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TG/44/10

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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

UNION INTERNATIONALE POUR LA PROTECTION DES OBTENTIONS VÉGÉTALES

INTERNATIONALER VERBAND ZUM SCHUTZ VON PFLANZEN-ZÜCHTUNGEN

UNIÓN INTERNACIONAL PARA LA PROTECCIÓN DE LAS OBTENCIONES VEGETALES

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

TOMATO

(*Lycopersicon lycopersicum* (L.) Karsten ex Farw.)

GENEVA
2001

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These Guidelines should be read in conjunction with document TG/1/2, which contains explanatory notes on the general principles on which the Guidelines have been established.

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I. Subject of these Guidelines

These Test Guidelines apply to all varieties of *Lycopersicon lycopersicum* (L.) Karsten ex Farw. (*Lycopersicon esculentum* Mill).

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the seed required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. The minimum quantity of plant material to be supplied by the applicant in one or several samples should be:

(a)	vegetatively propagated varieties:	25 plants for greenhouse varieties, 50 plants for outdoor varieties per growing season
(b)	seed propagated varieties:	10 g or 2500 seeds.

The plant material/seed supplied should be visibly healthy, not lacking in vigor or affected by any important pest or disease. The seed should at least meet the minimum requirements for germination capacity, moisture content and purity for marketing seed in the country in which the application is made. The germination capacity should be as high as possible.

2. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

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

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The tests should be carried out under conditions ensuring normal growth. The size of the plots should be such that plants or parts of plants may be removed for measurement and counting without prejudice to the observations which must be made up to the end of the growing period. Each test should include a total of 20 plants in the greenhouse or 40 plants in the open which should be divided between two or more replicates. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions. Varieties stemming from tissue culture should, in addition, be compared to plant material of comparable varieties raised under the same conditions.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise indicated, all observations determined by measurement, weighing or counting should be made on 20 plants or parts taken from each of 20 plants.

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 20 plants, the maximum number of off-types allowed would be 1. In the case of a sample size of 40 plants, the maximum number of off-types allowed would be 2.

3. When resistance characteristics are used for assessing distinctness, uniformity and stability, records must be taken under conditions of controlled infection and, unless otherwise specified, on at least 10 plants.

4. All observations on the leaf should be made before ripening of fruit.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. Characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

2. It is recommended that the competent authorities use the following characteristics for grouping varieties:

(a) Plant: growth type (characteristic 2)
(b) Leaf: division of blade (characteristic 9)
(c) Peduncle: abscission layer (characteristic 20)
(d) Fruit: shape in longitudinal section (characteristic 24)
(e) Fruit: number of locules (characteristic 33)
(f) Fruit: green shoulder (before maturity) (characteristic 34)
(g) Fruit: color at maturity (characteristic 38)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Table of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of the different characteristics.

3. Legend:

(*) Characteristics that should be used on all varieties in every growing cycle over which the examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible.

(+) See Explanations on the Table of Characteristics in Chapter VIII.

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. **(*)**	**Seedling: anthocyanin coloration of hypocotyl**	**Plantule: pigmentation anthocyanique de l'hypocotyle**	**Keimpflanze: Anthocyanfärbung des Hypocotyls**	**Plántula: pigmentación antociánica del hipocótilo**		
	absent	absente	fehlend	ausente		1
	present	présente	vorhanden	presente	Montfavet H 63.4	9
2. **(*)** **(+)**	**Plant: growth type**	**Plante: type de croissance**	**Pflanze: Wuchstyp**	**Planta: hábito de crecimiento**		
	determinate	déterminé	begrenzt wachsend	determinado	Campbell 1327, Prisca	1
	indeterminate	indéterminé	unbegrenzt wachsend	indeterminado	Marmande VR, Saint-Pierre, San Marzano 2	2
3.	**Only determinate growth type varieties: Plant: number of inflorescences on main stem (side shoots to be removed)**	**Seulement variétés à type de croissance déterminée: Plante: nombre d'inflores-cences sur la tige principale (bourgeons axillaires à éliminer)**	**Nur begrenzt wachsende Sorten: Pflanze: Anzahl ~~Knoten~~ Blütenstände am Haupttrieb (Seitentriebe sind zu entfernen)**	**Sólo variedades con tipo de crecimiento determinado: Planta: número de inflorescencias (eliminar ramas laterales)**		
	few	petit	gering	bajo	Campbell 1327	3
	medium	moyen	mittel	medio	Montfavet H 63.4	5
	many	grand	groß	alto	Prisca	7
4. **(+)**	**Stem: anthocyanin coloration of upper third**	**Tige: pigmentation anthocyanique du tiers supérieur**	**Stengel: Anthocyan-färbung des oberen Drittels**	**Tallo: pigmentación antociánica del tercio superior**		
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil		1
	weak	faible	gering	débil	Montfavet H 63.5	3
	medium	moyenne	mittel	media	Rondello	5
	strong	forte	stark	fuerte	Grinta, Nemato	7
	very strong	très forte	sehr stark	muy fuerte		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
5. **(+)**	**Only indeterminate growth type varieties: Stem: length of internode (between 1st and 4th inflorescence)**	**Seulement variétés à type de croissance indéterminé: Tige: longueur de l'entrenœud (entre la 1ère et la 4ème inflorescence)**	**Nur unbegrenzt wachsende Sorten: Stengel: Internodienlänge (zwischen dem 1. und dem 4. Blütenstand)**	**Sólo variedades con tipo de crecimiento indeterminado: Tallo: longitud del entrenudo (entre la 1a y 4a inflorescencia)**		
	short	court	kurz	corta	Dombito, Manific, Paso, Trend	3
	medium	moyen	mittel	media	Montfavet H 63.5	5
	long	long	lang	larga	Berdy, Calimero	7
6. **(*)**	**Leaf: attitude (in middle third of plant)**	**Feuille: port (au tiers moyen de la plante)**	**Blatt: Stellung (im mittleren Drittel der Pflanze)**	**Hoja: porte (en el tercio medio de la planta)**		
	semi-erect	demi-dressé	halbaufrecht	semierecto	Allround, Drakar, Vitador	3
	horizontal	horizontal	waagerecht	horizontal	Aromata, Triton	5
	semi-drooping	demi-retombant	halbüberhängend	semicolgante	Montfavet H 63.5	7
7. **(*)**	**Leaf: length**	**Feuille: longueur**	**Blatt: Länge**	**Hoja: longitud**		
	short	courte	kurz	corta	Nelson, Red Robin, Tiny Tim~~(+ determinate /indeterminate varieties)~~	3
	medium	moyenne	mittel	media	Lorena	5
	long	longue	lang	larga	Montfavet H 63.5	7
8. **(*)**	**Leaf: width**	**Feuille: largeur**	**Blatt: Breite**	**Hoja: anchura**		
	narrow	étroite	schmal	estrecha	Marmande VR, Red Robin, Tiny Tim	3
	medium	moyenne	mittel	media	~~(+ determinate /indeterminate varieties)~~	5
	broad	large	breit	ancha	Saint-Pierre	7
9. **(*)**	**Leaf: division of blade**	**Feuille: division du limbe**	**Blatt: Fiederung**	**Hoja: división del limbo**		
	pinnate	penné	gefiedert	pinnada	Mikado, Pilot, Red Jacket	1

