



# Crop Science Report

RESEARCH/EXTENSION

CLUB WHEATS FOR OREGON

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Club Wheats (*Triticum compactum*) have traditionally been grown in the lower rainfall areas of eastern Oregon. Wheat varieties grown in such areas must often be taller than the semi-dwarf common wheats grown in areas of higher yield potential. Semi-dwarfs have shorter coleoptile and internode lengths and aren't able to emerge as quickly or from as great a depth as the taller clubs. However, in recent years, cereal breeders have developed several common wheats that do perform well under lower rainfall conditions. Improvements in common wheats over the years have caused, and continue to cause, club wheat acreage to decline.

Stripe rust has also dealt another blow to club wheats in recent years. Most club wheat varieties have race specific forms of rust resistance and many of these specific resistance genes have been overcome by new rust races. This past growing season was particularly devastating in that Jacmar, Faro, Moro, and Tyee were all heavily infected by rust in parts of the Columbia Basin. Moro and Tyee have shown a slight level of resistance, in some areas, which would suggest that each may contain one or several minor resistance genes which confer resistance to some races of rust. However, both are susceptible to other rust races and are likely to suffer yield reduction due to rust.

Crew and Tres, newer varieties out of Washington State University, are still rated as intermediate to resistant in their stripe rust reactions. Crew is a multiline variety composed of ten separate wheat lines. While several of the ten lines carry effective resistance genes, others are susceptible to current stripe rust races. Hence, a certain percentage of plants in a field of Crew will be highly infected by rust. Tres is a pure line with a single gene for adult plant rust resistance and is expected to show a uniform reaction to rust.

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Fungicides for stripe rust control are available and have proven to be very effective. The availability of fungicides allows club wheat growers in rust infested areas to make a decision when choosing winter wheat varieties for the 1984-85 growing season. A grower may decide to grow and spray a rust-susceptible club wheat with a proven yield in his area, or to grow a rust-resistant common or club variety with a lower yield potential or an unproven yield record.

To assist in making this decision, agronomic, disease, and yield data on the club wheats and the better dryland common wheats are provided in Tables 1, 2 and 3, respectively. Yield information is only available for selected varieties and is taken from variety trials conducted over several locations by Chuck Crampton. In addition, brief variety descriptions of each club variety are given below.

No attempt has been made to make a variety recommendation as growing conditions vary considerably across the Columbia Basin; however, an effort has been made to point out the strengths and weaknesses of each variety.

## VARIETIES

### Barbee

Barbee is a bearded, brown-chaffed, semi-dwarf wheat released in 1976 by Washington State University. It equals Moro in test weight and winter hardiness. Compared to Paha, Barbee is slower to emerge, about six inches shorter, and very resistant to lodging. Barbee matures about two days later than Paha; therefore, it may be too late for most of the club wheat-growing areas of northeastern Oregon. It is resistant to smut, but susceptible to stripe rust and Cercospora foot rot. The baking quality of its flour is very good, but milling quality is similar to that of Nugaines and not as good as that of Faro or Moro.

### Crew

Crew is a multiline variety of club wheat made up of a blend of 10 components which have resistant, intermediate, or susceptible reactions to the prevalent races of stripe rust. It is heterogenous for plant height, chaff color, and heading date because of inherent differences among its components. Crew equaled or exceeded Faro for stand establishment, cold hardiness, and lodging resistance. In tests at Moro and Pendleton, the yield and test weight of Crew have been about equal to the yield and test weight of Faro. Most of the components head about two days later than Faro. The milling and baking quality of Crew is similar to that of Faro. Crew was developed cooperatively by Agricultural Research Service, U.S. Department of Agriculture, the Washington Agricultural Research Center, and the Oregon Agricultural Experiment Station. Crew was released in 1981.

### Daws

Daws is a bearded, white-chaffed, semi-dwarf wheat released in 1976. Grain test weight is about 2 lb/bu lower than that of Nugaines. Daws is more winter-hardy than any other soft, white, winter wheat variety grown in the Pacific

Northwest. Seedling emergence is poorer than that of Nugaines. Daws is resistant to lodging. Plant height and maturity date are similar to Nugaines. Daws has adult resistance to stripe rust and is resistant to most races of smut, but is susceptible to Cercospora foot rot and to leaf rust. Milling and baking quality is good (similar to Nugaines).

