No. 9300160

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

North Carolina Agricultural Research Service

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF EIGHTEEN YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

TOMATO

'NC EBR-4'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirtieth day of July in the year of our Lord one thousand nine hundred and ninety-nine.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
North Carolina Agricultural Research Service

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
8481-1-2-1-1

3. VARIETY NAME
NC EBR-4

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
N.C. State University
Box 7643
Raleigh, NC 27695-7643

5. PHONE *(include area code)*
919-515-2717

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300160

FILING
Date: Mar. 10, 1993
Time: 2:15 ☐ A.M ☒ P.M.

FEES RECEIVED
Filing and Examination Fee: $2150. & 175.
Date: 3/10/93 & 4/5/93
Certificate Fee: $ 300.00
Date: 5/24/1999

6. GENUS AND SPECIES NAME
Lycopersicon esculentum

7. FAMILY NAME *(Botanical)*
Solanaceae

8. CROP KIND NAME *(Common Name)*
tomato

9. DATE OF DETERMINATION
March 13, 1992

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
State Governmental Agency

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Michael W. Baker
NC Foundation Seed Producers, Inc.
8220 Riley Road
Zebulon, NC 27597

PHONE *(Include area code)*: 919-269-5592

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. ☒ Exhibit A, Origin and Breeding History of the Variety.
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety.
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____.
g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☐ YES *(If "YES," answer items 16 and 17 below)* ☒ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date _____.)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Johnny C. Wynne	Director, N.C. Agricultural Research Service	11-12-92
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

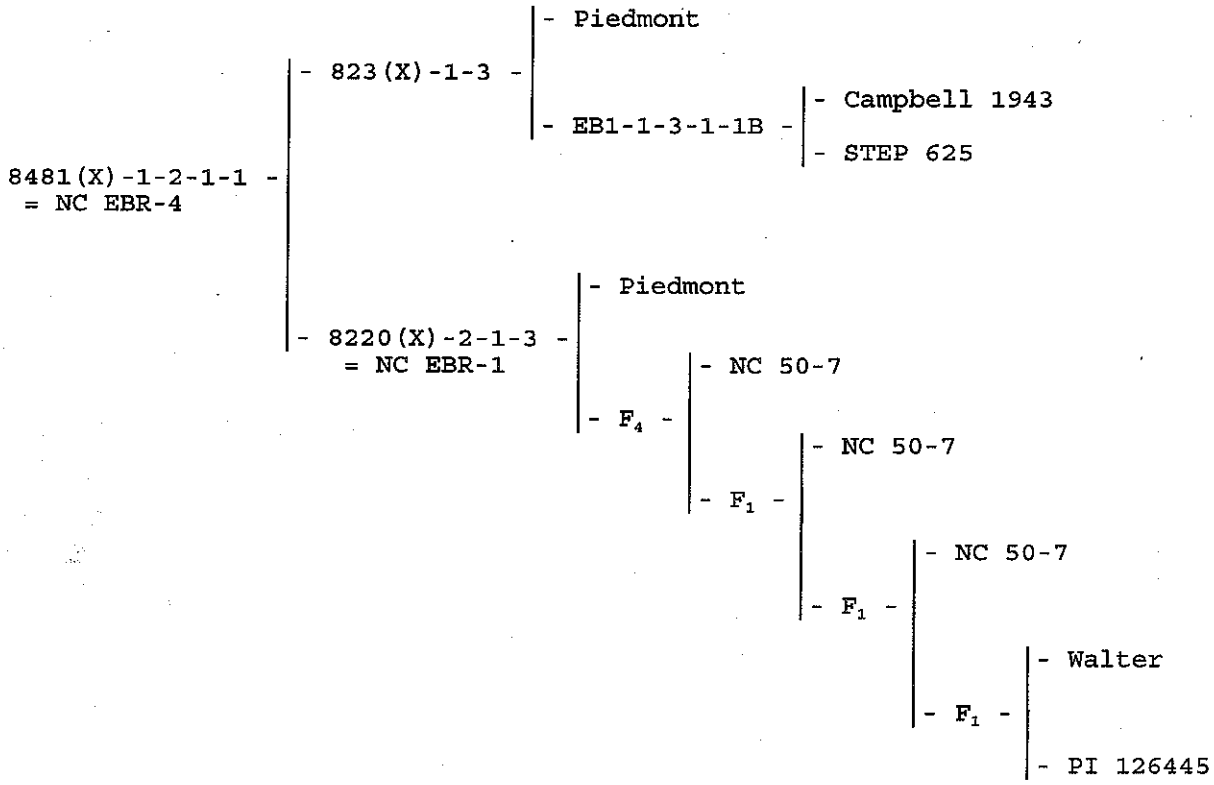
9300160

Revised 7/8/96

Tomato
NC EBR-4

14A. Exhibit A:

