

APPLICATION FOR RELEASE

APPLICATION FOR RELEASE OF (check one):

CULTIVAR

**ASSOCIATE CULTIVAR
GERMPLASM**

**PARENTAL LINE
GENETIC STOCK**

1. Crop: Rabbiteye Blueberry (*Vaccinium ashei* Reade)

2. Experimental no. or name: 'T-1101'

3. Pedigree and history:

'T-1101' was selected in 2007 at the Georgia Experiment Station in Griffin, Ga, originating from a group of seedlings derived from open pollinated 'Vernon' fruit in 2004. The maternal parent, 'Vernon', is a 2004 UGA release (USPP 18291). 'T-1101' has been tested in plantings at UGA Blueberry Research Farms in Alapaha and Griffin, Ga. since 2009.

4. Description of plant material:

'T-1101' is a rabbiteye blueberry (*V. ashei*) being released for commercial usage, as well as pick-your-own and homeowner markets. The new variety ripens near the time of 'Vernon' and the UGA release 'Alapaha' (USPP 16266), which have become early rabbiteye season standards in Georgia for the past 10 years (Tables 1 and 2). However, 'T-1101' berry size greatly exceeds both 'Vernon' and 'Alapaha', being much more the size of the recently released 'Titan' (USPP 24135). 'T-1101' also has favorable fruit scar, firmness, and flavor, as well as good yield and plant vigor. Chill hour requirement is estimated to be in the range of 400 to 450 hours. Data describing these and other details follow in Tables.

5. Need for and potential users of plant material:

Rabbiteye blueberry cultivars constitute the major portion of the blueberry acreage in Georgia. The species is largely grown due to its high plant vigor and adaptability to the Southeast. However, the small fruit size of most rabbiteye blueberry varieties often diminishes their potential to compete with larger fruited highbush varieties from other regions in the fresh market arena. Also, the small berry size leads to high inefficiency with hand harvesting, which often destines much of the rabbiteye crop to machine harvests to be used for processing to a large extent. Concurrently, many small pick-your-own operations would greatly benefit from larger fruited varieties to improve the overall "harvest experience" for their customers. We have been diligently seeking larger fruit rabbiteyes in the past 12 years with hopes of alleviating some of these issues. 'Titan' was released in 2010 as a very large fruited rabbiteye, and it has stirred interest

among many growers and visitors to our program during the past 3 years. The impressive fruit size garnered excitement from all interested in rabbiteye varieties. 'T-1101' is being released as a second large fruited rabbiteye to be grown in conjunction with 'Titan'. Berry sizes are similar, both being very large; however, 'T-1101' does have better flavor in most years. Together the two varieties would be expected to offer growers of rabbiteye blueberries companion varieties suitable for pollinating each other that also have compatible berry size.

6. Justification for release:

As discussed above (Tables 1 and 2), an outstanding feature of 'T-1101' is its large berry size. Berry weight, firmness, and BRIX data for 'T-1101' and standard cultivars from Griffin during the past 2 growing seasons for the first 25% of ripe fruit are depicted in Table 3. 'T-1101' fruit size rivals 'Titan' both years, and greatly exceeds that of 'Alapaha' and 'Vernon' berries. Data from several harvests over time (not shown) have revealed that 'T-1101' maintains superior berry size over the entire season by a similar magnitude; although, all varieties fall off in size some as harvest progresses. Nevertheless, 'T-1101' consistently produces very large fruit. 'T-1101' also had the highest 2-year average BRIX value among the varieties, indicating sweetness is better than the others, especially 'Titan'. However, 'Titan' fruit are firmer than 'T-1101'.

While yield data are limited, Table 4 depicts total yield per plant taken from three single plant replicates via hand harvesting in selection test plots at the Alapaha Blueberry Farm in 2013 and 2014 for 'T-1101' and 'Vernon'. These data support that 'T-1101' is also high yielding. Note that berry size was also very large when compared to 'Vernon' at this location.