#### Faro

Faro is a soft white, beardless, brown-chaffed wheat released in 1976 by Oregon State University. It is exceptionally well-adapted to the lower rainfall areas of eastern Oregon where club wheats commonly are grown and is recommended as a replacement for Moro and Paha. Compared to Moro, it is equal in test weight, superior in lodging resistance, and four to seven inches shorter. Faro is slightly shorter than Paha which it resembles in growth habit, winterhardiness, seedling emergence, and lodging resistance. Faro is earlier maturing than Paha so that it often ripens before the heat of summer. Faro is susceptible to stripe rust and moderately resistant to smut, but very susceptible to leaf rust. It has good milling and baking quality.

#### Jacmar

Jacmar is a soft white, beardless, brown-chaffed wheat released in 1979. It is very well-adapted to the lower rainfall areas of eastern Oregon where club wheat commonly are grown. Compared to Faro, it is about 1 pound lower in test weight, superior in lodging resistance, and one to three inches shorter. Jacmar is susceptible to stripe rust. It appears to be similar to Faro in winterhardiness and seedling emergence. Jacmar matures about the same as Faro; therefore, it often ripens before the heat of summer. It has good milling and baking quality.

#### Moro

Moro is a beardless, brown-chaffed, medium-tall wheat released by Oregon State University in 1965. It is best adapted for growing in the lower rainfall areas of eastern Oregon where its taller straw may be desirable for erosion control. Test weight is medium-low and maturity is medium-early. Although seedling emergence is good, plants are somewhat susceptible to lodging. Moro which is resistant to smut, but is very susceptible to leaf rust has moderate susceptibility to stripe rust. Milling and baking quality is good.

#### Paha

Paha is a short-strawed, beardless, brown-chaffed, club wheat released by Washington State University in 1970. In comparison to Moro, its test weight is heavier and lodging resistance superior. Paha has some resistance to Cercospora foot rot, but is susceptible to both stripe and leaf rusts and is very susceptible to flag smut. Faro, due to its earlier maturity, has replaced Paha in many club wheat growing areas in Oregon.

#### Stephens

Stephens is a bearded, white-chaffed, semi-dwarf wheat released in 1977. Heads are distinctly coarse in appearance with beards which tend to flare.

Grain test weight is about 3 lb/bu less than Nugaines and equals that of Hyslop and McDermid. Winterhardiness and seedling emergence of Stephens are similar to those of Hyslop. Stephens is about one inch taller than Hyslop and is resistant to lodging. It matures slightly earlier than McDermid. Stephens has adult plant resistance to stripe rust and above average resistance to leaf rust. Stephens appears to have some tolerance to Cercosporiella foot rot. It has an outstanding yield record as evidenced by its yield superiority across environmentally diverse locations for several years. Milling and baking quality is good.

### Tres

Tres is a semi-dwarf, awnless, white-chaffed club wheat released by Washington State University in 1983. Tres carries genes for moderate resistance to the three main foliar diseases of club wheat -- stripe rust, leaf rust and powdery mildew -- hence the name. Tres is one of the 10 components of Crew. Tres is slightly taller than Tyee and Crew and is similar to Crew and Faro in lodging resistance. Winterhardiness is superior to that of Faro. Stephens emergence is similar to Faro or Tyee. Tres has good yield potential and does particularly well under higher yielding conditions. It is the variety of choice where leaf rust is a problem.

### Tyee

Tyee is a beardless, white-chaffed wheat released in 1979. Grain test weight is about 0.2 lb/bu lighter than Faro. It grows about two inches taller than Faro and resists lodging. Tyee has satisfactory winterhardiness, but has only average seedling vigor. It is resistant to common bunt, but is susceptible to flag smut, stripe rust, leaf rust, and mildew. Tyee has tolerance to Cercosporiella foot rot. It has good club wheat milling and baking quality. Tyee has a yield potential exceeding that of Paha, Moro, and Barbee. Yields are equivalent to Faro in most environments.

Table 1. Agronomic data for several club and common wheat varieties.