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
	bipinnate	bipenné	doppelt gefiedert	bipinnada	Lukullus, Saint-Pierre	2
10. **(+)**	**Leaf: size of leaflets (in middle of leaf)**	**Feuille: taille des folioles (au centre de la feuille)**	**Blatt: Größe ~~des~~ der Blattfiedern ~~Blättchens~~ (in der Blattmitte)**	**Hoja: tamaño de los folíolos (en el medio de la hoja)**		
	very small	très petit~~s~~es	sehr klein	muy pequeños	Minitom	1
	small	~~petits~~petites	klein	pequeños	Tiny Tim	3
	medium	~~moyens~~moyennes	mittel	medios	Marmande VR, Royesta	5
	large	~~grands~~grandes	groß	grandes	Daniela, Hynema	7
	very large	très ~~grands~~grandes	sehr groß	muy grandes	Dombo	9
11.	**Leaf: intensity of green color**	**Feuille: intensité de la couleur verte**	**Blatt: Intensität der Grünfärbung**	**Hoja: intensidad del color verde**		
	light	claire	hell	claro	Macero II, Poncette, Rossol	3
	medium	moyenne	mittel	medio	Lucy	5
	dark	foncée	dunkel	oscuro	Allround, Daniela, Lorena, Red Robin	7
12.	**Leaf: glossiness (as for 6)**	**Feuille: brillance (comme pour 6)**	**Blatt: Glanz (wie unter 6)**	**Hoja: brillo (como para 6)**		
	weak	faible	gering	débil	Daniela	3
	medium	moyenne	mittel	medio	Marmande VR	5
	strong	forte	stark	fuerte	Guindilla	7
13.	**Leaf: blistering (as for 6)**	**Feuille: cloqûre (comme pour 6)**	**Blatt: Blasigkeit (wie unter 6)**	**Hoja: abullonado (como para 6)**		
	weak	faible	gering	débil	Daniela	3
	medium	moyenne	mittel	medio	Marmande VR	5
	strong	forte	stark	fuerte	Delfine, Tiny Tim	7
14.	**Leaf: size of blisters (as for 6)**	**Feuille: taille des cloques (comme pour 6)**	**Blatt: Größe der Blasen (wie unter 6)**	**Hoja: tamaño del abullonado (como para 6)**		
	small	petites~~s~~	klein	pequeño	Husky Cherrie Red	3
	medium	moyennes~~s~~	mittel	medio	Marmande VR	5
	large	grandes~~s~~	groß	grande	Daniela, Egéris	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
15. **(+)**	**Leaf: attitude of petiole of leaflet in relation to main axis (as for 6)**	**Feuille: port des ~~folioles~~ pétioles par rapport à l'axe central (comme pour 6)**	**Blatt: Stellung ~~der~~ des Blattstiels ~~Seitenfieder~~ im Verhältnis zur Hauptachse (wie unter 6)**	**Hoja: porte del pecíolo de los folíolos en relación con el eje principal (como para 6)**		
	semi-erect	demi-dressé	halbaufrecht	semierecto	Blizzard, Marmande VR	3
	horizontal	horizontal	waagerecht	horizontal	Sonatine	5
	semi-drooping	demi-retombant	halbüberhängend	semicolgante	Montfavet H63.5	7
16.	**Inflorescence: type (2nd and 3rd truss)**	**Inflorescence: type (2ème et 3ème cymes)**	**Blütenstand: Typ (2. und 3. Blütenstand)**	**Inflorescencia: tipo (2º y 3er racimo)**		
	mainly uniparous	principalement unipare	überwiegend unverzweigt	principalmente unípara	Dynamo	1
	intermediate	intermédiaire	intermediär	intermedia	Harzfeuer	2
	mainly multiparous	principalement multipare	überwiegend verzweigt	principalmente multípara	Marmande VR	3
17.	**Flower: fasciation (1st flower of inflorescences)**	**Fleur: fasciation (1ère fleur des inflorescences)**	**Blüte: Verbänderung (1. Blüte der Blütenstände)**	**Flor: fasciación (1a flor de las inflorescencias)**		
	absent	absente	fehlend	ausente	Monalbo, Moneymaker	1
	present	présente	vorhanden	presente	Marmande VR	9
18. **(+)**	**Flower: pubescence of style**	**Fleur: pilosité du style**	**Blüte: Behaarung des Griffels**	**Flor: pubescencia del estilo**		
	absent or very scarce	absente ou très faible	fehlend oder sehr wenig	ausente o muy escasa	Campbell 1327	1
	present	présente	vorhanden	presente	Saint-Pierre	9
19. **(*)**	**Flower: color**	**Fleur: couleur**	**Blüte: Farbe**	**Flor: color**		
	yellow	jaune	gelb	amarillo	Marmande VR	1
	orange	orange	orange	anaranjado	Pericherry	2
20. **(*)** **(+)**	**Peduncle: abscission layer**	**Pédoncule: assise d'abscission**	**Blütenstandstiel: Bruchstelle**	**Pedúnculo: capa de abscisión**		
	absent	absente	fehlend	ausente	Aledo, Bandera, Count, Lerica	1
	present	présente	vorhanden	presente	Montfavet H 63.5, Roma	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
21. **(*)** **(+)**	**<u>Only for varieties with abscission layers</u>:** **Peduncle: length (from abscission layer to calyx)**	**<u>Seulement pour variétés avec assise d'abscission</u>:** **Pédoncule: longueur (du point d'abscission au calice)**	**<u>Nur für Sorten mit Bruchstellen des Stiels:</u>** **Blütenstandstiel: Länge (von der Bruchstelle bis zum Kelch)**	**<u>Solo para variedades con abscisión</u>:** **Pedúnculo: longitud (desde la zona de abscición hasta el cáliz)**		
	short	court	kurz	corta	Cerise, Ferline, Montfavet H 63.18, Rossol	3
	medium	moyen	mittel	media	Dario, Primosol	5
	long	long	lang	larga	Erlidor, Ramy, Ranco	7
22. **(*)**	**Fruit: size**	**Fruit: taille**	**Frucht: Größe**	**Fruto: tamaño**		
	very small	très petit	sehr klein	muy pequeño	Cerise, Sweet 100	1
	small	petit	klein	pequeño	Early Mech, Europeel, Roma	3
	medium	moyen	mittel	medio	Alphamech, Diego	5
	large	grand	groß	grande	Carmello, Ringo	7
	very large	très grand	sehr groß	muy grande	Erlidor, Lydia, Muril	9
23. **(*)**	**Fruit: ratio length/diameter**	**Fruit: rapport longueur/diamètre**	**Frucht: Verhältnis Länge/Durchmesser**	**Fruto: relación longitud/diámetro**		
	very small	très petit	sehr klein	muy pequeña	Campbell 28, Marmande VR	1
	small	petit	klein	pequeña	Alicia	3
	medium	moyen	mittel	media	Early Mech, Peto Gro	5
	large	grand	groß	grande	Rimone, Rio Grande	7
	very large	très grand	sehr groß	muy grande	Elko, Macero II	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24. (*) (+)	**Fruit: shape in longitudinal section**	**Fruit: forme en section longitudinale**	**Frucht: Form im Längsschnitt**	**Fruto: forma en sección longitudinal**		
	flattened	aplatie	abgeflacht	aplanada	Campbell 28, Marmande VR	1
	slightly flattened	légèrement aplatie	leicht abgeflacht	ligeramente aplanada	Montfavet H 63.4, Montfavet H 63.5	2
	circular	arrondie	kreisförmig	circular	Cerise, Moneymaker	3
	rectangular	rectangulaire	rechteckig	rectangular	Early Mech, Peto Gro	4
	cylindrical	cylindrique	zylindrisch	cilíndrica	Hypeel 244, Macero II, San Marzano 2	5
	~~oblong~~ elliptic	~~rectangulaire~~ elliptique	~~rechteckig~~ elliptisch	~~oblonga~~ elíptica	Alcaria, Castone	6
	heart-shaped	cordiforme	herzförmig	cordiforme	Valenciano	7
	obovate	obovale	verkehrt eiförmig	oboval	Barbara	8
	ovate	ovale	eiförmig	oval	Rimone, Rio Grande	9
	pear-shaped	forme de poire	birnförmig	forma de pera	Europeel	10
25. (*)	**Fruit: ribbing at peduncle end**	**Fruit: ~~cannelures~~ côtes à l'attache pédonculaire**	**Frucht: Rippung am Stielende**	**Fruto: acostillado en la zona pedúncular**		
	absent or very weak	absentes ou très faibles	fehlend oder sehr gering	ausente o muy débil	Calimero, Cerise	1
	weak	faibles	gering	débil	Early Mech, Hypeel 244, Melody, Peto Gro, Rio Grande	3
	medium	moyennes	mittel	medio	Montfavet H 63.4, Montfavet H 63.5	5
	strong	fortes	stark	fuerte	Campbell 1327, Carmello, Count	7
	very strong	très fortes	sehr stark	muy fuerte	Costeluto F~~i~~iorentino, Marmande VR	9
26.	**Fruit: cross section**	**Fruit: section transversale**	**Frucht: Querschnitt**	**Fruto: sección transversal**		
	not round	non arrondie	nicht rund	no redonda	Ranco, San Marzano	1
	round	arrondie	rund	redonda	Cerise, Ferline, Rondello	2