With all of the positive attributes, 'T-1101' does carry the negative characteristic of being slightly to moderately susceptible to fruit splitting. Fruit splitting is a physiological phenomenon, not completely understood, that occurs periodically for certain varieties after heavy rains that occur during fruit ripening. Limited field observations indicate that 'T-1101' could encounter fruit splitting problems under certain conditions; however, 'Titan' has been shown to be even more susceptible. Another less desirable trait is 'T-1101' can have some delay in development of blue color over the entire berry. Pickers will need to let the fruit fully mature before harvest to avoid "pink backs" with the fruit. However, full color development does occur if the fruit is not harvested prematurely.

7. Participating scientists:

D. Scott NeSmith, UGA

8. Location(s) at which plant material was developed:

UGA Griffin Campus and UGA Alapaha Blueberry Farm

9. Recommended form of intellectual property protection and royalty:

Plant Patent and royalty based on per plant sold or production based.

10. Method of propagation:

T-1101 readily propagates using softwood cuttings and can also be easily produced using tissue culture techniques.

11. Amount of breeder seed stocks available (if applicable): NA

12. Amount of foundation seed stocks available if applicable: NA

13. Amount of cutting or bud material available for vegetatively propagated material for nursery distribution (if applicable):

We have contracted with Agri-Starts commercial TC lab to produce 1000 or more TC plants for distribution, with increased numbers possible if desired.

14. Describe any unusual difficulty anticipated in the production of any class of seed stocks:

15. Suggest up to three names for the cultivar, if appropriate:

Suggested names for this variety: 1) 'Krewer'; 2) 'Blue Collar'; 3) 'Flint'.

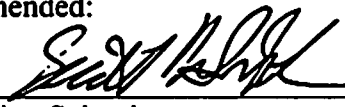
16. Name approved by plant cultivar and germplasm release committee:

APPLICATION FOR RELEASE

(Please keep this as a separate page)

Application for the release of (insert experimental name or number and crop)

Recommended:

A.  _____
Originating Scientist Date

B. **Douglas Bailey** Digitally signed by Douglas Bailey
DN: cn=Douglas Bailey, o=University of Georgia, ou=Department
of Horticulture, email=dabailey@uga.edu, c=US
Date: 2014.10.09 07:01:45 -05'00'
Department Head Date

C. _____
For Griffin and Tifton, Assistant Dean Date

D. **Peggy Ozias-Akins, Director** Digitally signed by Peggy Ozias-Akins, Director
DN: cn=Peggy Ozias-Akins, Director,
o=University of Georgia, ou=Institute of Plant
Breeding, Genetics & Genomics,
email=pozias@uga.edu, c=US
Chair, GAES PCGRC Date: 2014.11.02 00:33:47 -08'00'
Date

E.  _____
Associate Dean for Research Date 11/5/14

Approved:

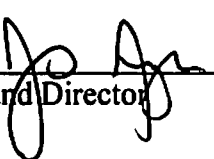
F.  _____
Dean and Director Date 11/6/14

Table 1. Plant and fruit ratings for T-1101 and variety standards Alapaha Farm. Data are 4 Year avg (2011-2014).

Berry and plant attributes^{1/}	T-1101	Alapaha	Vernon	Titan
Berry size	9.3 ± 0.1	6.3 ± 0.1	7.9 ± 0.1	8.9 ± 0.2
Berry scar	7.4 ± 0.2	7.4 ± 0.1	7.2 ± 0.1	7.5 ± 0.2
Berry color	7.2 ± 0.2	6.7 ± 0.1	7.1 ± 0.1	7.0 ± 0.1
Berry firmness	7.8 ± 0.1	6.9 ± 0.1	7.5 ± 0.2	8.3 ± 0.2
Berry flavor	7.2 ± 0.1	7.1 ± 0.1	7.3 ± 0.1	6.8 ± 0.1
Cropping	6.1 ± 0.5	6.8 ± 1.0	4.5 ± 0.9	5.2 ± 0.8
Plant vigor	8.6 ± 0.1	8.0 ± 0.3	9.2 ± 0.3	9.5 ± 0.3
Date of 50% flowering	Mar 16	Mar 26	Mar 21	Mar 24
Date of 50% ripening	May 28	June 4	June 1	June 2
Fruit development period (days)	78 ± 3.7	73 ± 2.0	75 ± 3.0	75 ± 1.6

^{1/} Values are means ± the standard error with n=4.

