



University of Idaho
College of Agriculture
Cooperative Extension Service
Agricultural Experiment Station

Current Information Series No. 319
January 1977

LIBRARY

JUN 15 1977

UNIVERSITY OF IDAHO

UI 76

*A small white navy bean
developed in Idaho*

John J. Kolar, Research Agronomist Marshall J. LeBaron, Agronomist and Superintendent
University of Idaho Research and Extension Center, Kimberly

The small white navy or pea bean is the major dry edible bean produced in the United States, composing approximately 30 percent of the total dry bean production. It has been the leading dry bean in the export trade for many years, going principally to the North European market. It is also one of the most popular dry beans in domestic trade, used principally for packaging and canning.

Although the production center of navy beans has been and will continue to be in Michigan, considerable interest has been expressed by the canning industry in developing production in other bean growing areas. The West Coast canning trade is especially interested in a source of small white beans produced closer to their processing facilities so that transportation costs could be reduced and the supply of beans would be more stable.

In Idaho, the production of small white navy beans has been limited with most of the acreage devoted to production of seed for use in other areas. A greater demand for Idaho-grown navy beans for the seed and canning trade is anticipated.

"UI 76" is a white navy bean variety released by the Idaho Agricultural Experiment Station in December 1976. The information provided here summarizes its pedigree, its characteristics and its performance in trials in Idaho and other states. These tests indicate that UI 76 has the potential to perform satisfactorily in most major dry bean growing areas of the United States. However, it is not recommended for areas where Curly Top virus is a problem since it is not resistant to this disease.

Pedigree and Plant Description

UI 76 was selected from the progeny of a cross of PI 282057 with Idaho Experimental Line 4792. The cross was made in 1965 by the late Dr. Lucien Laferriere and single

plant selections were made by Dr. Laferriere and his successors. PI 282057 is a late maturing plant introduction from Chile with numerous pods and very small white seeds. Experimental Line 4792 is a late maturing, small white line developed by the University of Idaho, which has not been released for production.

UI 76 was tested in the Cooperative Dry Bean Nursery trials and other tests together with its sister lines XSW36 and XSW37. UI 76 was given preference over its sister lines because of its superior performance in most areas.

UI 76 has a semi-vining plant habit. It is medium in size and medium green in color. Plants are less viney than Bonus and Chief but have more vine than Sanilac and other recent Michigan pea bean varieties. Pods are numerous and have 4 to 7 seeds per pod, averaging over 5 seeds per pod.

Disease Reaction

UI 76 is resistant to the Type and A strains of bean common mosaic. No symptoms of the mosaic virus were observed in inoculated plants of UI 76 in the field or greenhouse. The new variety is moderately susceptible to Curly Top virus. In tests at Prosser, WA, UI 76 had 20 to 50 percent Curly Top infected plants compared to 85 to 100 percent infection of the adjacent susceptible Tendercrop.

White mold has not been a severe problem with UI 76 in Idaho when compared to some other dry bean varieties that are more viney or later in maturity. It is not resistant to this pathogen, but is damaged less because of its smaller plant size and maturity.

UI 76 is not resistant to root rot but has some tolerance. Root rot severity of UI 76 rated 2.5 compared to 2.3 for Sanilac, 3.5 for 6R395 and 3.3 for Bonus, based on a scale of 1 resistant to 5 very susceptible.

Maturity

Table 1 compares the number of days from planting to harvest for UI 76 with other small white varieties grown in Idaho and other states. UI 76 and Sanilac required an average of 100 days to reach maturity in Idaho compared to 109 days for Bonus and Chief. The average maturity of UI 76 in the U.S. was similar to that observed in Idaho. Days needed to complete maturation, which ranged from 80 to 124 days for UI 76 compared with 100 to 127 for Chief, were strongly influenced by location and year.

Yield

In yield tests of small white lines and varieties at Parma and Kimberly, UI 76 yielded slightly less than Bonus and slightly more than 6R395, a Washington experimental line being considered for release. Average yields of these three varieties were slightly higher than Chief, Sanilac and Kentwood, and significantly higher than Aurora and Seafarer (Table 2).

