Registration of the SG1P Soybean Population with High Seed Protein and ms₂ Nuclear Male Sterility

The SG1P soybean [Glycine max (L.) Merr.] population (Reg. no. GP-274, NSL 382830) was developed to incorporate high seed protein content into an elite soybean population that was segregating for nuclear male sterility to facilitate intermating. Eight plant introductions (PI) were selected from the USDA Soybean Germplasm Collection based on their high seed protein concentration, which averaged 501 g kg⁻¹ (1,2). The high-protein lines used to develop this population were PI 339734, PI 398516, PI 398672, PI 407788A, PI 423948A, PI 423949, PI 360843, and PI 404177. The cultivar 'Hobbit 87', a high-yielding, determinate cultivar, was also used as a parent in this population (3).

Three intermatings were used to form the Cycle 0 population. The eight Pls and Hobbit 87 were used as pollen parents, each mated by hand with five different male-sterile (ms₂:ms₂) F₁ plants from the SG1E3 population (4). Crosses were made during the summer of 1988 at the University of Nebraska Agronomy Research Farm, Lincoln, NE. The S₀ seed (Ms₂:ms₂) was harvested from individual male-sterile plants of each cross separately. For the second intermating, six S₁ seeds from crosses involving each male parent were planted in the greenhouse during October 1989. The S₀ plants from a cross involving a given male parent were planted in one 30.5-cm pot. Each male-sterile parent used as a female for the first intermating was represented by at least one S₀ plant in the greenhouse. Chain crosses were made among the nine half-sib families for the second intermating: Family 1 x Family 2, Family 2 x Family 3,..., Family 8 x Family 9, and Family 9 x Family 1. Six S₁ seeds per cross were obtained by making at least one cross on every S₀ plant in a pot. The S₁ seeds (1Ms₂:Ms₂:2Ms₂:ms₂:1ms₂:ms₂) from the second intermating were harvested from each S₀ seed individually. The S₀ seeds from each half-sib family were harvested in bulk for each family. The third intermating of Cycle 0 was conducted at the Agronomy Research Farm during the summer of 1989. A balanced composite of 46 S₁ seeds from each half-sib family used in the second intermating were planted in hill plots spaced 1.0 m apart in all directions, and alternated with hill plots containing S₀ seed from the second intermating. Twelve seeds were planted in each hill plot. The population was planted in isolation, separated from other soybean plants by at least 15.2 m of bare ground. A hive of honey bees (Apis mellifera L.) was maintained nearby to facilitate pollen transfer and obtain good seed set on male-sterile plants. The S₀ seed from the third intermating was harvested from 63 individual male-sterile (ms₂:ms₂) plants.

Selfed seed from male-fertile plants of the third intermating of Cycle 0 were harvested in bulk and placed in cold storage (3Ms₂:Ms₂:2Ms₂:ms₂:1ms₂:ms₂). The bulk was planted in isolation for intermating. Seeds from male-sterile plants were harvested in bulk, and should provide S₀ seeds in a frequency of 4Ms₂:ms₂:1Ms₂:ms₂. After harvest of the male-sterile plants, selfed seeds from the remaining fertile plants (Ms₂:ms₂) were harvested in bulk. The harvested seeds should provide a frequency of 7Ms₂:Ms₂:2Ms₂:ms₂:1Ms₂:ms₂. This is the seed that will be deposited in the germplasm collection and provided to researchers.

The SGIP population has been subject to recurrent selection for increased seed protein content at the University of Nebraska. The base population is phenotypically diverse for seed yield and protein content, as well as other plant and seed traits. The pedigree diversity of the SG1E3 population and the different origins of the PI parents should also provide adequate genetic diversity for long-term improvement.

A sample of up to 750 seeds for research purposes may be obtained from the corresponding author for at least 5 years following the date of this publication. Appropriate recognition of source should be given when this germplasm contributes to research or development of new cultivars.

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References and Notes
5. Dep. of Agronomy, Univ. of Nebraska, Lincoln, NE, 68583-0915. Contribution from the Nebraska Agric. Exp. Sm., Journal Paper no. J-12417, Project 12-255 and 12-194. The research was supported in part by a grant from the Nebraska Soybean Board. Registration by CSSA. Accepted 28 Feb. 1999. *Corresponding author (ggraef1@unl.edu).

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Registration of the SG1LS Soybean Population with Large Seed Size and ms² Nuclear Male Sterility

The SG1LS soybean [Glycine max (L.) Merr.] population (Reg. no. GP-273, NSL 382831) was developed to incorporate large seed size into an elite soybean population that was segregating for nuclear male sterility to facilitate intermating. Five plant introductions were selected from the USDA Soybean Germplasm Collection based on their large seed size (2,3). The large-seeded parents used to develop this population were PI 416892, PI 423849, PI 424459, 'Jogun', and 'Imperial', with an average seed weight of 334 mg seed⁻¹. Hobbit 87, a high-yielding, determinate cultivar, was also used as a parent in this population (1).

Three intermatings were used to form the Cycle 0 population. The five large-seeded lines and Hobbit 87 were used as pollen parents, each mated by hand with five different male-sterile (ms₂:ms₂) F₁ plants from the SG1E3 population (4). Crosses were made during the summer of 1988 at the University of Nebraska Agronomy Research Farm, Lincoln, NE. The S₀ seed (Ms₂:ms₂) was harvested from individual male-sterile plants of each cross separately. For the second intermating, six S₁ seeds from crosses involving each male parent were planted in the greenhouse during October 1989. The S₀ seeds from a cross involving a given male parent were planted in one 30.5-cm pot. Each male-sterile parent used as a female for the first intermating was represented by at least one S₀ plant in the greenhouse. Chain crosses were made among the nine half-sib families for the second intermating: Family 1 x Family 2, Family 2 x Family 3,..., Family 8 x Family 9, and Family 9 x Family 1. Six S₁ seeds per cross were obtained by making at least one cross on every S₀ plant in a pot. Each male-sterile parent used as a female for the first intermating was represented by at least one S₀ plant in the greenhouse. Chain crosses were made among the nine half-sib families for the second intermating: Family 1 x Family 2, Family 2 x Family 3,..., Family 8 x Family 9, and Family 9 x Family 1. Six S₁ seeds per cross were obtained by making at least one cross on every S₀ plant in a pot. The S₀ seeds (1Ms₂:Ms₂:2Ms₂:ms₂:1ms₂:ms₂) from the second intermating were harvested from each S₀ plant individually. The S₀ seeds from each half-sib family were harvested in bulk for each family. The third intermating of Cycle 0 was conducted at the Agronomy Research Farm during the summer of 1989. A balanced composite of 46 S₁ seeds from each half-sib family used in the second intermating...