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Description and Performance of the Virginia-Market-Type Peanut Cultivars

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Introduction

While the runner-type peanut is the predominant market type grown in the United States, the Virginia-Carolinas region has traditionally grown only the large-seeded, Virginia-type peanut. There are several old — as well as new — Virginia-type cultivars available to the peanut industry. While information on older cultivars is available in Extension publications, information on the most recently released cultivars is lacking. Therefore, this publication will provide growers, shellers, and processors with the latest research-based information on the performance of the newest cultivars and currently grown cultivars.

Historically, the Virginia-type peanut has been bred and grown only in Virginia and North Carolina. More recently, there has been an increasing interest for it in states such as South Carolina, and there have been new releases from breeding programs at the universities of Georgia and Florida. Because some cultivars may perform better in some areas than in others, it is important to evaluate performance across multiple locations. The Peanut Variety and Quality Evaluation (PVQE) program at Tidewater Agricultural Research and Extension Center (AREC) in Suffolk, Va., evaluates the agronomic, grade, and quality characteristics of cultivars and advanced breeding lines at various locations throughout Virginia and the Carolinas.

This publication will extend the availability of information on Virginia-type cultivars to other states, breeding programs, and research groups. The publication is also intended as a resource for Extension agents and crop advisors whose clientele wish to know what cultivars can reduce production risk and increase profit potential.

Source of Information

The Peanut Variety and Quality Evaluation program has been in operation for more than 38 years. It began as a joint venture between peanut breeding programs of the Virginia Agricultural Experiment Station, the U.S. Department of Agriculture-Agricultural Research Service, and North Carolina State University. Commercially available, Virginia-type cultivars — including Bailey, CHAMPS, Gregory, NC-V 11, Perry, Phillips, Sugg, and VA 98R — are in part the result of unbiased research using replicated field trials within the PVQE program.

Current objectives of this program are: (1) to determine yield, grade, and quality characteristics of released peanut cultivars and advanced breeding lines at multiple locations in Virginia, North Carolina, and South Carolina; (2) to develop a database of Virginia-type cultivars for research-based selection of cultivars by growers, industry, and breeding programs; and (3) to identify the

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Figure 1. Peanut planting with an NG Plus 3 Monosem two-row precision vacuum planter at three to four seeds per row-foot. Temik 15G is applied at 7 pounds per acre in furrow at planting.

best-suited peanut lines to release as new cultivars so as to meet the needs in various regions.

Annually, 30 to 48 cultivars and lines were planted from early to mid-May at up to six locations in replicated research trials (figure 1).

Plots were two 30-foot rows planted on 36-inch centers (three seed per row-foot) with an NG Plus 3 Monosem two-row precision vacuum planter. All plots were dug with a KMC two-row digger and combined with a two-row Hobbs peanut picker (model 325A), equipped with a bagging attachment. At each location, the test was replicated three times in a randomized complete block design with genotypes (cultivars and lines) as the only factor.

Cultural practices were performed according to Virginia, North Carolina, and South Carolina recommendations for production of high yield and quality and after soil samples were taken every year to determine soil pH and mineral content. Because the PVQE test seeks to determine yield potential and maximum yield of various genotypes, intensive cultural practices were applied annually to the PVQE plots. These measures may not be necessary on large acreages and for regular peanut production. Corn and cotton were the only two crops used to rotate with peanut in all three states; rotation length was at least three years. Soil fumigation for control of *Cylindrocladium* black rot was used in Virginia and North Carolina, but not in Florence, S.C. Vapam 42% (7.5 gallons per acre) was applied in mid-April. Temik 15G (7 pounds per acre) was applied at all locations in furrow at planting.

In general, three herbicide applications and up to two cultivations were performed, and insecticide applications varied from two in South Carolina to five in Virginia and North Carolina. Herbicides recently used were Dual Magnum (1.5 pints per acre), Gramoxone (14 fluid ounces per acre), Intro (12 quarts per acre), and Storm (1.5 pints per acre). Insecticides were used as needed based on crop scouting, including Orthene 97 (6 ounces per acre), Lorsban (13 pounds per acre), Asana (6 ounces per acre), and Danitol (10 ounces per acre).