	Released		Agronomic Characteristics							
	Yr	St	Emrg <sup>1</sup>	Wntr <sup>1</sup> Hard	Head <sup>2</sup> Date	Hgt <sup>3</sup>	Lodg <sup>4</sup>	Test <sup>1</sup> Wgt.	Awns <sup>5</sup>	Glume <sup>6</sup>
BARBEE	1976	WA	5	5	M-L	SD	R	5	A	B
CREW <sup>7</sup>	1981	WA	6	6	M	SD	MR	5	ALS	W-B
DAWS	1976	WA	4	8	M	SD	R	7	A	W
FARO	1976	OR	6	5	E-M	SD	R	5	ALS	B
JACMAR	1978	PR <sup>9</sup>	5	7	E-M	SD	R	5	ALD	B
MORO	1965	OR	8	5	E-M	MT-T	MS	5	ALS	B
PAHA	1970	WA	6	5	M	S	R	6	ALD	B
STEPHENS	1977	OR	5	3	E-M	SD	R	7	A	W
TRES	1984	WA	5	6	M	SD	R	7	ALS	W
TYEE	1979	WA	5	6	M	SD	R	5	ALS	W

<sup>1</sup> Scale of 1 to 10, 5 =adequate

<sup>2</sup> E=early, M=midseason, L=late

<sup>3</sup> SD=semi-dwarf, S=short, MT=midtall, T=tall

<sup>4</sup> S=susceptible, R=resistant, T=tolerant, M=moderately

<sup>5</sup> A=awned, ALD=awnletted, ALS=awnless

<sup>6</sup> W=white, B=brown

<sup>7</sup> Crew is a multiline variety containing ten components, some of which are susceptible to the rust diseases.

Table 2. Disease ratings for several club and common wheat varieties.<sup>1</sup>

Variety	Rust		Bunt		Flag Smut	Ceph <sup>2</sup> Strp	Sept- Oria	Foot Rot	Take All
	Strp	Leaf	Comm	Dwrf					
BARBEE	S	S	R	MS	MS	MR	--	S	S
CREW <sup>4</sup>	MR-S	MR	MR	S	MS	MS	--	T	S
DAWS	MR	MS	R	S	MS	MR	MS	T	S
FARO	S	S	R	S	MS	S	MS	MS	S
JACMAR	S	S	R	-- <sup>5</sup>	MS	MS	MT	T	S
MORO	S <sup>3</sup>	S	R	R	MR	MR	--	MS	S
PAHA	S	S	R	S	S	MR	--	T	S
STEPHENS	R	MR	R	S	MS	S	MS	MR	S
TRES <sup>6</sup>	MR	MR	MR	S	S	MS	--	MT	S
TYEE	S <sup>3</sup>	S	R	S	S	MR	--	T	S

- 1 R=resistant, MR=moderately resistant, MS=moderately susceptible, S=susceptible, S=susceptible, T=tolerant, MT=moderately tolerant, -- = reaction unknown
- 2 Resistance to cephalosporium seems to vary with environment. Resistance may be due to morphological growth patterns rather than true genetic resistance.
- 3 These two varieties have shown some resistance.
- 4 Crew is a multiline variety composed of ten separate lines, some of which are rust susceptible.
- 5 Omar, the parent cultivar of Jacmar, was resistant to dwarf bunt.
- 6 Resistant to powdery mildew; Tres = resistance to three foliar diseases

Table 3. Yield data of winter wheat varieties tested in the lower yielding areas of eastern Oregon, 1978-1983.

Variety	Pilot		Echo	Lxngtn	Hpnr	Arlngtn	Condon	Average
	Moro	Rock						
	(bushels per acre)							
Crew	47.8	40.5	31.6	40.1	37.9	41.0	35.7	39.2
Daws	49.4	40.9	29.4	37.7	39.4	36.6	34.9	38.3
Faro	51.7	37.3	33.5	40.4	41.4	41.5	32.2	39.7
Jacmar	53.9	37.6	31.2	38.2	36.4	43.6	35.6	39.5
Stephens	55.5	43.0	32.4	43.5	43.1	40.9	32.9	41.6
Tyee	51.5	41.6	29.1	38.6	43.2	39.0	34.3	39.6