Pedigree:



NC EBR-4, an inbred line in the F_7 generation, was developed using the pedigree breeding method. The objective in the breeding program was to incorporate early blight resistance into an improved tomato line. Campbell 1943, which as a high level of resistance to the stem lesion (collar rot) phase of early blight and moderate resistance to the foliar blight phase, and L. hirsutum P.I. 126445, which has foliar resistance, were the resistance sources. F_2 plants were selected in field plots at Fletcher, North Carolina for foliar and stem resistance. F_3 and advanced generation lines were evaluated for resistance in replicated field plots. In addition, stem lesion resistance was verified in greenhouse screening trials.

as per letter of July 8, '96 RWS 4-22-99

NC EBR-4 appeared uniform and stable in the F_4 through F_7 generations in research station field and greenhouse trials and seed increase plantings. No variant or off-type plants were observed. NC EBR-4 is uniform and stable.

Exhibit B. Novelty Statement

NC EBR-4 is most similar to the variety 'Piedmont' (registered with the PVP office). It differs from 'Piedmont' in having a moderate level of resistance to the foliar blight phase of early blight and a high level of resistance to the stem lesion (collar rot) phase of early blight (see tables below). 'Piedmont' is susceptible to the foliar blight and stem lesion phases of early blight. Data regarding susceptibility of 'Piedmont' were submitted when NC EBR-1 was registered with the PVP office.

Exhibit B
NC EBR-4 (applic. no. 9300160)
additional information, October 30, 1997

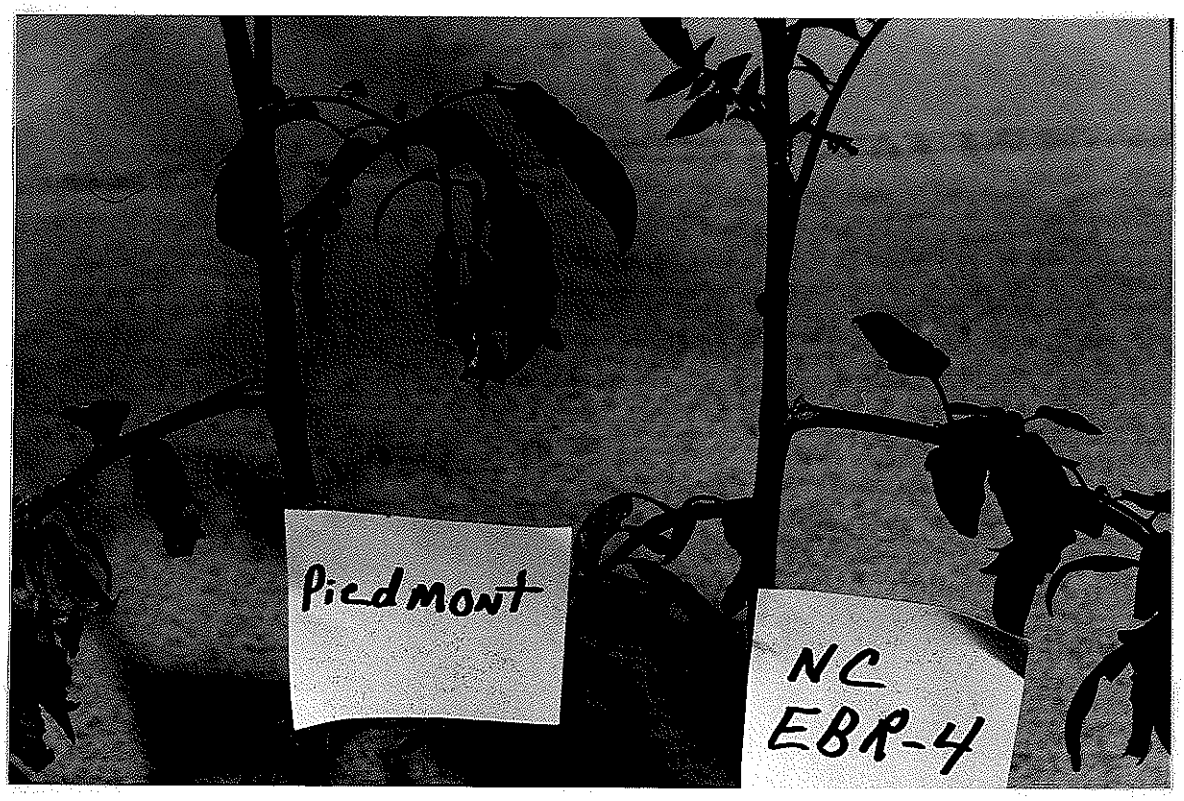
Early blight stem lesion ratings[z] for tomato plants in two greenhouse tests[y] at the Mountain Horticultural Crops Research Station, Fletcher, NC, October 1997.

