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U.S. DEPARTMENT OF AGRICULTURE
 AGRICULTURAL MARKETING SERVICE
 SCIENCE AND TECHNOLOGY
 PLANT VARIETY PROTECTION OFFICE

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY
TOMATO
 (Lycopersicon esculentum Mill.)

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
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FIELD TRIAL LOCATIONS IN DECIMAL DEGREES (DD) LOCATION	LATITUDE	LONGITUDE
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Morphology:

I. SEEDLING:

1. _____ Anthocyanin in hypocotyl of 2 – 15 cm seedling:

- 1. Absent
- 2. Present

2. _____ Habit of 3 – 4 week old seedling:

- 1. Normal
- 2. Compact

II. MATURE PLANT (at maximum vegetative development)

1. _____ Mature Plant Height (cm)

2. _____ Mature Plant Growth:

- 1. Indeterminate
- 2. Determinate

3. _____ Form:

- 1. Lax, open
- 2. Normal
- 3. Compact
- 4. Dwarf
- 5. Brachytic

4. _____ Size of canopy (compared to others of similar type):

- 1. Small
- 2. Medium
- 3. Large

5. _____ Mature Plant Habit:

- 1. Sprawling (decumbent)
- 2. Semi-erect
- 3. Erect

III. STEM

1. _____ Branching:

- 1. Sparse
- 2. Intermediate
- 3. Profuse

V. INFLORESCENCE (make observations on 3rd inflorescence)

1. _____ Type:

- 1. Simple
- 2. Forked (2 major axes)
- 3. Compound (much branched)

2. _____ Average number of flowers in inflorescence

3. _____ Leafy or "running" inflorescences:

- 1. Absent
- 2. Occasional
- 3. Frequent

VI. FLOWER

1. _____ Calyx:

- 1. Normal, lobes awl-shaped
- 2. Macrocalyx, lobes large, leaflike
- 3. Fleshy

2. _____ Calyx-lobes:

- 1. Shorter the corolla
- 2. Approx. equalling corolla
- 3. Distinctly longer than corolla

3. _____ Corolla color:

- 1. Yellow
- 2. Old gold
- 3. White or tan

4. _____ Style pubescence:

- 1. Absent
- 2. Sparse
- 3. Dense

5. _____ Anthers:

- 1. All fused into tube
- 2. Separating into 2 or more groups at anthesis

6. _____ Fasciation (1st flower of 2nd or 3rd inflorescence):

- 1. Absent
- 2. Occasionally present
- 3. Frequently present

VII. FRUIT (3rd fruit of 3rd or 3rd cluster)

For the first 5 characters below, match your variety with the most similar illustration on pages at the end of this for 13.

1. _____ Typical fruit shape



1. Flattened



2. Slightly Flattened



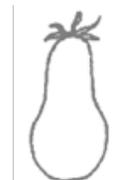
3. Round



4. High Round



5. Pear



6. Lengthened – Pear

VII. FRUIT (3rd fruit of 3rd or 3rd cluster) (continued)



7. Plum or Egg Shape



8. Heart

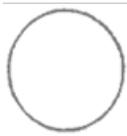


9. Lengthened cylindrical



10. Angular

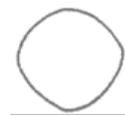
2. _____ Shape of transverse section



1. Round



2. Flattened



3. Angular



4. Irregular

3. _____ Shape of blossom end



1. Indented



2. Flat



3. Nipped



4. Tapered

4. _____ Shape of stem end



1. Flat

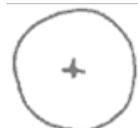


2 = Indented

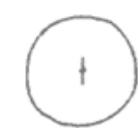
5. _____ Shape of pistil scar



1. Dot



2. Stellate



3. Linear



4. Irregular

6. _____ Abscission layer:

1. Present (pedicellate)

2. Absent (jointless)

7. _____ Point of detachment of fruit at harvest:

