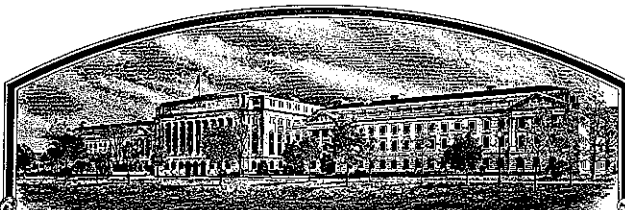


No.

9300162



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 THEREOF 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 HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT, 34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

TOMATO

'NC 109'

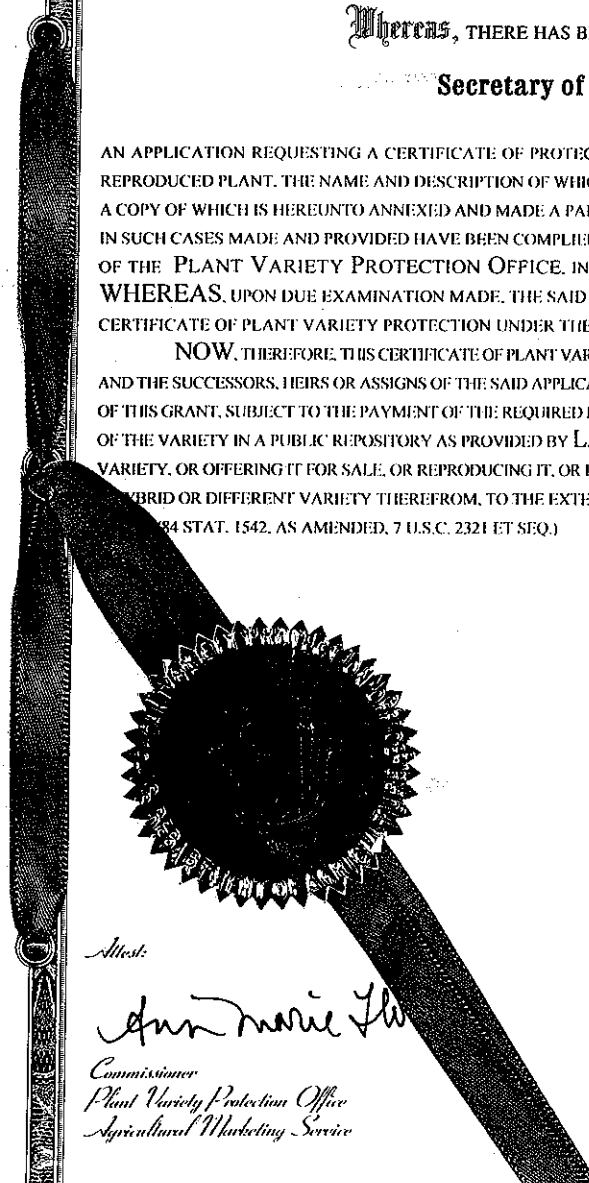
In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirtieth day of July in the year of our Lord one thousand nine hundred and ninety-nine.

Attest:

Ann Marie Sh...

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Earl B. Wickens
Secretary of Agriculture



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. 8224-3-1-1C-1C-1	3. VARIETY NAME NC 109
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 9300162 Date Mar. 10, 1993 Time 2:45 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M. Filing and Examination Fee: \$ 2150 - \$ 175 - Date 3/10/93 = 4/5/93 Certificate Fee: \$ Date
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

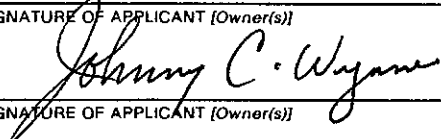
17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
 FOUNDATION REGISTERED CERTIFIED

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

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed Exhibits A,B,C,E; (3) at least 2,500 viable untreated seeds; (4) check, drawn on a U.S. bank, payable to "Treasurer of the United States" in the amount of \$2,150 (\$250 filing fee and \$1,900 examination fee). (See section 180.175 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for 30 days, then returned to the applicant as unfiled. Mail application and other requirements to: Plant Variety Protection Office, AMS, USDA, Rm. 500, NAL Building, 10301 Baltimore Blvd., Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the Application are self-explanatory unless noted below. Corrections on the Application form and Exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a Certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$250 for issuance of the Certificate.

