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2005 REGIONAL BARLEY, COMMON WHEAT AND TRITICALE, DURUM WHEAT, AND CEREAL FORAGE PERFORMANCE TESTS IN CALIFORNIA¹

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University of California Cooperative Extension cereal evaluation tests were conducted in the intermountain valleys of northern California; the Sacramento, San Joaquin, and Imperial Valleys; and in the south central coastal region in 2005. Entries in the tests included standard cultivars, new and soon-to-be released cultivars, and advanced breeding lines from both public and private breeding programs. Fall-sown winter barley (16 entries) was evaluated at four sites; fall-sown spring barley (25 entries), at 6 sites; and spring-sown spring barley (33 entries), at two sites. Fall-sown winter wheat and triticale (19 entries) was evaluated at four sites; fall-sown spring wheat and triticale (42 entries total), at ten sites (not all entries were evaluated at all sites); and spring-sown spring wheat (18 entries), at two sites. Durum wheat (30 entries) was evaluated at 5 sites. Fall-sown cereal forage (6-19 entries) was evaluated at three sites.

Tests were conducted at University of California Field Stations or in fields of cooperating growers. Tests were sown at seeding rates of 1.2 million seeds per acre for common and durum wheat tests (equivalent to 84 to 143 lbs/acre for common wheat, and from 107 to 156 lbs/acre for durum wheat, depending on the entry) if irrigation was planned and at 1.0 million seeds per acre for rainfed wheat and all barley (equivalent to 74 to 119 lbs/acre) and triticale (equivalent to 76 to 117 lbs/acre) tests. Randomized complete block designs with four replications were used. Each plot was nine drill rows wide (5 to 6-inch row spacing) and 20 feet long, except at the UC Desert Research and Extension Center (Imperial) where plots were 16 feet long. Grain was harvested with a Wintersteiger Seedmaster Universal 150 plot combine. Foliar diseases were assessed at the soft-to-medium dough stage of growth by estimating the percentages of areas of penultimate leaves (flag-1 leaf) affected. BYD assessments, however, were based on the percentage of plants showing symptoms. Black point was assessed on grain samples of durum wheat after harvest. Yield, test weight, kernel weight, plant height, days to heading and maturity, lodging, shattering, disease reaction, and grain quality were determined as indicated in the tables. Information regarding each site is given in Table 1.

The small grain crop for the 2005 season in California, according to the California Agricultural Statistics Service, consisted of 558,000 acres of wheat (including 90,000 acres of durum), 100,000 acres of barley, and 250,000 acres of oat. Wet weather prevented planting of about 25-30% of the durum acreage in the Imperial Valley. Triticale acreage for green-chop for dairies in the San Joaquin Valley continued to expand; total triticale acreage, including winter triticale in the intermountain area, amounts to about 60,000 acres. Wheat for green-chop also continued to expand at the expense of grain acres and now accounts for 60-70% of the San Joaquin Valley wheat crop. The fall-sown spring wheat acreage in 2005 was dominated by cultivars that began the season as resistant to stripe rust: Summit (hard red spring) and Blanca Grande (hard white spring). The statewide acreage of Summit was 169,000 (35% of the total wheat acreage) while that of Blanca Grande was 86,500 (18% of the total). Durum acreage was dominated by Kronos, with acreage of 28,700 (37% of total durum acreage) in 2005.

¹These tests were conducted by the UC Davis Department of Plant Sciences and Cooperative Extension. Land for the tests, the grain produced and other facilities were contributed by cooperating growers identified in Table 1. Quality evaluations were provided by the California Wheat Commission (CWC) quality laboratory. The assistance of growers and the CWC quality laboratory is acknowledged with appreciation. The regional testing program is supported in part by funds provided by the California Crop Improvement Association and the California Wheat Commission.

