VIRGINIA

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2013 wheat production in the Commonwealth of Virginia.

Growing conditions. Most small grain was seeded timely in the autumn of 2012 due to cooperative weather conditions (Figs. 1 and 2). By mid-October, 22% of wheat and 72% of barley was planted, which was ahead of the five-year average for both crops. Early November brought hurricane Sandy and the associated rains that left some flooded areas and killed wheat and barley in low spots in fields in some areas. These rains delayed planting of the final wheat acres, but by November 25, 77% of the crop was seeded, which was still 8% ahead of the long term average. In most of the Commonwealth, December was relatively mild and dry until rain showers occurred at the very end of the month. January was mostly dry but cold in most areas, which delayed tillering of small grain in many areas.On 30 January, 66% of the small grain crop was rated good, 22% fair, and only 8% excellent. A large portion of February and March was unseasonably cold, but the wheat crop was still rated as 65% good at the end of March. By 15 April, warm weather, 14° above normal for some areas, along with rain showers accelerated development of the small grain crop. However, cooler temperatures returned quickly, and the month as a whole was significantly cooler than the long term average. By 30 April, only 23% of the wheat crop had headed, compared with 85% the previous year. Rainy weather occurred throughout wheat and barley flowering and created conditions that were conducive to development of fusarium head blight in many areas of eastern Virginia. Growers also reported significant infestations of Stagonospora leaf and glume blotch. In many areas, preharvest sprouting of grain also was an issue due to frequent rains occurring during the harvest season.

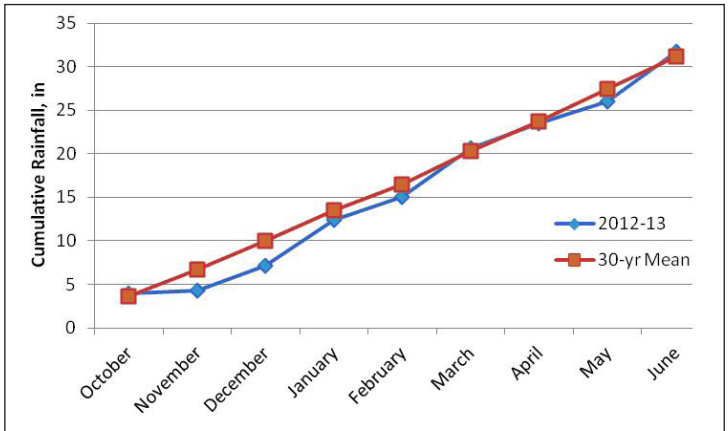

Fig. 1. The 2012–13 and 30-yr mean cumulative growing season precipitation for Virginia.

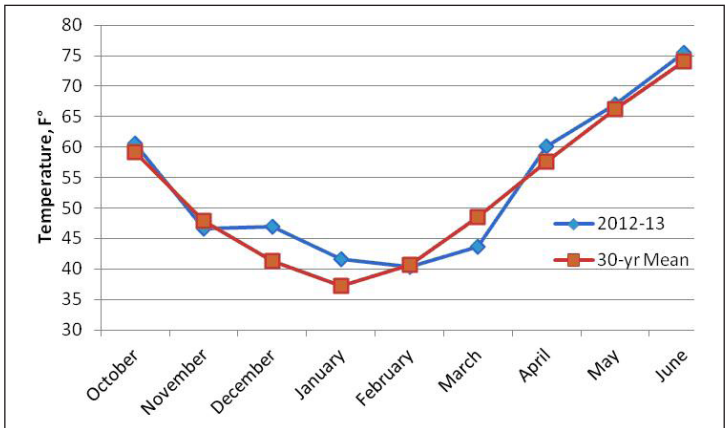

Fig. 2. Growing season monthly average temperature, 2012–13 and 30-yr mean for Virginia.

Production. According to the United States Department of Agriculture's National Agriculture Statistical Service, in the spring of 2013 there were 275,000 acres (111,289 ha) of wheat harvested in the state of Virginia. The average yield was 62 bu/A (4,166 kg/ha), down 3 bu/A (202 kg/ha) from 2012. In 2013, Virginia saw a 9% increase in wheat production with 17.6 x 10^6 bushels (383,540 metric ton) of wheat being produced in the state.