	Test 1	Test 2
Piedmont	4.4	4.7
NC EBR-4	2.0	1.5
LSD (0.05)	0.6	0.6

[z]Values presented are means of 8 plants (reps) in a randomized complete block design for each test. Ratings based on lesion diameter using a 1-5 scale: 1 = pinpoint necrotic flecks, 2 = 0-1 mm, 3 = 1-2 mm, 4 = 2-4 mm, 5 = > 4 mm. Data were analyzed by analysis of variance and means separated by a least significant difference test (LSD) at the 95% confidence level.

[y]Seven-week-old plants in quart pots were inoculated by atomizing a water suspension of conidia of Alernaria Solani (approximately 10,000 spores/ml) onto the plant stems. Plants were kept wet in a mist chamber for 15 hr. each night and allowed to dry off during the day. Ratings were made 14 days after inoculation for each test. (See attached HortScience 25:222-223. 1990 article for more detail.)

Exhibit B
NC EBR-4 (applic. no. 9300160)
additional information, October 30, 1997



Early blight stem lesion reaction of NC EBR-4 (resistant) compared to Piedmont (susceptible).

Percent early blight defoliation of tomatoes at mid-season in replicated field plots at Fletcher, NC[z].

	Year			
	1987	1988	1989	1990
Flora-Dade	57	64	90	85
NC EBR-3	13	11	40	48
NC EBR-4	13	11	20	31
LSD(.05)	10	25	35	17

[z]Plots sprayed with fungicide at a 10-day interval instead of recommended 5-day interval.

Early blight stem lesion ratings of tomatoes inoculated in a greenhouse[z].

Flora-Dade	3.5[y]
NC EBR-3	1.3
NC EBR-4	1.7
(LSD(.05)	0.6

[y]Ratings based on diameter size of lesions: 1 = < 1 mm (pinpoint flecks); 2 = 1-2 mm; 3 = 2-3 mm; 4 = > 3 mm

[z]Five-week-old plants were inoculated by spraying stems with a suspension of Conidia of Alternaria Solani (10,000 spores/ml) and incubating in a chamber with mist applied at night. Ratings were made 10 days after inoculation.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
~~LIVESTOCK, MEAT, GRAIN AND SEED DIVISION~~
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Tomato)

OBJECTIVE DESCRIPTION OF VARIETY
TOMATO *(Lycopersicon esculentum* Mill.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
N.C. Agricultural Research Service Dr. R.G. Gardner (Breeder)	8481(X)-1-2-1-1	NC EBR-4

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
N.C. State University
Box 7643
Raleigh, NC 27695-7643