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The 2005 season was wet and cool, just about the opposite from 2004 when warm weather and a relatively dry season led to an early maturing crop. The 2005 conditions resulted in a late maturing crop and high disease pressure – not only from stripe rust but also from other diseases including *Septoria tritici* blotch of wheat, leaf rusts of wheat and barley, BYDV of all cereals, and scald and net blotch of barley. Stripe rust infection foci within fields of Summit and other cultivars in the Sacramento Valley and northern San Joaquin Valley were reported as early as mid-March. In some cases more extensive areas of disease developed and significant yield losses were sustained. Many fields of Summit were stripe-rust free, however, so races with the ability to attack Summit or Blanca Grande are not widespread. Yield loss from stripe rust on wheat in 2005 was about the same as in 2004, about 5%.

BARLEY

Fall-sown winter barley. The fall-sown winter barley test contained 16 entries (6 cultivars and 10 advanced lines). Entries in the test, type of barley, their backgrounds, and seed sources are shown in Table 2. Yield and agronomic performance data are given in Tables 3-7. There was heavy weed competition (feral rye) at the Siskiyou site. Several entries, including Steptoe, J2-5-1, J1-8-17, 94Ab1274, 94Ab1269 and 95Ab2299, had severe grain shatter caused by bird-feeding at the Siskiyou and Lassen sites. Lodging was severe at the Siskiyou site. Stripe rust was severe on Steptoe at the November-sown Tulelake site. Average yields ranged from 2550 lb/acre at the Siskiyou site to 5020 lb/acre at the Lassen site. Average yields at the November-sown Tulelake site (5010 lb/acre) were only slightly higher than average yields at the February-sown Tulelake site (4750 lb/acre). Strider, Eight-Twelve, 92Ab1308, and Westbred Sprinter were the highest yielding entries in 2005.

Fall-sown spring barley. The fall-sown spring barley test contained 25 entries (8 cultivars and 17 advanced lines). Entries in the test, type of barley, their backgrounds, and seed sources are shown in Table 8. Yield and agronomic performance data are given in Tables 9-17. Very wet, saturated conditions in the winter affected stand survival and retarded growth at the Glenn (rainfed) site. Stripe rust was severe on Max, Commander, and WWW BA8017 at the UC Davis, Butte, and San Luis Obispo (rainfed) sites. Scald was severe on Meltan, Commander and WWW BA8017 at the Butte and UC Davis sites. Lodging was most severe at the Butte and UC Davis sites; UC 603, Patti and UCD YP03-9/3 showed the best lodging resistance. Average yields ranged from 3270 lb/acre at the rainfed Glenn site to 5920 lb/acre at the UC Davis site. UCD YP03-9/3 and 23 IBYT 7 were highest yielding in the Sacramento Valley; UCD C135 and UCD PYT99 A-13, in the San Joaquin Valley; and UCD PYT99 A-13, UCD C140, UCD C147, and UCD C135, at rainfed sites. In the three-year period 2003-2005, UCD C140, UCD C147 and UCD C109 have been the highest yielding in the Sacramento Valley; UCD C108, UCD PYT01 C6, UCD C140, and Patti, in the San Joaquin Valley; and UCD C147, UC 937, and UC 933, at rainfed sites.

Spring-sown spring barley. The intermountain spring barley test contained 33 entries (16 cultivars and 17 advanced lines). Entries in the test, type of barley, their backgrounds, and seed sources are shown in Table 18. Yield and agronomic performance data are given in Tables 19-21. Late season moisture stress reduced yields at the Siskiyou site. Stripe rust was severe at the Tulelake site. Steptoe, Creel, Tradition, Legacy, Spaulding, Golden Eye, UT99B1669-3243, and UT99B1670-3458 were most affected. Average yields ranged from 3720 lb/acre at the Siskiyou site to 7940 lb/acre at the Tulelake site. Overall, UCD-TLB52 and UCD-TL20 were highest yielding in 2005. In the period 2003-2005, Creel, UCD-TL20 and Millenium were highest yielding region-wide; Xena, in Siskiyou Co; and Creel, at Tulelake.

