Registration of TW 98-1 Soybean Genetic Stock

TW 98-1 soybean [Glycine max (L.) Merr.] (Reg. no. GS-38, PI 631123) was developed by the USDA-ARS at Beltsville, MD, and released on 15 April 2002. TW 98-1 produces a high frequency of twinspots in its foliage during the juvenile stage. The phenomenon of twinspots has been observed in Drosophila melanogaster, cotton (Gossypium hirsutum L.), corn (Zea mays L.), tomato (Lycopersicon esculentum Mill.), and soybeans and is sufficiently rare to have merited investigation by a number of researchers (Barrow et al., 1973; Jones, 1937; Stern, 1936; Vig, 1969; Zhu et al., 1995). Twinspots are immediately adjacent areas with contrasting phenotypes. In the case of TW 98-1, these are adjacent sectors on the leaves differing in green versus white color. An extensive discussion by Barrow et al. (1973) indicates that somatic crossing-over has been proffered as an explanation for the twinspot phenomena, though not accepted by all investigators. TW 98-1 displays an exceptionally high frequency of the twinspot phenomenon. TW 98-1 was released to provide an experimental tool for plant geneticists studying the phenomenon of twinspots and somatic crossing-over.

TW 98-1 is an F₈ derived line from the cross of BV-4 × PA10-1-1. BV-4 was derived from the cross of T135 × PI 83945-4. PA10-1-1 was derived from the cross of PA4-11-b × ‘BSR 201’ (Tachibana et al., 1983). PA 4-11b was developed from the four-way cross (‘Wilson 6’ × ‘Forrest’) × (‘Perry’ × L76-0253) (USDA-ARS GRIN; Hartwig and Epps, 1973; Weiss, 1953). L76-0253 is an F₆ segregate of the cross Williams × PI229358 (Bernard and Lindahl, 1972).

TW 98-1 is homozygous for both the f allele conditioning fasciated stem and the y9 allele, which, in homozygous mode, conditions bright yellow green colored leaves rather than normal dark green colored leaves. Devine (1998) found the y9 locus close to the y17 locus. The y17 allele also conditions chlorotic leaves. The chlorotic condition is necessary to observe the twinspots in TW 98-1. The twinspots are of variable size and are apparent on the upper surfaces of the unifoliolate and early trifoliolate leaves of TW 98-1 during the juvenile growth period. The twinspots are immediately adjacent sectors differing in color with a dark green sector bordering a white sector. The sectors are discernable against the background of the light green leaf color. In a greenhouse test, TW 98-1 has shown twinspot frequencies averaging 1.18 per unifoliolate leaf, 4.7 per first trifoliolate leaf, 1.27 per second trifoliolate leaf, and 0.30 for the third trifoliolate leaf. Although the frequency of twinspots varies from leaf to leaf and plant to plant, all the plants of TW 98-1 examined to date exhibit twinspots.

TW 98-1 has tawny pubescence and white flowers. TW 98-1 has a black hilum and a yellow seed coat with dark splotches.

TW 98-1 may provide geneticists studying the segregation of twinspot with a biological tool for investigating events outside meiosis. Seed of TW 98-1 will be available by the Sustainable Agricultural Systems Laboratory, USDA-ARS, for 5 yr and will be available in packets of 200 seeds on written request. The appropriate import permits accompany requests from outside the USA. Seeds of TW 98-1 were deposited in the National Plant Germplasm System and will be available for research purposes, including development and commercialization of new soybean varieties.

References