1. At pedicel joint

2. At calyx attachment

VII. FRUIT (3rd fruit of 3rd or 3rd cluster) (continued)

8. _____ Length of pedicel from joint to calyx attachment (mm)
9. _____ Length of mature fruit stem axis (mm)
10. _____ Diameter of fruit at widest point (mm)
11. _____ Mature Fruit Weight (g)
12. _____ Number. of locules:
- | | | |
|-----------------|-------------------|-----------------|
| 1. Two to Three | 2. Three and four | 3. Five or more |
|-----------------|-------------------|-----------------|
13. _____ Fruit surface:
- | | | |
|-----------|-------------------|-------------------------------|
| 1. Smooth | 2. Slightly rough | 3. Moderately rough or ribbed |
|-----------|-------------------|-------------------------------|
14. _____ Fruit base color at mature-green stage:
- | | | |
|---------------------|-----------------|--------------------------|
| 1. Light green | 2. Yellow green | 3. Apple or medium green |
| 4. Light gray-green | 5. Dark green | |
15. _____ Fruit pattern (mature-green stage):
- | | | |
|------------------|---------------------|-------------------------------------|
| 1. Uniform green | 2. Green-shouldered | 3. Radial stripes on sides of fruit |
|------------------|---------------------|-------------------------------------|
16. _____ Shoulder color if different from base:
- | | | |
|---------------|---------------|-----------------|
| 1. Dark green | 2. Gray green | 3. Yellow green |
|---------------|---------------|-----------------|
17. _____ Fruit color, full-ripe:
- | | | |
|-------------|--------------------|-----------------------|
| 1. White | 2. Yellow | 3. Orange |
| 4. Pink | 5. Red | 6. Brownish |
| 7. Greenish | 8. Red with Purple | 9. Yellow with Purple |
| 10. Purple | | |
18. _____ Flesh color, full-ripe:
- | | | |
|-----------|----------------|-------------|
| 1. Yellow | 2. Red/Crimson | 3. Pink |
| 4. Orange | 5. Brownish | 6. Greenish |
19. _____ Flesh color:
- | | |
|------------|---|
| 1. Uniform | 2. With lighter and darker areas in walls |
|------------|---|
20. _____ Locular gel color of table-ripe fruit:
- | | | |
|----------|-----------|--------|
| 1. Green | 2. Yellow | 3. Red |
|----------|-----------|--------|
21. _____ Ripening one:
- | | |
|------------------------|------------|
| 1. Blossom-to-stem end | 2. Uniform |
|------------------------|------------|
22. _____ Ripening two:
- | | | |
|---------------|--------------|---------------|
| 1. Inside out | 2. Uniformly | 3. Outside in |
|---------------|--------------|---------------|
23. _____ Stem scar size:
- | | | |
|-------------------|-----------------------|----------|
| 1. Small ('Roma') | 2. Medium ('Rutgers') | 3. Large |
|-------------------|-----------------------|----------|
24. _____ Fruit core:
- | | |
|---|------------|
| 1. Coreless (absent or smaller than 6x6 mm) | 2. Present |
|---|------------|

VII. FRUIT (3rd fruit of 3rd or 3rd cluster) (continued)

25. _____ Epidermis color:

1. Colorless

2. Yellow

26. _____ Epidermis:

1. Normal

2. Easy-peel

27. _____ Epidermis texture:

1. Tender

2. Average

3. Tough

28. _____ Thickness of pericarp:

1. Thin (< 3 mm)

2. Medium (3-6 mm)

3. Thick (> 6 mm)

VIII. RESISTANCE TO FRUIT DISORDER

If claim of novelty is based wholly or in substantial part upon resistance, trial data should be appended. These should specify the method of testing, the reaction of the application variety, and reaction of well-known check varieties grown in the trial (identified by name).

(1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

1. _____ Blossom end rot

2. _____ Blotchy Ripening

3. _____ Bursting

4. _____ Catface

5. _____ Concentric Cracking

6. _____ Radial Cracking

7. _____ Fruit Pox

8. _____ Gold Fleck

9. _____ Graywall

10. _____ Zippering

IX. DISEASE AND PEST REACTION

If claim of novelty is based wholly or in substantial part upon disease resistance, trial data should be appended. These should specify the method of testing, the reaction of the application variety, and reaction of well-known check varieties grown in the trial (identified by name).

1. Viral Diseases: (1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

1. _____ Cucumber mosaic

2. _____ Curly top

3. _____ Potato-Y virus

4. _____ Tobacco mosaic, Race 0

5. _____ Tobacco mosaic, Race 1

6. _____ Tobacco mosaic, Race 2

7. _____ Tobacco Mosaic, Race 2 to the Power of 2

8. _____ Tomato spotted wilt

9. _____ Tomato yellows

1. Viral Diseases: (continued)

10. _____ Other virus (specify) _____

2. Bacterial Diseases: (1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

1. _____ Bacterial canker (*Corynebacterium michiganense*)

2. _____ Bacterial soft rot (*Erwinia corotovora*)

3. _____ Bacterial speck (*Pseudomonas tomato*)

4. _____ Bacterial spot (*Xanthomonas vesicatorium*)

5. _____ Bacterial wilt (*Pseudomonas solanacearum*)

6. _____ Other bacterial disease (specify) _____

3. Fungal Diseases: (1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

1. _____ Anthracnose (*Colletotrichum* spp.)