WHEAT

Fall-sown winter wheat and triticale. The fall-sown winter wheat and triticale test contained 19 entries (16 wheat and 3 triticale). Entries in the test, their backgrounds, and seed sources are shown in Table 22. Yield and agronomic performance data are given in Tables 23-27. There was heavy weed competition (feral rye) at the Siskiyou site. Leaf rust was moderately severe on Golden Spike at the November-sown Tulelake site. Average yields ranged from 4930 lb/acre at the Siskiyou site to 6750 lb/acre at the February-sown Tulelake site. Average yields for the November-sowing at Tulelake site (6730 lb/acre) were nearly identical to those of the February-sowing, but entries had different yield rankings at the different sowing dates. The three triticale entries Décor, MAH 3800, and Trimark 336 were highest yielding in 2005. Tubbs was the highest yielding wheat in 2005. Rohde, Rod, and Golden Spike were the highest yielding in the three-year period 2003-2005.

Fall-sown spring wheat and triticale. The fall-sown spring wheat and triticale test contained 42 entries (12 wheat cultivars, 25 advanced wheat lines, and 5 triticale cultivars/lines). Entries in the test, type, background, and seed sources are shown in Table 28. Yield, agronomic performance, and quality data are given in Tables 29-44. Very wet, saturated conditions in the winter affected stand survival and retarded growth at the Glenn (rainfed) site. Stripe rust was severe on susceptible

entries at 6 sites (Table 39). Entries highly susceptible at one or more sites included Anza, Yecora Rojo, Pavon, Express, Plata, Solano, UC 1296, UCD 03010/18, YU999-178, Pavon 1RS.1AL, Pavon 1RS.1BL, Pavon 1RS.1DL, WB DA902-7, WWW CHBR1315, RSI 97WY63520D, and APB W02AZ-228MT. Cultivars and lines with the lowest disease reactions (most resistant) to stripe rust included Blanca Grande, Dash 12, WWW BR3677, UCD 03010/24, MLO41-37A, WB DA902-42, WB YU901-379, WWW CHBR1975A, WWW BR6000W, RSI 00WWB80404, APB W02GE-19-1, APB W02GE-19-6 and triticale entries Trical 105, Trical 118, Trical 116 and RSI 00TV60147. Leaf rust was severe on WB YU902-209 at three sites (Table 39). Septoria tritici blotch was severe at four sites (Table 40); entries with the lowest disease reactions (most resistant) included all of the triticale entries as well as wheat entries UCD 03010/24, WWW BR0061 and RSI 00WWB80404. Lodging was severe at harvest on susceptible entries at seven sites (Table 41); entries least affected (most resistant to lodging) included RSI 97WY63520D and triticale entries Trical 96, Trical 118, and Trical 116. Grain protein content of samples from four sites in the Sacramento Valley and three sites in the San Joaquin Valley was measured (Table 42). Average grain protein content ranged from 10.2% to 14.7% for samples from the Sacramento Valley and from 11.5% to 13.9% for samples from the San Joaquin Valley. Quality evaluations (conducted by the California Wheat Commission laboratory) of samples from the Kings site (Table 43) showed that the highest loaf volumes and overall bread scores were produced by Solano, WB YU901-379, and APB W02GE-19-6. Average grain yields ranged from 2340 lb/acre at the rainfed Glenn site to 6930 lb/acre at the Imperial site. Triticale Trical 118 was the highest yielding in the Sacramento Valley and in the San Joaquin Valley (RSI 00WWB80404 was the highest yielding wheat in the Sacramento Valley while YU999-178 and Summit were the highest yielding wheat entries in the San Joaquin Valley). Triticale entries Trical 96 and Trical 105 and wheat Blanca Grande were the highest yielding in the Imperial Valley. In the three-year period 2003-2005, Summit was the highest yielding in the Sacramento Valley and the San Joaquin Valley; and Summit, Blanca Grande, and Plata, in the Imperial Valley (Table 44).

