AgriLIFE RESEARCH & EXTENSION
Texas A&M System

TEXAS A&M UNIVERSITY

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Department of Soil and Crop Sciences
Academic & Student Advising Office

TEXAS A&M PLANT BREEDING Bulletin

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New Cultivars from Texas A&M AgriLife Research

TAMO 411 Oat Cultivar: AgriLife Research approved the release of a new winter oat, TAMO 411. This duel-purpose winter oat was developed by the Small Grains Breeding Team led by Amir Ibrahim and Jackie Rudd. TAMO 411 resulted from the cross of TAMO 405 and 'Plot Spike' made in 2003. This new and improved cultivar combines excellent grain yield, test weight, forage potential, winter hardiness, and straw strength to resist lodging with excellent resistance to current races of crown rust in Texas and moderate resistance to current stem rust races prevalent in Texas. TAMO 411 requires an average of 104 days to maturity and averaged 42 inches in height while TAMO 405 is slightly earlier at 101 days and shorter at 36 inches. TAMO 411 has been submitted for Plant Variety Protection and authorized seed classes of TAMO 411 in the U.S. will be Foundation, Registered, and Certified. Breeder and Foundation Seed of TAMO 411 will be maintained by Texas A&M AgriLife Research Foundation Seed unit. TAMO 411 will be available for licensing to competing private entities with small quantities of seed for research purposes available from Dr. Amir Ibrahim for at least five years.

Performance of TAMO 411 Oat

Cultivar	3-yr avg yield bu/ac	Test wt. lb/bu	Avg. forage yd lb/ac	Crown rust rating	Stem rust rating
Dallas	92.8	29.2	-	100S	S
Harrison	93.7	32.4	4613	80S	VS
Horizon 201	107.6	28.6	-	20MS	S
Plot Spike	104.9	29.6	-	40MS	MR
TAMO 405	96.4	30.7	-	40MS	MS
TAMO 406	99.5	31.2	4444	R	MS
TAMO 411	108.6	31.9	4987	R	MR

* R=resistant; MR=moderately resistance; MS= moderately susceptible; S=susceptible

Tamrun OL12: Mark Burow, Michael Baring, J.L. Ayers, Mike Schubert, Yolanda Lopez, and Charles Simpson developed and recently released a new high oleic peanut for Texas producers. Tamrun OL12 was released in response to the shift in peanut acreage to West Texas, which is higher in latitude and elevation. The West Texas environment has cooler nighttime temperatures despite warm daytime temperatures. These environmental factors cause later crop maturity in peanut which affects both Flavor Runner 458 and Tamrun OL02 cultivars that predominate our acreage. In some years, there is a tendency for off-flavors, notably a fruity-fermented flavor that results from drying immature peanuts under warm daytime temperatures. Their new cultivar, Tamrun OL 12, is a runner type peanut, with spreading growth habit, and lacking flowers on the mainstem. Tamrun OL12 yields equivalent to Flavor Runner 458 and Tamrun OL02, has similar quality characteristics but matures significantly earlier.

Performance of Tamrun OL12 peanut cultivar compared with Flavor Runner 458 and Tamrun OL02. Yield is pod yield (kg/ha) as an average of four years, TSMK is percent total sound mature kernels, ELK is percent extra-large kernels, Med is percent medium size kernels, Pod Maturity is percent mature pods at harvest, and oil is percent oil averaged over two years.

Genotype	Yield	TSMK	ELK	Med	Pod maturity	Oil
Flavor Runner	5842 a	75 a	32 a	26 b	28 b	49 a
Tamrun OL12	5761 a	74 a	28 a	28 ab	53 a	50 a
Tamrun OL02	5623 a	73 a	28 a	30 a	20 b	49 a

A.B.Tx3363: Texas A&M AgriLife

Research recently released Tx3362, a black pericarp R line of grain sorghum (R.Tx3362). This was the first temperately adapted photoperiod-insensitive line that produces high levels of 3-DOA, 3-deoxyanthocyanin, which has been associated health benefits such as slow and/or reduce digestibility, reduced cholesterol levels, high in antioxidants, anti-inflammatory properties, and anti-carcinogenic properties. In addition, consumers often judge the nutritional value and appeal of food products based on color, thus the food industry uses a range of artificial dyes to improve sensory appeal. The 3-DOA is more stable than common anthocyanins, making them uniquely valuable as natural food colorants. These pigments are concentrated in the sorghum bran so they can be easily concentrated via normal sorghum processing and they are stable after processing. However, grain yields of R.Tx3362 are poor and when used as a pollinator on standard sorghum seed parents (which have either red, white or yellow pericarp color), the hybrids are all red with low 3-DOA concentrations, indicating that the black-seeded trait is recessive and producing a black-grain hybrid will require that both parents produce black-colored grain. To meet this requirement, Bill Rooney, Ostilio Portillo, and Chad Hays with the Texas A & M Agrilife Sorghum Breeding Program developed a series of black pericarp grain-sorghum seed parents with high levels of 3-DOA. Following evaluation as hybrids using R.Tx3362, A.B.Tx3363 was released for use with R.TX3362 in order to maximized both grain yield and 3-DOA concentrations in their hybrids. This A-line seed parent has a black-pericarp and in hybrid combination with R.Tx3362, produces a hybrid with the same black grain and with high parent heterosis for grain yield. Grain from this hybrid has potential applications in the food industry and possibly in health food supplements.

