

UI 228 and UI 239—New Small Red Bean Cultivars

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UI 228 and UI 239 are small red bean cultivars released in 1993. UI 228 is an early-maturing cultivar with a semi-erect growth habit that yields well under adverse field conditions. UI 239 is a high-yielding, early-maturing small red cultivar similar to NW 63. UI 228 possesses excellent canning characteristics, and UI 239 has better-than-average canning qualities.

Pedigree

UI 228 and UI 239 were developed by the Idaho Agricultural Experiment Station at Kimberly. UI 228 is a selection made by John Kolar from the 1970 cross AR 8-5/D-80. AR 8-5 is a small red cultivar developed by Doug Burke at Prosser, Washington. AR 8-5 is high yielding, has medium to late maturity, and is root rot tolerant. D-80 is a great northern cultivar from the Campbell's Soup program selected for excellent rapid and uniform soaking qualities. D-80 yields and maturity are similar to those of UI 59.

UI 228 was tested in advanced yield trials at Kimberly and Parma, Idaho, from 1986 through 1993, and in the 1984 Cooperative Dry Bean Nursery at 18 locations. It also was tested in yield trials in Michigan in 1989, 1990, and 1993 and was grown in New York yield trials in 1989 and 1990. UI 228 was previously tested under the experimental designation K0228.

UI 239 is an F₆ selection made in 1984 from the 1978 cross NW 63/2/UI 36/Viva. UI 36 is a small red cultivar released by the Idaho Agricultural Experi-

ment Station in 1963. UI 36 has intermediate maturity and yield. Viva is a pink cultivar with small seed size and high yield. NW 63 is a high-yielding, early-maturing, small red cultivar. Viva and NW 63 were developed by the USDA-ARS at Prosser, Washington.

UI 239 was tested in advanced yield trials at Kimberly and Parma, Idaho, from 1986 through 1993, and in the Cooperative Dry Bean Nursery at 15 locations in 1993 and 28 locations in 1994. UI 239 was previously tested under the experimental numbers 52039 and 6202.

Disease reaction

UI 228 and UI 239 were tested for resistance to bean common mosaic virus (BCMV) at Kimberly in 1992. UI 228 is resistant to NL-8 and NY-15 BCMV strains but susceptible to NL-3 and Mexican strains. This reaction suggests that UI 228 possesses *bc-1²* resistance.

UI 239 is resistant to NL-8 and NY-15 BCMV strains but susceptible to the Mexican strain. UI 239 showed a variable reaction to NL-3, NL-5, and Western BCMV strains. These reactions suggest that UI 239 possesses *bc-1²* resistance with an unknown factor that gives tolerance to pathogroups 4 and 6.

UI 228 and UI 239 were tested in the 1993 Uniform Dry Bean Rust Nursery. In trials at Beltsville, Maryland; North Platte, Nebraska; and Saginaw, Michigan, UI 228 and UI 239 were very susceptible to rust [*Uromyces appendiculatus* (Pers.:Pers.)

Table 1. Growth habit of small red beans grown at Kimberly and Parma, Idaho.¹

Cultivar	Kimberly					Parma					Combined mean	
	1993	1992	1991	1990	Mean	1993	1992	1991	1990	Mean		
UI 228	33	33	33	32	33			33	33	33	33	33
UI 239	33	32	33	33	33			33	33	31	31	32
NW 63	33	33	31	33	33			34	34	32	33	33
NW 59	33	33	31	33	33			33	34	31	33	33

¹ First digit indicates vine type: 1=determinate bush; 2=upright short vine; 3=floppy vine. Second digit indicates vine length.

Unger]. UI 228 was moderately susceptible to air pollution injury, while UI 239 was very susceptible.

No symptoms of curly top virus have been observed in either UI 228 or UI 239 in trials in Idaho and Washington.

Description

UI 228 plants have a Type III growth habit (CIAT classification, Table 1) with very short vines. UI 228 main stems are semi-erect and pods are set mid-plant, holding them off the ground better than other small red cultivars with pods set lower on the stem. UI 228 plants also have larger leaves than most other small red cultivars.

UI 239 plants have a floppy short vine growth habit (CIAT classification Type IIIA, Table 1). Vine length in UI 239 plants is shorter than in NW 59 and NW 63. Lodging is similar to that of NW 59 and NW 63 (Table 2). UI 239 leaf shape, size, and color is similar to NW 59 and NW 63.

Performance

UI 228 and UI 239 were tested in advanced yield trials at Kimberly and Parma, and in the Cooperative Dry Bean Nursery to determine seed size, maturity, seed yield, and yield efficiency. Yield efficiency is a measure of reproductive growth rates and was calculated as seed yield divided by days to maturity.

In the Kimberly trials, UI 228 seed size was larger than UI 239, NW 59, or NW 63 (Table 3). At Parma, UI 228 seed size was similar to NW 63. Both UI 228 and NW 63 had larger seed than either UI 239 or NW 59. UI 239 seed size at Kimberly was very similar to NW 59 seed size. At Parma, UI 239 seed was smaller than UI 228 and NW 63 but larger than NW 59. UI 228 mean seed size was 1,460 seed/lb in data combined from both locations, while UI 239 mean seed size was 1,520 seed/lb.

UI 228 matured 87 days after planting in Idaho, 2 days earlier than NW 63 and 4 days sooner than NW 59 (Table 4). UI 239 required 89 days to reach maturity.