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27. **(+)**	**Fruit: depression at peduncle end**	**Fruit: dépression à l'attache pédonculaire**	**Frucht: Einsenkung am Stielende**	**Fruto: depresión en la zona pedúncular**		
	absent or very weak	absente ou très faible	fehlend oder sehr gering	ausente o muy débil	Europeel, Heinz 1706, Rossol, Sweet Baby	1
	weak	faible	gering	débil	Futuria, Melody	3
	medium	moyenne	mittel	media	Carmello, Count, Fandango, Saint-Pierre	5
	strong	forte	stark	fuerte	Ballon Rouge, Marmande VR	7
	very strong	très forte	sehr stark	muy fuerte		9
28.	**Fruit: size of peduncle scar**	**Fruit: taille de l'attache pédonculaire**	**Frucht: Größe des Stielansatzes**	**Fruto: tamaño de la cicatriz pedúncular**		
	very small	très petite	sehr klein	muy pequeña	Cerise, Heinz 1706, Sweet Baby	1
	small	petite	klein	pequeña	Early Mech, Peto Gro, Rio Grande	3
	medium	moyenne	mittel	media	Montfavet H 63 4, Montfavet H 63 5	5
	large	grande	groß	grande	Apla, Campbell 1327, Carmello, Fandango, Flora Dade	7
	very large	très grande	sehr groß	muy grande	Marmande VR	9
29.	**Fruit: size of blossom scar**	**Fruit: taille de l'attache pistillaire**	**Frucht: Größe des Blütenansatzes**	**Fruto: tamaño de la cicatriz pistilar**		
	very small	très petite	sehr klein	muy pequeña	Cerise, Early Mech, Europeel, Heinz 1706, Peto Gro, Rio Grande	1
	small	petite	klein	pequeña	Montfavet H 63.4, Montfavet H 63.5	3
	medium	moyenne	mittel	media	Alphamech, Apla, Carmello, Floradade	5
	large	grande	groß	grande	Campbell 1327, Count, Marmande VR, Saint-Pierre	7
	very large	très grande	sehr groß	muy grande		9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
30. **(+)**	**Fruit: shape at blossom end**	**Fruit: forme au sommet**	**Frucht: Form am Blütenende**	**Fruto: forma del extremo distal**		
	indented	déprimée	eingesenkt	hundida	Marmande VR, Super Mech	1
	indented to flat	déprimée à aplatie	eingesenkt bis flach	hundida a plana	~~plana~~	2
	flat	aplatie	flach	plana	Montfavet H 63.4, Montfavet H 63.5	3
	flat to pointed	aplatie à pointue	flach bis spitz	plana a puntiaguda	Cal J, Early Mech, Peto Gro	4
	pointed	pointue	spitz	puntiaguda	Europeel, Heinz 1706, Hypeel 244, Roma VF	5
31.	**Fruit: size of core in cross section (in relation to~~-~~ total diameter)**	**Fruit: taille du cœur en coupe transversale (par rapport au diamètre total)**	**Frucht: Herzgröße im Querschnitt (im Verhältnis zum ~~Durchmesser~~Gesamt durchmesser)**	**Fruto: tamaño del corazón en corte transversal (en relación al diámetro total)**		
	very small	très petit	sehr klein	muy pequeño	Cerise	1
	small	petit	klein	pequeño	Early Mech, Europeel, Heinz 1706, Peto Gro, Rio Grande, Rossol	3
	medium	moyen	mittel	medio	Montfavet H 63.4, Monfavet H 63.5	5
	large	grand	groß	grande	Apla, Campbell 1327, Carmello, Count, Fandango, Flora~~-D~~dade	7
	very large	très grand	sehr groß	muy grande	Marmande VR, Valenciano	9
32.	**Fruit: thickness of pericarp**	**Fruit: épaisseur du péricarpe**	**Frucht: Dicke des Perikarps**	**Fruto: espesor del pericarpio**		
	thin	mince	dünn	delgado	Marmande VR	3
	medium	moyen	mittel	medio	Carmello, Europeel, Floradade, Heinz 1706 Montfavet H 63.5	5
	thick	épais	dick	grueso	Cal J, Daniela, Ferline, Peto Gro, Rio Grande	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33. (*)	**Fruit: number of locules ~~(within a plant)~~**	**Fruit: nombre de loges ~~.....(par fruit)~~**	**Frucht: ~~überwiegende~~ Anzahl Kammern ~~(in einer Pflanze)~~**	**Fruto: número de lóculos ~~.....~~**		
	only two	seulement deux	nur zwei	sólo dos	Early Mech, Europeel, San Marzano	1
	two or three	deux ou trois	zwei oder drei	dos o tres	Alphamech, Futuria	2
	three or four	trois ou quatre	drei oder vier	tres o cuatro	Montfavet H 63.5	3
	four, five or six	quatre, cinq ou six	vier, fünf oder ~~sieben~~sechs	cuatro, cinco o seis	~~Carmello~~Raïssa, Tradiro	4
	more than six	plus que six	mehr als sechs	más que seis	Marmande VR	5
34. (*)	**Fruit: green shoulder (before maturity)**	**Fruit: collet vert (avant maturité)**	**Frucht: Flammung (vor der Reife)**	**Fruto: hombro verde (antes de madurez)**		
	absent	absent	fehlend	ausente	Felicia, Rio Grande, Trust	1
	present	présent	vorhanden	presente	Daniela, Montfavet H 63.5	9
35. (*)	**Fruit: extent of green shoulder (as for 34)**	**Fruit: taille du collet vert (comme pour 34)**	**Frucht: Größe der Flammung (wie unter 34)**	**Fruto: tamaño del hombro verde (como para 34)**		
	small	petit	klein	pequeño	Cristy, Firestone	3
	medium	moyen	mittel	medio	Erlidor, Foxy, Montfavet H 63.5	5
	large	grand	groß	grande	Cobra, Delisa, Epona, Manific	7
36. (*)	**Fruit: intensity of green color of shoulder (as for 34)**	**Fruit: intensité de la couleur verte du collet (comme pour 34)**	**Frucht: Intensität der Grünfärbung der Flammung (wie unter 34)**	**Fruto: intensidad del color verde del hombro (como para 34)**		
	light	claire	hell	claro	Juboline	3
	medium	moyenne	mittel	medio	Montfavet H 63.5	5
	dark	foncée	dunkel	oscuro	Ayala, Erlidor, Xenon	7
37. (*)	**Fruit: intensity of green color (as for 34)**	**Fruit: intensité de la couleur verte (comme pour 34)**	**Frucht: Intensität der Grünfärbung (wie unter 34)**	**Fruto: intensidad del color verde (como para 34)**		
	light	claire	hell	claro	Capello, Duranto, Trust	3
	medium	moyenne	mittel	medio	Rody	5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
	dark	foncée	dunkel	oscuro	Ayala, Tatiana, Uragano	7
38. (*)	**Fruit: color at maturity**	**Fruit: couleur à maturité**	**Frucht: Farbe ~~zur~~ bei der Reife**	**Fruto: color en la madurez**		
	cream	crème	cremefarben	crema	Jazon, White Mirabell	1
	yellow	jaune	gelb	amarillo	Goldene Könige, Yellow Pear	2
	orange	orange	orange	anaranjado	Sungold	3
	pink	rose	rosa	rosa	House Momotaro	4
	red	rouge	rot	rojo	Ferline, Daniela, Montfavet H 63.5	5
	brownish	brunâtre	bräunlich	marronáceo	~~Marrón~~Ozyrys	6
39. (*)	**Fruit: color of flesh (at maturity)**	**Fruit: couleur de la chair (à maturité)**	**Frucht: Fleischfarbe (bei Reife)**	**Fruto: color de la pulpa (en su madurez**		
	cream	crème	cremefarben	crema	Jazon	1
	yellow	jaune	gelb	amarillo	Jubilée	2
	orange	orange	orange	anaranjado	Sungold	3
	pink	rose	rosa	rosa	Regina	4
	red	rouge	rot	rojo	Ferline, Saint-Pierre	5
	brownish	brunâtre	bräunlich	marronáco	Ozyrys	6
40. (*) (+)	**Fruit: firmness**	**Fruit: fermeté**	**Frucht: Festigkeit**	**Fruto: firmeza**		
	very soft	très mou	sehr weich	muy blando	Marmande VR	1
	soft	mou	weich	blando	Trend	3
	medium	moyen	mittel	medio	Cristina	5
	firm	ferme	fest	firme	Fernova, Konsul, Tradiro	7
	very firm	très ferme	sehr fest	muy firme	Daniela, Karat, Lolek	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41. **(+)**	**Fruit: shelf-life**	**Fruit: durée de ~~vie sur l'étalage~~conservation**	**Frucht: Haltbarkeit**	**Fruto: duración de la conservación**		
	very short	très courte	sehr kurz	muy corta	Marmande VR	1
	short	courte	kurz	corta	Rambo	3
	medium	moyenne	mittel	media	Durinta	5
	long	longue	lang	larga	Daniela	7
	very long	très longue	sehr lang	muy larga	Ernesto	9
42. **(+)**	**Time of flowering**	**Époque de floraison**	**Zeitpunkt der Blüte**	**Época de floración**		
	early	précoce	früh	precoz	Feria, Primabel	3
	medium	moyenne	mittel	media	Montfavet H 63.5, Prisca	5
	late	tardive	spät	tardía	Manific, Saint-Pierre	7
43. **(*)**	**Time of maturity**	**Époque de maturité**	**Reifezeit**	**Época de madurez**		
	very early	très précoce	sehr früh	muy precoz	Dolcevita, Sungold, Sweet Baby	1
	early	précoce	früh	precoz	Feria, Rossol	3
	medium	moyenne	mittel	media	Montfavet H 63.5	5
	late	tardive	spät	tardía	Manific, Saint-Pierre	7
	very late	très tardive	sehr spät	muy tardía	Daniela	9
44.	**Fruit: dry matter content (at maturity)**	**Fruit: teneur en matière sèche (à maturité)**	**Frucht: Trockensubstanzgehalt (bei Reife)**	**Fruto: contenido de materia seca (en su madurez)**		
	low	faible	niedrig	bajo	Bonset	3
	medium	moyenne	mittel	medio		5
	high	forte	hoch	alto	Aloha, Coudoulet	7
45. **(+)**	**Sensitivity to silvering**	**Sensibilité à l'argenture**	**Empfindlichkeit gegen Silberblatt**	**Sensibilidad al plateado**		
	insensitive	insensible	fehlend	insensible	Marathon, Sano ~~Sonatine~~	1

