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Winter Wheats for Washington*

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Brevor and Elmar are two new varieties of winter wheat that appear to be well-adapted to the soft-wheat areas of eastern and central Washington because of their high yields and resistance to bunt.

Brevor is a soft white wheat with a common type of head. The straw is white, short to medium in height, rather coarse, stiff, and highly resistant to lodging. The heads have white chaff and short awnlets at the tip. The awnlets are easily broken off at maturity by windstorms, often causing the heads to appear completely awnless.

Elmar is a medium-tall white club wheat that closely resembles Elgin. It has white, stiff straw and good resistance to lodging. The club heads have white chaff and short tip awnlets that also tend to break off at maturity.

Brevor is a selection from the cross of (Turkey-Florence x Fortyfold-Federation), and (Oro x Turkey-Florence) (Oro x Fortyfold-Federation), made by the senior author in 1938. Plant selections in this cross were made each year from 1941 to 1944. Selection No. 1-3-11-5, later named Brevor, was retained because of its short straw; resistance to bunt, lodging, and shattering; and uniformly soft-to-medium kernel texture.

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It was advanced to uniform nursery trials in 1945, and released for commercial production in 1949.

Elmar was selected in the third generation of a backcross (Hymar-Elgin x Elgin) x Elgin, designed to combine Hymar smut resistance with the Elgin type of plant. The original Hymar-Elgin cross was made by S. P. Swenson in 1942, the first backcross in the greenhouse during the winter of 1942-43, and the second backcross in the field during the summer of 1943. The successive progenies grown from 1943 to 1946 were inoculated with races of bunt to which Hymar is resistant, so that the Elgin plant types carrying the Hymar resistance could be identified. In 1947, the F₄ plant rows from one of the F₃ lines showed both the desired bunt resistance and the plant type. Fifty-six of these rows bulked together supplied the seed stock for varietal testing and seed increase in 1948. It was named Elmar and released for commercial production in 1949.

Comparative Yields

Varietal trials of Brevor and Elmar were conducted on the experiment stations at Pullman, Lind, and Prosser, and on farms at Pomeroy, Walla Walla, Goldendale, Deer Park, and Moses Lake. At Pullman, the varieties were tested under several conditions, including summer fallow and pea land, early and late seeding, and soils of high and low fertility. The trials at other locations were under conditions fairly representative of standard farm practices. Those at Lind were in both replicated rod-row nurseries and field plots. At all other locations, the trials were limited to rod-row nurseries.

Brevor has been tested for yield performance since 1946, and Elmar since 1948. A summary of comparative yields is given in Table 1. Average yields on the different trials are given in Appendix Tables 1 and 2.

Brevor and Elmar have performed very satisfactorily, when compared with Elgin—the highest yielding commercial variety previously available to wheat growers. Brevor has a slightly higher average yield than either Elmar or Elgin at Pullman, Walla Walla, and Goldendale. At Lind, Brevor ranks noticeably below Elmar and Elgin but is slightly higher than Rio—the recommended variety for that section.

The breeding objective of bunt-resistant varieties with yields equal or superior to those of Elgin has been realized in Brevor and Elmar.

Table 1.—YIELDS OF BREVOR, ELMAR, AND SEVEN OTHER FALL-SOWN COMMERCIAL WHEATS, AT EIGHT LOCATIONS IN EASTERN AND CENTRAL WASHINGTON, 1946-1950.

<i>Yields in Percentages of Comparable Yields of Elgin</i>								
Variety	Pullman	Pomeroy	Walla Walla	Lind	Goldendale	Deer Park	Moses Lake	Prosser
Number of replicated trials	27	5	5	7	4	2	3	1
BREVOR	105	99	112	87 ^c	111 ^b	100	100 ^e	—
ELMAR	102 ^a	98 ^b	103 ^b	98 ^d	101	91	94	108
Elgin	100	100	100	100	100	100	100	100
Elgin (Av. yield, bu.)	(60.4)	(51.0)	(57.3)	(27.0)	(37.2)	(19.3)	(60.9)	(93.5)
Triplet	93	92	101	86 ^c	—	—	94	89
Orfed	89	87	99	85	97	75	86	90
Rex	88	92	101	73	98	92	84	101
Hymar	90	88	87	96	88	90	94	83
Rio	88	80	100	83	85	82	83	79
Golden	88	84	92	77 ^e	90	85	92	79

^a 21 trials.