Table 2. Plant and fruit ratings for T-1101 and variety standards Griffin Farm. Data are 4 Year avg (2011-2014).

Berry and plant attributes^{1/}	T-1101	Alapaha	Vernon	Titan
Berry size	8.7 ± 0.2	6.5 ± 0.2	7.7 ± 0.1	8.8 ± 0.3
Berry scar	7.4 ± 0.1	7.3 ± 0.1	7.1 ± 0.1	7.6 ± 0.4
Berry color	7.3 ± 0.3	7.0 ± 0.1	7.2 ± 0.1	7.1 ± 0.1
Berry firmness	7.4 ± 0.1	6.9 ± 0.1	7.5 ± 0.2	8.5 ± 0.3
Berry flavor	7.1 ± 0.2	7.3 ± 0.2	7.5 ± 0.2	7.0 ± 0.1
Cropping	6.6 ± 0.7	7.5 ± 0.9	6.2 ± 0.5	7.1 ± 1.0
Plant vigor	7.4 ± 0.4	7.5 ± 0.3	8.8 ± 0.1	9.5 ± 0.2
Date of 50% flowering	Mar 24	April 1	April 2	April 3
Date of 50% ripening	June 16	June 13	June 13	June 18
Fruit development period (days)	84 ± 1.9	76 ± 1.6	76 ± 2.1	80 ± 3.9

^{1/} Values are means ± the standard error with n=4.

Table 3. Berry wt., firmness and BRIX for T-1101 and standard varieties at Griffin, Ga 2012 and 2013.

Year	T-1101	Alapaha	Vernon	Titan
	Berry wt (g/berry) ^{1/}			
2012	2.92 ± 0.07	1.28 ± 0.06	1.60 ± 0.05	2.60 ± 0.06
2013	3.08 ± 0.10	1.63 ± 0.04	2.43 ± 0.09	3.10 ± 0.08
Avg	3.00	1.46	2.01	2.85
	Firmness (g/mm) ^{1/}			
2012	198 ± 5	175 ± 4	185 ± 4	240 ± 7
2013	168 ± 3	169 ± 4	164 ± 6	220 ± 5
Avg	183	172	175	230
	Brix (%) ^{2/}			
2012	12.7 ± 0.3	10.8 ± 0.4	11.5 ± 0.5	10.2 ± 0.3
2013	13.0 ± 0.5	13.2 ± 0.3	10.0 ± 0.5	10.0 ± 0.1
Avg	12.9	12.0	10.8	10.1

^{1/} Values are means ± the standard error with n=3 (each sample derived from 25 berry avg).

^{2/} Values are means ± the standard error with n=3 (each sample derived from 5 berry composite).

Table 4. Yield and berry wt. for 'T-1101' and 'Vernon' at Alapaha, Ga 2013 and 2014.

Year	T-1101	Vernon
	Berry wt (g/berry) ^{1/}	
2013	2.75 ± 0.09	1.93 ± 0.08
2014	2.90 ± 0.08	2.14 ± 0.09
Avg	2.83	2.03
	Yield (lbs/plant) ^{2/}	
2013	12.5 ± 0.4	9.5 ± 1.9
2014	24.0 ± 1.5	21.6 ± 1.3
Avg	18.3	15.6

^{1/} Values are means ± the standard error with n=3 (each sample derived from 25 berry avg).

^{2/} Values are means ± the standard error with n=3.



Figure 1. T-1101 plants during flowering.