Disease incidence and severity. Entries in Virginia's 2013 state wheat variety trials were rated (0 = no infection to 9 = severe infection) for disease severity at four diverse locations. The 101 entries in the 2013 trial had mean powdery mildew (*Blumeria graminis*) ratings that varied from 0 to 6 in Virginia's southwestern region (Montgomery Co.) and from 0 to 4 on the Eastern Shore (Accomack Co.). Barley/cereal yellow dwarf virus infection was moderate at Blackstone, VA, in the Southern Piedmont with ratings ranging from 1 to 5. Fusarium head blight (*Fusarium graminearum*) was widespread across the Commonwealth and severe in several regions. At Warsaw, VA, in Richmond County, entries in the state wheat trial received disease index (accounts for incidence and severity) values ranging from 0 to 9%. Glume blotch also was prevalent in the Warsaw trial with ratings ranging from 1 to 4. Leaf rust (*Puccinia triticina*) was prevalent in many regions and was severe at the southwestern test site where susceptible lines had ratings ranging from 5 to 9. Race surveys conducted by Dr. James Kolmer of the USDA–ARS Cereal Disease Lab on 29 isolates from three regions in Virginia identified nine races of leaf rust and only race MCTNB was common at two locations (Accomack and Montgomery counties). Five additional races (MCTSB, MFPSB, MFQHG, SBDGG, and TNRJJ) were identified on the Eastern Shore, and three other races (TBRKG, TCGJG, and TCRKG) were identified at Warsaw. Stripe rust (*Puccinia striiformis*) was prevalent and moderately severe in the trial at Blacksburg, VA. Rust samples were sent to Dr. Xianming Chen at USDA-ARS in Pullman, WA, for race identifications. Three races were identified, including PSTv-37 (virulence for genes *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, *YrTr1*, and *YrExp2*), race PSTv-52 (virulence for *Yr6*, *Yr7*, *Yr8*, *Yr9*, *Yr17*, *Yr27*, *Yr43*, *Yr44*, and *YrExp2*), and race PSTv-53 (virulence for *Yr1*, *Yr6*, *YrSP*, and *YrTye*).

State cultivar tests. In the 2012–13 tests, there were a total of 101 entries planted in seven environments across Virginia (http://www.grains.cses.vt.edu/). The test included 58 soft red winter (SRW) wheat cultivars and 43 experimental lines. No-till tests and tests planted after corn were conducted at Warsaw and Holland, VA. Mean grain yields varied from 45 bu/ac (3,024 kg/ha) at Holland, VA, in the Tidewater region to 93 bu/ac (6,249 kg/ha) at Orange, VA, in the northern Piedmont, and the mean yield over six locations was 79 bu/ac (5,308 kg/ha). Commercial cultivars USG 3404, USG 3013, USG 3612, USG 3523, AgriMAXX 434, SY Harrison, SY 474, Steyer Hunker, and Pioneer Brands 25R40, 26R10, and 26R41 all produced yields (85–89 bu/ac, 5,711–5,980 kg/ha) that were significantly higher than that of the overall trial average. Average grain yields among the 101 entries ranged from 62.0 bu/ac (4,166 kg/ha) for the long-term check cultivar Massey to 91 bu/ac (6,114 kg/ha) for experimental line VA10W-21. Test weight means among six locations varied from 51.6 lb/bu (66.4 kg/hl) at Blackstone, VA, in the southern Piedmont, to 59.3 lb/bu (76.3 kg/hl) at Orange, VA. Average test weights of the 101 entries over five environments ranged from 51.5 lb/bu (66.3 kg/hl) to 58.3 lb/bu (75.0 kg/hl), with an overall trial average of 55.9 lb/bu (71.9 kg/hl).