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PVPO NUMBER
9300160

Choose responses for the following characters which best fit your variety. Complete this form as fully as possible for best characterization of the variety. When a single quantitative value is requested (e.g., fruit weight), your answer should be the mean of an adequate-sized, unbiased sample of plants. Use leading zeroes when necessary (e.g., [0][9] or [0][8][1], etc.). The applicant variety should be compared with at least one well-known standard check variety of the same type (see list of recommended check varieties below), and grown in the same trials. The characters on this form should be described from plants grown under normal conditions of culture for the variety. Indicate by a check whether trial data are from greenhouse ____ or field X plantings. Trials direct-seeded ____ or transplanted X ; staked X or unstaked ____. Give locations and dates of seeding and transplanting here: Fletcher, North Carolina Seeding dates: 5/4/87; 5/2/88; 5/8/89; 5/7/90; 4/16/91; 5/20/91
Transplant dates: 6/10/87; 6/8/88; 6/12/89; 6/7/90; 5/31/91; 6/24/91

COMPARISONS SHOULD BE MADE TO ONE OR MORE CHECK VARIETIES IN THE FOLLOWING LIST, IF AT ALL POSSIBLE. ENTER THE* NUMBER *OF THE CHECK IN BOXES WHERE IDENTITY OF CHECK IS REQUESTED.

1 = Ace 55 VF
2 = Campbell 37
3 = Chico III
4 = Flora Dade
5 = Florida MH-1
6 = Heinz 1350
7 = Homestead 24
8 = Marglobe
9 = Murietta
10 = New Yorker
11 = Ohio MR-13
12 = Red Cherry Large
13 = Red Rock
14 = Roma VF
15 = Rutgers
16 = Sunray
17 = Tropic
18 = UC 82
19 = VF 134
20 = US 28
21 = VF 145 B 7879
22 = Other *(Specify)* ____

1. SEEDLING:

[2] Anthocyanin in hypocotyl of 2-15 cm. seedling: 1 = Absent 2 = Present

[1] Habit of 3-4 week old seedling: 1 = Normal 2 = Compact

2. MATURE PLANT (at maximum vegetative development):

[1][0][0] Cm. Height

[2] Growth: 1 = Indeterminate 2 = Determinate

[2] Form: 1 = Lax, open 2 = Normal 3 = Compact 4 = Dwarf 5 = Brachytic

[2] Size of canopy (compared to others of similar type): 1 = Small 2 = Medium 3 = Large

[2] Habit: 1 = Sprawling (decumbent) 2 = Semi-erect 3 = Erect ('Dwarf Champion')

3. STEM:

[2] Branching: 1 = Sparse ('Brehm's Solid Red', 'Fireball') 2 = Intermediate ('Westover') 3 = Profuse ('UC 82')

[1] Branching at cotyledonary or first leafy node: 1 = Present 2 = Absent

[2] No. of nodes below the first inflorescence: 1 = 1-4 2 = 4-7 3 = 7-10 4 = 10 or more

[2] No. of nodes between early (1st - 2nd, 2nd - 3rd) inflorescences.

[2] No. of nodes between later-developing inflorescences.

[3] Pubescence on younger stems: 1 = Smooth (no long hairs) 2 = Sparsely hairy (scattered long hairs) 3 = Moderately hairy 4 = Densely hairy or wooly

4. LEAF (mature leaf beneath the 3rd inflorescence):

[1] Type: 1 = Tomato 2 = Potato ('Trip-L-Crop')

[2] Morphology *(choose illustration on pg. 5 of this form that is most similar)*

[3] Margins of major leaflets: 1 = Nearly entire 2 = Shallowly toothed or scalloped 3 = Deeply toothed or cut, esp. towards base

[1] Marginal rolling or wiltiness: 1 = Absent 2 = Slight 3 = Moderate 4 = Strong

[ ] Onset of leaflet rolling: 1 = Early-season 2 = Mid-season 3 = Late season

4. LEAF (mature leaf beneath the 3rd inflorescence -- continued):

[2] Surface of major leaflets: 1 = Smooth 2 = Rugose (bumpy or veiny)

[2] Pubescence: 1 = Smooth (no long hairs) 2 = Normal 3 = Hirsute 4 = Wooly

5. INFLORESCENCE (make observations on 3rd inflorescence):

[1] Type: 1 = Simple 2 = Forked (2 major axes) 3 = Compound (much branched)

[0][5] Number of flowers in inflorescence, average

[1] Leafy or "running" inflorescences: 1 = Absent 2 = Occasional 3 = Frequent

6. FLOWER:

[1] Calyx: 1 = Normal, lobes awl-shaped 2 = Macrocalyx, lobes large, leaflike 3 = Fleshy