Plant Variety Protection Office
Telephone: 301/344-2518

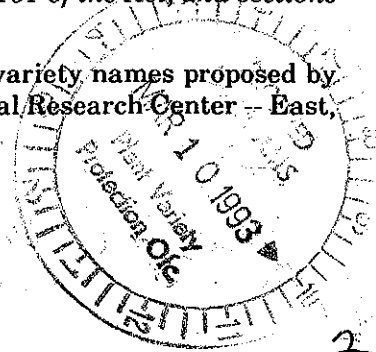
ITEM

9. Give the date when there has been at least a tentative determination that the variety has been sexually reproduced with recognized characteristics, whether or not the novelty of those characteristics has been determined. [See section 41(d) of the Plant Variety Protection Act (Act).]
- 14a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability. (See sections 41 and 52 of the Act.)
- 14b. Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons which clearly indicate novelty.
- 14c. Exhibit C forms are available from the PVPO; specify crop kind. Fill in the Exhibit C (Objective Description of Variety form) to describe your variety.
- 14d. Optional additional characteristics and/or photographs: Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 14e. Section 52(4) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. The applicant may be the actual breeder, the employer of the breeder, the owner through purchase or inheritance, etc.
15. If "Yes" is specified (*seed of this variety be sold by variety name only as a class of certified seed*), the applicant may NOT reverse this affirmative decision after the variety has either been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified the applicant may change the choice. (See section 180.16 of the Regulations and Rules of Practice.)
19. See sections 41 (i, j) and 42 of the Act and section 180.7 of the Regulations and Rules of Practice for eligibility requirements.

NOTES:

It is the responsibility of the applicant/owner to keep the PVPO informed of any change of address or change of ownership or assignment during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment is \$25. [See section 101 of the Act, and sections 180.130, 180.131, 180.132, and 180.175(h) of the Regulations and Rules of Practice.]

To avoid conflict with other variety names in use, the applicant should check the variety names proposed by contacting: Seed Branch, AMS, USDA, Rm. 213, Building 306, Beltsville Agricultural Research Center - East, Beltsville, MD 20705. Telephone: 301/344-2089.



Tomato

NC 109

14A. Exhibit A:

Pedigree

		- NC 50-7
82224 (X) -3-1-1C-1C-1 -		
= NC 109		- T5

NC 109, an inbred line in the F_8 generation, was developed using the pedigree breeding method. It resulted from the cross of the North Carolina State University release NC 50-7 (PVP) and T5, a line received from the University of California fresh-market tomato breeding program.

Single plant selections were made in staked field plots at Fletcher, North Carolina in the F_2 through F_6 generations. The F_7 generation was bulked in the greenhouse to provide F_8 generation seed. Selection of single plants in the F_2 through F_6 generations was based on observational evaluation of plants. A subjective rating scale of 1-5, with 1 being least desirable and 5 most desirable expression of a particular characteristic, was used in sensory ratings of vision, feel, and taste. Selection was for the most desirable combinations of plant habit and fruit characteristics of blossom scar size, stem scar size, crack resistance, firmness, color, flavor, fruit shape and size, and freedom from angularity and puffiness.

NC 109 ^{is and} appeared uniform and stable in the F_4 through F_7 generations in research station plots and in the greenhouse at Fletcher, North Carolina. No off types or variants were observed.

as per
phone call
RW
1-31-97

Exhibit B. Novelty Statement

NC 109 is most similar to NC 50-7. It differs from NC 50-7 in morphology of the style of the flower. NC 109 has a constriction at the base of the style slightly above the juncture of the style and ovary. Breakage of the style following fruit set occurs at the constricted area producing a pinpoint blossom scar. In NC 50-7, no constriction is evident in the style and breakage of the style occurs at the surface of the ovary producing a larger blossom scar.

Exhibit B
NC 109 (applic. No. 9300162)
additional information
11/24/97

NC 109 has a constricted area at the base of the style resulting in a very small, uniform blossom scar of fruit compared to NC 50-7 PVP which has a larger, irregular shape of blossom scar due to lack of the constricted style character (Fig. 1 and 2).