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
	sensitive	sensible	vorhanden	sensible	~~Marathon,~~ ~~Sano~~Sonatine	9
46. **(+)**	**Resistance to *Meloidogyne incognita*** **(+)**	**Résistance au *Meloidogyne incognita*** **(+)**	**Resistenz gegen *Meloidogyne incognita*** **(+)**	**Resistencia a *Meloidogyne incognita*** **(+)**		
	absent	absente	fehlend	ausente	Casaque Rouge, Clairvil	1
	present	présente	vorhanden	presente	Anabel, Anahu	9
47. **(*)** **(+)**	**Resistance to *Verticillium dahliae*** **– Race 0**	**Résistance au *Verticillium dahliae*** **– Pathotype 0**	**Resistenz gegen *Verticillium dahliae*** **– Pathotyp 0**	**Resistencia a *Verticillium dahliae*** **– Raza 0**		
	absent	absente	fehlend	ausente	Anabel, Marmande verte	1
	present	présente	vorhanden	presente	Clairvil, Marmande VR	9
48. **(+)**	**Resistance to *Fusarium oxysporum* f. sp. *lycopersici*** **(+)**	**Résistance au *Fusarium oxysporum* f. sp. *lycopersici*** **(+)**	**Resistenz gegen *Fusarium oxysporum* f. sp. *lycopersici*** **(+)**	**Resistencia a *Fusarium oxysporum* f. sp. *lycopersici*** **(+)**		
48.1 **(*)**	**– Race 0 (ex 1)**	**– ~~Race~~ Pathotype 0 (ex 1)**	**– Pathotyp 0 (ex 1)**	**– Raza 0 (ex 1)**		
	absent	absente	fehlend	ausente	Marmande verte	1
	present	présente	vorhanden	presente	Anabel, Marporum, Marsol	9
48.2 **(*)**	**– Race 1 (ex 2)**	**– ~~Race~~ Pathotype 1 (ex 2)**	**– Pathotyp 1 (ex 2)**	**– Raza 1 (ex 2)**		
	absent	absente	fehlend	ausente	Marmande verte	1
	present	présente	vorhanden	presente	Motelle, Walter	9
49. **(+)**	**Resistance to *Fusarium oxysporum* f. sp. *radicis lycopersici*** **(+)**	**Résistance au *Fusarium oxysporum* f. sp. *radicis lycopersici*** **(+)**	**Resistenz gegen *Fusarium oxysporum* f. sp. *radicis lycopersici*** **(+)**	**Resistencia a *Fusarium oxysporum* f. sp. *radicis lycopersici*** **(+)**		
	absent	absente	fehlend	ausente	Motelle	1
	present	présente	vorhanden	presente	Momor	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
50. **(+)**	**Resistance to** ***Cladosporium fulvum***	**Résistance au** ***Cladosporium fulvum***	**Resistenz gegen** ***Cladosporium fulvum***	**Resistencia a** ***Cladosporium fulvum***		
50.1	**– Race 0**	**– ~~Race~~ Pathotype 0**	**– Pathotyp 0**	**– Raza 0**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Angela, Estrella, Sonatine, Sonato, Vemone	9
50.2	**– Group A**	**– Groupe A**	**– Gruppe A**	**– Grupo A**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Angela, Estrella, Sonatine, Sonato	9
50.3	**– Group B**	**– Groupe B**	**– Gruppe B**	**– Grupo B**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Angela, Estrella, Sonatine, Sonato, Vemone	9
50.4	**– Group C**	**– Groupe C**	**– Gruppe C**	**– Grupo C**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Angela, Estrella, Sonatine	9
50.5	**– Group D**	**– Groupe D**	**– Gruppe D**	**– Grupo D**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Estrella, Sonatine, Vemone	9
50.6	**– Group E**	**– Groupe E**	**– Gruppe E**	**– Grupo E**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Sonatine	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
51. **(+)**	**Resistance to ~~Tobacco~~ Tomato Mosaic Virus**	**Résistance au virus de la mosaïque de la tomate~~du tabac~~**	**Resistenz gegen das ~~Tabak~~mosaik~~Tomaten~~ mosaikvirus**	**Resistencia al virus del mosaico del ~~tabaco~~tomate**		
51.1	**– Strain 0**	**– Souche 0**	**– Pathotyp 0**	**– Cepa 0**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Mobaci, Mocimor, Moperou	9
51.2	**– Strain 1**	**– Souche 1**	**– Pathotyp 1**	**– Cepa 1**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Mocimor, Moperou	9
51.3	**– Strain 2**	**– Souche 2**	**– Pathotyp 2**	**– Cepa 2**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Mobaci, Mocimor	9
51.4	**– Strain 1-2**	**– Souche 1-2**	**– Pathotyp 1-2**	**– Cepa 1-2**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Lucy, Mocimor, Momor, Rapids	9
52. **(+)**	**Resistance to *Phytophthora infestans***	**Résistance au *Phytophthora infestans***	**Resistenz gegen *Phytophthora infestans***	**Resistencia a *Phytophthora infestans***		
	absent	absente	fehlend	ausente	Heinz 1706, Saint Pierre	1
	present	présente	vorhanden	presente	Heline, Pieraline, Pyros	9
53. **(+)**	**Resistance to *Pyrenochaeta lycopersici***	**Résistance au *Pyrenochaeta lycopersici***	**Resistenz gegen *Pyrenochaeta lycopersici***	**Resistencia a *Pyrenochaeta lycopersici***		
	absent	absente	fehlend	ausente	Montfavet H 63.5	1
	present	présente	vorhanden	presente	Kyndia, Moboglan, Pyrella	9
54. **(+)**	**Resistance to *Stemphylium* spp.**	**Résistance au *Stemphylium* spp.**	**Resistenz gegen *Stemphylium* spp.**	**Resistencia a *Stemphylium* spp.**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Motelle	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
55. **(+)**	**Resistance to *Pseudomonas syringae* pv. tomato**	**Résistance au *Pseudomonas syringae* pv. tomato**	**Resistenz gegen *Pseudomonas syringae* pv. tomato**	**Resistencia a *Pseudomonas syringae* pv. tomato**		
	absent	absente	fehlend	ausente	Monalbo	1
	present	présente	vorhanden	presente	Ontario 7710	9
56. **(+)**	**Resistance to ~~*Pseudomonas* *Ralstonia* *solanacearum*** **– Race 1**	**Résistance au ~~*Pseudomonas* *Ralstonia* *solanacearum*** **– P~~race~~ athotype 1**	**Resistenz gegen ~~*Pseudomonas* *Ralstonia* *solanacearum*** **– Pathotyp 1**	**Resistencia a ~~*Pseudomonas* *Ralstonia* *solanacearum*** **– Raza 1**		
	absent	absente	fehlend	ausente	Floradel	1
	present	présente	vorhanden	presente	Caraïbo~~, Anastasia~~	9
57. **(+)**	**Resistance to Tomato Yellow Leaf Curl Virus**	**Résistance au *Tomato Yellow Leaf Curl Virus***	**Resistenz gegen gelbes Tomatenblattrollvirus**	**Resistencia a virus de la hoja en cuchara**		
	absent	absente	fehlend	ausente	Montfavet H 63.5	1
	present	présente	vorhanden	presente	Anastasia, Mohawk, TY 20	9
58. **(+)**	**Resistance to Tomato Spotted Wilt Virus**	**Résistance au *Tomato Spotted Wilt Virus***	**Resistenz gegen das gefleckte Tomaten-welkevirus**	**Resistencia a *Tomato Spotted Wilt Virus***		
	absent	absente	fehlend	ausente	Montfavet H 63.5	1
	present	présente	vorhanden	presente	Lisboa	9
59. **(+)**	**Resistance to *Leveillula taurica***	**Résistance au *Leveillula taurica***	**Resistenz gegen *Leveillula taurica***	**Resistencia a *Leveillula taurica***		
	absent	absente	fehlend	ausente	Montfavet H 63.5	1
	present	présente	vorhanden	presente	Atlanta	9
60. **(+)**	**Resistance to *Oidium lycopersicum***	**Résistance au *Oidium lycopersicum***	**Resistenz gegen *Oidium lycopersicum***	**Resistencia a *Oidium lycopersicum***		
	absent	absente	fehlend	ausente	Montfavet H 63.5	1
	present	présente	vorhanden	presente	Romiro	9

VIII. Explanations on the Table of Characteristics

Ad. 2: Plant: growth type

The growth type is predominantly controlled by one monoallelic gene (self-pruning + / self-pruning -).

