3. Mapping of the *ABERRANT SPIKELET 1* (*ASP1*) gene in rice.

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Morphologies of flowers and inflorescences in monocots are distinct from those of flowers and inflorescences in eudicots. Especially in grasses, the inflorescence comprises of unique structural units, the spikelet and the floret. Spikelet structure of rice is unique even in grasses and is composed of the floret, the sterile lemma and the rudimentary glume (Fig. 1B). The rice floret consists of one lemma, one palea, two lodicules, six stamens, and one central pistil. There are many studies to understand how floral organs are specified in rice, and both conserved and diversified functions of genes involved in flower development have been reported so far (Yamaguchi et al. 2004). There are, however, few studies on organs specifically seen in the spikelet, such as the sterile lemma and the rudimentary glumes, except for *SUPERNUMERARY BRACT* (Lee et al. 2006) that produces a number of extra bract-like structures at the base of the spikelets.

In this study, we focused on a recessive mutant, named *aberrant spikelet 1* (*asp1*). In the vegetative phase, no remarkable phenotypes were observed in *asp1*. After transition to the reproductive phase, a number of branches and spikelets were generated in wild type. By contrast, the *asp1* mutant produced a smaller panicle with reduced numbers of branches and spikelets (Fig. 1A). Wild-type plant has about 120 spikelets per panicle, whereas the *asp1* mutant panicle has about 25-30 spikelets in average. These observations suggest that the branch meristem abort at earlier stages of inflorescence development in the *asp1* mutant. In all *asp1* spikelets examined, the sizes of the rudimentary glume and the sterile lemma were larger than those in wild type. In addition, floral organs exhibited abnormalities; the number of the carpel and the style increased, suggesting that the determinacy of the floral meristem is partially compromised in *asp1* (Fig. 1F-1H). These defects caused severe sterility. Taken together, it is likely that *ASP1* is involved in the regulation of maintenance in the inflorescence meristem and the floral meristem.

To determine map position of the *ASP1* locus, we crossed the *asp1* mutant with an indica strain, Kasalath. We selected mutants showing the *asp1* phenotype from the F_2 plants and used them for mapping. The *ASP1* locus was roughly mapped to the short arm of chromosome 8 between two public markers, C61344 and E60275 (Fig. 2). Detailed mapping with STS markers confined the locus to within 200 kb.

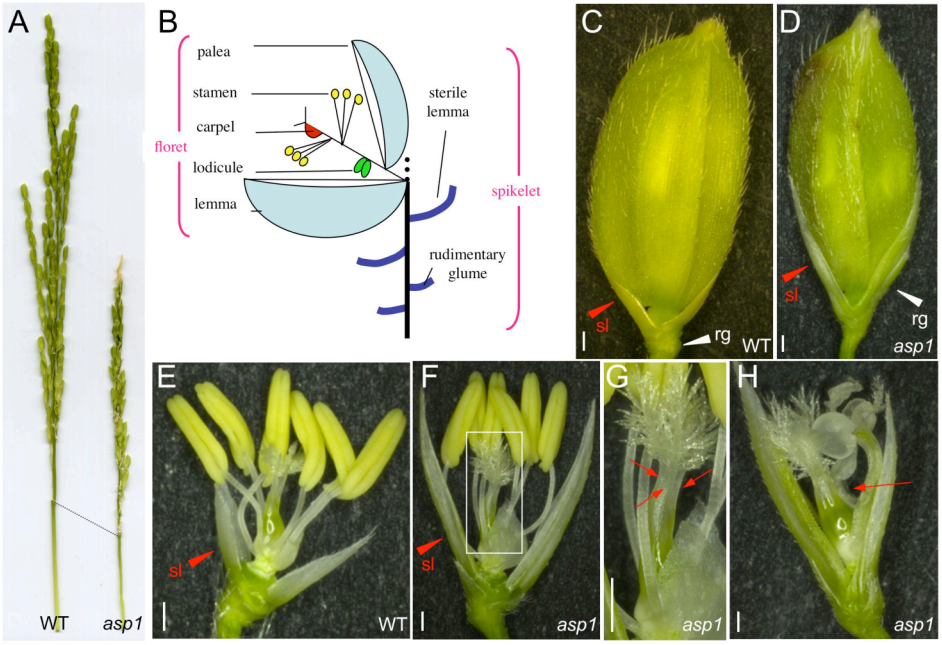

Fig. 1 Phenotypes of panicles (A) and spikelets (B-H) in wild type and *asp1*. Red and white arrowheads indicate sterile lemma and rudimentary glumes, respectively. Arrows indicate the style. sl, sterile lemma; rg, rudimentary glume. Bars=1mm.

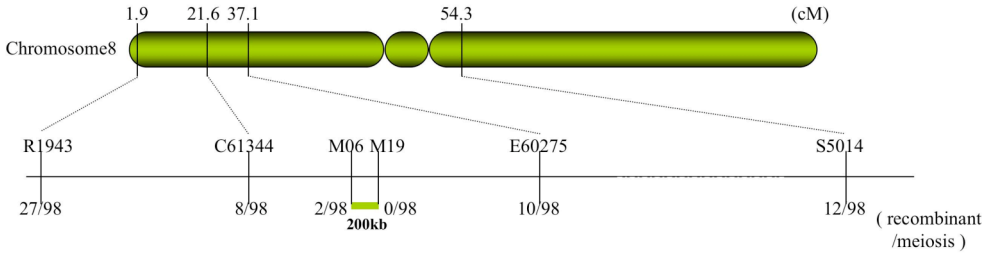

Fig. 2 Mapping of the *ASP1* locus. The numbers of the recombinant event are indicated together with the marker in the linkage map.

References

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