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A genetic analysis of the self-compatible gene according to wild buckwheat
(Fagopyrum homotropicum)

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In order to identify the genetic constitution of the heterostyle and the homostyle genes, interspecific hybrids of F. esculentum(thrum) X F. homotropicum and their selfed progenies or backcrossing lines were used. As a results, the proposed style genes model is that the homomorphic, $S^hS^h$, allele induces pollen tube stop in stigma carrying the ss allele in the heteromorphic (thrum-type $Ss$, pin-type ss), whereas the $S^hS^h$ allele induces no pollen tube stop in stigmas with either of the other alleles. Two major types of self-fertile plants found. One is a type with long-homostyle flowers, SBW 1, and the other is a type with short-homostyle flowers, SBW 2. To clarify whether the locus controlling flower morphology and self-fertility of SBW 2 is the same as that of SBW 1, pollen tube tests and genetic analysis have been performed. As a results, the suggest that SBW 2 possesses the s allele as pin does, not an allele produced by the recombination in the $S$ supergene, and that the short style length of SBW 2 is controlled by multiple genes.

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High throughput SCAR markers tightly linked to the $S^h$ gene in buckwheat

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F$_1$ hybrids obtained by embryo rescue between common buckwheat (Fagopyrum esculentum Moench.), a heteromorphic sporophytic self-incompatibility species, and F. homotropicum, an annual wild homomorphic self-compatible species, as well as F$_2$, F$_3$ and BC$_1$F$_1$, a backcross to common buckwheat were used in this study. This gene was designated as $S^h$. Also, the results indicated that the style type is controlled by multiple alleles. The relationships of dominancy among these alleles appeared to be as $S^h > S^h > s$. Three RAPD markers, OPB14 1250, OPP8 1000 and OPQ7 800, tightly linked to $S^h$ gene were cloned and characterized. Two of these SCAR primers, SCB14 1250, and SCP8 1000, amplified a single fragment in Fagopyrum homotropicum but was absent in common buckwheat, F. esculentum. In one case, SCQ7 800, showed different size PCR fragments in common buckwheat than in F. homotropicum. This co-dominant marker is useful for differentiating heterozygosity from both types of homozygote.