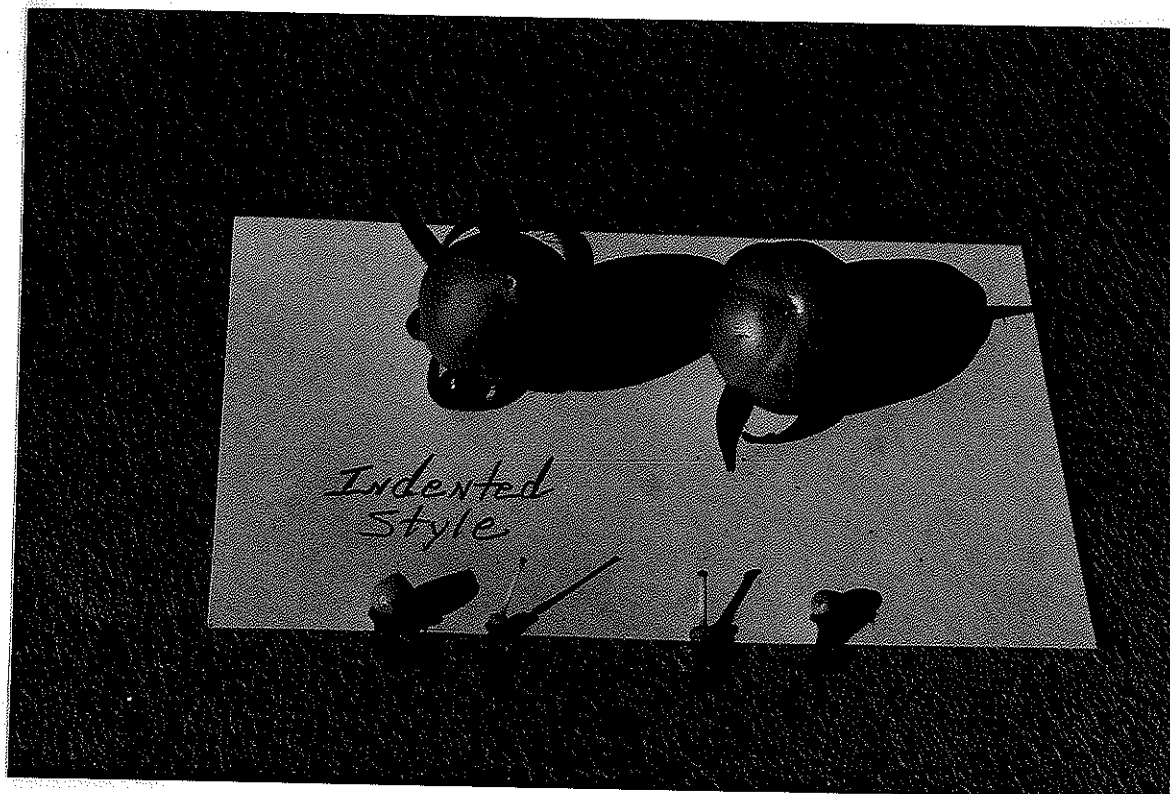


Fig. 1. NC 109 (left) compared to NC 50-7 PVP (right). Shadow at lower left showing ovary with style attached reflects the constriction at the base of the style of NC 109 compared to lack of constriction for NC 50-7 (lower right). Small blossom scar of NC 109 (upper left) results from breakage of the style at the constricted area compared to the larger scar of NC 50-7 resulting from breakage of the style at the fruit surface (upper right).

