Special issue on plant reproduction research in Asia

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We are pleased to present this special issue on *Plant Reproduction Research in Asia*. This special issue is intended to provide an overview of the development of the field of plant reproduction research in Asia over the last decade and to present an update of current insights in the molecular mechanisms underlying the processes of sexual and asexual reproduction in plants.

In fact, over the last decade, plant reproduction research has been expanding rapidly in Asia, partially due to strong support from the governments of Asian countries. There is an unprecedented emphasis on crop improvement for increased and higher-quality food production in Asia. Consequently, as a necessary basis for crop improvement, plant reproduction research has attracted much attention in Asia. For example, in China, at least five national projects have been funded in the last decade, each involving 10–20 research laboratories. These projects focused on plant fertility, fertilization, embryogenesis, endosperm development, and meiosis, respectively. In Japan, the plant reproduction research community has maintained very competitive group

grants for more than 12 years. To renew a project, plant reproduction researchers have to compete with researchers from all fields of biology every 5 years. A current group grant, “The Birth of New Plant Species,” involves 26 research groups and 57 researchers. Members of this project contributed to this special issue. Other large grants included the Exploratory Research for Advanced Technology (ERATO) project and World Premier International Research Center Initiative (WPI) program. All of the grants promoted plant reproduction research in Japan using unique technologies, e.g., live-cell imaging, microfluidics, chemical synthesis, structural biology, and bioinformatics. As a consequence, plant reproduction research is one of the most active and leading fields in biological sciences in Japan. All these efforts foster a flourishing plant reproduction research community in Asian countries. It is also worth noting that young scientists are increasingly becoming involved in this field, which will enhance the research area in Asia.

As a partial reflection of the development of plant reproduction research in Asia, this special issue includes 11 papers that deal with floral meristem size control (Uemura et al. 2018), the small RNA pathway for germline control (Nonomura 2018), photoperiod and thermo-sensitive male sterility in rice (Fan and Zhang 2018), receptor-like kinases in anther development (Cai and Zhang 2018), epigenetic dominance modifiers in self-incompatibility (Fujii and Takayama 2018), pollen tube guidance (Li et al. 2018), self-incompatibility and polyembryony in citrus fruit development (Zhang et al. 2018), the cell cycle in the egg cell and zygotic development (Sukawa and Okamoto 2018), cell fate transition during early embryogenesis (Peng and Sun 2018), arabinogalactan proteins and the role of their sugar chains in reproduction (Su and Higashiyama 2018), and the use of Mitsucal computer system to identify causal mutations (Suzuki et al. 2018). One related paper that deals with cytoplasmic male sterility and restoration in rice has also been published earlier (Tang et al. 2017 vol 30: 179–184). These papers summarize recent advances in each specific area based mainly on the authors’ work and update our understanding of the mechanisms underlying each process in plant

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reproduction. As can be seen in this issue, as the major crop in Asia, rice is examined in much of these studies, which is one of the distinct characteristics of plant reproduction research in Asia.

Due to the limited size of this issue, many more studies and areas worth mentioning could not be included. However, the 25th International Congress on Sexual Plant

Reproduction (ICSPR) will be held in Japan for the first time this year and will surely provide an opportunity to present a more complete overview of plant reproduction research in Asia, together with advances in this field in other parts of the world. We expect to see more exiting achievements at the conference.