

Prospect for Developing Black-Spot-Resisting  
Line Through Sunflower Interspecific Cross

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Black spot (*Alternaria helianthi* (Hansf) Tubaki and Nishihara) is one of the major sunflower diseases in northern China. According to our investigation, black spot infects all varieties of cultivated sunflower.

Interspecific cross was conducted between cultivated sunflower and the Jerusalem artichoke (*H. tuberosus*), which is immune from black spot. As a result, a seedset rate of 25% has been achieved. Heterosis has been noticed in the plant height and the leaf number in the first generation while the growth duration, one-thousand-seed-weight, head size and the stem thickness are between those of their parents. All plants have tubers and branch at the lower part of the stem. A small amount of little allergic spots appeared on the lower leaves of all plants. The crossed plants have showed high resistance to black spot. In order to improve the economic characters the F<sub>1</sub> was backcrossed with cultivated varieties, resulting in an average seedset rate of 16.63%. Despite the shortened growth duration, lowered height and decreased leaf number, the BC<sub>1</sub>, which varies in morphology, has gained an increase in one-thousand-seed-weight. None of the plants has a tuber. The Jerusalem artichoke 2n is equal to 102. Sunflower 2n is equal to 34 and F<sub>1</sub> 2n to 68. It is guessed that F<sub>1</sub> may form various gametes that have different amount of chromosomes but only a few gametes can produce seeds. This has been proved by the experiment we conducted in which

just a few plants produced seeds, the seed set rate being 0.71%. Among the plants that are able to produce seeds, 75% are highly resistant to black spot.

The traits of the second backcrossed generation are closer to those of the male plant, but the number of highly black-spot-resisting plants has dropped by 26%. 11% families of the third back generation are highly resistant to black spot and similar to the cultivated sunflower (*H. annuus* L).

It is possible to obtain the lines which possess disease-resistant genes transferred from the Jerusalem artichoke and which maintain the high-yielding feature of cultivated sunflower.