A disease-control program was implemented at all locations throughout the growing season, with at least six fungicide applications at each location. Fungicides used include Bravo (0.75 pint per acre), Folicur (7.2 ounces per acre), Provost (10 ounces per acre), Omega (1 pint per acre), and Headline (10 ounces per acre). At the Florence, S.C., site, Stratego (7 ounces per acre) was preferred in place of Folicur and Omega. Landplaster and manganese were applied at all locations in June or July. At the Tidewater AREC, Southampton County, Va., and Martin County, N.C., sites, manganese was applied twice — in June and July. Similarly, boron was applied in July or August at all locations. At the Tidewater AREC, boron was applied twice — in early April before planting and in July. Quantities were similar at all locations: 1,000-1,200 pounds per acre for landplaster, 1-1.5 quarts per acre for manganese, and 1 quart per acre for boron. At Florence, S.C., Solubor was used at a rate of 2.5 pounds per acre.

Throughout the growing season, data on plant growth habit, height, and disease incidence was collected. After harvest (late September to mid-October), yield and farmer-stock grade factors, including percentage of foreign material (FM), loose-shelled kernels (LSK), jumbo and fancy pods, extra-large kernels (ELK), sound mature kernels (SMK), total meat (TM), sound splits (SS), other kernels (OK), damaged kernels (DK), and price per pound were calculated by the federal formula. Value per acre was determined based on yield and the market loan rate. Quality factors included colorimetric readings of pod brightness for jumbo and fancy pods, fatty acid profiles of sound mature kernels, blanching properties of extra-large and medium kernels, and calcium content of sound mature kernels (figure 2).

This information is included in two reports published annually by Virginia Cooperative Extension (*http://pubs.ext.vt.edu/category/crops.html*) and distributed to more than 200 scientists, growers, Extension agents, consumers, retailers, and shellers. In addition, the most significant results are presented at professional and nontechnical meetings and at annual field days. Here, data collected from 2005 to 2009 are presented for the recently released and older cultivars.

Figure 2. Shelling and grading to determine market grade and value according to the loan rate.

Performance of Virginia-Type Cultivars

Market demand, total production, and carryover will influence the crop value for contracted crops. Regardless of how the gross value of crop production is computed — based on contract price or by applying the federal loan rate — the determinant factors are yield and quality (figure 3). Yield and quality are highly dependent upon cultivar, year, location, and crop management. For example, in 2005 and 2006, crop value and yield were 30 percent to 50 percent less than in 2007, 2008, and 2009 (figure 4). Yield in PVQE tests was calculated by applying the federal support price to the yield, with other kernels and sound splits deducted and extra-large kernels premium computed. Yield was adjusted to 7 percent standard moisture, and foreign material and loose-shelled kernels were deducted.

At the Suffolk and Southampton locations in Virginia, returns were consistently higher than at other locations and varied little from one year to another because yield was always high (*http://pubs.ext.vt.edu/category/crops.html*). Conversely, at the Martin County, N.C., location, crop value was highly variable each year; at locations in South Carolina and southeastern North Carolina, crop value and yields were lowest. Each year, Bailey, CHAMPS, NC-V 11, Phillips, VA 98R, Wilson, and Sugg had high yields that were not significantly different (figure 5). Least-productive cultivars in the PVQE test plots — particularly in 2006 and 2007 — were Perry, NC 12C, and Gregory (figure 5).

Crop value is also influenced by the farmer-stock grade characteristics, and cultivars significantly varied for those characteristics (table 1).

Grade factors — including foreign material, loose-shelled kernels, jumbo and fancy pods, extra-large kernels, sound mature kernels, total meat, sound splits, other kernels, and damaged kernels — are used to calculate price per pound and the crop value per acre. Therefore, knowing the grade characteristics of cultivars is important when selecting a cultivar.

Cultivars with large percentages of extra-large kernels are Brantley, Phillips, Gregory, NC 12C, and Sugg (table 1). Gregory had significantly less "other kernels" and sound splits than other cultivars, but more damaged kernels and less sound mature kernels. Cultivars expressing high total meat content in our experiments were Sugg, Phillips, CHAMPS, and NC12C, but they were not significantly different from Bailey, NC-V 11, VA 98R, and Perry. Wilson, Gregory, and Brantley have significantly less total meat than most of the other cultivars (table 1).