Determinate (1): This type is predominately controlled by the recessive allele, self-pruning - (Sp-). This type produces a limited number of trusses. The number of trusses is different among plants and is influenced by agroclimatic conditions. In this type, the number of leaves or internodes between inflorescences varies from one to three. In the terminal trusse, the stem ends with an inflorescence and no lateral shoots are produced.

This type includes some "semi-determinate" varieties which do not have three leaves or internodes consistently between inflorescences, and show semi-determinate growth, for example, with the termination of the stem prolongation above 9th inflorescence (e.g. "Prisca" type) or at higher than 20th inflorescence (e.g. Early Pack type).

Indeterminate (2): This type is predominantly controlled by the dominant allele, self-pruning + (Sp +). In this type, three leaves or internodes are generally observed between inflorescences. Each trusse produces three buds: the terminal bud is transformed into a flowering bud; one of the two axillary buds is transformed into a lateral shoot which produces next three buds and carries on the prolongation of stem. Plants of this type grows with the continuous repeat of this growth pattern.

It should be noted that only two leaves or internodes might be observed between inflorescences in some parts of plants in a certain group of indeterminate variety types (e.g. varieties originated from "Daniela").

Marmande, San Marzano and Costoluto Fiorentino types might be considered to be categorized into an intermediate class between indeterminate and determinate, but they always have three leaves or internodes between inflorescences. They should therefore be categorized into the indeterminate type.

Ad. 4: Stem: anthocyanin coloration of upper third

Most of the varieties are classed 1 to 5. Expression of anthocyanin is influenced by day temperature. Under greenhouse conditions, the variation is rather low, except for varieties with Tm2 allele which is linked to anthocyanin of the stem (especially at the inter node).

Ad. 5: Only indeterminate growth type varieties: Stem length of internode (between 1st and 4th inflorescence)

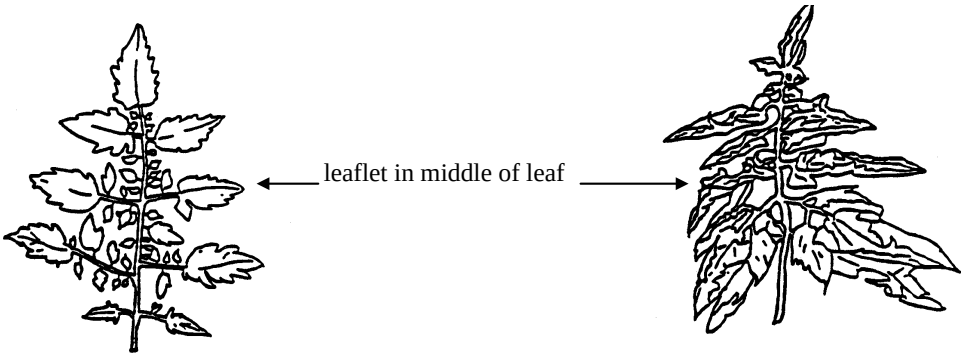
Indeterminate growth type varieties have, in general, 3 nodes between inflorescences except some genotypes (see Ad. 2). This means that, in general, there are 12 internodes between the 1st and 4th inflorescence.

Measure the length between the 1st and 4th inflorescence, and count the number of internodes (generally 12). In order to obtain the average length of an internode, calculate the ratio: length of stem/number of internodes. The observation should be made at following stage:

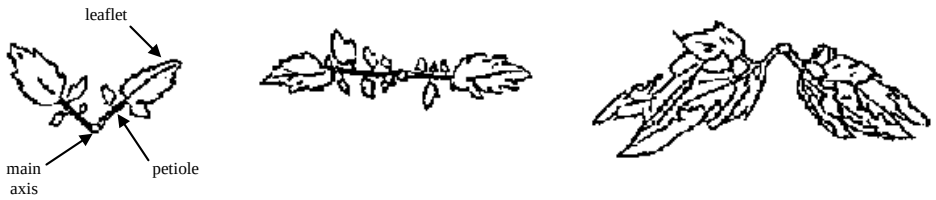
- one leaf above the 5th or 6th inflorescence on staked open field crops
- one leaf above the 7th to 12th inflorescence for plants grown in a greenhouse, depending on the height of the greenhouse.

Formatted: Bullets and Numbering

Ad. 10: Leaf: size of leaflets (in middle of leaf)



Ad. 15: Leaf: attitude of petiole of leaflet in relation to main axis

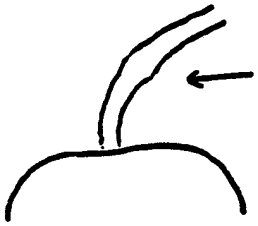


3	5	7
semi-erect	horizontal	semi-drooping

Ad. 18: Flower: pubescence of style

Some non-hairy varieties can present some rare and small hairs at the base of the style.

Ad. 20: Peduncle: abscission layer

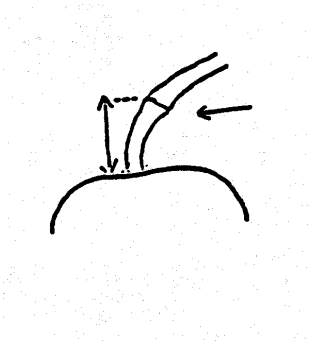


1
absent

9
present

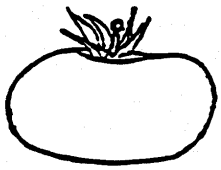
Some varieties which have only a collar instead of an abscission layer (heterozygous for the gene which controls the presence of the joint) are considered as jointless ("absent (1)").

Ad. 21: Only for varieties with abscission layers: Peduncle: length (from abscission layer to calyx)

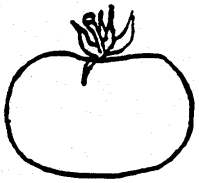


abscission layer

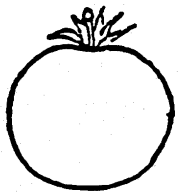
Ad. 24: Fruit: shape in longitudinal section



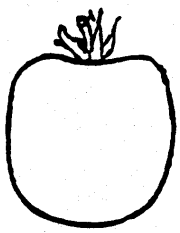
1
flattened



2
slightly flattened



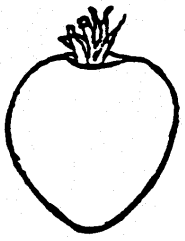
3
circular



4
rectangular

5
cylindrical

6
elliptic



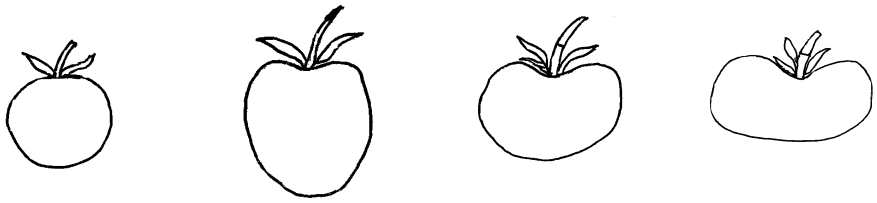
7
heart-shaped

8
obovate

9
ovate

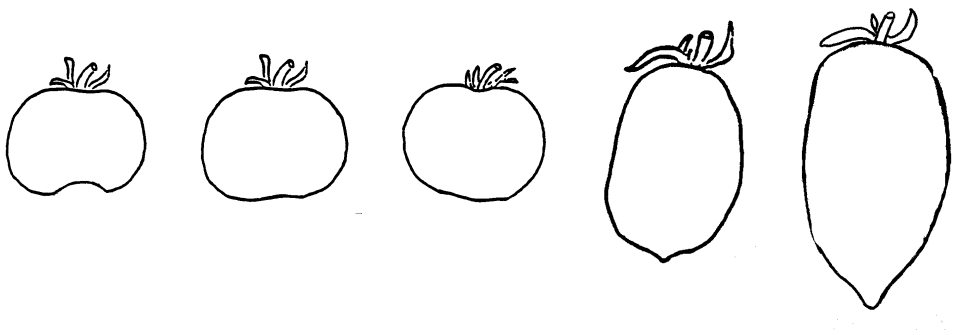
10
pear-shaped

Ad. 27: Fruit: depression at peduncle end



1	3	5	7
absent or very weak	weak	medium	strong

Ad. 30: Fruit: shape at blossom end



1	2	3	4	5
indented	indented to flat	flat	flat to pointed	pointed

Ad. 40: Fruit: firmness

Method

Harvesting stage: fruits should be harvested when they are completely colored.