[1] Calyx-lobes: 1 = Shorter than corolla 2 = Approx. equalling corolla 3 = Distinctly longer than corolla

[1] Corolla color: 1 = Yellow 2 = Old gold 3 = White or tan

[3] Style pubescence: 1 = Absent 2 = Sparse 3 = Dense

[1] Anthers: 1 = All fused into tube 2 = Separating into 2 or more groups at anthesis

[1] Fasciation (1st flower of 2nd or 3rd inflorescence): 1 = Absent 2 = Occasionally present 3 = Frequently present

7. FRUIT (3rd fruit of 2nd or 3rd cluster): ***For the first 5 characters below, match your variety with the most similar illustration on pg. 6 of this form.***

[3] Typical fruit shape:

[1] Shape of transverse section:

[2] Shape of stem end:

[2] Shape of blossom end:

[2] Shape of pistil scar:

---

[1] Abscission layer: 1 = Present (pedicellate) 2 = Absent (jointless)

[1] Point of detachment of fruit at harvest: 1 = At pedicel joint 2 = At calyx attachment

[0][9] mm length of pedicel (from joint to calyx attachment)

[0][6][5] mm length of mature fruit (stem axis)		[0][6][5]	mm length, check var. no.		[0][4]
[0][7][8] mm diameter of fruit at widest point		[0][7][5]	mm diameter, check var. no.		[0][4]
[2][2][3] g weight of mature fruit		[2][0][6]	g weight, check var. no.		[0][4]

[3] No. of locules: 1 = Two 2 = Three and four 3 = Five or more

[1] Fruit surface: 1 = Smooth 2 = Slightly rough 3 = Moderately rough or ribbed

[1] Fruit base color (mature-green stage): 1 = Light green ('Lanai', 'VF145-F5') 2 = Light gray-green ('Westover') 3 = Apple or medium green ('Heinz 1439 VF') 4 = Yellow green 5 = Dark green

[1] Fruit pattern (mature-green stage): 1 = Uniform green 2 = Green-shouldered 3 = Radial stripes on sides of fruit

[ ] Shoulder color if different from base: 1 = Dark green 2 = Grey green 3 = Yellow green

[5] Fruit color, full-ripe: 1 = White 2 = Yellow 3 = Orange 4 = Pink 5 = Red 6 = Brownish 7 = Greenish 8 = Other *(Specify)* _____

[3] Flesh color, full-ripe: 1 = Yellow 2 = Pink 3 = Red/Crimson 4 = Orange 5 = Other *(Specify)* _____

[2] Flesh color: 1 = Uniform 2 = With lighter and darker areas in walls

[2] Locular gel color of table-ripe fruit: 1 = Green 2 = Yellow 3 = Red

[2] Ripening: 1 = Blossom-to-stem end 2 = Uniform

9300160

7. FRUIT (3rd fruit of 2nd or 3rd cluster): Continued

[1] Ripening: 1 = Inside out 2 = Uniformly 3 = Outside in

[2] Epidermis color: 1 = Colorless 2 = Yellow

[1] Epidermis: 1 = Normal 2 = Easy-peel

[2] Epidermis texture: 1 = Tender 2 = Average 3 = Tough

[3] Thickness of pericarp . . . . . [3]

1 = Under 3 mm 2 = 3-6 mm 3 = 6-9 mm 4 = Over 9 mm

Thickness of pericarp, check var. no. [0][4]

[2] Stem scar size: 1 = Small ('Roma') 2 = Medium ('Rutgers') 3 = Large

[2] Core: 1 = Coreless (absent or smaller than 6x6 mm) 2 = Present

8. RESISTANCE TO FRUIT DISORDERS (Use code: 0 = Unknown, 1 = Susceptible, 2 = Resistant)

[2] Blossom end rot	[2] Catface	[2] Fruit pox	[2] Zippering
[2] Blotchy ripening	[2] Cracking, concentric	[2] Gold fleck	[ ] Other *(Specify)*
[2] Bursting	[2] Cracking, radial	[2] Graywall	

9. DISEASE AND PEST REACTION (Use code: 0 = Not tested, 1 = Susceptible, 2 = Resistant). NOTE: 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).