Performance of A.TX3363/R.Tx3362 black seeded hybrid with three grain sorghum hybrids when grown at College Station and Halfway in 2009.

Trait	ATx3363/ RTx3362	Pioneer 84G62	ATx2752/ RTx437	Tannin	L.S.D (P<.05)
Days to Anthesis (d)					
College Station	63	69	64	-	1
Halfway	60	65	59	70	1
Panicle exsertion (cm)					
College Station	7.6	1.3	10.2	4.4	2.6
Halfway	17.8	7.6	10.2	8.0	3.1
Moisture content (%)					
College Station	12.3	14.3	12.3	11.2	0.5
Halfway	14.4	15.3	14.3	13.1	0.5
Test weight (kg/hl)					
College Station	55.5	60.9	70.0	57.8	1.8
Halfway	67.7	73.0	72.7	69.5	1.5
Plant height (cm)					
College Station	117	125	135	117	4
Halfway	140	127	140	142	4
Grain yield (kg/ha)					
College Station	2853	4762	4738	3357	470
Halfway	4843	6182	5397	5960	390

The release of TAM 305 hard red winter wheat was approved recently by the Director of Texas A&M AgriLife Research for production in South Texas and the Blacklands regions of Texas. These areas suffer losses from leaf and stripe rusts cause by *Puccinia recondita* (Roberge ex Desmaz) and *Puccinia striiformis* Westend, respectively, and TAM 305 will provide excellent resistance to these diseases. Three years of performance testing indicated that TAM 305 is well adapted and will be competitive in South Texas and the Blacklands regions. The test weight of TAM 305 was 60 lb/bu when averaged over 31 site-years, the same as TAM 112, and higher than TAM

401, which averaged 57 lb/bu. Forage yield trials involving TAM 305 were conducted in 10 environments during 2009-2010 and 2010-2011 growing seasons and results indicate that this new HRW cultivar has good forage production and re-growth potential following clipping (data available at http://varietytesting.tamu.edu/wheat/docs/forageTrials). Milling and baking quality characteristics of TAM 305 were rated as very good by the USDA/ARS-Hard Winter Wheat Quality Laboratory in Manhattan, KS. Loaf volume was higher than the three checks and all other Texas entries evaluated.

Other News

The following information is available in a downloadable format at http://soilcrop.tamu.edu/graduateprogram.html

Distance Education in Plant Breeding at Texas A&M

As the global population increases, providing food, fiber and fuel to meet growing demand has become a significant challenge. We are one of the top tier U.S. universities training future plant breeders to meet this challenge and have expanded our effort through our Distance Education Program in Plant Breeding. We seek to alleviate hunger and poverty through the genetic improvement of plants while educating and developing plant breeders worldwide.

Overview

This program is an extension of the existing Plant Breeding programs offered by the Department of Soil and Crop Sciences and the Department of Horticultural Science at Texas A&M University. We offer a non-thesis option M.S. and thesis option M.S. in Plant Breeding completely at a distance to students unable to study on-campus in a traditional setting. This program is designed for individuals employed in private industry, CGIAR centers, government agencies, non-government organizations, and other agriculture professionals who need and desire additional knowledge and training in plant breeding but cannot relocate to a university campus. Distance Education students will take advantage of the same curriculum available to on-campus students with identical course content and professors. Our unique program is designed to deliver a high quality plant breeding education to students across the globe.

Available Degrees

Master of Science in Plant Breeding (Non-Thesis Option)

Description

The non-thesis option M.S. in Plant Breeding requires 36 hours of coursework, four of which are an internship activity at the student's present company or locale. This is considered a terminal degree for students who do not wish to pursue their education beyond the M.S. level. Courses will vary depending upon the student's career goals and current situation. Students will work with a graduate advisor to determine which courses best suit their needs. A typical degree plan will include a variety of course work in plant breeding, molecular and environmental plant sciences, statistics, plant pathology, entomology, agricultural economics, and education and human development.