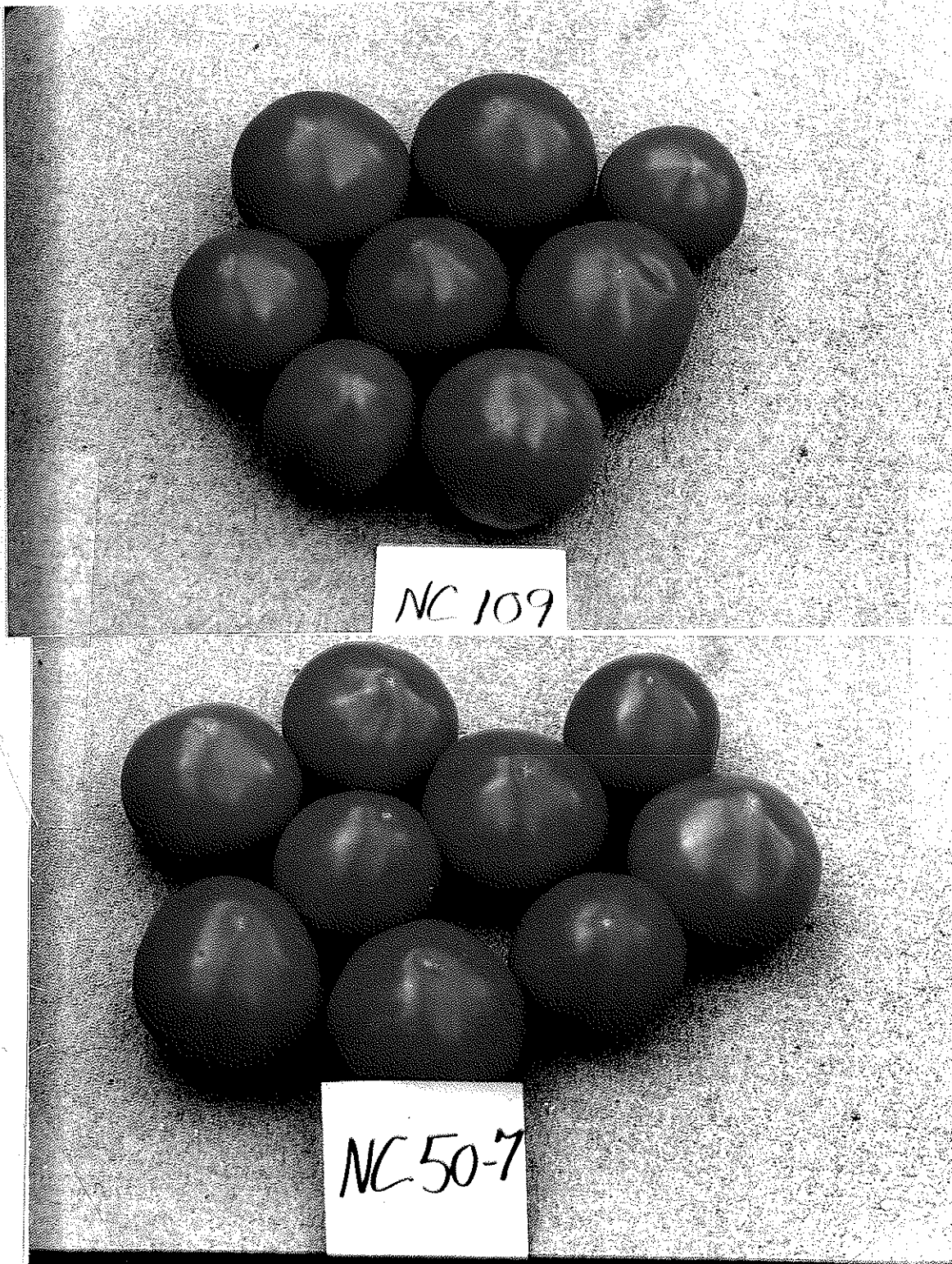


Fig. 2 Comparison of small, uniform blossom scar size and shape of NC 109 (upper) to larger, irregular size and shape of NC 50-7 (lower) blossom scar.

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) N.C. Agricultural Research Service Dr. R.G. Gardner (Breeder)	TEMPORARY DESIGNATION 109-1(87)	VARIETY NAME NC 109
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) N.C. State University Box 7643 Raleigh, NC 27695-7643		FOR OFFICIAL USE ONLY
		PVPO NUMBER
		9300162