Figure 3. Example of vine health and high yield by NC-V 11 in 2009 field trials at Suffolk, Va.

Table 1. Summary of agronomic and grade characteristics of the cultivars in PVQE trials, 2005 to 2009. Table presents averages of five years, five to six locations each year, and two or three replicated plots per year and location. The total number of test plots (n) is 100, except for NC 12C, Wilson, and Brantley, which were excluded from the tests in 2009. For comparisons, a Virginia Tech advanced breeding line, VT024051, was included among the cultivars. When years were combined, no interaction of the cultivar and year was observed, indicating that the highest-yielding cultivars were the same each year. Similarly, no interaction of the cultivar and test location was observed, except for 2007. Therefore, agronomic and grade data were combined for all locations and years from 2005 to 2009 and analyzed for cultivar performance.

	Loose-shelled kernels (LSK)	Foreign material (FM)	Farmer stock fancy pods	Jumbo pods		Fancy pods		Extra-large kernels (ELK)	Sound splits (SS)	Other kernels (OK)	Dam-aged kernels (DK)	Sound mature kernels (SMK)	Total kernels	Yield[1]	Value[2]
Variety or line	(%)	(%)	Content (%)	Content (%)	Brightness (Hunter L)	Content (%)	Brightness (Hunter L)	(%)	(%)	(%)	(%)	(%)	(%)	(lb/ac)	($/ac)
Bailey	0.96^{ab}	0.88^{a}	79^{d}	32^{f}	46^{a}	45^{d}	44^{a}	42^{b}	2.94^{ab}	2.31^{bc}	1.80^{a}	66^{a}	72.9^{ab}	4,911^{a}	882^{a}
Sugg	0.78^{ab}	0.98^{a}	86^{bc}	40^{e}	45^{ab}	46^{d}	44^{ab}	48^{a}	3.54^{b}	2.35^{bc}	2.38^{a}	66^{ab}	73.9^{a}	4,722^{ab}	859^{ab}
NC-V 11	1.04^{ab3}	1.04^{a}	79^{d}	35^{ef}	45^{ab}	44^{cd}	44^{ab}	38^{cd}	2.56^{ab}	2.58^{c}	2.68^{a}	65^{a-c}	72.5^{a-c}	4,647^{ab}	821^{ab}
VT024051	1.39^{b}	0.90^{a}	87^{bc}	59^{c}	45^{ab}	28^{b}	44^{ab}	43^{b}	3.48^{b}	1.95^{ab}	3.10^{bc}	64^{a-c}	72.8^{ab}	4,543^{ab}	808^{ab}
Phillips	1.08^{ab}	0.90^{a}	84^{c}	43^{e}	46^{a}	42^{c}	45^{a}	49^{a}	3.24^{b}	1.76 ^{a}	2.81^{a}	66^{a}	73.7^{a}	4,498^{ab}	817^{ab}
Wilson	0.53^{a}	0.83^{a}	86^{bc}	46de	44^{ab}	40^{c}	44^{ab}	36^{d}	3.26^{b}	2.17^{ab}	3.46^{bc}	60^{d}	69.3^{d}	4,461^{ab}	745^{b}
VA 98R	1.08^{ab}	0.99^{a}	78^{d}	35^{ef}	45^{ab}	43^{cd}	44^{ab}	40^{bc}	3.50^{b}	2.30^{b}	3.53^{bc}	64^{a-c}	73.1^{a}	4,449^{ab}	789^{ab}
CHAMPS	1.34^{b}	0.97^{a}	83^{cd}	42^{e}	45^{a}	41^{c}	45^{a}	40^{bc}	2.56^{ab}	2.35^{bc}	2.88^{ab}	66^{a}	73.5^{a}	4,446^{ab}	797^{ab}
Gregory	2.03^{c}	1.42^{b}	91^{a}	72^{a}	44^{b}	19^{a}	42^{b}	48^{a}	2.19^{a}	1.95^{ab}	4.28^{c}	62^{cd}	70.7^{c}	4,359^{ab}	751^{b}
Brantley	1.75^{c}	0.96^{a}	89^{ab}	65^{b}	43^{b}	24^{b}	42^{b}	50^{a}	3.43^{b}	1.57^{a}	3.85^{bc}	63^{b-d}	71.8^{bc}	4,276^{ab}	752^{ab}
NC 12C	2.32^{c}	1.28^{b}	86^{bc}	58^{bc}	44^{b}	28^{b}	42^{b}	48^{a}	3.57^{b}	1.52^{a}	3.16^{bc}	65^{ab}	73.5^{a}	4,223^{ab}	762^{ab}
Perry	1.06^{ab}	1.26^{a}	80^{d}	38^{ef}	45^{ab}	42^{c}	44^{a}	43^{b}	3.14^{b}	2.40^{bc}	2.66^{ab}	65^{ab}	73.2^{a}	4,207^{b}	753^{b}
Mean	**1.28**	**1.03**	**84**	**47**	**45**	**37**	**44**	**44**	**3.12**	**2.10**	**3.05**	**64**	**72.6**	**4,478**	**794.6**
Probability	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001	0.0001	0.0430	0.0007