Time for Completion

Since this program is designed for industry professionals who will continue to be employed full time during their graduate studies, typical course load will be 1 to 2 classes per semester. Many factors will effect completion time, but most students can expect to finish within 3-5 years.

Master of Science in Plant Breeding (Thesis Option)

Description

The thesis option M.S. in Plant Breeding requires 32 semester credit hours of course work and a thesis on original research. Student research can be completed at the student's location. An on-site Ph.D. scientist, educator, or supervisor who qualifies as an adjunct member of the Texas A&M graduate faculty must be available to serve as co-chair of the student's graduate advisory committee and be able to direct thesis research locally. Students will have an on-campus co-chair to oversee the academic aspect of their degree. Communication with committee members, examinations, and thesis defense will be conducted via the internet.

Requirements Leading to the Master of Science Degree

1. 32 graduate credit hours beyond the B.S. degree; general requirements are:
    a. 23 course hours approved by the student's advisory committee and the Office of Graduate Studies.
    b. Statistics 651 or equivalent.
    c. An exit seminar discussing research findings (SCCS 681).
    d. No more than 8 hours of SCSC 691 (Research) or SCSC 685 (Directed Studies).
    e. No more than 9 hours of upper level (300 or 400) undergraduate courses and no graduate credit for the following courses required for a B.S. degree:
        SCSC 101
        SCSC 105
        SCSC 301
    f. See Graduate Catalog for additional requirements, http://tamu.edu/admissions/catalogs/.

2. A thesis written on original research as directed by student's advisory committee.

Time for Completion

Time for completion will vary depending on number of courses taken per semester and the student's original research project. Typical completion time will be 3-5 years.

Course Delivery

Each course has been uniquely designed by the instructor to provide course content in an accessible, understandable format. All courses will be delivered on-line, completely at a distance

via Texas A&M University's E-learning system. This system utilizes the Blackboard Vista learning platform to allow students to view instructional materials, interact with other students and faculty, and complete assignments and examinations. *(To check your computer's compatibility with this system visit Texas A&M's E-Learning and perform the E-Learning Browser Check.)* The web based nature of course delivery allows students to access and complete course material at a time convenient to them.
For thesis option MS students, graduate advisory committee meetings, examinations, and research defense will be handled through electronic communication, including video and teleconferencing. **No campus visit will be required.**

Admission Procedure

Applicants should follow all of the guidelines and procedures to apply for graduate studies in a department offering a plant breeding degree at Texas A&M University at College Station using the Texas A&M on-line admission process. On-line application to graduate studies at Texas A&M University can be found at admissions.tamu.edu. The Department of Soil & Crop Sciences and the Department of Horticultural Sciences confer graduate degrees in plant breeding.
Additional items to be provided by the applicant:

Non-Thesis Option

- A letter of application directed to Wayne Smith, David Byrne, or LeAnn Hague providing sufficient background information to demonstrate the student's commitment and ability to complete an on-line Master of Science (NTO) program and internship, including prospective internship location or activity.

Thesis-Option

- A letter of application directed to Wayne Smith, David Byrne, or LeAnn Hague providing sufficient background information to demonstrate the student's aptitude to conduct plant breeding research.
- Identification of the area of plant breeding research to be pursued and its importance to the agricultural industry.
- A one or two-page letter of support from the perspective distance co-chair indicating commitment of facilities and time for the conduct of the proposed research.

Students applying to the *Department of Soil and Crop Sciences* must send these additional items to the attention of Wayne Smith, Department of Soil and Crop Sciences, 2474 Texas A&M University, college Station, TX 77843-2474 (cwsmith@tamu.edu).
Students applying to the *Department of Horticultural Sciences* must send the additional items to the attention of David Byrne, Department of Horticultural Sciences, 2133 TAMU, College Station, TX 77843-2133 (dbyrne@tamu.edu).

Some of the Available Courses

The following courses are currently available and included in the distance program.

Course Name	**Credit Hours**
SCSC 304: Undergraduate Plant Breeding	3

SCSC 306: Crop Production	3
SCSC 422: Soil Fertility	3
SCSC 641: Plant Breeding	3
SCSC 642: Quantitative Plant Breeding	3
SCSC 643: Quantitative Genetics	3
SCSC 654: Genomic Analysis	3
SCSC 660: Experimental Designs	3
STAT 651: Statistics I	3
STAT 652: Statistics II	3
STAT 653: Statistics III	3
AGEC 314: Marketing Agriculture Production	3
EHRD 602: Human Resource Development	3
EHRD 605: Leadership	3

Contact Information

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Additional Websites

eLearning at Texas A&M University
Office of Graduate Studies – Texas A&M University

Please direct comments concerning this bulletin to Wayne Smith, cwsmith@tamu.edu or 979.845.3450.