Yield comparisons of UI 76 with other selected varieties in the Cooperative Dry Bean Nursery and other tests in the United States are presented in Table 3. The average yield of UI 76 was superior to any other small

white variety, equal to Great Northern UI 59 but less than Pinto UI 111 and UI 114. The overall performance of UI 76 in all tests to date show it is superior to most other varieties when paired comparisons are made. As shown in Table 3, yields of UI 76 were equal to or greater than Sanilac in 21 of 22 tests or 95 percent of the tests. Its advantage over other varieties are indicated in the table. Only Pinto UI 111 and UI 114 showed yield superiority over UI 76 in the majority of tests.

Seed Size, Protein Content, Cooking Quality

The seed of UI 76 is slightly smaller than that of Sanilac and many other commercial varieties. The average number of seeds per pound and the range of seed size from 19 locations is shown in Table 4. UI 76 was intermediate in size to Kentwood and 6R395, the largest seeded small white varieties, and Aurora which had the smallest seed size.

Determinations of seed protein and cooking quality were made by the Campbell Research Institute. UI 76 was intermediate in average protein content when compared to other varieties at 5 locations. Standard canning tests showed UI 76 to be satisfactory in size, shape, flavor, texture, and water pickup (Table 4).

Table 1. Range of maturity and average maturity in days from planting to harvest of selected bean varieties in Idaho and other states, 1972-1975.

Variety	Range and average maturity in days																			
	New York			Minnesota			Nebraska		Kansas		Wyoming		Idaho		Washington		North Dakota		All locations	
	Range	Avg		Range	Avg		Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg
UI 76	80-105	95		98-105	101		92	93-103	98	106-120	113	95-106	100	93-95	94	102-124	111	80-124	101	
6R395	80-95	89		86-97	91		92	91-99	95	103-119	111	91-103	97	90-95	93	96-122	109	80-122	97	
Chief	100-127	113		116-126	120		100	103-110	107	113-122	118	104-114	109	100	100	—	—	100-127	110	
Bonus	100-120	111		108-124	116		104	103-108	106	109-122	116	104-114	109	95-100	98	—	—	95-124	108	
Aurora	83-111	98		96-103	96		92	97-103	100	105-117	111	94-106	101	95	95	—	—	83-117	99	
Sanilac	—	—		93-103	98		—	—	—	—	—	95-106	100	—	—	102-127	112	93-127	103	
Seafarer	—	—		85-92	89		—	—	—	—	—	93-103	98	—	—	95-117	105	85-117	97	
Kentwood	—	—		105-114	110		—	—	—	—	—	96-106	99	—	—	—	—	96-114	105	

Table 2. Maturity and seed yields in pounds per acre of UI 76 and several other small white bean varieties grown in Idaho.

Variety	Maturity ¹												Yield (pounds per acre)											
	Parma			Kimberly			State		1972			1973			1974			Kimberly ²			State			
	Range	Avg		Range	Avg		avg	1972	1973	1974	1975	Avg	1972	1973	1974	1975	1974 ²	1975 ²	Avg	1974	1975	Avg		
UI 76	95-103	99		95-106	102		100	3809	3218	2919	2924	3218	3509	3637	3058	3468	2738	3358	3295	3257	3257	3215		
6R395	91-103	97		93-103	98		97	3759	3377	3292	3002	3358	3437	3289	2625	3312	2759	3006	3071	3215	3215	3215		
Chief	104-114	109		104-113	111		109	3561	3382	2750	3550	3314	3230	2371	2639	3248	2913	2711	2852	3083	3083	3083		
Bonus	104-114	109		104-113	108		109	3055	3427	3069	3746	3324	3511	3954	2859	3520	3078	3698	3437	3381	3381	3381		
Aurora	100-103	102		94-106	102		101	—	1749	2042	2604	2132	3261	3584	2713	3290	2700	3210	3126	2629	2629	2629		
Sanilac	95-103	99		99-106	103		100	2115	2558	2766	2870	2577	2827	3443	2811	3154	—	—	3058	2818	2818	2818		
Seafarer	93-103	98		96-101	99		98	1397	2100	2357	2726	2149	2863	3185	2578	3152	—	—	2945	2547	2547	2547		
Kentwood	96-103	100		96-106	100		99	—	—	2999	2768	2884	—	2608	2821	3500	—	—	2976	2930	2930	2930		
L.S.D. (.05)								958	187	472	300		517	570	282	272								

¹Maturity in days from planting to harvest, 1972-1975.
²Duplicate data for 1974 and 1975 are from two yield tests, one, the regular small white yield test and the other, the Cooperative Dry Bean Nursery.