Determining firmness: determine by hand the firmness of the fruits compared to the standard varieties.

Ad. 41: Fruit: shelf-life

Explanation

The length of shelf life is estimated by the number of weeks that the fruit remains commercially viable on the shelf.

Twenty fruits per plot (2 per plant) are picked from the 4th, 5th or 6th cluster in similar stages of exterior ripening (when green color disappears in half of whole fruit). Fruits are stored in boxes in single layers. The boxes can be stored one on top on another if they permit the air to circulate between them. The storage place does not need to be climatically controlled, but must to have naturally good conditions for storing fruits.

An observation is made every 7 days, noting the firmness of fruits, taking care not to damage them, and removing those accidentally damaged or rotten. The observation is made to determine when the firmness of fruits becomes no longer commercially viable (the firmness is lower than or equal to Note 3 "soft" in characteristics 40). The length of shelf life is calculated by the number of weeks between picking of fruits and the time that the firmness becomes no longer commercially viable.

The observations can be completed in the 8th week if some varieties still remain.

Ad. 42: Time of flowering

For staked varieties, this characteristic is assessed by observing the flowering date of the third flower on the second and third trusses, plant by plant. It is recommended not to record the time of flowering on the first trusse, as the expression on the first trusse is more influenced by the seed vigor and the plantation quality.

The date of flowering is recorded by the plot average, trusse by trusse.

For determinate non-staked varieties, it is recommended to grow them on pruned stakes on the main stem and to record the characteristics in the same way as those for 'staked varieties'. On non-staked crops, this characteristic cannot be observed due to the branching of the plant.

Ad. 45: Sensitivity to silvering

Method

Evaluation:	Evaluation is done on fully-grown plants.
Execution of test:	As silvering only occurs under specific growing conditions, these conditions have to be present during growth.

Sowing:	Under short day conditions (November/December in Northern Europe). Normal planting in the soil or in an artificial medium in the greenhouse.
Temperature:	Day temperature maximum 18ºC.
Light:	Normal daylight.
Growing method:	No special method necessary.
Duration of test:	4-5 months.
Number of plants tested:	Minimum of 20.
Observation of the expression:	A visual survey has to be made on the presence of leaves that show signs of silvering.
Standard varieties:	Expression absent: Marathon, Sano Expression present: Sonatine

Ad. 46: Resistance to *Meloidogyne incognita*

Method

Maintenance of Strain

Type of medium:	On roots of susceptible varieties (grown in the greenhouse).
Special conditions:	Avoid rotting of roots.

Execution of test

Temperature:	Not over 28º C.
Growing method:	In the greenhouse.
Method of inoculation:	Dishes are inoculated with eggs (totally or on sowing lines).

Duration of test

- from sowing to inoculation:	inoculation before sowing
- from inoculation to reading:	30 to 45 days
Number of plants tested:	10 to 20.

Remarks:	Avoid rotting of roots avoid high temperature on hybrid varieties. Heterozygote varieties can have a slightly lower level of expression in the test.
Standard varieties:	susceptible: Casaque Rouge, Clairvil resistant: Anabel, Anahu, F1 "Anahu X Monalbo"

Ad. 47: Resistance to *Verticillium dahliae* Race 0

Method

Maintenance of Races

Type of medium:	On agar medium.
Special conditions:	Transplantation of Races each month.

Execution of test

Growth stage of plants:	Cotyledons expanded.
Temperature:	Day: 22º C; night: 16-18º C.
Light:	10 hours.
Growing method:	In the greenhouse, under high humidity.
Method of inoculation:	Soaking of root system in liquid medium of fungi, after cutting radicels, thereafter replanting.

Duration of test

- from sowing to inoculation:	15 to 20 days
- from inoculation to reading:	25 to 30 days
Number of plants tested:	10 to 20 plants.
Remarks:	Reading: control presence of ***Verticillium*** by external symptoms and inside vessels. Heterozygote varieties can show symptoms of a slightly lower level of expression.
Standard varieties:	susceptible: Anabel, Marmande Verte resistant: Clairvil, Marmande VR, F1 "Marmande Verte x Marmande VR"

Ad. 48.1 + 48.2: Resistance to *Fusarium oxysporum* f. sp. *lycopersici* Race 0 (ex 1) and Race 1 (ex 2)

Method

Maintenance of Races

Type of medium:	On agar medium.
Special conditions:	22-25º C, transplantation of Races each month.

Execution of test

Growth stage of plants:	Cotyledons expanded.
Temperature:	Day: 28º C; night: 25º C.
Light:	12 hours.
Growing method:	Under high humidity, in the greenhouse or climatic room.
Method of inoculation:	Soaking of roots, plants in liquid medium of fungi, after cutting radicels, thereafter replanting.
Duration of test:	
- from sowing to inoculation:	10 to 20 days
- from inoculation to reading:	20 to 25 days
Number of plants tested:	
Remarks:	Reading: test with heterozygous F1 varieties must be interpreted carefully because on test Race 1, and even Race 0, can attack some plants. Heterozygote varieties can show symptoms of a slightly lower level of expression.
Standard varieties:	susceptible: Marmande Verte resistant to Race 0: Marsol, Anabel, Marporum, F1 "Marsol x Marmande Verte" resistant to Race 0 and Race 1: Walter, Motelle, F1 "Motelle x Monalbo"

Ad. 49: Resistance to *Fusarium oxysporum* f. sp. *radicis lycopersici*

Method

Maintenance of Race

Type of medium:	On synthetic medium (according to Messiaen).
Special conditions:	Refrigerator 4º C.

Execution of test

Growth stage of plants:	Appearance of third leaf.
Temperature:	Day: 22º C; night: 16º C.
Light:	14 hours.
Growing method:	Climatic room.
Method of inoculation:	Soaking of roots and of hypocotyl axis for five minutes in the inoculum. After inoculation, transplantation of plantlets in steam disinfected sand.

Duration of test

- from sowing to inoculation:	18 to 20 days
- from inoculation to reading:	10 days
Number of plants tested:	10 to 20 plants.
Remarks:	Need for frequent renewal of Races because of loss of pathogeneity
Standard varieties:	susceptible: Motelle resistant: - Momor (homozygote) - F1 Momor x Motelle (heterozygote) - the Frl gene does not completely control the disease in the heterozygote stage

Ad. 50.1 - 50.5: Resistance to *Cladosporium fulvum*

Method

Maintenance of Races

Type of medium:	Synthetic medium.
Special conditions:	20-22º C, transplantation of Races every six weeks.

Execution of test

Growth stage of plants:	3 leaves expanded.
Temperature:	Day: 24º C; night: 16º C
Light:	12 hours.
Growing method:	In climatic room, highest possible humidity, arresting growth a few days before inoculation by irrigation of roots with ALAR 85 (daminazoide).
Method of inoculation:	Spraying of a solution with the fungus on leaves.

Duration of test

- from sowing to inoculation:	22 to 25 days
- from inoculation to reading:	20 to 25 days
Number of plants tested:	30 plants.
Remarks:	The level of expression of symptoms may vary between plants due to alleles of resistance.

Standard varieties:

susceptible: Monalbo

resistant: has to be chosen with the concerned alleles

cf1:	Stirling Castle
cf2:	Vetomold
cf3:	V 121
cf4:	Purdue 135
cf5:	IVT 1149
cf2 cf4:	Vagabond
cf2 cf5:	F1 “Vetomold x IVT 1149”
cf2 cf4 cf5:	F1 “Vagabond x IVT 1149”
cf6:	F 77-38
cf9:	IVT 1154

Race 0:	Angela, Estrella, Sonatine, Sonato, Vemone
Group A:	Angela, Estrella, Sonatine, Sonato
Group B:	Angela, Estrella, Sonatine, Sonato, Vemone
Group C:	Angela, Estrella, Sonatine
Group D:	Estrella, Sonatine, Vemone
Group E:	Sonatine

Ad.51.1 - 51.4: Resistance to Tomato Mosaic Virus, Strains 0, 1, 2 and 1-2

Method

Maintenance of Strains

Type of medium: On plants or dry leaf.

Special conditions: Congelation or BOS method.

Identification: Use the Strain 0 inducing necrosis on varieties with allele $Tm2^2$.

Execution of test

Growth stage of plants: Expanded cotyledons.

Temperature: Day: 30 to 35º C; night: 25 to 30º C.

Light: 12 hours.

Growing method: In the greenhouse.

