inbred line *i*. Yield from the first two pickings, July 27 and August 6, showed significant differences among the three hybrids and seed parent varieties (table 1) with F = 14. All of the hybrids were significantly superior to the parent varieties, VF6, VF36 and VFN8. Hybrid B was significantly superior to hybrids A and C.

Yield differences

Differences in yield, including a third picking on August 23, were significant at the 0.05% level (table 1) with an F = 4.1. The mean square for error for the three pickings was 3.2 times that of the first two. Hybrid B yielded about 8.7 tons per acre in spite of the wide spacing and the fact that 18% were infected with the lethal disease, curly top. Curly top was most severe in May and extended into June, increasing the error variance. Yield of the F_1 hybrids was concentrated into a shorter harvest period than that of the seed parents. The smallest difference in yield was between VFN8 and its hybrid C.

Low fruit weight was a partially dominant characteristic in inbred *i* (table 2). Hybrid B, the highest in yield, weighed only 0.20 lb. Fruit weight invariably decreased as the season advanced. On August 23 some deep cracks occurred in the parent varieties, especially VFN8, but fewer appeared in the hybrids. Sunburn was severe on fruit picked on August 23, especially on the hybrids. The injury might have been less if plants had been closely planted.

Inoculation

The F_1 hybrids were inoculated in the greenhouse by dipping young seedlings in suspensions of *Fusarium lycopersici* (F) and two races of *Verticillium alboatrum* (C1) from cotton and V9 from tomato. No symptoms of *Fusarium* wilt appeared except in two plants of hybrid A and one plant of hybrid B (table 3). When inoculated with V9 about one-half of the plants of hybrids, A, B and C were stunted. C1 was apparently less virulent since very few plants of hybrids A, B and C were affected. The *Fusarium* resistance of V36 was confirmed by these results. The inbred line *i* was susceptible to *Fusarium*. As expected, resistance to *Fusarium* was dominant but resistance to *Verticillium* was only partially dominant. Nematode resistance of hybrid C was not tested.

The percentage of soluble solids was estimated by refractometer readings on juice from samples of 10 to 20 fruits. It was similar in the hybrids A, B and standard varieties and was lower in all cases in the August 16 picking (table 2). VF36 had the highest soluble solids of the parent varieties. Titratable acidity (table 2) measured August 8 and August 23 varied with date of sampling and variety. On August 23 it was higher in hybrids A, B and C than in the parent varieties VF6, VF36, VFN8 and inbred *i*, but the differences probably were not significant. In all hybrids and parents, acidity increased significantly from August 8 to August 23. Acidity of VF36 was highest on August 8 with 0.83 and VFN8 was lowest with 0.50. Of the parent varieties VF36 had the highest soluble solids, titratable acidity and production.

Hybrids superior

On the whole the hybrids were superior to the parent varieties in early fruit production. The fruit was smaller, similar in soluble solids and slightly less inclined to cracking. Flavor and keeping quality of the hybrids was very satisfactory. Hybrid B produced the highest fruit yield. Hybrids of male sterile (ms) parents and their inbred produced more early fruit. The relatively expensive hybrid seed may be justified for fresh fruit and home gardens in areas where air pollutants are high but may be prohibitive for processed tomatoes. The longer style of ms31 is more accessible for hand pollenation than that of ms40; and ms-VFN8 was not available. Accordingly, the fruit harvested July 27 and August 6 originated from flowers that set fruit in mid-June. Air polluting oxidants were very high on June 12, 1971, through June 26, 1971. It seems probable that yield was related to air pollution conditions early in the flowering season. In the absence of controls, however, this was not proved. Evidently, under severe atmospheric pollution the F_1 hybrids were superior to the parent varieties.

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ANZA–

C. O. QUALSET · J. D. PRATO

ANZA, A SPRING WHEAT variety released by the University of California in 1971, offers growers a new choice for a variety in the medium-to-late maturity range. Named in honor of Don Juan Baptiste de Anza, who led settlers from Sonora, Mexico to California in about 1775, the variety has followed a similar route.

Anza originated from a hybrid made at the Centro de Investigaciones Agricolas del Noroeste (CIANO) near Cuidad Obregon, Sonora, Mexico by scientists of the Mexican Government and the International Maize and Wheat Improvement Center (CIMMYT). The parentage of Anza is (Lerma Rojo × Norin 10 – Brevor) × [(Yaktana 54 × Norin 10 – Brevor) × Andes^s] and the hybrid and selection number is II8739-4R-1M-1R. A selection from this cross was sent from the station in Sonora to J. C. Williams at Davis by N. E. Borlaug in 1964. Another selection from this cross was entered in the International Spring Wheat Yield Nursery in 1969 from the wheat improvement program in the Sudan. The Sudanese selection was subsequently released and named Mexicani in the Sudan. A similar variety (WW15), selected from the same hybrid was released in Australia. Anza was not released in Mexico because of its susceptibility to certain races of stem and leaf rust that occur in the state of Sonora. Anza has performed well in the world-wide international yield nursery and is now known to be adapted to much of California's wheat producing area.

