



The University of Georgia

Center for Applied Genetic Technologies

October 30, 2003

Dr. D. Scott NeSmith
Department of Horticulture
Georgia Experiment Station
1109 Experiment Street
Griffin, GA 30223-1797

Dear Dr. NeSmith:

The original approved copy of your Application for Approval of Cultivars/Associate Cultivars for blueberry cultivar TH-471 is enclosed for your records. You should be hearing from Dr. John Ingle's office concerning the Licensing Committee meeting.

Sincerely,

Joe Bouton, Chair
Plant Cultivar Germplasm Release Committee (PCGRC)

Enclosure

cc: Dr. John Ingle

APPLICATION FOR APPROVAL OF CULTIVAR

D. Scott NeSmith, Dept. of Horticulture, Georgia Station, Griffin, GA 30223

1. **Crop:** Southern Highbush Blueberry (*Vaccinium sp.*)
2. **Experimental no. or name:** TH-471
3. **Pedigree and history:** TH-471 was selected in 1985 at the Coastal Plain Experiment Station in Tifton, Ga. from a cross of US-158 X TH-157 made by USDA. A pedigree of the selection is depicted in Figure 1. The selection is actually a hybrid containing mostly *V. corymbosum* and a small amount of *V. darrowi*. The selection has been tested in a planting at Alapaha, Ga. since 1992. The selection was planted in other locations beginning in 2001.
4. **Description:** TH-471 is an early season southern highbush blueberry, having favorable fruit attributes, concentrated ripening, good yields and excellent plant vigor. The selection will likely have a similar chill hour requirement to that of other early season southern highbush, in the range of 350 to 400 hours. Data describing these and other details follow in Tables.
5. **Station(s) where developed:** TH-471 was developed primarily at the Coastal Plain Experiment Station, with some activity at the Georgia Station.
6. **Participating scientists:** Scientists participating in the development of this blueberry cultivar include D. Scott NeSmith, UGA; Arlen D. Draper, USDA-ARS retired; James M. Spiers, USDA-ARS Small Fruit Laboratory, Poplarville, MS.
7. **In what respect is the new cultivar superior to the cultivar now in use?:** Southern highbush blueberries are highly desirable for many Georgia growers and those across the Southeast because of their early ripening fruit which brings high market prices. The selection TH-471 is only the second southern highbush to be proposed for release from UGA. The cultivar Georgiagem was the first release (in 1987), and growers have found it difficult to grow (low plant vigor), or have not been satisfied with its ripening time and fruit quality (especially firmness). An older Florida release, 'Sharpblue', also has not been widely grown by Georgia growers due to poor plant vigor, early flowering, and protracted ripening. Table 1 depicts yields over a 5 year period for TH-471, 'Georgiagem', and 'Sharpblue'. 'Georgiagem' has yielded no fruit during the first week in May, whereas, TH-471 yielded more than 35% of its fruit during that time period on average. When the first 2 weeks of May are considered, TH-471 ripened more than 75% of its fruit during that time on average, compared to only 38% and 51% for 'Georgiagem' and 'Sharpblue', respectively. TH-471 yields overall were greater than 'Georgiagem' for the 5 year average.

Table 2 portrays average berry attributes and plant vigor for TH-471 and 4 other southern highbush blueberry selections grown at Alapaha, Ga. over a 6 year period. TH-471 exceeded all of the cultivars with respect to plant vigor, and berry scar was superior to all of the cultivars except for 'Oneal'. For other berry attributes, TH-471 was generally similar to the various cultivars, except for berry size, which was smaller (but commercially acceptable). Thus, TH-471 has good to excellent fruit quality, and outstanding plant vigor.

Flowering and ripening times are important data for growers who are considering producing southern highbush blueberries. Generally, the early flowering times require frost protection measures, and growers want the ripening times to be early enough to offer a "high price reward" for the risk they encounter. Table 3 lists flowering and ripening dates for TH-471 and 3 southern highbush cultivars at Alapaha, Ga. over a 6 year period. The flowering times of all of the selections (late February to early March) are early, yet, TH-471 generally ripens the earliest.

As for adaptability to other areas, TH-471 seems to be as adaptable as the popular cultivar 'Star' (released by Florida in 1996). Table 4 depicts fruit and plant characteristics of TH-471 and 'Star' for 2 to 4 year-old plants at 3 locations in Georgia and one location in Mississippi during 2003. The two entries generally ripened at the same time, and had similar attributes. The exceptions were that TH-471 had firmer fruit than 'Star', and typically had a better cropping score also.

Growers are interested in the firmness of fruit to offer the possibility of machine instead of hand-harvesting. To date, little or no southern highbush cultivars grown in Georgia are machine harvested. Table 5 presents data from a 1999 experiment comparing firmness of hand harvested and machine harvested TH-471 and 'Georgiagem'. 'Georgiagem' showed the typical response of a great loss in firmness of berries due to mechanical harvesting; whereas, TH-471 seemed to remain firm even when mechanically harvested.