VIRAL DISEASES:

[0] Cucumber mosaic	[0] Tobacco mosaic, Race 0	[0] Tobacco mosaic, Race 2^2
[0] Curly top	[0] Tobacco mosaic, Race 1	[0] Tomato spotted wilt
[0] Potato-Y virus	[0] Tobacco mosaic, Race 2	[0] Tomato yellows

[ ] Other virus *(Specify)* _____

BACTERIAL DISEASES:

[1] Bacterial canker *(Corynebacterium michiganense)*	[0] Bacterial spot *(Xanthomonas vesicatorium)*
[0] Bacterial soft rot *(Erwinia carotovora)*	[0] Bacterial wilt, *(Pseudomonas solanacearum)*
[0] Bacterial speck *(Pseudomonas tomato)*	[0] Other bacterial disease *(Specify)* _____

FUNGAL DISEASES:

[0] Anthracnose *(Colletotrichum* spp.*)*	[0] Leaf mold, Race 1 *(Cladosporium fulvum)*
[0] Brown root rot or corky root, *(Pyrenochaeta lycopersici)*	[0] Leaf mold, Race 2
[2] Collar rot or stem canker, *(Alternaria solani)*	[0] Leaf mold, Race 3
[2] Early blight defoliation, *(Alternaria solani)*	[ ] Leaf mold, other races *(Specify)* _____
[2] Fusarium wilt, Race 1, *(F. oxysporum f. lycopersici)*	[0] Nailhead spot *(Alternaria tomato)*
[1] Fusarium wilt, Race 2	[0] Septoria leafspot *(S. lycopersici)*
[0] Fusarium wilt, Race 3	[0] Target leafspot *(Corynespora casiicola)*
[0] Gray leaf spot *(Stemphylium* spp.*)*	[2] Verticillium wilt, Race 1 *(V. albo-atrum)*
[0] Late blight, Race 0, *(Phytophthora infestans)*	[0] Verticillium wilt, Race 2
[0] Late blight, Race 1	[ ] Other fungal disease _____
	[ ] Other fungal disease _____

9. DISEASE AND PEST REACTION (Use code: 0 = Not tested, 1 = Susceptible, 2 = Resistant – Continued)

INSECTS AND PESTS:

- [0] Colorado potato beetle *(Leptinotarsa decemlineata)*
- [0] Southern root knot nematode *(Meloidogyne incognita)*
- [0] Spider mites *(Tetranychus spp.)*
- [0] Sugar beet army worm *(Spodoptera exigua)*
- [0] Tobacco flea beetle *(Epitrix hirtipennis)*
- [0] Tomato hornworm *(Manduca quinquemaculata)*
- [0] Tomato fruitworm *(Heliothis zea)*
- [0] Whitefly *(Trialeurodes vaporariorum)*
- [ ] Other *(Specify)* _____

POLLUTANTS:

- [0] Ozone
- [0] Sulfur dioxide
- [ ] Other *(Specify)* _____

10. 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. Fill in table below with values for the new variety and for at least one well-known check variety of similar type grown in the same trial. Specify names or numbers of check varieties.

	SUBMITTED VARIETY	Check Variety _____	Check Variety _____	Check Variety _____
pH				
Titratable acidity, as % citric				
Total solids (dry matter, seeds and skin removed)				
Soluble solids, as °Brix				

11. 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. Give comparative data for at least one check variety; identify checks by name or by number from table on page 1.

	APPLICATION VARIETY	Check variety Flora-Dade (04)	Check variety _____	Check variety _____
Seeding to 50% flower (1 open flower on 50% of plants)	60 days	56 days		
Seed to once-over harvest *(if applicable)*				

[2] Fruiting season: 1 = Long ('Marglobe') 2 = Medium ('Westover') 3 = Short, concentrated ('VF 145') 4 = Very concentrated ('UC 82')

[5] Relative maturity in areas tested: 1 = Early 2 = Medium early 3 = Medium 4 = Medium late 5 = Late 6 = Variable (if relative maturity is known to differ by location or environment, please explain on separate sheet).