[1]All yields are net, adjusted to 7 percent standard moisture, and foreign material is deducted.

[2]Crop value was computed by applying the federal loan rate and grade characteristics.

[3]Means within a column followed by the same letter are not significantly different according to the Tukey's HDS test.

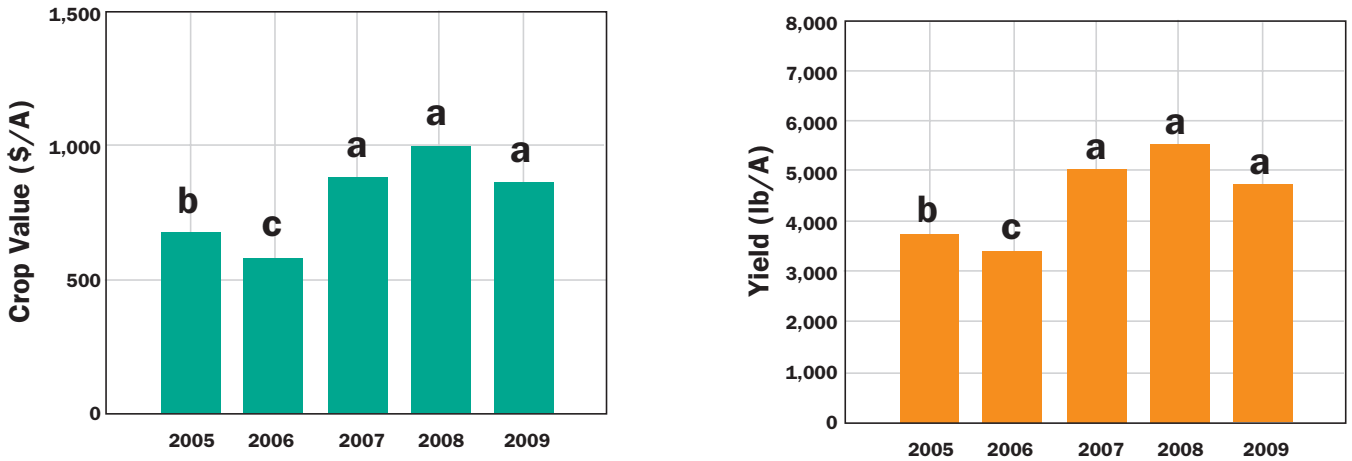

Figure 4. Variation of crop value and yield across years for commercially available Virginia-type peanut cultivars Bailey, Brantley, CHAMPS, Gregory, NC-V 11, NC 12C, Perry, Phillips, Sugg, VA 98R, and Wilson in the PVQE plots, 2005 to 2009. Bars showing the same letter at the top are not significantly different according to the Tukey's HSD test.