Mapping studies on Fusarium head blight resistance (FHB) in the SRW wheat cultivars Roane and Jamestown were conducted using data from field and greenhouse experiments. Preliminary results identified a putative QTL on chromosome 1B of Jamestown that is associated with resistance to FHB. The QTL accounted for 12.7% to 13.3% of the phenotypic variation in deoxynivalenol (DON) toxin accumulation and 26.1% of the phenotypic variation in FHB severity. The most diagnostic marker for the QTL on chromosome 1B is *Xwmc500.6* located 7.2 cM from the QTL peak and flanked by markers *Xwmc500.7* and *Xgwm273.2* (28.2 cM interval). Similarly, preliminary results from first year field data in another FHB-mapping study involving the SRW wheat cultivar Tribute indicate the presence of putative QTL associated with FHB incidence on chromosomes 2D, 3BSc, and 5D; QTL for FHB severity on chromosomes 2A, 2D, 3BSc, 5A, and 5D; and QTL for DON content on chromosome 2A.

Table 1. Virginia Wheat Yield Contest results. The 2013 contest was conducted statewide and the results can be found in the table below. Congratulations to our winners!

Place	Grower	Farm	County	Variety	Yield (bu/acre)
1	Robert Hinton	Cedar Plains Farm	Westmoreland	USG 3251	98.0
2	Ronnie Russell	Corbin Hill Farm	Middlesex	Pioneer 26R15	94.2

Release of soft red winter wheat cultivar 72014415.

The SRW wheat cultivar **72014415**, formerly designated VA07W-415, was developed and released in March 2013 by the Virginia Agricultural Experiment Station. The cultivar was derived from the cross 'VA98W-895/GA881130LE5//

VA98W-627'. Cultivar 72014415 is a broadly adapted, high-yielding, full-season, medium-height, semidwarf (gene *Rht2*) wheat. Plant color of 72014415 is blue green; at maturity it has creamy, white-colored, strap-shaped spikes with short tip awns, and yellow-colored straw. In the southern SRW wheat region, head emergence of 72014415 (106 days) is about 1 day later than USG 3555. In the eastern SRW wheat region, head emergence of 72014415 (131 days) is about 1 day later than that of Branson and 1 day earlier than Shirley. Average mature plant height of cultivar 72014415 has varied from 35 to 38 inches (89–97 cm) and is similar to that of Pioneer Brand 25R15. On average, straw strength (0 = erect to 9 = completely lodged) of cultivar 72014415 (0.5–3.6) is good, being most similar to that of Chesapeake (0.9–3.7) and better than that of 5187J (1.9–4.5). Winter kill (0 = none to 9 = complete) of cultivar 72014415 (0.9) in the 2010 Uniform Eastern SRW Wheat Nursery was most similar to those of check cultivars Bess (0.6) and Shirley (1.2). In Virginia's State Variety Trials (2010–12), cultivar 72014415 had a mean grain yield (88 bu/ac, 5,913 kg/ha) that was similar to those of the highest yielding cultivars Shirley and Featherstone Brand VA258. Over the same period, cultivar 72014415 had a mean test weight (59.5 lb/bu, 76.6 kg/hl) that was significantly higher than those of Shirley and USG 3555. Cultivar 72014415 is resistant to Hessian fly (*Mayetiola destructor* (Say)) biotypes B, C, D, O, and L, and possesses gene *H13*. The cultivar also has the *Lr37*/*Yr17*/*Sr38* gene complex that governs resistance to leaf rust, stripe rust, and stem rust.

Release of soft red winter wheat cultivar Featherstone 73.

The SRW wheat cultivar **Featherstone 73**, formerly designated VA09W-73, was developed and released in March 2013 by the Virginia Agricultural Experimental Station. The cultivar was derived from the cross '38158 (PI 19052)/VA99W-188//Tribute (PI 632689)'. Featherstone 73 is a broadly adapted, high-yielding, full-season, medium-height, semidwarf (gene *Rht2*) wheat. Plant stem and spike color of Featherstone 73 is blue, and spikes are strap shaped with short tip awns. In the eastern SRW wheat region, head emergence of Featherstone 73 (116 days) was most similar to that of Branson, and 2 days earlier than Shirley. Average mature plant height of Featherstone 73 has varied from 33 to 36 inches (84–91 cm) and is similar in height to that of Branson. Straw strength (0 = erect to 9 = completely lodged) of Featherstone 73 (0.9–3.6) is good being most similar to that of USG 3555 (0.8–4.0) and better than that of Featherstone VA258 (2.8–4.8). In the Uniform Eastern SRW Wheat Nursery, winter hardiness and spring freeze tolerance (0 = no injury to 9 = severe injury) of Featherstone 73 (1.2 and 0.4) were similar to those (1.1–1.4 and 0.2–0.5) of check cultivars Bess, Branson, and Shirley. Featherstone 73 ranked second over locations for grain yield (77.1 bu/ac, 5,180 kg/ha) among 35 entries evaluated at 25 locations in the 2012 Uniform Eastern SRW Wheat Nursery. Average test weight of Featherstone 73 (60.2 lb/bu, 77.5 kg/hl) was most similar to that of the check cultivar Bess and significantly ($P < 0.05$) higher than those of Branson and Shirley. Featherstone 73 expresses moderate to high levels of resistance to diseases prevalent in the SRW wheat region including leaf and stripe rusts, powdery mildew, leaf and glume blotches, Fusarium head blight, and barley yellow dwarf virus.

