



# Clara CL Hard White Wheat

**Terry J. Martin**  
Wheat Breeder (Retired)  
Agricultural Research Center—Hays

**Guorong Zhang**  
Wheat Breeder  
Agricultural Research Center—Hays

**Allan K. Fritz**  
Wheat Breeder  
Department of Agronomy

**James P. Shroyer**  
Crop Production Specialist  
Department of Agronomy

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Publications from Kansas State University are available at:  
[www.ksre.ksu.edu](http://www.ksre.ksu.edu)

Publications are reviewed or revised annually by appropriate faculty to reflect current research and practice. Date shown is that of publication or last revision. Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Terry J. Martin, *Clara CL Hard White Wheat*, Kansas State University, May 2013.

**Kansas State University  
Agricultural Experiment Station  
and Cooperative Extension Service**

L931

May 2013

K-State Research and Extension is an equal opportunity provider and employer. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, John D. Floros, Director.

**Clara CL** is a new, hard white winter wheat variety developed and released by the Kansas Agricultural Experiment Station. Clara CL carries a single gene for resistance to Beyond herbicide. Foundation seed was distributed to seed producers in 2012. Registered and certified seed will be available in 2013.

**Origin and development.** Clara CL is selected from the cross KS03HW154/KS03HW1. Parent KS03HW154 is a sister line to RonL and KS03HW1 contributes herbicide resistance. The cross was made during the winter of 2002 at the Agricultural Research Center — Hays. Clara CL was developed using a modified bulk breeding method. Clara CL has been tested in replicated yield trials since 2009 under its experimental designation of KS08HW35. It was tested regionwide in the 2011 Southern Regional Performance Nursery and in the 2012 Kansas Winter Wheat Performance Test. Besides yield trials, Clara CL was tested for herbicide tolerance in the one gene Clearfield qualification trials in 2010 and 2011. The development of Clara CL was supported partially by grants from the Kansas Wheat Commission and BASF.

**Agronomic characteristics.** Clara CL is an awned, white-chaffed, hard-white seeded wheat variety. It is medium late and medium tall (one day earlier and slightly shorter than Danby) and has fair straw strength. Clara CL's coleoptile length is average for a semi-dwarf variety and it has good winter hardiness. Clara CL has good tolerance to both grain shattering and preharvest

sprouting (slightly less than Danby). Its acid soil reaction is moderately susceptible. Ratings for agronomic characteristics of Clara CL and other varieties are given in Table 1.

**Resistance to pests.** Clara CL has resistance to leaf rust, stem rust, and wheat streak mosaic virus. It had good stripe rust resistance in 2010, but it was intermediate in 2012 because of the race change in stripe rust. Clara CL is moderately resistant to soilborne mosaic virus and Hessian fly. Clara CL is moderately susceptible to barley yellow dwarf mosaic virus and tan spot, and is susceptible to Russian wheat aphid. A summary of pest resistance for Clara CL and other varieties is presented in Table 1.

**Area of adaptation.** Clara CL is best adapted to dryland production in western Kansas. Its performance has been better than or equal to the performance of most wheat varieties in that area since 2009 (Table 2 and 3). Its performance under irrigation has not been thoroughly tested. Clara CL performed well in central and eastern Kansas in 2011 but due to a stripe rust race change, did not perform well in 2012.

### Milling, baking, and noodle characteristics.

Clara CL has excellent test weight, which is similar to Danby (Tables 2 and 4). Its flour extraction rate and protein level have been equal to those of Tiger. Overall baking quality is usually better than that of Danby. Clara CL has longer mixing time, more mixing tolerance, and higher baking absorption than Danby. Its crumb grain and texture, and loaf volume are also better than those of Danby.

The Asian noodle quality of Clara CL was evaluated in 2011 by the Wheat Quality Council. Its color stability is not as good as Tiger, making it less desirable for alkaline noodles. This is due to its intermediate to high level of polyphenol oxidase. It was, however, rated as good flour for white salted noodles (Japanese Udon-type) because of its bright color, chewiness, and high water uptake.

**Table 2.** Yield and test weight (TW) summary for Clara CL and selected varieties from western Kansas dryland locations<sup>1</sup> of the Kansas Wheat Performance Test in 2012.

Entry	Class	Yield (bu/a)	TW (lb/bu)
Clara CL	HWW	43.4	58.6
Danby	HWW	44.6	57.8
TAM111	HRW	43.2	57.0
TAM112	HRW	44.0	55.4
PostRock	HRW	46.4	57.4
Fuller	HRW	42.8	57.8
Hatcher	HRW	40.2	58.2
T158	HRW	43.8	58.6

<sup>1</sup>Five locations: Hays, Colby, Tribune, Larned, Dodge

**Table 3.** Yield (bu/a) summary for Clara CL and selected varieties in Kansas breeding program yield trials at dryland locations in western Kansas.

Entry	2011	2010	2009
Clara CL	69.4	73.3	69.8
Danby	63.4	61.5	72.5
Hatcher	62.2	68.7	69.0
Bill Brown	61.1	—	—
Armour	58.9	70.6	72.6
Tiger	55.2	67.0	68.0
TAM112	—	63.3	—

—: not tested

**Table 4.** Test weight (lb/bu) of grain produced by Clara CL and selected varieties in Kansas breeding program yield trials at dryland locations in western Kansas.

Entry	2011	2010	2009
Clara CL	61.4	63.0	62.5
Danby	62.1	63.2	64.0
Hatcher	60.1	61.7	62.4
Bill Brown	60.3	—	—
Armour	58.4	60.2	61.1
Tiger	59.5	61.8	61.6
TAM112	—	61.1	—

—: not tested

**Table 1.** Agronomic and pest resistance characteristics for Clara CL and other varieties.

Variety	Class	Maturity	Test weight	Coleoptile rating	Winter hardiness	Lodging resistance	Shatter resistance	Sprouting tolerance	SBMV <sup>2</sup>	WSMV <sup>3</sup>	BYDV <sup>4</sup>	Stripe <sup>5</sup> rust	Leaf rust	Stem rust	Speckled				
															leaf blotch	Tan spot	Powdery mildew	Hessian fly	Russian aphid
Clara CL	HWW	3	3	5 <sup>1</sup>	3	5	3	4	4	2	7	5	2	1	—	7	—	4	9
Danby	HWW	3	3	5	3	4	2	3	7	5	8	8	8	2	6	8	7	9	9
RonL	HWW	3	3	5	3	4	2	9	4	2	7	—	7	6	6	7	5	9	9
Tiger	HWW	3	4	5	3	4	3	9	2	6	7	9	2	3	7	7	5	2	9
Armour	HRW	1	4	3	5	3	1	3	1	6	6	7	5	3	6	5	2	6	9
Bill Brown	HRW	2	4	4	5	4	3	3	8	7	7	8	2	8	6	8	4	7	9
Hatcher	HRW	3	4	6	6	6	2	3	7	8	7	5	7	3	5	5	5	6	9

<sup>1</sup>Rating based on 1-9 scale where 1=resistance or the best and 9=susceptible or poorest, except for maturity where 0=earliest and 9=latest.

<sup>2</sup>SBMV – Soilborne mosaic virus.

<sup>3</sup>WSMV – Wheat streak mosaic virus.

<sup>4</sup>BYDV – Barley yellow dwarf mosaic virus.

<sup>5</sup>Stripe rust ratings are based on 2012 reaction

— not rated