

AVALANCHE, A NEW NAVY BEAN FOR THE NORTHERN PLAINS

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ABSTRACT

Avalanche is a medium maturing, high yielding navy bean, with very good seed size, shape, and appearance. Avalanche has white flowers, dark green leaf color, is erect (Type II, short vine), with good lodging resistance. Avalanche exhibits good synchronous plant dry-down prior to harvest (both plant and pods mature concurrently). Maturity is earlier than Vista and Mayflower. The upright plant structure, combined with its synchronous dry-down, suggests that this line may be suitable for direct combining, given appropriate equipment and operator care.

PEDIGREE AND BREEDING HISTORY

Avalanche (previously coded as ND012103) is a navy bean line selected from the cross 96-177-01-01//Voyager/Black Knight, which was made in 1999. It was the final step of a hybridization series that involved crosses made back in 1985. This cross was an attempt to combine several traits such as good yield, earliness, erect architecture, desirable seed characteristics, and multiple disease resistance. 96-177-01-01 is a line from the NDSU dry bean breeding program involving several crosses with lines from Michigan State University (N90618, N90616, and N85007), Ica Bunsí, Northland, Norstar, and some other experimental lines from the NDSU breeding program. Ica Bunsí, N91618 and N90616 have some degree of resistance to white mold (Tu and Beversdorf, 1982; Kelly, personal comm.). Additionally, several of the lines involved in this cross have upright architecture. Voyager is a navy bean released by Rogers[®] in 1995. Black Knight is a black bean jointly released by the Florida, Idaho, and Cornell Agricultural Experimental Stations in 1998 (Halseth et al., 1998).

In the summer of 1999, the F₁ seed from this cross was grown in the field in Fargo, ND. Obtained F₂ seeds were then planted in spaced-plant rows at Hatton, ND in 2000 and individual plants were selected and harvested. Seed from each plant was grown in individual rows at the Puerto Rico winter nursery in 2001. The line coded as ND012103 was selected and F₄ seed was bulk harvested and sent back to ND. Given its excellent visual appearance for architecture, yield potential (pod load), maturity, plant growth habit, and lack of disease symptoms, the line was directly included in the navy preliminary yield trials (NPYT) at two locations in ND (Erie and Hatton) in the summer of 2001. Avalanche was one of the best lines in these trials and therefore it was moved up to the navy advanced yield trials (NAYT) for additional testing across years and locations. From 2002 to 2007, Avalanche has been tested at more than 24 environments across ND as well as other states. Avalanche has shown excellent performance across most of the environments tested, with yields superior to other navy commercial varieties (Table 1). Avalanche possesses an upright structure with a type II growth habit (Kelly, 2000).

Avalanche is resistant to bean common mosaic virus (BCMV), but it is susceptible to the necrotic strain (BCMNV). Avalanche is moderately resistant to rust and it is being tested for anthracnose resistance. Canning tests made at Michigan State University showed that Avalanche was close to Vista in terms of visual appearance and quality. Limited amounts of seed can be obtained from the corresponding author.

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Table 1. Comparison of Avalanche with commercial check cultivars for agronomic and disease reactions summarized from several tests in ND.

Trait	Avalanche	Vista	Mayflower
Yield (kg ha ⁻¹) ¹	2402	2211	2166
Maturity (d)	102	103	107
100-weight seed (g)	18.4	18.2	18.7
Growth Habit ²	II	II	II
Pl. Height (cm)	53	55	58
Lodging (0-9) ³	2	1	1
Rust ⁴	MR	R	R
BCMV ⁴	R	R	R

¹ Average seed yield across 21 environments.

² Growth Habit = CIAT scale where I = determinate bush; II = upright, short vine (IIb tendency toward floppiness); III = prostrate vine (IIIa will be erect in certain environmental conditions); IV = indeterminate climber.

³ Lodging scores 0 = 100% erect, 9 = no erect plants

⁴ Rust and BCMV: R= Resistant, MR= Moderately Resistant, S=Susceptible

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