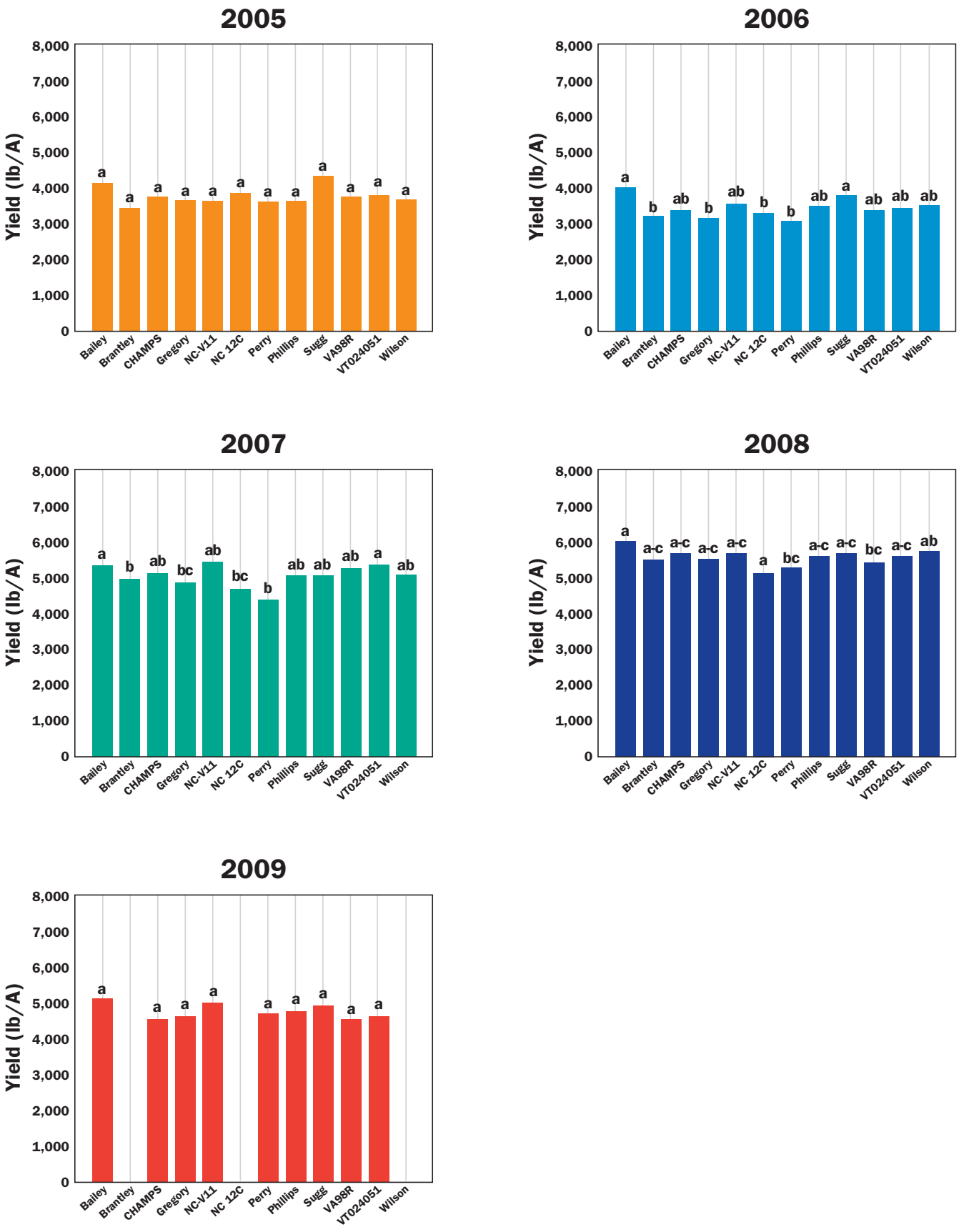

Figure 5. Average pod yield of the commercially available Virginia-type cultivars at various locations in Virginia, North Carolina, and South Carolina, 2005 through 2009. Bars representing cultivar yield with the same letters at the top are not significantly different according to the Tukey's HSD test.