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

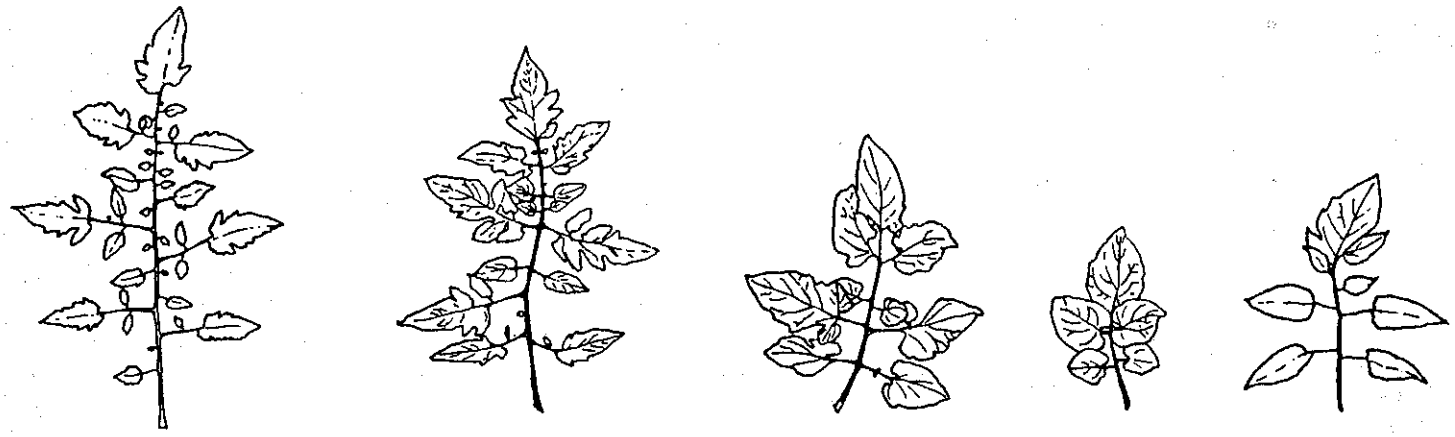
[1] Culture: 1 = Field 2 = Greenhouse

[5][2] Principal use(s): 1 = Home garden 2 = Fresh market 3 = Whole-pack canning 4 = Concentrated products 5 = Other *(Specify)* Parent in F_1 hybrid

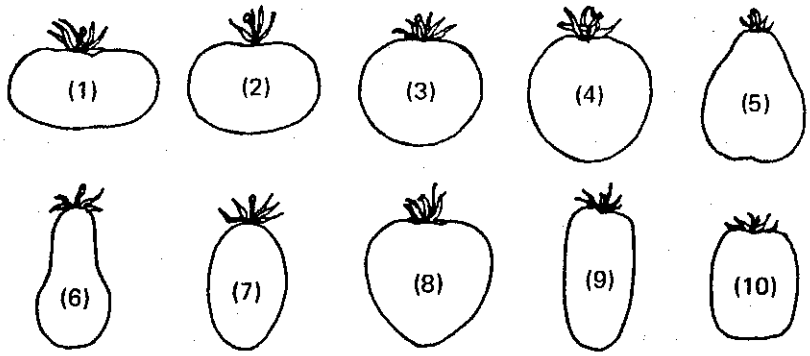
[1] Machine harvest: 1 = Not adapted 2 = Adapted

[3] Regions to which adaptation has been demonstrated:
1 = Northeast 2 = Mid Atlantic 3 = Southeast 4 = Florida
5 = Great Plains 6 = South-central 7 = Intermountain West 8 = Northwest
9 = California: Sacramento and Upper San Joaquin Valley
10 = California: Coastal areas 11 = California: Southern San Joaquin Valley & deserts

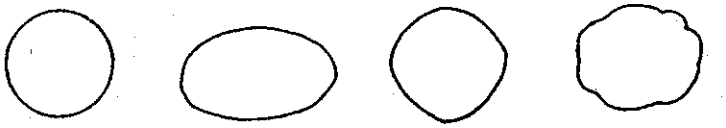
4. LEAF: Morphology:



7. FRUIT: Typical fruit shape:

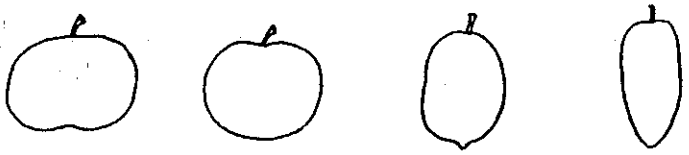


Shape of transverse section:

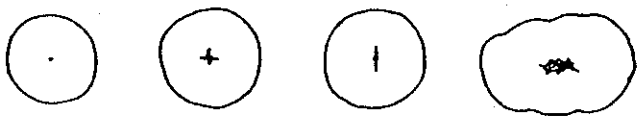


Shape of stem end:

Shape of blossom end:



Shape of pistil scar:



REFERENCES

Anonymous, 1976. All About Tomatoes. Ortho Books, Chevron Chemical Co., San Francisco. In three volumes: Midwest/Northeast Edition, West Edition, and South Edition

Ware, G.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.

Exhibit D. Additional Description of NC EBR-4.

NC EBR-4 had non-graded yield lower than 'Flora-Dade' in one trial and equivalent to 'Flora-Dade' in a second trial (Table 1).

NC EBR-4 has smoother fruit and is less susceptible to rough blossom scar (catfacing) than 'Flora-Dade', resulting in a higher percentage of U.S. Combination Grade fruit from NC EBR-4 (Table 2).

NC EBR-4 is equivalent or higher in yield of U.S. Combination Grade fruit than 'Flora-Dade' (Table 3).

NC EBR-4 is later in maturity than 'Flora-Dade' (Table 4).

NC EBR-4 has fruit size equivalent to 'Flora-Dade' (Table 5).

Table 1. Total non-graded yield (tons/acre).

	1991a	1991b
Flora-Dade	51.3	42.4
NC EBR-3	44.0	42.9
NC EBR-4	35.6	38.7
LSD (.05)	6.1	6.6

Table 2. Percent U.S. Combination Grade fruit.

	1991a	1991b
Flora-Dade	56	48
NC EBR-3	56	70
NC EBR-4	69	76
LSD (.05)	8	9

Table 3. U.S. Combination Grade fruit (tons/acre).

	1991a	1991b
Flora-Dade	28.6	20.2
NC EBR-3	24.4	30.1
NC EBR-4	24.5	29.4
LSD (.05)	6.1	5.3

Table 4. Early season yield (tons/acre).

	1991a	1991b
Flora-Dade	8.3	9.8
NC EBR-3	7.8	9.4
NC EBR-4	3.5	6.6
LSD (.05)	3.1	3.2

Table 5. Average fruit weight (gm/fruit).

	1991a	1991b
Flora-Dade	199	213
NC EBR-3	196	210
NC EBR-4	219	227
LSD (.05)	28	28

REPRODUCE LOCALLY. *Include form number and date on all reproductions.* FORM APPROVED - OMB NO. 0581-0055 EXPIRES: 12-31-96

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

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
North Carolina Agricultural Research Service
Dr. R. G. Gardner (Breeder)

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
8481(X)-1-2-1-1

3. VARIETY NAME
NC EBR-4

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
North Carolina State University
Box 7643
Raleigh, NC 27695-7643

5. TELEPHONE *(include area code)*
(704) 684-3562

6. FAX *(include area code)*
(704) 684-8715

7. PVPO NUMBER
9300160 RWS 4-22-99

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?
If no, give name of country _____ [X] YES [ ] NO

10. Is the applicant the original breeder? If no, please answer the following: [X] YES [ ] NO

a. If original rights to variety were owned by individual(s):
Is (are) the original breeder(s) a U.S. national(s)? If no, give name of country _____

b. If original rights to variety were owned by a company:
Is the original breeder(s) U.S. based company? If no, give name of country _____ [ ] YES [ ] NO

11. Additional explantion on ownership *(If needed, use reverse for extra space):*
NC EBR-4 was developed by Dr. R. G. Gardner, Professor of Horticultural Science and plant breeder with the NC Ag. Research Service, NC State University, 2016 Fanning Bridge Road, Fletcher, NC 28732-9216. Phone: (704) 684-3562 FAX: (704) 684-8715

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. **If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.**

2. **If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.**

3. **If the applicant is an owner who is not the original breeder, both the original breeder and the applicant must meet one of the above criteria.**

The original breeder may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.