Reinforcement of resistance of modern rose to black spot disease via hybridization with Rosa rugosa

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Most of the modern rose cultivars are susceptible to the highly destruct- -ive rose black spot disease caused by Marssonina rosae. In order to clarify the effect of hybridization with diploid Rosa rugosa on the mor- phological performance and black spot disease resistance of modern roses, we created the hybrid R. hybrida 'Porcelina' × R. rugosa 'Dahong Zizhi' and analyzed the morphological diversity and genetic constitution of 142 progeny. The progeny showed a wide range of variation, with a coefficient of variation of all traits of 40% and a maximum internode length of 118.9%. Cluster analysis of morphology- ical traits and principal coordinate analysis of simple sequence repeats indicated that most of the progeny clustered with the female parent, while only a few individuals grouped with the male parent.

Detached leaf assays were used to evaluate the black spot disease resistance of 75 lines and the two parents. The mean leaf area with symptoms (LAS) of the tested leaves of 'Porcelina' was 72.0 ± 12.9%, classifying it as highly susceptible, while R. rugosa showed high resistance to black spot disease. The coefficient of variation in LAS of the progeny was 68.1%, which indicates that the broad-spectrum resistance of rose black spot disease is controlled by multiple genes. A total of 11 progeny had an LAS 10% and were significantly more resistant than the female parent. The results showed that the introduction of diploid R. rugosa into modern rose through conventional hybridization is effective at reinforcing resistance to black spot disease.