

# Onion Inbred Line ‘B8667 A&B’ and Synthetic Populations ‘Sapporo-Ki-1 A&B’ and ‘Onion Haploid-1’

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**Abstract.** The U.S. Department of Agriculture, Agricultural Research Service, announces the release of onion inbred ‘B8667 A&B’ and synthetic population ‘Sapporo-Ki (SKI) -1 A&B’. Both of these releases represent a cytoplasmic male-sterile (A) line with its maintainer (B) for seed propagation of male-sterile plants. ‘B8667 A&B’ is intended for production of red, long-day, well-storing hybrids. ‘SKI-1’ combines the earliness of the Japanese population ‘Sapporo-Ki’ with maintenance of cytoplasmic male sterility. The long-day synthetic population ‘Onion Haploid-1’ (‘OH-1’) is a joint release of the U.S. Department of Agriculture, Agricultural Research Service, and the University of Ljubljana, Slovenia. ‘OH-1’ is intended to serve as a responsive control for extraction of gynogenic haploids of onion.

The U.S. Department of Agriculture, Agricultural Research Service, announces the release of onion inbred ‘B8667 A&B’ and synthetic population ‘Sapporo-Ki (SKI) -1 A&B’. Both of these releases represent a cytoplasmic male-sterile (A) line with its maintainer (B) for seed propagation of male-sterile plants. The synthetic population ‘Onion Haploid-1’ (‘OH-1’) is a joint release of the U.S. Department of Agriculture, Agricultural Research Service, and the University of Ljubljana, Slovenia.

## Origin and Description

‘B8667 A&B’ is intended for production of red, long-day, well-storing hybrids. This inbred line is round in shape, dark red with color extending through the internal rings of the bulb, with good scale retention and excellent storage quality when produced on high-organic (muck) soils (Fig. 1A). ‘B8667B’ is a F<sub>1</sub>MSM<sub>2</sub>M<sub>3</sub> from USDA PI 262985 (‘Noord Holland Bloodred’) crossed with ‘B5361B’ (a red inbred developed by

the late Dr. Clint Peterson, USDA-ARS, but never released). This inbred has a soluble solids content of 13.4 ± 0.7% and is relatively pungent at 10.7 ± 1.0 μM pyruvate per milliliter. The cytoplasmic male-sterile A line is a BC<sub>7</sub>. Testcrosses of ‘B8667B’ to a series of male-sterile hybrid female lines (MSU611-1A × MSU611B, MSU5718A × MSU8155B, and B1731A × MSU5785B) produced only red bulbs and were not significantly different for bulb yield as compared with commercial hybrids evaluated in replicated trials over 2 years at Palmyra, WI (Table 1).

‘Sapporo-Ki’ is an open-pollinated population grown on the Japanese island of Hoikkaido and has relatively high frequencies of both S cytoplasm and the dominant allele at the male-fertility restoration locus (*Ms*) (Havey, 1995). This synthetic population combines the early maturity of ‘Sapporo-Ki’ with maintenance of cytoplasmic male sterility. Random plants from ‘Sapporo-Ki’ were self-pollinated and testcrossed to male-sterile plants of MSU611-1A × MSU611B or MSU5718A × MSU8155B. The S<sub>1</sub> families were evaluated for their cytoplasm using the molecular markers as described by Havey (1993a, 1995). Testcross families from N-cytoplasmic plants were scored for male-fertility restoration (Gokce and Havey, 2002). S<sub>1</sub> families that were N-cytoplasmic and homozygous recessive at *Ms* were selected. Five S<sub>1</sub> bulbs from each of eight families were caged, allowed to flower, and intercrossed using flies (*Musca domestica* L. from Rincon-Vitova Insectaries, Ventura, CA) as described by Havey (1993b) followed by three generations of seed increases. The cytoplasmic male-sterile A line is a BC<sub>5</sub>.

Bulbs of this synthetic population are yellow (Fig. 1B) and mature ≈2 weeks earlier than commercial hybrids in Wisconsin.

‘Onion Haploid (OH) -1’ is a long-day synthetic population intended to serve as a responsive control for extraction of gynogenic haploids of onion. Random plants from the relatively responsive inbreds ‘B2923B’ and ‘B0223B’ were evaluated for gynogenic haploid production as described by Bohanec and Jakše (1999) and Jakše et al. (2003). Plants that produced relatively high numbers of gynogenic haploids were self-pollinated (Bohanec et al., 2003). Five bulbs from each of 10 S<sub>1</sub> families (nine from ‘B2923B’ and one from ‘B0223B’) were caged, allowed to flower, and intercrossed using flies. Plants in this synthetic produced on average 12 gynogenic haploids for every 100 flowers plated. Bulbs of this synthetic population are yellow with good storage quality (Fig. 1C). All plants of ‘OH-1’ should be N-cytoplasmic and homozygous recessive at the *Ms* locus, although this has not been confirmed.

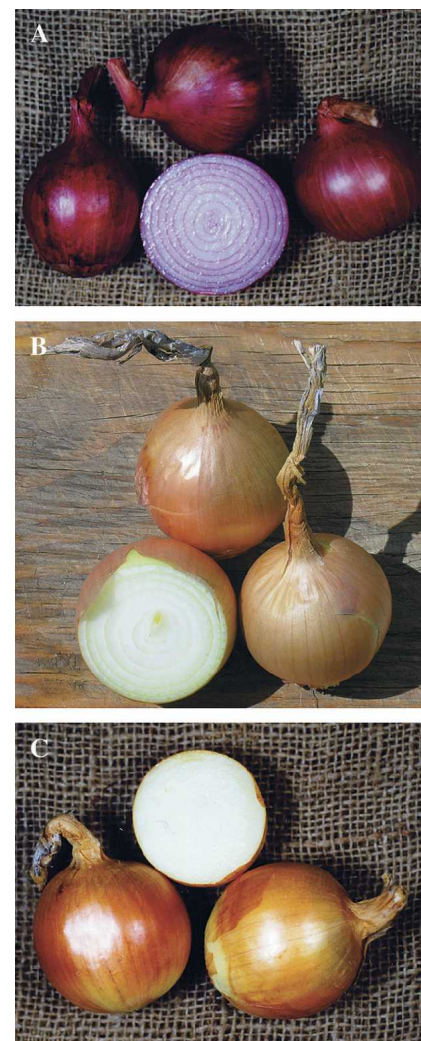


Fig. 1. Bulbs of ‘B8667 B’ (A), ‘SKI-1 B’ (B), and ‘OH-1’ (C).

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Names are necessary to report factually on available data; however, the U.S. Department of Agriculture (USDA) neither guarantees nor warrants the standard of the product, and the use of the name by USDA implies no approval of the product to the exclusion of others that may also be suitable.

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Table 1. Mean yield of onion bulbs over 2 years for commercial hybrids and testcrosses using inbred B8667B as the male.

Population	Metric tons per ha
(MSU5718A × MSU8155B) × B8867B	37.9
(MSU611-1A × MSU611B) × B8867B	34.4
(B1731A × MSU5785B) × B8867B	31.6
Mean of all commercial hybrids	36.3
Least significant difference (0.05)	13.6

#### Availability

Breeders' seed of 'B8667 A&B', 'OH-1', and 'SKI-1 A&B' from cage isolations are available Dr. M. J. Havey, USDA-ARS,

Department of Horticulture, 1575 Linden Dr., University of Wisconsin, Madison WI 53706. Seed of the maintainer (B) lines have been deposited into the USDA PI System as numbers 645565 ('8667B'), 645566 ('OH-1'), and 645567 ('SKI-1B').

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