Figure 2. – Fruit ripening on young plant of T-1101.



Figure 3 – Close-up of T-1101 berries.

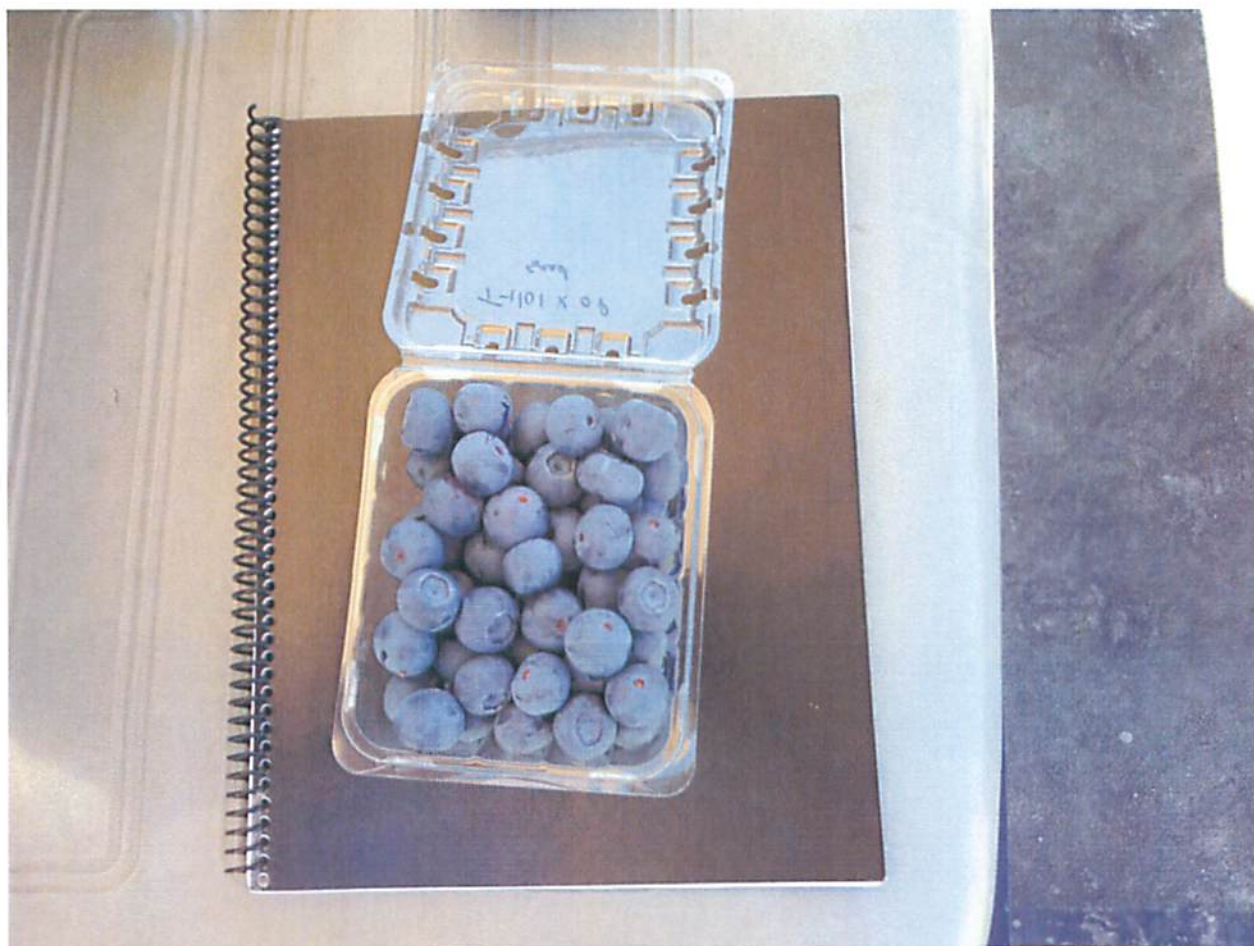


Figure 4 – Harvested berries of T-1101.