Method of inoculation: Mechanical, by rubbing of cotyledons.

Duration of test

- from sowing to inoculation: 12 to 14 days
- from inoculation to reading: 10 to 12 days

Number of plants tested: 15 to 30 plants.

Standard varieties: susceptible: Monalbo
resistant:

- with alleles		Resistant to Race
Tm 1:	Mobaci	Strains 0 and 2
Tm 2:	Moperou	Strains 0 and 1

Tm 2^2:	Momor - Rapids	Strains 0, 1, 2 and 1-2
Tm 1 - Tm 2^2:	Mocimor	Strains 0, 1, 2 and 1-2
Tm 2^2/+:	Momor x Monalbo	Strains 0, 1, 2 and 1-2

Ad. 52: Resistance to *Phytophthora infestans*

Method

Maintenance of Race

Type of medium: On agar medium.

Special conditions: 18º C

Execution of test

Growth stage of plants: 10 leaves developed.

Temperature: 18º C

Light: After inoculation darkness during 24 hours, thereafter 10 hours darkness per day.

Growing method: Climatic room.

Method of inoculation: Spraying of spore suspension, use Race replicated 3 weeks before inoculation.

Duration of test

- from sowing to inoculation: 6 to 7 weeks
- from inoculation to reading: 7 to 8 days

Hygrometry: Very high during the first four days after inoculation (cover plants with polyethylene cover).

Remarks: Heterozygote varieties can show symptoms of a slightly lower level of expression.

Standard varieties: susceptible: Heinz 1706, Saint-Pierre
resistant: F1 “Pieraline x Pieralbo”, Heline, Pieraline, Pyros

Ad. 53: Resistance to Pyrenochaeta lycopersici

Method

Maintenance of Race:	Method 1:	On roots obtained from plants grown in the greenhouse on naturally contaminated soil (or with enforced natural contamination).
	Method 2:	Inoculum grown on sand or mould, mixed with oat-meal and sterilized in the autoclave (artificial infection).

Execution of test:

Growth stage of plants:	Method 1:	On adult plants around fruit maturity.
	Method 2:	4 to 6 weeks after sowing (first flowering inflorescence).
Temperature:	Day: 24º C; night: 14º C.	
Light:	12 hours minimum.	
Growing method and method of inoculation:	Method 1:	Plants are planted in contaminated soil mixed with cut contaminated roots.
	Method 2:	Plants are sown in steam-disinfected sandy mould mixed with inoculum.
Duration of test		
- from sowing to inoculation:	Method 1:	6 weeks
	Method 2:	when sowing
- from inoculation to reading:	Method 1:	3 to 4 months
	Method 2:	4 to 6 weeks
Number of plants tested:	10 minimum	
Remarks:	Method 1:	is more efficient to clearly separate susceptible from resistant plants
	Method 2:	pathogenicity of the Strains has to be tested before inoculation on roots of young plants
Standard varieties:	susceptible:	Montfavet H 63.5
	resistant:	Kyndia, Moboglan, Pyrella

Ad. 54: Resistance to *Stemphylium* spp.

Method

Maintenance of isolate

Type of medium:	On synthetic medium.
Special conditions:	Refrigerator 4º C without light.

Execution of test

Growth stage of plants:	3 leaves expanded.
Temperature:	Constant, day: 24º C, night: 24º C
Light:	12 hours.
Growing method:	Climatic room.
Method of inoculation:	Pulverization on leaves.

Duration of test

- from sowing to inoculation:	20 to 22 days
- from inoculation to reading:	10 days
Number of plants tested:	30 plants
Remarks:	Production of inoculum on medium V8 under light.
Standard varieties:	susceptible: Monalbo resistant: Motelle, F1 Motelle x Monalbo

Ad. 55: Resistance to *Pseudomonas syringae* pv. tomato

Method

Maintenance of Races

Type of medium:	On KING B medium.
Special conditions:	20-22º C in the dark, transplantation every 10 days.

Execution of test

Growth stage of plants:	3 leaves expanded.

Temperature:	Day: 22º C; night: 16º C
Light:	12 hours.
Growing method:	Climatic room in summer, glasshouse in winter.
Method of inoculation:	Pulverization on leaves.
Duration of test	
- from sowing to inoculation:	20 to 22 days
- from inoculation to reading:	8 days
Number of plants tested:	30 plants.
Remarks:	Races to be renewed each year.
Standard varieties:	susceptible: Monalbo resistant: Ontario 7710, F1 Monalbo x Ontario 7710

Ad. 56: Resistance to *Ralstonia solanacearum*, (ex. *Pseudomonas solanacearum)* Race 1

Method

Maintenance of Race	Two Races may affect Tomato: Race 1 (active between 25-30º C) and Race 3 (active between 20-23º C).
Type of medium:	Freezing at –80ºC; culture in PYDAC emersed in oil; suspension in sterile distilled water.
Special conditions:	Conservation at 15ºC in sterile distilled water.

Execution of test

Growth stage of plants:	3 to 4 well-developed leaves.
Temperature (in climatic chamber):	Day: 26-30º C; night: 25º C.
Light:	10-12 hours.
Growing method:	Two possibilities: - in climatic chamber: rapid test - in the field: long test (applicable in tropical climate only)

Method of inoculation:	Deposit of at least 2 ml of inoculum, adjusted to 10^7 colonies per ml, at the foot of each plantlet prior to planting.
Duration of test	
- from sowing to inoculation:	3 to 4 weeks
- from inoculation to reading:	- 3 weeks for the fast test - 2 months for the long test
Number of plants tested:	Minimum of 30.
Remarks:	Maintain high humidity.
Standard varieties:	susceptible: Floradel resistant: Caraibo

Ad. 57: Resistance to Tomato Yellow Leaf Curl Virus (TYLCV)

Method

Execution of test	Plants are tested under field crop conditions respecting a period of planting and a place where the disease has been proven to exist. 100% contaminated plants are grown of susceptible local varieties to ensure natural transmission by Bemisia insect and repeatability of the results.
Growth stage of plants:	On adult plants of field crop outside.
Method of inoculation:	Natural inoculation by Bemisia.
Duration of test	
- from sowing to inoculation:	6 weeks minimum
- from inoculation to reading:	2.5 months maximum
Number of plants tested:	20 plants minimum.
Remarks:	
Standard varieties:	susceptible: local varieties resistant: TY 20 or accessions from *L. pimpinellifolium* and from *L. peruvianum*

Ad. 58: Resistance to Tomato Spotted Wilt Virus

Method

Maintenance of Races

Type of medium:	On tomato plants or freezing at –70º C .
Special conditions:	

Execution of test

Growth stage of plants:	1 or 2 leaves expanded.
Temperature:	Day: 20º C; night: 20º C.
Light:	Extra light in winter.
Growing method:	Glasshouse.
Method of inoculation:	Mechanical, rubbing with carborundum on cotyledons, inoculum suspension < 10º C.

Duration of test

- from sowing to inoculation:	20 days
- from inoculation to reading:	14 to 20 days
Number of plants tested:	15 to 30 plants.
Remarks:	Be aware of thrips.
Standard varieties:	susceptible: Monalbo resistant: Bodar, Tsunami

Ad. 59: Resistance to *Leveillula taurica*

Method

Maintenance of Races

Type of medium:	Tomato plants.
Special conditions:	

Execution of test

Growth stage of plants:	On adult plants of field crop outside.
Method of inoculation:	Natural infection.
Duration of test	
- from sowing to inoculation:	infection possible from planting stage to full grown plants
- from inoculation to reading:	before harvest
Number of plants tested:	20 plants.
Remarks:	Yellow chlorotic spots on upper side of leaves, mycelium on lower side of leaves. Check cleistochecia under microscope if it really concerns *Leveillula* and not another powdrey mildew.
Standard varieties:	susceptible: Monalbo resistant: Atlanta

Ad. 60: Resistance to *Oidium lycopersicum*

Method

Maintenance of Strain

Type of medium:	On tomato plants.
Special conditions:	Climatic room.

Execution of test

Growth stage of plants:	3 weeks.
Temperature:	24°C during the day ; 18°C during the night.
Light:	12 hours
Method of innoculation:	- by spraying (10^4 conidies/ml) on leaves - by dredging (uncontrolled inoculum) on leaves

Execution of test

Duration of test

- from sowing to inoculation: 18 to 20 days
- from inoculation to reading: 15 to 18 days

Number of plants tested: 30 plants/lot

Remarks:

Scale of notes:

- no sporulation
- sporulation without extension (necrotic points)

} Resistant

- moderated sporulation
- abundant sporulation

} Susceptible

Standard varieties:

susceptible: Momor (*L. esculentum*)
resistant: *L. hirsutum* P1247087 (accession),
F1 Mormor x *L. hirsutum* P1247087

IX. Literature

KJELLBERG, L., 1973: Sortundersökningar av tomat enligt UPOV, Swedish University of Agricultural Sciences, Research Information Centre, Alnarp Trädgaard 162, SE.

