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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^hallele 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_1F_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 $S > S^h > s$. 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.