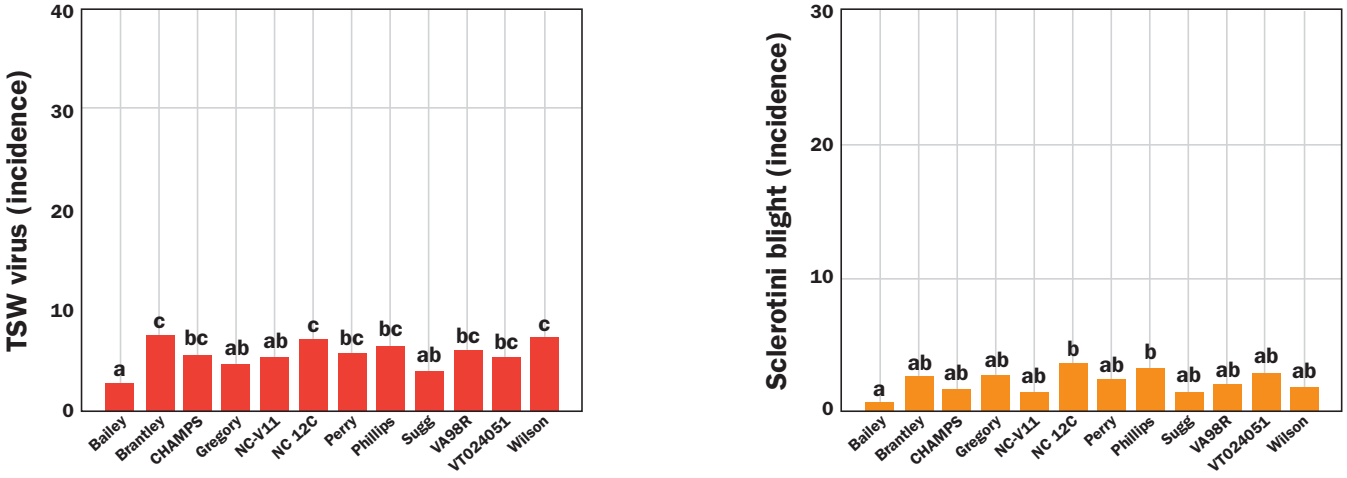

Figure 6. Incidence of the tomato spotted wilt (TSW) virus and *Sclerotinia* blight (SB) recorded for the commercially available Virginia-type cultivars at various locations in Virginia, North Carolina, and South Carolina, 2005 through 2009. Bars with the same letters at the top are not significantly different according to the Tukey's HSD test.

For the in-shell peanut market, a high content of jumbo pods and brightness is important. Gregory, Brantley, and NC 12C had the highest jumbo-pod content, but pods were not bright. Conversely, Bailey, NC-V 11, Sugg, VA 98R, and Perry showed the brightest jumbo pods, but the jumbo-pod content was low. A promising line to have both high jumbo-pod content and brightness is VT024051 (table 1).

Important cost savings can be achieved if disease-resistant cultivars are used. Five-year data from the PVQE program show that significant differences among cultivars exist for resistance to the tomato spotted wilt (TSW) virus (figure 6). Bailey, Gregory, NC-V 11, and Sugg were the most resistant, whereas Brantley, NC 12C, and Wilson were the most sensitive. CHAMPS, Perry, Phillips, and VA 98R were intermediate.

Similarly, Bailey was the most resistant and NC 12C and Phillips were the most sensitive to *Sclerotinia* blight (SB), a disease very common in Virginia and northern North Carolina. This is based on the number of plants symptomatic for Sclerotinia.

It is essential that peanuts being grown for seed receive a continuously available supply of calcium, typically in the form of calcium sulfate ("landplaster") from pegging through seed development to ensure a high rate of germination. A minimum of 450 parts per million of calcium content is required for good seed germination results. All cultivars showed high efficiency of calcium absorption by the kernels, regardless of kernel size. For example, Gregory — the largest-seeded peanut available — was believed to require larger amounts of applied calcium for optimum germination rates, compared with NC-V 11, the smallest-seeded cultivar. According to the PVQE results, seed calcium content was similar for both cultivars treated with landplaster at 1,000 pounds per acre.

In conclusion, the yield and grade characteristics of most Virginia-type cultivars are generally excellent (figures 7 and 8). However, there are cultivar differences for disease resistance, maturity, and suitability for various markets. Therefore, a recommended approach to spread risk and allow better crop management is planting several cultivars each year.

Description of Virginia-Type Cultivars Tested

Data presented here include 11 cultivars, but in the past two to three years, some of these cultivars were no longer grown or preferred by the peanut industry. For example, Brantley was released as a high-oleic cultivar but failed to meet this criteria after release. Therefore, descriptions will only be provided for Bailey, CHAMPS, Gregory, NC-V 11, Perry, Phillips, Sugg, and VA 98R.