Release of soft white winter wheat cultivar MCIA Venus.

The soft white winter wheat cultivar **MCIA Venus**, formerly designated VA09W-188WS, was developed and released in March 2013 by the Virginia Agricultural Experiment Station. The cultivar was derived from the cross 'Pioneer Brand 25W60 (PI 607579)//Pioneer Brand 25W33 (PI 599197)/VAN98W-170WS'. MCIA Venus is a broadly adapted, high-yielding, early heading, medium-height, semidwarf (gene *Rht2*) wheat. At maturity, the cultivar has yellow-colored straw and spikes with the latter being slightly recurved, tapering in shape, and awned. In the northeastern soft winter wheat regions of the U.S. and Ontario, Canada, average head emergence of MCIA Venus (139–157 days) was 2 to 4 days earlier than that of Caledonia and 4 to 7 days earlier than Superior. Average mature plant height of MCIA Venus has varied from 36 to 41 inches (91–104 cm). MCIA Venus is most similar in height to Featherstone Brand VA258, 2 to 3 inches taller than Branson, and 3 to 5 inches shorter than Superior. Straw strength (0 = erect to 9 = completely lodged) of MCIA Venus (3.2–3.7) is moderate, most similar to those of SS 520 (3.1–4.5) and USG 3555 (2.0–4.0). In the Uniform Eastern Soft White Winter Wheat Nursery, winter hardiness (0–100% survival) of MCIA Venus (93–97%) was similar to those of northern check cultivars. MCIA Venus was evaluated at five locations (Michigan, New York, Virginia, and Ontario, Canada) in the 2012 Uniform Eastern Soft White Winter Wheat Nursery and had a mean grain yield of 77 bu/ac (5,174 kg/ha) over locations. MCIA Venus also was evaluated in this nursery in 2011 at seven locations (Indiana, Ohio, Michigan, New York, Virginia, and Ontario) and ranked second for grain yield (80 bu/ac, 5375 kg/ha). In these two nursery years, average test weights of MCIA Venus were 57.1 and 57.4 lb/bu (73.5–73.9 kg/hl) and similar to or significantly ($P < 0.05$) higher than those of Caledonia. MCIA Venus expresses moderate to high levels of resistance to diseases preva-

lent in the eastern soft white winter wheat region, including leaf and stripe rusts, powdery mildew, Septoria tritici leaf blotch, Fusarium head blight, barley yellow dwarf virus, wheat soil-borne mosaic virus, and Hessian fly.

Publications.

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The mission of the lab is two-fold: conduct milling, baking, and end-use quality evaluations on wheat breeding lines, and conduct research on wheat grain quality and utilization. Our web site: http://www.wsu.edu/~wwql/php/index.php provides great access to our research and methodology. Our research publications are available on our web site.

Morris and Engle lead the Pacific Northwest Wheat Quality Council, a consortium of collaborators who evaluate the quality of new cultivars and advanced breeding lines. We also conduct the U.S. Wheat Associates' Overseas Varietal Analysis Program for Soft White and Club Wheat. Our current activities and projects include grain hardness and puroindolines, waxy wheat, polyphenol oxidase (PPO), arabinoxylans, SDS sedimentation test, and soft durum wheat.

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