Blueberry Traits and Rating Scale

D. Scott NeSmith

Many of the traits evaluated in the blueberry breeding program are qualitative and/or subjective, and we use a 1 to 10 scale for our ratings. In this system, typically a value of 1 is poor and least desirable, and a value of 10 is excellent and most desirable. A value of 6-7 on this scale is generally considered to be the minimum level for “commercial acceptability”. An exception is cropping score, which can be less than 6 in some years depending on weather, pollination, etc. For advanced selections, nearly all traits would be at the minimum value (6-7), therefore, there is not a wide range in values among entries in these final trials (i.e., those selections with values < 6 didn’t make it this far). Ratings are based on averaged or integrated values across several plants and berries, not just single berries. More specific information for the different traits is listed below.

Berry size – For berry size large berries are typically desirable. There are occasions that small berries may be desired, but in general we select for large fruit. Our berry size scale does relate to a quantity in many regards. A value of 6 is given to berries that are 13 to 14 mm in diameter, a value of 7 is 15 to 16 mm, a value of 8 is 17 to 18 mm, a 9 is 20 to 21 mm, and a value of 10 is greater than 21 mm.

Berry scar – Berry scar refers to the region where the fruit is detached from the stem. The most desirable form of this trait is a very small scar, that is completely dry. A value less than 6 is unacceptable commercially because the tearing and leakage would cause fruit storage problems. A value of 6 would be a scar with perhaps slight tearing on an occasional berry. A value of 7 would be a large scar, but would tend to be dry. The rest of the scale (8 to 10) basically accounts for a smaller and smaller scar.

Berry color – The “blue color” of blueberries actually is caused by the waxy bloom covering the fruit. Nearly all blueberries are midnight blue to black if this wax is removed. So, in essence the color scale we use is an indicator of waxy bloom on the fruit. The most desirable form of this trait is a high wax bloom that gives a sky blue appearance. In our scale, a value less than 6 is considered too dark (not waxy enough) for commercial acceptance. Going from 6 to 10 is basically increasing in intensity of light blue color.

Berry firmness – Firmness of blueberries is important for harvesting, handling, and storage of the fruit. If a berry is too soft, it will bruise during these processes and become unusable. Our fruit firmness rating is based on “feel” when rolling berries between the fingers, and somewhat on texture “crispness” when biting into the fruit. Rating values < 6 are considered too soft to be commercially viable. Going from a value of 6 to 10 is increasing in firmness. Very few berries are ever rated at 10 on this scale. Typically fruit that exceed a value of 8.5 to 9.0 could likely be machine harvested.

Berry flavor – Blueberry flavor is a blend of volatiles, acid and sugars that give various combinations of flavor. If berries are too acid, they are bitter and are not appealing to

consumers. If both acidity and sugars are too low, berries can have too bland of a flavor and this is not appealing to consumers either. A flavor rating < 6 is not considered commercially suitable. Going from a rating of 6 to 10, flavor is becoming increasingly sweet, aromatic, and more pronounced.

Cropping – Cropping score is an integrated value of the “percent” crop a plant is carrying. It is related to yield somewhat, but is actually more a measure of fruit set. Thus, overall size of the canopy is not accounted for. You could have a small plant canopy with high fruit set, but overall yield would be low due to its size. Also, large berry size can increase yield if two selections have a similar crop load, but one has larger berry size. The 1 to 10 scale used is basically a percentage of crop that is set (i.e., 1 = 10%, 2=20%, etc.). A cropping score of 9 to 10 can be overcropped resulting in small, slow ripening fruit.

Plant Vigor – Rating of plant vigor integrates the overall robustness and durability of the plant itself (wood and vegetation). It does not reflect berry quality, although poor vigor plants can have very small berries, but not always. This is a 1 to 10 visual scale, with 1 being near death, and 10 being extremely healthy and vigorous.