Table 3. Yields of dry bean varieties in pounds per acre and as percentage of UI 76 yields, U.S. tests, 1972-1975.

Variety	Western ¹ Region		North Central Region		Central Region		Eastern Region		All States		Tests in which UI76 equal to or superior to other varieties	
	No. tests	Yield lb./A UI76 % of	No. tests	Yield lb./A UI76 % of	No. tests	Yield lb./A UI76 % of	No. tests	Yield lb./A UI76 % of	No. tests	Yield lb./A UI76 % of	Variety	No. Tests %
6R395	14	2861 98.6	17	1711 98.1	13	1854 86.5	9	2041 98.6	53	2106 95.5	6R395	34 66
Chief	14	2802 96.5	9	1444 95.8	13	1659 77.4	9	2241 108.3	45	2088 93.3	Chief	28 62
Bonus	14	2967 102.2	9	1397 92.7	13	1889 88.1	9	2078 100.4	45	2164 96.7	Bonus	25 55
Aurora	13	2450 86.5	9	1407 93.4	13	1671 77.9	9	2221 107.3	44	2015 91.6	Aurora	29 66
Sanilac	8	2818 84.9	13	1578 84.3	0	—	1	1516 108.1	22	2026 83.6	Sanilac	21 95
Seafarer	8	2545 76.7	10	1425 71.5	0	—	1	1328 94.7	19	1891 78.2	Seafarer	17 89
Kentwood	5	2939 91.8	5	1506 108.6	0	—	0	—	10	2222 96.9	Kentwood	7 70
UI59	5	2322 98.1	6	1550 114.1	13	2075 96.8	8	1985 92.9	32	1993 99.8	UI59	19 59
UI111	5	2589 109.3	6	1509 111.0	13	2412 112.5	8	2317 107.1	32	2247 112.5	UI111	12 38
UI114	5	2762 116.0	6	1736 127.7	13	2385 111.2	8	2733 126.9	32	2409 120.6	UI114	10 31

¹States within each region and number of tests in each state:

- Western Region - Idaho (10), Washington (4)
- North Central - Montana (2), North Dakota (5), Minnesota (8), Illinois (1), Ohio (1)
- Central - Nebraska (4), Colorado (2), Wyoming (3), Kansas (3), New Mexico (1)
- Eastern - New York (8), New Jersey (1)

Table 4. Seed size, protein content and canning quality evaluations of several small white beans, 1972-1974.

Seeds/lb. (No.) ¹	Protein (%) ²				Canning Quality Evaluation ³			
	Range	Avg	Range	Avg	1973 Flavor	1973 Size	1973 Texture	1974 Water Pickup
UI76	2054-3153	2505	19.9-25.4	22.8	S ⁴	S	S	S
6R395	1716-2802	2193	20.8-25.6	23.2				Satisfactory; good size and shape
Chief	2225-3338	2663	17.0-24.7	23.2				Satisfactory; good size and shape
Bonus	2037-2948	2472	18.7-25.0	22.5				Size and shape of Calif. small white Soft; mushy
Aurora	2395-3661	3009	21.1-27.5	26.0		slightly		Satisfactory; elongated shape good size
Sanilac	1753-2910	2387	19.7-27.1	24.3	S	large	chewy	S
Seafarer	1981-2752	2306	21.3-26.7	25.6				Satisfactory; good size and shape
Kentwood	1657-2248	2001	18.8-21.7	21.0				Slightly soft; good size and shape

¹ Data from 19 tests

² Data from 6 tests

³ Protein content and canning evaluations courtesy of Campbell Research Institute

⁴ S = Satisfactory

Issued in furtherance of cooperative extension work in agriculture and home economics. Acts of May 8 and June 30, 1914, in cooperation with the U. S. Department of Agriculture. James L. Graves, Director of Cooperative Extension Service, University of Idaho, Moscow, Idaho 83843. We offer our programs and facilities to all people without regard to race, creed, color, sex, or national origin.