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'Starlight' —Great Northern Dry Bean

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The release of 'Starlight', a Great Northern dry bean cultivar (*Phaseolus vulgaris* L.), fulfills a need in western Nebraska for a cultivar with a relatively large seed size and a uniformly bright-white seedcoat (Korban et al., 1981). Foreign buyers of Great Northern beans desire a larger seed than the current predominant Great Northern cultivar Beryl (J.A. McGill, Jr., personal communication). In addition, the cultivar possesses improved architectural avoidance mechanisms to white mold disease (WMD) incited by *Sclerotinia sclerotiorum* (Lib.) de Bary (Coyne, 1980), a serious problem in some seasons in western Nebraska.

Origin

'Starlight' (evaluated as F₁₀ WM1-85-43) was derived by pedigree selection from a cross of the F₁ breeding lines GN-WM2-79-12 and GN-SK-80-45. These lines were derived from crosses of 'Tacaragua' from Venezuela (black seed, upright architecture, and resistance to rust) × GN Nebraska #1 selection 27 [resistant to common bacterial blight incited by *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye] and 'GN Emerson' (large white seed and moderate resistance to common blight) × 'Bulgarian White' (unadapted line with late maturity and large white seed), respectively. GN WM2-79-12 is resistant to rust, bean common mosaic virus (BCMV), and common bacterial blight and has a moderately upright and open habit of growth, which contributed to its avoidance of WMD. However, it has small seed with a dull-colored seedcoat. GN SK-80-45 has moderately early

maturity and large, uniform, bright-white, Great Northern-type seed with resistance to seedcoat cracking.

Description

'Starlight' has an indeterminate semi-upright plant habit (Type IIb) (Singh, 1982) with a fairly open plant canopy that provides an architectural mechanism for avoidance of WMD. 'Starlight' had a significantly lower WMD percentage than all other entries in 1985, but was only significantly different in WMD from one entry in 1988 and three entries in 1989 (Table 1). Data from 1986 and 1987 were not presented because of a low

WMD incidence due to irrigation problems and destruction of plots by hail, respectively. Yield of 'Starlight' was significantly higher than of Great Northern 'Harris' and 'Spinel' in 1985, 1988, and 1989 in the WMD test nurseries (Table 1). There was no significant difference in yield among 'Starlight', 'Beryl', and 'UI59' in the WMD test nurseries over years (Table 1). 'Starlight' was similar in yield to the standard cultivars in the nondisease nurseries during 1986 to 1989 in Nebraska (data not presented). 'Starlight' and 'Beryl' were resistant to the populations of rust (*Uromyces appendiculatus* var. *appendiculatus* Pers. Unger) present in Nebraska (naturally infected rust nurseries) during 1985-89, whereas the other standard cultivars were susceptible. 'Starlight', 'Beryl', and 'UI59' were moderately susceptible to common bacterial blight, whereas 'Harris' was moderately resistant and 'Spinel' was highly susceptible in inoculated nurseries at North Platte, Neb., during 1985-89. 'Starlight' expressed high tolerance (mild mottle symptoms) to BCMV NY-15 strain in a greenhouse test, whereas severe mosaic symptoms occurred

Table 1. Mean yield and percent white mold incidence of 'Starlight' and other Great Northern bean cultivars in white mold test nurseries (Mitchell, Neb.).²

Entry	Years					
	1985		1988		1989	
	Yield (kg·ha ⁻¹)	White mold (%)	Yield (kg·ha ⁻¹)	White mold (%)	Yield (kg·ha ⁻¹)	White mold (%)
Starlight	2300	38	2460	50	2370	18
Harris	1200	75	1300	85	1770	53
Beryl	---	---	2190	68	2230	44
Spinel	1200	65	1490	74	1660	59
UI59	1960	58	2210	57	2220	23
LSD 0.05	928	19	665	29	549	21

²The nurseries were surrounded by a corn windbreak, and each furrow was irrigated every 7 days from flowering to maturity to create a microclimate favorable for white mold. A randomized complete block design, with five replications of three row plots, was used in all trials.

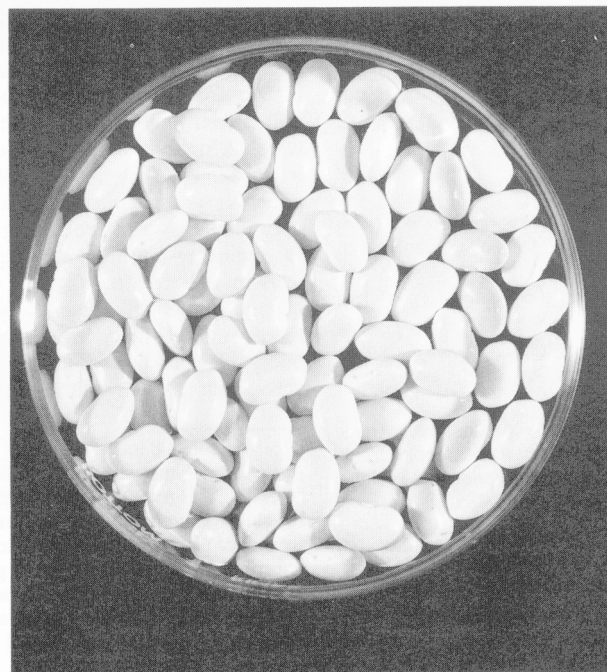


Fig. 1. Seed of Great Northern 'Starlight' (formerly WM1-85-43).

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Table 2. Seed size and mean rankings for whiteness of seedcoats of 'Starlight' and standard Great Northern bean cultivars.

Entry	Years		
	1988	1989	1989
	Seed size (g/100 seed)		Whiteness ² (rank)
Starlight	32.1	40.9	1.0 c
Harris	28.1	37.1	4.0 a
Beryl	27.2	33.0	2.4 b
Spinel	28.0	37.1	---
UI59	28.4	34.1	2.6 b
LSD 0.05	1.9	2.1	

²Ranking for uniformity of whiteness by a 10-person evaluation panel, 1 = most preferred for whiteness. Mean separation in columns by Duncan's multiple range test, $P = 0.05$.

on Pinto 'UI 111' and navy bean 'Sanilac'. Extremely low seed transmission of BCMV was observed in 'Starlight' in the field in 1990. The maturity ranges of the cultivars over the years were as follows: 'Starlight', 88-93 days; 'Beryl' and 'UI59', 85-90 days; 'Spinel' and 'Harris', 95-100 days.

'Starlight' had a significantly heavier seed (Table 2) and a more attractive, uniformly white seedcoat (also with a gloss) than all of the other entries. Seed whiteness and uniformity of whiteness (lack of veininess) was significantly better than for 'Beryl', 'UI59', and 'Harris', as determined by 10 evaluators in a ranking test. All participants ranked 'Starlight' first for uniformity of seedcoat whiteness (Fig. 1). There was no significant difference for seedcoat cracking, using Dickson's dropping method (Dickson and Boettger, 1977), and in cooking time, using the "Mattson" cooker (Jackson and Varriono-Marston, 1981), among any of the cultivars tested (data not presented).

Availability

Foundation seed, as well as samples for trial, can be obtained from the Nebraska Foundation Seed Division, Univ. of Nebraska, Lincoln, NE 68583.

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