LATERROT, H., 1973: Sélection de variétés de Tomate résistantes aux Meloidogyne," OEPP/EPPO Bulletin 3(1): 89.92.

DENBY, L. G., WOOLIAMS, G. E., 1962: The Development of Verticillium Resistant Strains of Established Tomato Varieties, Canadian Journal Plant Science 42,681-685.

LATERROT, H., 1972: Sélection de tomates résistantes à Fusarium oxysporum f. sp. lycopersici, Phytopathologia Mediterranea, Volume XI, No. 3, p. 154-158.

LATERROT, H., 1981: La lutte génétique contre la Cladosporiose de la Tomate en France, P.H.M. Revue Horticole, No. 214, February 1981.

LATERROT, H., 1973: Résistance de la Tomate au virus de la Mosaïque du Tabac. Difficultés rencontrées pour la Sélection de variétés résistantes, Ann.Amelior.Plantes, 1973, 23(4), 287-313.

LATERROT, H., 1990: Situation de la lutte génétique contre les parasites de la Tomate dans les pays méditerranéens, P.H.M. Revue Horticole, No. 303, January 1990.

LATERROT, H., 1975: Sélection pour la résistance au Mildiou, Phytophthora infestans MONT. DE BARY chez la Tomate, Ann.Amelior.Plantes, 1975, 25(2), 129-149.

LATERROT, H., 1982: L'argenture de la Tomate, P.H.M. Revue Horticole, No. 225, March 1982.

LATERROT, H., 1983: La lutte génétique contre la maladie des racines liégeuses de la Tomate, P.H.M. Revue Horticole, No. 238, June-July 1983.

LATERROT, H. and BLANCARD, D., 1983: Criblage d'une série de lignées et d'hybrides F1 de Tomate pour la résistance à la Stemphyliose, Phytopath. medit. 1983, 22, 188-193.

LATERROT, H. and BLANCARD, D., 1986: Les Stemphylia rencontrés sur la Tomate, Phytopath. medit. 1986, 25, 140-144.

X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Species	*Lycopersicon lycopersicum* (L.) Karsten ex Farw. TOMATO
2. Applicant (Name and address)	
3. Proposed denomination or breeder's reference	

4. Information on origin, maintenance and reproduction of the variety

4.1 Method of maintenance and reproduction

(a) vegetative propagation [ ]

(b) seed propagation [ ]

- hybrid [ ]

- open-pollinated [ ]

4.2 Other information

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the state of expression which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (2)	**Plant: growth type**		
	determinate	Campbell 1327, Prisca	1[ ]
	indeterminate	Marmande VR, Saint-Pierre, San Marzano 2	2[ ]
5.2 (9)	**Leaf: division of blade**		
	pinnate	Mikado, Pilot, Red Jacket	1[ ]
	bipinnate	Lukullus, Saint-Pierre	2[ ]
5.3 (20)	**Peduncle: abscission layer**		
	absent	Aledo, Bandera, Count, Lerica	1[ ]
	present	Montfavet H 63.5, Roma	9[ ]
5.4 (22)	**Fruit: size**		
	very small	Cerise, Sweet 100	1[ ]
	small	Early Mech, Europeel, Roma	3[ ]
	medium	Alphamech, Diego	5[ ]
	large	Carmello, Ringo	7[ ]
	very large	Erlidor, Lydia, Muril	9[ ]

	Characteristics	Example Varieties	Note
5.5 (24)	**Fruit: shape in longitudinal section**		
	flattened	Campbell 28, Marmande VR	1[ ]
	slightly flattened	Montfavet H 63.4, Montfavet H 63.5	2[ ]
	circular	Cerise, Moneymaker	3[ ]
	rectangular	Early Mech, Peto Gro	4[ ]
	cylindrical	Hypeel 244, Macero II, San Marzano 2	5[ ]
	elliptic	Alcaria, Castone	6[ ]
	heart-shaped	Valenciano	7[ ]
	obovate	Barbara	8[ ]
	ovate	Rimone, Rio Grande	9[ ]
	pear-shaped	Europeel	10[ ]
5.6 (25)	**Fruit: ribbing at peduncle end**		
	absent or very weak	Calimero, Cerise	1[ ]
	weak	Early Mech, Hypeel 244, Melody, Peto Gro, Rio Grande	3[ ]
	medium	Montfavet H 63.4, Montfavet H 63.5	5[ ]
	strong	Campbell 1327, Carmello, Count	7[ ]
	very strong	Costeluto Fiorentino, Marmande VR	9[ ]
5.7 (33)	**Fruit: number of locules**		
	only two	Early Mech, Europeel, San Marzano	1[ ]
	two or three	Alphamech, Futuria	2[ ]
	three or four	Montfavet H 63.5	3[ ]
	four, five or six	Raïssa, Tradiro	4[ ]
	more than six	Marmande VR	5[ ]

	Characteristics	Example Varieties	Note
5.9 (34)	**Fruit: green shoulder (before maturity)**		
	absent	Felicia, Rio Grande, Trust	1[ ]
	present	Daniela, Montfavet H 63.5	9[ ]
5.10 (38)	**Fruit: color at maturity**		
	cream	Jazon, White Miraball	1[ ]
	yellow	Goldene Königin, Yellow Pear	2[ ]
	orange	Sungold	3[ ]
	pink	House Momotaro	4[ ]
	red	Daniela, Ferline, Montfavet H 63.5	5[ ]
	brownish	Ozyrys	6[ ]
5.11 (40)	**Fruit: firmness**		
	very soft	Marmande VR	1[ ]
	soft	Trend	3[ ]
	medium	Cristina	5[ ]
	firm	Fernova, Konsul, Tradiro	7[ ]
	very firm	Daniela, Karat, Lolek	9[ ]

6. Similar varieties and differences between these varieties

Denomination of similar variety	Characteristic in which the similar variety is different [o)]	State of expression of similar variety	State of expression of candidate variety

[o)] In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases (please specify Races/Strains if possible)

	absent	present	Not tested
- *Meloïdogyne incognita* (characteristic 46)	[ ]	[ ]	[ ]
- *Verticillium dahliae* Race 0 (characteristic 47)	[ ]	[ ]	[ ]
- *Fusarium oxysporum* f. sp. *lycopersici*;			
Race 0 (ex 1) (characteristic 48.1)	[ ]	[ ]	[ ]
Race 0 (ex 2) (characteristic 48.2)	[ ]	[ ]	[ ]
- *Fusarium oxysporum* f. sp. *radicis lycopersici* (characteristic 49)	[ ]	[ ]	[ ]
- *Cladosporium fulvum*;			
Race 0 (characteristic 50.1)	[ ]	[ ]	[ ]
Group A (characteristic 50.2)	[ ]	[ ]	[ ]
Group B (characteristic 50.3)	[ ]	[ ]	[ ]
Group C (characteristic 50.4)	[ ]	[ ]	[ ]
Group D (characteristic 50.5)	[ ]	[ ]	[ ]
Group E (characteristic 50.6)	[ ]	[ ]	[ ]
-Tomato Mosaic Virus			
Strain 0 (characteristic 51.1)	[ ]	[ ]	[ ]
Strain 1 (characteristic 51.2)	[ ]	[ ]	[ ]
Strain 2 (characteristic 51.3)	[ ]	[ ]	[ ]
- *Phytophtora infestans* (characteristic 52)	[ ]	[ ]	[ ]
- *Pyrenochaeta lycopersici* (characteristic 53)	[ ]	[ ]	[ ]
- *Stemphylium* spp. (characteristic 54)	[ ]	[ ]	[ ]
- *Pseudomonas* syringae pv. tomato (characteristic 55)	[ ]	[ ]	[ ]
- *Ralstonia solanacearum* Race 1(characteristic 56)	[ ]	[ ]	[ ]
- Tomato Yellow Leaf Curl Virus (characteristic 57)	[ ]	[ ]	[ ]
- Tomato Spotted Wilt Virus (characteristic 58)	[ ]	[ ]	[ ]
- *Leveillula taurica* (characteristic 59)	[ ]	[ ]	[ ]

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- *Oidium lycopersicum* (characteristic 60)	[ ]	[ ]	[ ]
Others (specify)	[ ]	[ ]	[ ]

7.2 Special conditions for the examination of the variety

(a) Type of culture:
- under glass [ ]
- in the open [ ]

- staked [ ]
- semi-staked [ ]
- non-staked [ ]

(b) Main use:
- fresh market or garden [ ]
- industrial processing (indicate type) [ ]
- pot plant [ ]

(c) Other conditions

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 that question is yes, please attach a copy of such an authorization.

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