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., 09 or 081, 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 plantings. Trials direct-seeded _____ or transplanted ; staked _____ or unstaked _____. Give locations and dates of seeding and transplanting here: Fletcher, North Carolina Seeding dates: 4/16/91; 5/20/91
Transplant dates: 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 | 7 = Homestead 24 | 13 = Red Rock | 19 = VF 134 |
| 2 = Campbell 37 | 8 = Marglobe | 14 = Roma VF | 20 = US 28 |
| 3 = Chico III | 9 = Murietta | 15 = Rutgers | 21 = VF 145 B 7879 |
| <input checked="" type="checkbox"/> 4 = Flora Dade | 10 = New Yorker | 16 = Sunray | 22 = Other (Specify) _____ |
| 5 = Florida MH-1 | 11 = Ohio MR-13 | 17 = Tropic | |
| 6 = Heinz 1350 | 12 = Red Cherry Large | 18 = UC 82 | |

1. SEEDLING:

Anthocyanin in hypocotyl of 2-15 cm. seedling: 1 = Absent 2 = Present Habit of 3-4 week old seedling: 1 = Normal 2 = Compact

2. MATURE PLANT (at maximum vegetative development):

Growth: 1 = Indeterminate 2 = Determinate Cm. Height

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

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

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

3. STEM:

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

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

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

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

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):

Type: 1 = Tomato 2 = Potato ('Trip-L-Crop') Morphology (choose illustration on pg. 5 of this form that is most similar)

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

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

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

9300162

<input type="checkbox"/> 1	Ripening:	1 = Inside out	2 = Uniformly	3 = Outside in	<input type="checkbox"/> 2	Stem scar size:	1 = Small ('Roma')
<input type="checkbox"/> 2	Epidermis color:	1 = Colorless	2 = Yellow			2 = Medium ('Rutgers')	3 = Large
<input type="checkbox"/> 1	Epidermis:	1 = Normal	2 = Easy-peel		<input type="checkbox"/> 2	Core:	1 = Coreless (absent or smaller than 6x6 mm)
<input type="checkbox"/> 2	Epidermis texture:	1 = Tender	2 = Average	3 = Tough		2 = Present	
<input type="checkbox"/> 3	Thickness of pericarp		<input type="checkbox"/> 3	Thickness of pericarp, check var. no.	<input type="checkbox"/> 0	<input type="checkbox"/> 4	
		1 = Under 3 mm	2 = 3-6 mm	3 = 6-9 mm	4 = Over 9 mm		

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

<input type="checkbox"/> 0	Blossom end rot	<input type="checkbox"/> 2	Catface	<input type="checkbox"/> 2	Fruit pox	<input type="checkbox"/> 2	Zippering
<input type="checkbox"/> 2	Blotchy ripening	<input type="checkbox"/> 2	Cracking, concentric	<input type="checkbox"/> 2	Gold fleck	<input type="checkbox"/>	Other (Specify)
<input type="checkbox"/> 2	Bursting	<input type="checkbox"/> 2	Cracking, radial	<input type="checkbox"/> 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:

<input type="checkbox"/> 0	Cucumber mosaic	<input type="checkbox"/> 0	Tobacco mosaic, Race 0	<input type="checkbox"/> 0	Tobacco mosaic, Race 2 ²
<input type="checkbox"/> 0	Curly top	<input type="checkbox"/> 0	Tobacco mosaic, Race 1	<input type="checkbox"/> 0	Tomato spotted wilt
<input type="checkbox"/> 0	Potato-Y virus	<input type="checkbox"/> 0	Tobacco mosaic, Race 2	<input type="checkbox"/> 0	Tomato yellows
<input type="checkbox"/>	Other virus (Specify) _____				

BACTERIAL DISEASES:

<input type="checkbox"/> 0	Bacterial canker (<i>Corynebacterium michiganense</i>)	<input type="checkbox"/> 0	Bacterial spot (<i>Xanthomonas vesicatorum</i>)
<input type="checkbox"/> 0	Bacterial soft rot (<i>Erwinia carotovora</i>)	<input type="checkbox"/> 0	Bacterial wilt, (<i>Pseudomonas solanacearum</i>)
<input type="checkbox"/> 0	Bacterial speck (<i>Pseudomonas tomato</i>)	<input type="checkbox"/>	Other bacterial disease (Specify) _____

FUNGAL DISEASES:

<input type="checkbox"/> 0	Anthrachnose (<i>Colletotrichum</i> spp.)	<input type="checkbox"/> 0	Leaf mold, Race 1 (<i>Cladosporium fulvum</i>)
<input type="checkbox"/> 0	Brown root rot or corky root, (<i>Pyrenochaeta lycopersici</i>)	<input type="checkbox"/> 0	Leaf mold, Race 2
<input type="checkbox"/> 0	Collar rot or stem canker, (<i>Alternaria solani</i>)	<input type="checkbox"/> 0	Leaf mold, Race 3
<input type="checkbox"/> 0	Early blight defoliation, (<i>Alternaria solani</i>)	<input type="checkbox"/>	Leaf mold, other races (Specify) _____
<input type="checkbox"/> 2	Fusarium wilt, Race 1, (<i>F. oxysporum</i> f. <i>lycopersici</i>)	<input type="checkbox"/> 0	Nailhead spot (<i>Alternaria tomato</i>)
<input type="checkbox"/> 1	Fusarium wilt, Race 2	<input type="checkbox"/> 0	Septoria leafspot (<i>S. lycopersici</i>)
<input type="checkbox"/> 0	Fusarium wilt, Race 3	<input type="checkbox"/> 0	Target leafspot (<i>Corynespora casiiicola</i>)
<input type="checkbox"/> 0	Gray leaf spot (<i>Stemphylium</i> spp.)	<input type="checkbox"/> 2	Verticillium wilt, Race 1 (<i>V. albo-atrum</i>)
<input type="checkbox"/> 0	Late blight, Race 0, (<i>Phytophthora infestans</i>)	<input type="checkbox"/> 0	Verticillium wilt, Race 2
<input type="checkbox"/> 0	Late blight, Race 1	<input type="checkbox"/>	Other fungal disease _____
		<input type="checkbox"/>	Other fungal disease _____

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

INSECTS AND PESTS:

<input type="checkbox"/> 0	Colorado potato beetle (<i>Leptinotarsa decemlineata</i>)	<input type="checkbox"/> 0	Tomato hornworm (<i>Manduca quinquemaculata</i>)
<input type="checkbox"/> 0	Southern root knot nematode (<i>Meloidogyne incognita</i>)	<input type="checkbox"/> 0	Tomato fruitworm (<i>Heliothis zea</i>)
<input type="checkbox"/> 0	Spider mites (<i>Tetranychus</i> spp.)	<input type="checkbox"/> 0	Whitefly (<i>Trialeurodes vaporariorum</i>)
<input type="checkbox"/> 0	Sugar beet army worm (<i>Spodoptera exigua</i>)	<input type="checkbox"/>	Other (Specify) _____
<input type="checkbox"/> 0	Tobacco flea beetle (<i>Epitrix hirtipennis</i>)		_____

POLLUTANTS:

<input type="checkbox"/> 0	Ozone	<input type="checkbox"/> 0	Sulfur dioxide	<input type="checkbox"/>	Other (Specify) _____
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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				
Titrateable 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.

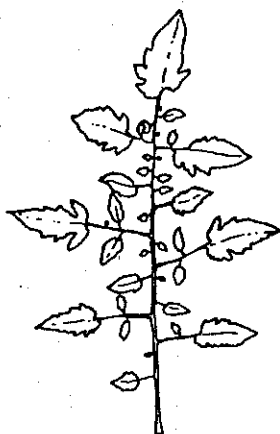
	APPLICATION VARIETY	Check variety Flora-Dade (04)	Check variety	Check variety
Seeding to 50% flower (1 open flower on 50% of plants)	64	56		
Seed to once-over harvest (if applicable)				

<input type="checkbox"/> 1	Fruiting season:	1 = Long ('Marglobe')	2 = Medium ('Westover')	3 = Short, concentrated ('VF 145')
		4 = Very concentrated ('UC 82')		
<input type="checkbox"/> 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).

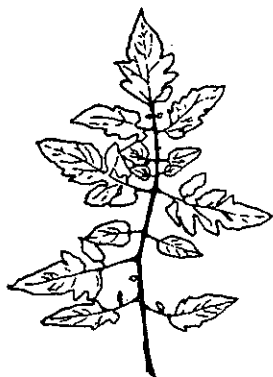
12. ADAPTATION: If more than one category applies, list all in rank order.