Finally, of interest to growers again are flowering and ripening times of southern highbush blueberry cultivars, especially those they might produce in a high density planting. Table 6 shows flowering and ripening dates for TH-471 and 4 of the most popular southern highbush cultivars to date. Two of these (Emerald and Windsor) were released by the Univ. of Florida only in the last 2 years. The data suggest that TH-471 will be in the middle of these cultivars with respect to flowering, yet, will be on the earlier side with respect to ripening.


8. **Method of propagation:** Propagation of TH-471 has been easily accomplished from softwood cuttings.
9. **Amount of breeder seed stocks available (if applicable):** NA

10. **Amount of foundation seed stocks available if applicable: NA**
11. **Amount of cutting or bud material available for vegetatively propagated material for nursery distribution (if applicable):** TH-471 propagation material is currently available in limited quantities from stock plants at Alapaha, Ga. Additionally, 3000 to 5000 rooted cuttings have been propagated during 2003 for distribution by GSDC.
12. **Is there likely to be unusual difficulty in the production of any class of seed stocks?** No.
13. **Three suggested names for the cultivar:** Southern highbush release from UGA will depict those things that are "southern". Proposed name: *1) Palmetto*
14. **Name approved by plant cultivar and germplasm release committee:**
15. **Form of intellectual property protection:** Selection should be PVP.
16. **Is a royalty assessment recommended?:** Yes No


RECOMMENDED BY:

A. 
Originating Scientist

B. 
Department Head


C. 
Chairperson, GAES Plant Cultivar and
Germplasm Release Committee

D. _____
Assistant Dean /Appropriate Station

E. 
Associate Dean for Research

F. _____

APPROVED:



Dean and Director
College of Agricultural and Environmental Sciences

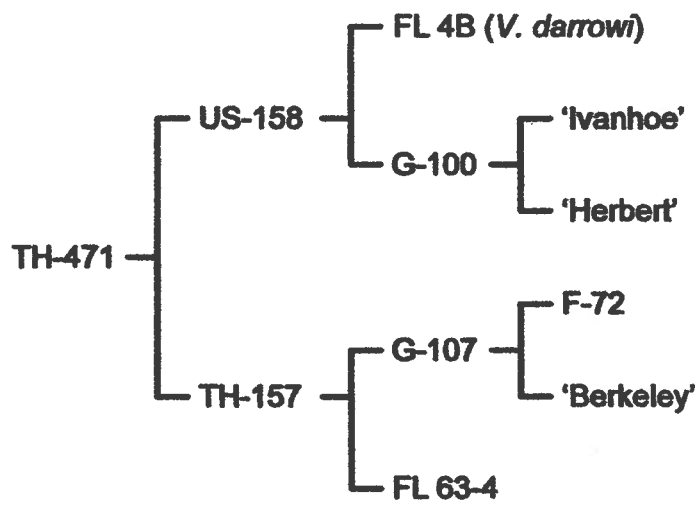


Figure 1. Pedigree of TH-471 southern highbush blueberry.

Table 1. Yield of the southern highbush selection TH-471 and the standard cultivars 'Georgiagem' and 'Sharpblue' for different harvest periods during 1999 thru 2003. Plants were established in 1992, and have been grown without mulch, bedding, or irrigation.

Harvest time	Total yield per bush (lbs)		
	Georgiagem	Sharpblue	TH-471
	<i>1st week of May</i>		
1999	0.0	1.7	1.0
2000	0.0	1.3	3.0
2001	0.0	2.8	1.8
2002	0.0	1.1	2.7
2003	0.0	—	1.9
5 yr average ^{YI}	0.0 b	1.7 a	2.1 a
	<i>2nd week of May</i>		
1999	0.0	2.2	2.4
2000	1.3	2.1	3.7
2001	1.6	2.9	2.8
2002	0.8	0.0	0.7
2003	0.7	—	2.0
5 yr average	0.9 a	1.8 a	2.3 a
	<i>Total for season</i>		
1999	2.6	7.2	6.2
2000	3.2	5.9	8.1
2001	4.3	13.1	6.2
2002	0.8	1.1	3.4
2003	1.2	—	5.0
5 yr average	2.4 b	6.8 a	5.8 a

^{YI} The same lower case letter indicates the yields for the 5 year average were not significantly different at the 10% probability level.

Table 2. Average ratings of some fruit and plant characteristics of TH-471 and several southern highbush standard cultivars over a 6 year period at Alapaha, Ga. Rating scales are based on a 1 to 10 score, with 1 being the least desirable and 10 being the most desirable. A value of 6-7 is generally considered to be the minimum acceptable rating for a commercial cultivar.