In general, these cultivars have high yields of large pods and seeds. The most recent releases, Bailey and Sugg,

have improved disease resistance, particularly to early leaf spot, tomato spotted wilt (TSW) virus, *Cylindrocladium* black rot (CBR), and *Sclerotinia* blight (SB). CHAMPS is the earliest, maturing only 135 days after planting (DAP). Perry is the latest, requiring 160 DAP to reach maturity. Except for Brantley, none of the cultivars listed above have high levels of oleic fatty acid content — a trait that extends the shelf life of peanuts. According to the accepted terminology, a high-oleic peanut is a peanut line that has oleic acid content of approximately 74 percent to 84 percent, and a linoleic acid content of about 2 percent to 8 percent — each based upon the total fatty acid content of the seed — and a ratio of the amount of oleic acid to linoleic acid in the seed from about 9-to-1 to 42-to-1. New varieties with the high-oleic trait are currently being developed at N.C. State and will be included in future PVQE tests.

Other Virginia-type cultivars developed by breeding programs in Georgia and Florida — Florida Fancy, Georgia 05E, and Georgia 08V — were included in PVQE trials in 2008 and 2009. These cultivars have high yields, good disease resistance, and the high-oleic trait. Descriptions of Florida Fancy, Georgia-05E, and Georgia-08V are provided here based on the PVQE data in 2008 and 2009. However, based on research at the Tidewater AREC by us and others, these cultivars (and in particular the Georgia cultivars) may not be suitable for the Virginia-Carolinas area because they are too late in maturing in this region (P. Phipps 2010, personal communication).

Bailey

Released in 2008 and named in honor of the late Jack Bailey, plant pathologist at N.C. State, Bailey is a high-yielding, Virginia-type peanut. In PVQE trials, Bailey produced high yields across four years at multiple locations, an indication of good tolerance to changes in weather and growth conditions. Bailey has a growth habit between runner and bunch types, bright pods, and a tan kernel color (figure 7). More importantly, it is resistant to the TSW virus and partially resistant to CBR, early leaf spot, and SB. It matures in approximately 145 DAP, slightly later than CHAMPS, but it holds pods much better than CHAMPS if picked later.

CHAMPS

Released in 2004, CHAMPS is a large-seeded, Virginia-type peanut with a runner growth habit (figure 7). Its early maturity and high yield of bright pods have resulted in increased popularity in Virginia and North Carolina, where its acreage has increased each year since its release. In PVQE trials, yields at early digging (135 to140 DAP in Virginia) were high, and pod size, shape, and color were suited for the in-shell market. Seed color is pink to light pink. If an early frost advisory is in effect, CHAMPS can be harvested 10 days earlier than NC-V 11 with no reduction in yield. CHAMPS is somewhat resistant to the TSW virus, but susceptible to CBR and SB. High yields and favorable pod characteristics were observed across years and locations, which indicates tolerance to variation in growing conditions.

Figure 7. Kernels and pods of CHAMPS and Bailey from the 2009 PVQE plots at Southampton County, Va.

Figure 8. Kernels and pods of Gregory in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Gregory

Gregory has a growth habit between runner and bunch types. Maturity is similar to NC-V 11 (145 to 150 DAP). This cultivar produces an exceptionally high percentage of ELKs and jumbo pods. Even though seed size is large, Gregory does not require increased calcium amounts to be applied for good germination when it is produced for seed. It is somewhat resistant to the TSW virus, but susceptible to CBR and SB. Gregory is well-suited for gourmet and green boiled products.

NCV-11

Under good conditions, NC-V 11 has high yield and dollar value per acre. Maturity is about 145 to 150 DAP, depending on the growing season. NC-V 11 produces fewer fancy pods and a lower percent of ELKs than CHAMPS, especially at early digging. NC-V 11 has a runner (spreading) growth habit. It is somewhat resistant to the TSW virus but highly susceptible to CBR and SB.