<input type="checkbox"/> 1	Culture:	1 = Field	2 = Greenhouse
<input type="checkbox"/> 5	Principal use(s):	1 = Home garden	2 = Fresh market
		4 = Concentrated products	3 = Whole-pack canning
			5 = Other (Specify) <u>Parent line in F₁ hybrid</u>
<input type="checkbox"/> 1	Machine harvest:	1 = Not adapted	2 = Adapted
<input type="checkbox"/> 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

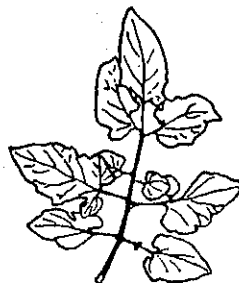
4. LEAF: Morphology:



(1)



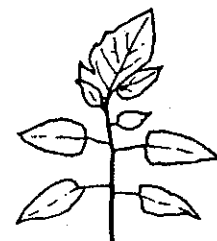
(2)



(3)



(4)

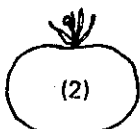


(5)

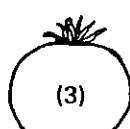
7. FRUIT: Typical fruit shape:



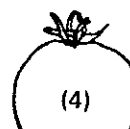
(1)



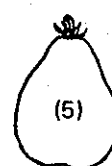
(2)



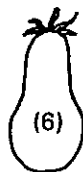
(3)



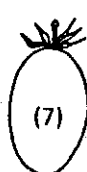
(4)



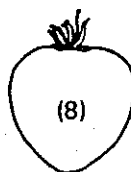
(5)



(6)



(7)



(8)

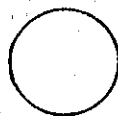


(9)



(10)

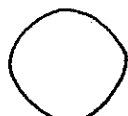
Shape of transverse section:



1=round



2=flattened



3=angular

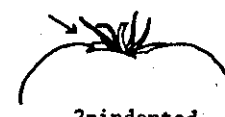


4=irregular

Shape of stem end:



1=flat



2=indented

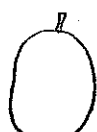
Shape of blossom end:



1=indented



2=flat

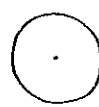


3=nipped

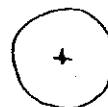


4=tapered

Shape of pistil scar:



1=dot



2=stellate



3=linear



4=irregular

REFERENCES

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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 109.

NC 109 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 (U.S. No. 1 + U.S. No. 2) fruit for NC 109 (Table 1).

NC 109 is later flowering than 'Flora-Dade' (Section II of Exhibit C) and is later in maturity than 'Flora-Dade' (Table 2).

Table 1. Percent U.S. Combination Grade fruit.

	<u>1991a</u>	<u>1991b</u>
Flora-Dade	56	48
NC 109	70	76
LSD (.05)	8	9

Analysis of variance of data from randomized complete block designs with 4 replicates of 6 plants each.

Table 2. Early season fruit yield (tons/acre).

	<u>1991a</u>	<u>1991b</u>
Flora-Dade	8.3	9.8
NC 109	2.1	2.8
LSD (.05)	3.1	3.2

Analysis of variance of data from randomized complete block designs with 4 replicates of 6 plants each.

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

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 652a) 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).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) North Carolina Agricultural Research Service Dr. R. G. Gardner (Breeder)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER 109-1(87)	3. VARIETY NAME NC 109
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 9300162 <i>RWS 2-24-99</i>		

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

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

10. Is the applicant the original breeder? If no, please answer the following: 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 _____

11. Additional explanation on ownership (if needed, use reverse for extra space):
NC 109 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 28732-9244. Phone: (704) 684-3562, FAX: (704) 684-8715, email: rgardner@fletcher.ces.state.nc.us

PLEASE NOTE:

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

- 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.
- 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.
- 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.

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TOMATO

NC 109

Exhibit E. Statement of The Basis of Applicant's Ownership

NC 109 was developed by Dr. R. G. Gardner, Professor of Horticultural Science and plant breeder with the N. C. Agricultural Research Service (NCARS), College of Agriculture and Life Sciences, N. C. State University. NC 109 is owned exclusively by the NCARS which retains all rights to its use.