^b 3 trials.

^c 6 trials.

^d 4 trials.

^e 2 trials.

Milling and Baking Quality

Milling and baking tests of Brevor and Elmar have been made on small samples at the Western Wheat Quality Laboratory at Pullman, and on bulk lots by commercial milling companies. Under the sponsorship of the Pacific Northwest Crop Improvement Association, both varieties were milled on a commercial basis at Island City, Oregon, in 1949. Brevor was milled again at Wenatchee, Washington, in 1950. Quality tests of Brevor also were made by the milling and baking laboratory of the Grain Branch, Production and Marketing Administration, USDA, at Beltsville, Maryland.

Elmar has shown excellent milling characteristics, similar to those of Elgin, in all trials. Brevor was decidedly inferior to Elmar in bran cleanup and in bolting quality. When compared with the milling qualities of other commercial varieties, Brevor and Elmar are classified by the Western Wheat Quality Laboratory as follows: Elgin, excellent; Elmar, excellent; Hymar, very good; Triplet, good; Rio, good; Golden, good; Orfed, fairly good; Brevor, fair; and Rex, poor.

Both Elmar and Brevor appear to have highly desirable baking qualities. Elmar appears to be very similar to Elgin, except for a slightly higher viscosity. Brevor appears to be a multiple-purpose type, being suitable for a wider range of products than is Elmar or Elgin.

Resistance to Lodging

Both Brevor and Elmar are more resistant to lodging than most commercial varieties now grown in eastern Washington. This is important in areas of high precipitation where lodging occurs rather frequently.

Observations on lodging in the nursery yield trials, particularly those in which heavy lodging occurred, indicate that Brevor, like Orfed and Rex, is among the most resistant. Elmar appears to be slightly superior to Elgin in lodging resistance, but it lodges more easily than Brevor. Both Brevor and Elmar are superior in lodging resistance to Hymar, Golden, or Triplet, and markedly so to Rio.

Short varieties usually lodge less than do tall varieties. Brevor often grows from 1 to 4 inches shorter than Elmar and Elgin; from 2 to 6 inches shorter than Orfed and Rex; from 4 to 8 inches shorter than Rio, Golden, and Triplet; and from 6 to 10 inches shorter than Hymar.

Other factors undoubtedly influence the lodging resistance of these new varieties. The taller stalks of Elmar are fairly erect, whereas those of Brevor usually lean, thus giving the field a tangled appearance even though few stalks lie on the ground.

Under droughty conditions, Elmar and Elgin heads have a tendency to remain and develop grain in the boot. In some such cases the plants may be too short to combine, particularly where the grain is sown in furrows on light land.

Shattering and Threshability

Brevor and Elmar appear to be about equal to Elgin and Orfed in resistance to shattering. They are superior to Triplet and Rio, and they are markedly superior to Golden. Golden is much more susceptible to shattering than are other commercial varieties.

Brevor and Elmar are similar to Elgin and Orfed in threshability. They thresh more readily than Rex, but not so easily as Golden, Hymar, Triplet, or Rio.

Winter Hardiness

Elmar and Brevor appear to be similar to Elgin and Golden in winter hardiness. They are superior to Orfed, but slightly less hardy than Rex and Triplet, and noticeably less hardy than Rio or Hymar.

Resistance to Smut

In smut tests, Brevor has exhibited moderate to high resistance to all of the known races of common bunt. It also appears to have considerable resistance to dwarf bunt.

Elmar is highly resistant to approximately half of the known races of common bunt, and also to dwarf bunt. It has the same smut resistance as Hymar and Rex, which to date have been effective in avoiding appreciable bunt damage. However, it should be pointed out that since several races of bunt can attack Elmar, Hymar, and Rex, there is always a possibility that these varieties may become severely infected.