Perry

Perry is a high-yielding, large-seeded, and CBR-resistant cultivar. Perry is less susceptible to SB and web blotch than other Virginia-type cultivars, but highly susceptible to the TSW virus. Maturity is approximately 164 DAP (14 days later than NC-V 11). Its growth habit is intermediate between runner and bunch types. Perry has a pink seed coat and good pod color. Fancy pod and ELK percentages are slightly lower than for other varieties.

Phillips

Phillips is a large-seeded, Virginia-type peanut with an intermediate runner growth habit. Yield has been high relative to other Virginia-type cultivars. Phillips has a higher ELK content than most Virginia-type cultivars. It is susceptible to all the major diseases in the Virginia-Carolinas region. It matures later than NC-V 11 and CHAMPS.

Figure 9. Kernels and pods of NC-V 11 in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Figure 10. Kernels and pods of Perry in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Figure 11. Kernels and pods of Phillips in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Figure 12. Kernels and pods of Sugg in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Figure 13. Kernels and pods of VA 98R in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Sugg

Sugg was released in 2009. Before release, it was tested as N03091T, a line developed at N.C. State to provide multiple disease resistance. It is resistant to CBR and early leaf spot and somewhat resistant to the TSW virus and SB. Sugg has an intermediate runner growth habit and a pink seed coat. Sugg produces high yields and has larger kernels than Bailey. It also has good blanching and flavor characteristics.

VA 98R

VA 98R has a runner growth habit and high-yield potential. Maturity is considered early (five to seven days earlier than NC-V 11). This cultivar has pod-size, shape, and color that are well-suited for in-shell markets. Fancy pod percentage is approximately equal to NC-V 11 but less than Gregory. VA 98R is susceptible to the major diseases of peanuts in the Virginia-Carolinas production area.

Florida Fancy

Florida Fancy is a high-oleic, Virginia-type cultivar released by the University of Florida. It is being evaluated in Virginia because of its high-oleic trait, its resistance to the TSW virus, and because it is not as susceptible to CBR and *Sclerotinia* blight as CHAMPS. Florida Fancy has an intermediate runner growth habit, a pink seed-coat color, and a large proportion of ELK.

Figure 14. Kernels and pods of Florida Fancy in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Figure 15. Kernels and pods of Georgia 08V in comparison with CHAMPS from the 2009 PVQE plots at Southampton County, Va.

Georgia 05E

Georgia 05E is a high-oleic, Virginia-type cultivar released by the Georgia Agricultural Experiment Station in 2005. It is being researched in Virginia because of its improved oil quality (high-oleic trait) and resistance to leaf spot and the TSW virus. This cultivar has a runner growth habit and a tan seed-coat color. It is late-maturing (165 DAP or longer) and unsuitable for Virginia.

Georgia 08V

Georgia 08V is another new high-oleic, Virginia-type cultivar released by the Georgia Agricultural Experiment Station. It is being researched in Virginia because of its high-oleic trait and its resistance to leaf spot and the TSW virus. This peanut has a runner growth habit and requires 150 DAP to mature in the Virginia-Carolinas region.

Future Plans to Improve Virginia-Type Cultivars

Improvement of Drought Tolerance

Although annual precipitation is typically high in the Virginia-Carolinas region, its distribution is problematic. Drought spells occur almost every year. When followed by a significant amount of rain, drought episodes do not affect yield, because peanut plants usually recover well from limited periods of moisture stress. However, yield can be affected significantly if extended periods of drought stress occur during flowering and early pegging. Starting in 2009, observations related to moisture stress were performed in the PVQE plots. These observations will help to identify the most drought-tolerant cultivars and to explain the mechanism of tolerance. Once explained, peanut breeders could use these mechanisms to further improve drought tolerance.

Earliness

Earliness is particularly important for peanut growers in Virginia where, due to the high latitude, early frosts are more likely than in the Carolinas. In 2009, observations on the growth, development stages, and maturity of peanut cultivars and lines were initiated in PVQE trials. These observations will help explain the mechanisms behind early development and will pinpoint those that can be used in breeding for shortening the peanut growing season.

High-Oleic Fatty Acid Content

Development of high-oleic, Virginia-type cultivars is an important objective of the peanut breeding program at N.C. State because this trait enhances the shelf life of peanut products. Advanced breeding lines are being developed by this program and will be included in PVQE in coming seasons.