2. _____ Brown root rot or corky root (*Pyrenochaeta lycopersici*)

3. _____ Collar rot or stem canker (*Alternaria solani*)

4. _____ Early blight defoliation (*Alternaria solani*)

5. _____ Fusarium wilt, Race 1 (*F. oxysporum* f. *lycopersici*)

6. _____ Fusarium wilt, Race 2 (*F. oxysporum* f. *lycopersici*)

7. _____ Fusarium wilt, Race 3 (*F. oxysporum* f. *lycopersici*)

8. _____ Gray leaf spot (*Stemphylium* spp.)

9. _____ Late blight, Race 0 (*Phytophthora infestans*)

10. _____ Late blight, Race 1

11. _____ Leaf mold, Race 1 (*Cladosporium fulvum*)

12. _____ Leaf mold, Race 2 (*Cladosporium fulvum*)

13. _____ Leaf mold, Race 3 (*Cladosporium fulvum*)

14. _____ Leaf mold, other races (specify) _____

15. _____ Nailhead spot (*Alternaria tomato*)

16. _____ Sepsoria leafspot (*S. lycopersici*)

17. _____ Target leafspot (*Corynespora casiicola*)

18. _____ Verticillium wilt, Race 1 (*V. albo-atrum*)

19. _____ Verticillium wilt Race 2

20. _____ Other fungal disease (specify) _____

4. Insects and Pests: (1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

1. _____ Colorado potato beetle (*Leptinotarsa decemlineata*)

2. _____ Southern root knot nematode (*Meloidogyne incognita*)

3. _____ Spider mites (*Tetranychus* spp.)

4. _____ Sugar beet army worm (*Spodoptera exigual*)

4. Insects and Pests: (continued)

- 5. _____ Tobacco flea beetle (*Epitrix hirtipennis*)
- 6. _____ Tomato hornworm (*Manduca quinquemaculata*)
- 7. _____ Tomato fruitworm (*Heliothis zea*)
- 8. _____ Whitefly (*Trialeurodes vaporariorum*)
- 9. _____ Other (specify) _____

5. Pollutants: (1 = Not Tested, 2 = Resistant, 3 = Intermediate, 4 = Susceptible)

- 1. _____ Ozone
- 2. _____ Sulfur dioxide
- 3. _____ Other (specify) _____

X. CHEMISTRY AND COMPOSITION OF FULL-RIPE FRUITS Suggested test methods may be found in "Tomato Products", 5th ed. ,

National Canners Assn. Bull. 27-L. Please specify test methods or give a reference to methods used.

- 1. _____ pH
- 2. _____ Titratable acidity, as % citric
- 3. _____ Totalsolids (dry matter, seeds and skin removed)
- 4. _____ Soluble solids as °Brix

XI. PHENOLOGY Express length of developmental stages either as calendar days or as heat units (growing degree days), in degrees Celsius. If heat units are used, indicate the base temperature used in their calculation here _____°C. See paper by Warnock under "References" for method.

Seeding to 50% flow (1 open on 50% of plants)
Seed to once over harvest (if applicable)

- 1. _____ Fruiting season:
 - 1. Long ('Marglobe)
 - 2. Medium ('Westover')
 - 3. Short, concentrated ('VF 145')
 - 4. Very concentrated ('UC 82')

2. _____ Relative maturity in areas tested:

If relative maturity is known to differ by location or environment, please explain on separate sheet)

- 1. Early
- 2. Medium early
- 3. Medium
- 4. Medium late
- 5. Late
- 6. Variable

XII. ADAPTATION

1. _____ Culture:

- 1. Field
- 2. Greenhouse
- 3. Both

2. _____ Principle use(s):

If more than one category applies, list all in rank order.

- 1. Home garden
- 2. Fresh market
- 3. Whole-pack canning
- 4. Concentrated products
- 5. Other (specify) _____

3. _____ Machine harvest:

- 1. Not adapted
- 2. Adapted

REFERENCES

- Anonymous, 1976. All About Tomatoes. Ortho Books, Chevron Chemical Co., San Francisco 15. In three volumes: Midwest/Northeast Edition, West Edition, and South Edition.
- Ware, W. W. & J.P. McCollum, 1968. Producing Vegetable Crops. The Interstate Printer & Publishers, Inc., Danville, Illinois. Chapter 30, pp. 451-473, "Tomatoes".
- Warnock, S.J. 1978. Using Tomato Heat Units. Leaflet No. 6, Campbell Institute for Agricultural Research, Camden, NJ. 10 p.
- Webb, R.E., T.H. Barksdale, & A. K. Stoner, 1973. "Tomatoes", pp. 344-361, in: Nelson, R.R. (Ed.), Breeding Plants for Disease Resistance. Pennsylvania State University Press, University Park.
- Young, P.A. & J.W. MacArthur, 1947. Horticultural characters of tomatoes. Bull. Texas Agric. Exper. Station No. 698.