Spring-sown spring wheat. The intermountain spring wheat test contained 18 entries (13 cultivars and 5 advanced lines). Entries in the test, type of wheat, their backgrounds, and seed sources are shown in Table 45. Yield and agronomic performance data are given in Tables 46-48. Late season moisture stress reduced yields at the Siskiyou site. Stripe rust was severe on several entries at the Tulalake site. Dirkwin, Super Dirkwin, ID 0597, BZ 901-678, Westbred 936, and ID 0593 were most affected. Average yields ranged from 3630 lb/acre at the Siskiyou site to 7150 lb/acre at the Tulalake site, where the top-yielding entry (Otis) yielded 8330 lb/acre. In the three-year period 2003-2005, Alturas and Nick were highest yielding region-wide; Eden, at Siskiyou; and Alturas and Nick, at Tulalake (Table 48).

Durum wheat. The durum wheat test contained 30 entries, including 13 cultivars and 17 advanced lines. Entries in the test, their backgrounds, and seed sources are shown in Table 49. Yield, agronomic performance, and quality data are given in Tables 50-60. Late season moisture stress contributed to low yields at the Fresno site. Severe stripe rust developed on several entries at the UC Davis, Kings and Kern sites, including Mohawk, Orita, Candura, WWW D5384-2, WB YU899-170 and GD 008 (Table 55). Low to moderate levels of black point occurred on some entries at one or more of the UC Davis, Kings, and Kern sites; Ria, Crown and Orita had relatively high black point severity at the Kern site, while Mohawk, Platinum, RSIOOWV50064 and GD 009 had low black point scores at all sites (Table 55). Lodging was very severe on most entries at the Kern and Kings sites. Entries with good lodging resistance included Crown, Ria, RSIOOWV50014 and RSIOOWV50064 (Table 56). Grain protein content of samples from the five sites was measured (Table 57). Average grain protein content ranged from 11.5% to 13.7% for samples from the Central Valley, and from 12.3% to 15.5% for samples from the Imperial Valley. APB D01AZ-474-7 had the highest grain protein content in both the Central Valley and the Imperial Valley. Quality evaluations (conducted by the California Wheat Commission laboratory) of samples from the Kings (Table 58) and Imperial (Table 59) sites showed that samples of 4 entries from the Kings site and 9 entries from the Imperial site had the highest possible pasta color scores. WB YU803-11 and WB YU803-15 had the maximum pasta color score at both sites. Average grain yields ranged from 4350 lb/acre at the Fresno site to 8180 lb/acre at the Imperial site. APB D99-425 was the highest yielding in the San Joaquin Valley while RSIOOWV50059 was highest yielding in the Imperial Valley. In the three-year period 2003-2005, Desert King, Platinum and Crown were the highest yielding in the San Joaquin Valley and Duraking, Topper, and Desert King were the highest yielding in the Imperial Valley (Table 60).

CEREAL FORAGE

Stanislaus Cereal Forage. The Stanislaus test, sown on November 19, 2004, contained 19 entries, including nine oat, four wheat, three triticale, and three mixtures. Entries in the test and seed sources are shown in Table 61. Yield data are given in Table 62. Forage was harvested either between boot and flowering stage or at dough (soft to hard) stage. Cayuse oat had the highest forage yield (23.3 tons/acre) of entries harvested between boot and flowering while Stanislaus Farm Mixture #1 and Swan oat had the highest forage yields (31.0 and 27.6 tons/acre, respectively) of entries harvested in the dough stage. A large-plot strip test consisting of fewer entries (three oat, two wheat, and three triticale entries) was planted adjacent to the

test and about 6 weeks earlier (Table 63). Plots were harvested between boot and flowering. Yields (ranging from 9.2 to 12.9 tons/acre) were lower than yields in the later planting.

Kings Cereal Forage. The Kings test contained 6 entries, four wheat and two triticale (Table 64). Both grain and forage (at milk to soft dough stage) yields were measured. The two triticale entries, Trical 118 and Trical 96, had both the highest grain yields and the highest forage yields. Summit had the highest grain and forage yields of the wheat entries.