It is recommended that farmers always treat Brevor and Elmar seed for common bunt. This greatly reduces the chances of new races of bunt being screened out and increased. Past experience with such varieties as Redit, Hymar, and Orfed has shown that new races of bunt can appear within a few years after the varieties are released if the seed is not treated.

Test Weight

The average test weights per bushel in all trials at Pullman, Pomeroy, and Walla Walla from 1948 to 1950 are:

<i>Variety</i>	<i>Wheat Subclass</i>	<i>Lbs.</i>
Brevor	Soft white	61.6
Elmar	White club	59.9
Elgin	White club	60.0
Triplet	Western red	62.3
Orfed	Soft white	62.7
Rex	Soft white	61.8
Hymar	White club	60.4
Rio	Hard red winter	62.7
Golden	Soft white	59.3

Brevor, unlike most soft white varieties and hybrids having short stiff straw, has moderately heavy grain. Its average test weight is 1.7 pounds higher than that of Golden.

Elmar, like Elgin, has a fairly light grain for a club variety, averaging slightly less than Hymar.

Appendix Table 1.—AVERAGE YIELDS IN BUSHELS PER ACRE OF BREVOR, ELMAR, AND SEVEN COMMERCIAL VARIETIES AT PULLMAN, POMEROY, AND WALLA WALLA, IN 1946-1950, INCLUSIVE.

Variety	C.I. No.	Pullman										Pomeroy		Walla Walla		Averages		
		Uniform Nurseries						Advanced Nurseries				Summer-fallow 46-50	Summer-fallow 48-50	Canning Pea-land ^b 46-50	Canning Pea-land ^b 48-50	46 & 47 to 50	48-50	
		Early Sown			Late Sown			Early Sown		Late Sown								
		Peas Green-manured 46-50	Peas Green-manured 48-50	Summer-fallow 48-50	Peas Green-manured 46-50	Peas Green-manured 48-50	Pea-land 48-50 ^a	Summer-fallow 48-50	Pea-land 47-50 ^a	Pea-land 48-50 ^a	Summer-fallow 47-50	Summer-fallow 48-50						
BREVOR	12385	82.4	79.5	69.4	66.1	66.8	52.4	60.7	52.8	52.5	60.3	59.2	50.5	56.1	64.2	61.4	62.7	62.0
ELMAR	12392	—	74.0	72.1	—	64.2	50.6	51.4	—	49.2	—	53.3	—	56.6	—	54.0	—	58.4
Elgin	11755	75.3	69.0	71.1	67.0	64.2	49.0	55.4	45.9	43.2	59.1	53.1	51.0	57.6	57.3	52.3	59.3	57.1
Triplet	5408	62.8	57.1	63.2	60.3	58.3	50.5	57.0	46.8	45.2	53.5	51.5	46.9	49.9	57.6	53.9	54.7	54.1
Orfed	11913	67.7	65.2	57.3	57.3	57.0	49.0	48.7	45.9	46.4	51.8	50.7	44.6	48.5	56.8	54.3	54.0	53.0
Rex	11689	66.1	64.1	60.5	52.1	53.2	47.5	52.1	44.3	43.0	49.7	48.6	47.1	52.1	57.9	55.4	52.9	52.9
Hymar	11605	64.8	57.8	61.3	59.7	58.6	48.7	48.1	46.7	45.8	52.2	49.8	44.9	49.8	49.9	46.6	53.0	51.8
Rio	10061	62.9	54.8	55.5	57.2	57.4	48.4	52.1	45.4	44.6	48.5	47.5	40.7	44.3	57.1	53.4	52.0	50.9
Golden	10063	64.9	57.0	59.9	57.3	55.5	46.0	46.7	48.0	47.1	49.4	47.7	42.8	43.7	52.5	49.0	52.5	50.3

^a Peas harvested at maturity.

^b Peas harvested green for canning.