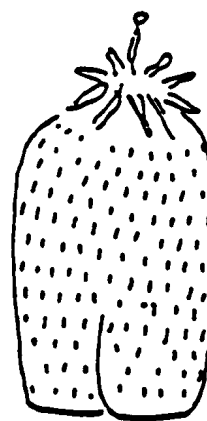
Figure. 1. Fruit shape (UPOV TG/22/9 Nr.23)



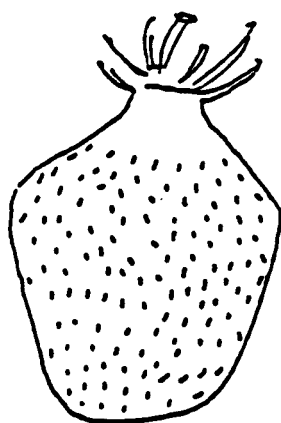
1
absent or very narrow



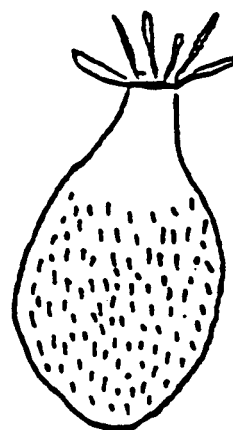
3
narrow



5
medium

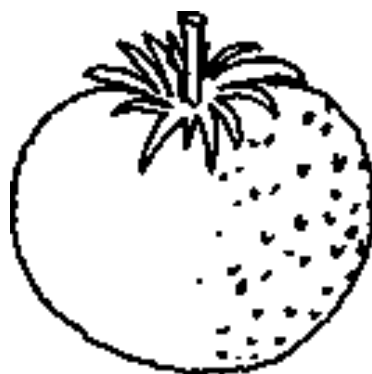


7
broad

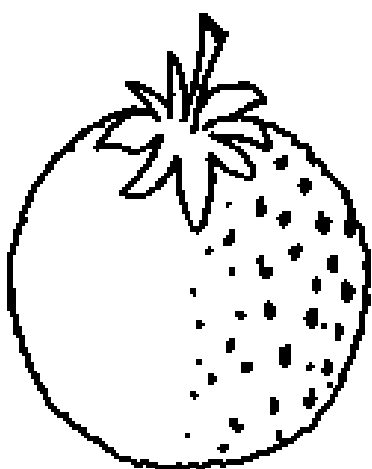


9
very broad

Figure 2. **Fruit band without achenes** (UPOV TG/22/9 Nr.25)



1- in a basin



2- level



3- set above fruit

Figure 3. **Insertion of calyx** (UPOV TG/22/9 Nr.31)