Berry and plant attributes	Cultivar				
	TH-471	'Georglagem'	'Sharpblue'	'Star' ^z	'Oneal'
Berry size ^y	7.3 b	7.5 ab	7.7 ab	7.8 ab	8.1 a
Berry scar	8.5 a	7.0 c	7.8 b	7.8 b	7.9 ab
Berry color	8.0 a	7.9 a	8.4 a	8.0 a	7.9 a
Berry firmness	8.3 a	6.7 c	7.6 ab	7.5 b	7.6 ab
Berry flavor	8.0 a	7.0 c	7.9 ab	7.3 bc	8.0 a
Plant vigor ^{zz}	8.8 a	7.0 b	6.8 b	6.3 bc	5.1 c

^y The same lower case letter indicates the attribute was not significantly different at the 10% probability level.

^z 'Star' plants were only evaluated for the last 3 years.

^{zz} Plant vigor is a relative scale (1 to 10) that considers overall robustness and durability of the plant itself (wood and vegetation). Vigor does not reflect berry quality, nor is it necessarily related to yield, especially annual yield.

Table 3. Average flowering and ripening date of TH-471 and three southern highbush standard cultivars over a 6 year period at Alapaha, Ga.

Year	Cultivar			
	TH-471	'Georgiagem'	'Sharpblue'	'Oneal'
<i>Date of 50% flowering</i>				
1998	Feb. 18	Feb. 23	Feb. 13	Feb. 15
1999	Mar. 6	Mar. 20	Mar. 3	Mar. 15
2000	Mar. 4	Mar. 17	Feb. 18	Mar. 12
2001	Feb. 26	Mar. 1	Feb. 21	Mar. 1
2002	Feb. 25	Mar. 5	Feb. 26	---
2003	Mar. 13	Mar. 20	---	---
Average ^{YI}	Mar. 1 ab	Mar. 10 a	Feb. 22 b	Mar. 4 ab
<i>Date of 50% ripening</i>				
1998	May 9	May 18	May 17	May 22
1999	May 16	May 21	May 19	May 21
2000	May 7	May 17	May 11	May 12
2001	May 6	May 14	May 10	May 11
2002	May 5	May 11	May 7	---
2003	May 9	May 21	---	---
Average	May 9 a	May 17 b	May 13 ab	May 17 b

^{YI} The same lower case letter indicates the flowering and ripening date across years were not significantly different at the 10% probability level.

Table 4. Ratings of some fruit and plant characteristics of TH-471 and the southern highbush standard 'Star' at four locations in 2003. Plantings are 2 to 4 years old and all are irrigated. Size, scar, color, firmness, flavor, plant vigor, and cropping rating scales are based on a 1 to 10 score, with 1 being the least desirable and 10 being the most desirable. A value of 6-7 is generally considered to be the minimum acceptable rating for a commercial cultivar. Ripening information is estimates of actual dates.

Berry and plant attributes	Location										Avg across locations	
	Alapaha, Ga.		Griffin, Ga.		Ware Co., Ga.		Stone Co., Miss.		Avg across locations			
	TH-471	Star	TH-471	Star	TH-471	Star	TH-471	Star	TH-471	Star	TH-471	Star
Berry size	7.5	7.5	7.5	7.5	8.0	8.0	8.0	8.0	7.0	7.0	7.5 a	7.8 a
Berry scar	8.5	7.5	8.5	7.5	7.5	7.0	7.0	7.0	7.0	7.0	7.9 a	7.3 a
Berry color	8.0	7.5	7.5	8.0	7.5	7.5	8.0	7.0	8.0	7.0	7.8 a	7.5 a
Berry firmness	8.3	7.0	8.5	7.5	8.5	8.0	8.0	8.0	8.0	8.0	8.3 a	7.6 b
Berry flavor	7.5	7.0	8.5	7.5	8.5	8.0	7.0	7.0	7.0	7.0	7.9 a	7.4 a
Plant vigor	8.0	6.5	7.0	7.0	8.5	8.5	8.0	8.0	8.0	7.0	7.9 a	7.3 a
Cropping	5.7	3.5	6.5	6.0	9.0	9.0	8.0	8.0	8.0	5.0	7.3 a	4.9 b
Ripening date (50%)	May 10	May 10	May 26	May 26	May 4	May 6	May 21	May 19	May 21	May 15 a	May 14 a	

^{y/} The same lower case letter indicates the attribute across locations was not significantly different at the 5% probability level.

Table 5. Firmness values (measured with FirmTech II) for southern highbush blueberries in response to hand and mechanical harvesting.

Cultivar or selection	Firmness at harvest	
	Hand harvested	Machine harvested
	----- g/mm -----	
Georgiagem	135 a ^z	116 a
TH-471	140 b	142 b

^z Values within a column followed by the same letter were not significantly different at the 5% probability level.

Table 6. Average flowering and ripening date of TH-471 and four southern highbush standard cultivars in a High Density Production System at Alapaha, Ga. in 2003. The high density beds were established in 2002.

Cultivar	Date of 50% flowering	Date of 50% ripening
TH-471	March 17	May 10
Oneal	March 13	May 14
Star	March 8	May 8
Emerald	March 1	May 13
Windsor	March 24	May 24