Description

Anza has a spring growth habit with medium to late maturity. Tillering is profuse and the leaves are moderately short and narrow. The spikes are fully awned, mid-dense, and erect with a tendency to nod at maturity. Glumes are cream to white in color and the peduncle is slightly S-shaped (see photograph). The variety is somewhat shorter than INIA 66R, Pitic 62, and Siete Cerros 66, but 3 to 6 inches taller than "triple dwarf" varieties such as Cajeme 71, Saric

a new high-yielding, short-statured WHEAT VARIETY

J. A. RUPERT · H. E. VOGT · M. A. KHALIFA · W. F. LEHMAN · W. H. ISOM

70, and Yecora 70. Depending on growing conditions, 0.5% or fewer of the plants are 4 to 8 inches taller than average of the population. Kernels are red, medium in size, and tend to have a soft texture. Bushel weight is good, being much heavier than Pitic 62 and somewhat lower than INIA 66R.

Disease reaction is generally acceptable for California. It is the first variety available which has tolerance to the barley yellow dwarf virus. It is resistant and moderately resistant to the prevailing races of stripe and leaf rust, respectively. Its reaction to stem rust has not been observed in California, but based on experience in Mexico it should be considered susceptible. It is susceptible to bunt, as are other varieties recently introduced.

Performance

Relative grain yields of varieties in comparison with Anza (table 1) in a rather large number of experiments in California over a 7-year period show Anza to be 18, 18, and 19% higher than INIA 66 or INIA 66R, Siete Cerros 66, and Pitic 62. Mean yields for 1971 and 1972 at eight locations, shown in table 2, indicate adaptation of Anza in the major wheat production areas. Yields of Anza in 1971 and 1972 were 10 to 20% higher than the "triple dwarf" varieties Yecora 70, Cajeme 71, and Saric 70. Some loss of grain by shattering at maturity has been observed but much less than Siete Cerros 66, INIA 66R, or Pitic 62.

Protein content of the grain has been 1 to 2% lower than INIA 66R and about comparable with Siete Cerros 66. Milling performance has been good, with flour yield often higher than for INIA 66R. The flour is not acceptable for breadmaking, however, because of inadequate mixing time, water absorption, dough-handling characteristics, and loaf volume. Additional evaluations are needed to establish whether the flour is acceptable for blending with strong gluten flour or for pastry and family flours. Additional data on performance and quality of Anza are presented in Agronomy Progress Reports 34 (1971) and 46 (1972), available from the Department of Agronomy and Range Science, U.C. Davis.

Adaptation

Anza is believed to be adapted to all areas of California where spring wheats are grown. Usage is anticipated in areas where early-planting (October-November) is practical and where frost at heading time is often a problem. In the Sacramento Valley the variety will be competitive with Pitic 62 where its higher yield, shorter stature, and higher test weight make it a desirable choice. The Sacramento-San Joaquin Delta region, with good subsoil moisture supply, is another area where Anza has performed well. The performance of Anza may not be competitive with earlier maturing varieties in non-irrigated situations where moisture supply is limited by climatic or soil conditions. In areas with strong winds Anza may be a good choice because of its tolerance to shattering. Where the barley yellow dwarf virus is often present, such as in the San Joaquin Valley, Anza can be used effectively if adequate moisture is provided.

Seed of Anza will be available for planting in the fall of 1972. Foundation seed will be maintained and distributed by Department of Agronomy and Range Science, U.C. Davis.

TABLE 1. PERFORMANCE OF SEVERAL WHEAT VARIETIES COMPARED WITH ANZA IN UNIVERSITY OF CALIFORNIA REGIONAL AND FIELD STATION TRIALS, 1964–66 AND 1969–72

Variety	Number of experiments	Times exceeded by Anza	Yield % of Anza
INIA 66 or INIA 66R	36	28	81
Siete Cerros 66	34	30	83
Pitic 62	35	32	79
Ramona 50	27	27	57
Nadadores 63	19	19	75
Sonora 64	23	22	71
Nainari 60	24	24	72
Maxigene® 1651	15	10	94
Bluebird 2	13	11	86
Yecora 70	15	14	86
Cajeme 71	20	20	85
Saric 70	21	18	89
Nuri 70	19	18	82
Potam 70	18	14	85

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TABLE 2. TWO-YEAR MEAN GRAIN YIELDS IN POUNDS PER ACRE OF 10 WHEAT VARIETIES AT 8 LOCATIONS IN CALIFORNIA, 1971–72

	lbs per acre								Mean (lbs per acre)		
		Riverside			Five				8	7	4
Variety	El Centro	Dryland	Irrigated	Corcoran	Points	Isleton	Davis	Dunnigan	locations	locations	locations
Anza	5375	800	4625	3540	5205	6530	5060	2405	4190	4025	5085
INIA 66R	3695	585	2745	3405	4300	5335	4600	2145	3350	3300	4410
Siete Cerros 66	4390	795	3485	3605	4935	5935	4390	1870	3675	3575	4715
Potam 70	4435	725	2675	3180	4550	4365	5105	1990	3380	3225	4300
Nuri 70	3415	680	3195	3240	4565	5605	4390	2025	3390	3385	4450
Yecora 70	4615*	600*	3055	3220	4840*	5945	4675	2055*	3625	3485	4670
Cajeme 71	—	700	3325	3150	4670	5640	4865	1845	—	3455	4580
Saric 70	—	595	2840	3135	4795	5825	4565	1930	—	3385	4580
Pitic 62	—	740	2770	3335	3970	5420	4530	1850	—	3230	4315
Maxigene ® 1651	—	—	—	3535	5165	6205	5065	—	—	—	4990
LSD (.05)	1265	150	555	350	570	735	540	350	650	500	565

* Bluebird 2 in 1971.