Table 2. Lodging of small red beans grown at Kimberly and Parma, Idaho.²

Cultivar	Kimberly						Parma						Combined mean
	1993	1992	1991	1990	1988	Mean	1993	1992	1991	1990	1988	Mean	
UI 228	3.4	3.7	3.0	3.3	4.1	3.5	2.7	4.0	4.4	3.6	3.5	3.6	3.6
UI 239	4.1	4.3	4.0	3.4	4.5	4.1	4.0	5.0	4.5	4.1	4.1	4.3	4.2
NW 63	4.0	4.0	4.0	2.9	4.4	3.9	3.0	4.0	4.1	4.1	4.1	3.9	3.9
NW 59	4.2	4.0	4.1	3.0	4.3	3.9	4.0	5.0	4.5	4.2	4.6	4.5	4.2

² Lodging scale: 1=erect; and 5=prostrate.

Table 3. Seed size of small red beans grown at Kimberly and Parma, Idaho (seed/lb).

Cultivar	Kimberly						Parma						Combined mean
	1993	1992	1991	1990	1988	Mean	1993	1992	1991	1990	1988	Mean	
UI 228	1,329	1,324	1,252	1,517	1,673	1,419	1,432	1,379	1,572	1,456	1,625	1,493	1,456
UI 239	1,596	1,423	1,341	1,620	1,638	1,524	1,548	1,455	1,570	1,461	1,539	1,515	1,519
NW 63	1,398	1,407	1,326	1,455	1,607	1,439	1,392	1,427	1,560	1,488	1,583	1,490	1,464
NW 59	1,474	1,460	1,407	1,584	1,633	1,512	1,580	1,597	1,662	1,453	1,694	1,597	1,554

Table 4. Physiological maturity of small red beans grown at Kimberly and Parma, Idaho (days after planting).

Cultivar	Kimberly						Parma						Combined mean
	1993	1992	1991	1990	1988	Mean	1993	1992	1991	1990	1988	Mean	
UI 228	101	89	85	83	87	89	89	88	84	82	80	85	87
UI 239	105	90	87	91	88	92	92	89	86	82	82	86	89
NW 63	103	90	86	91	90	92	90	90	85	84	84	87	89
NW 59	107	91	87	91	92	94	92	91	88	88	86	89	91

UI 228 seed yields at Kimberly and Parma were less than UI 239, NW 63, and NW 59 (Table 5). In data combined from both locations, UI 228 yielded 2,798 lb/acre. UI 239 seed yields at Kimberly were greater than NW 63 and slightly less than NW 59. At Parma, UI 239 yields were less than NW 63 and NW 59 yields. Combined data from both locations showed that UI 239 yielded 3,171 lb/acre.

Yield efficiency values for UI 228 were slightly less than UI 239, NW 59, and NW 63 (Table 6). UI 239 and NW 59 yield efficiencies were higher than either UI 228 or NW 63. At Parma, UI 239 yield efficiency was the same as NW 63 and less than NW 59. Combined data for yield efficiency showed that UI 239 yield efficiency is very similar to NW 63 and less than NW 59.

UI 228 and UI 239 were tested in 1992 canning trials by American Fine Foods and at Kimberly. UI 228 also was tested for cooking qualities by Michigan State University. UI 228 demonstrated better canning characteristics than any other small red cultivar. UI 228 remains uniformly red when cooked, beans do not split or clump, and canning liquor is comparatively starch-free. UI 239 demonstrated acceptable canning qualities, with fewer split seeds than NW 63.

UI 228 combines excellent canning qualities with early maturity, a semi-erect growth habit, and acceptable seed yields in Pacific Northwest production. UI 228 also is well adapted for small red bean production outside the Pacific Northwest. UI 239 is a high-yielding, early-maturing, small red bean cultivar with improved canning qualities.

Foundation class UI 228 and UI 239 seed will be available to producers in 1995 through the Idaho Foundation Seed Program, Kimberly Research and Extension Center, Kimberly, Idaho.

Plant Variety Protection (PVP), with the Title V option, is pending for UI 228 and UI 239. Under Title V, UI 228 and UI 239 may be sold only as a class of certified seed.

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Table 5. Seed yields of small red beans grown at Kimberly and Parma, Idaho (lb/acre).

Cultivar	Kimberly						Parma						Combined mean
	1993	1992	1991	1990	1988	Mean	1993	1992	1991	1990	1988	Mean	
UI 228	2,597	3,688	2,881	2,824	2,163	2,831	3,376	3,152	2,608	2,423	2,272	2,766	2,798
UI 239	3,058	3,458	3,517	3,383	2,603	3,204	3,523	3,297	3,389	2,893	2,655	3,151	3,178
NW 63	2,634	3,615	3,652	2,886	2,539	3,065	3,741	3,603	3,041	2,567	2,902	3,171	3,118
NW 59	2,952	3,782	3,661	4,011	2,466	3,374	4,060	3,624	3,241	2,714	3,100	3,348	3,361

Table 6. Yield efficiencies of small red beans grown at Kimberly and Parma, Idaho (lb/acre/day).

Cultivar	Kimberly						Parma						Combined mean
	1993	1992	1991	1990	1988	Mean	1993	1992	1991	1990	1988	Mean	
UI 228	25.7	41.4	33.9	34.0	24.9	32.0	37.9	35.8	31.0	29.5	28.4	32.5	32.3
UI 239	29.1	38.4	40.4	37.2	29.6	34.9	38.3	37.0	39.4	35.3	32.4	36.5	35.7
NW 63	25.6	40.2	42.5	31.7	28.2	33.6	41.6	40.0	35.8	30.6	34.5	36.5	35.1
NW 59	27.6	41.6	42.1	44.1	26.8	36.4	44.1	39.8	36.8	30.8	36.0	37.5	37.0

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