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Cereal crops such as maize, wheat, and rice account for a majority of biomass produced globally in agriculture. Continuous economic and population growth especially in developing countries accompanied more intensive production of cereal crops to meet increasing demands for them as main staple foods and livestock feeds. However, imbalance between production and consumption of cereal crops, which is inevitably reflected as their higher market prices, is becoming palpable in recent years. Stable production of cereal crops has been threatened by various abiotic and biotic stresses. One of the most threatening constraints is virus diseases. Especially, intensification of cereal crop production is often achieved by monoculture of a popular crop variety in a wide area. Such agroecosystems with low biodiversity is usually more conducive to biotic stresses, and may result in the outbreaks of existing and emerging cereal viruses. Numerous reports on incidences of various virus diseases of cereal crops attested that viruses have been a long-standing obstacle eroding yields of cereal crops worldwide. Despite of the evident economic losses incurred by virus disease of cereal crops, the progress in basic research on virus species causing major diseases of cereal crops lagged behind compared to that carried out for viruses that can infect dicotyledonous plants. This was partially due to the lack of ideal experimental systems to investigate the interaction between viruses and monocotyledonous crops. For example, inoculation of many viruses to cereal plants still requires tedious

manipulation of vector organisms, and reverse genetic systems are not available for many cereal viruses. However, application of latest molecular biology technologies has led to significant advance in cereal virology recently; transient gene expression systems through particle bombardment and agroinfiltration have been exploited to examine the functions of cereal virus proteins. Cell culture systems of vector insects enabled to investigate the molecular interactions between cereal viruses and insect vectors. Furthermore, RNAi technologies for vector insects and monocotyledonous plants facilitated identification of specific host and viral factors involved in viral replication and transmission cycles. Also, accumulating information on the genome sequences of cereal crop species has been simplifying the roadmap to pinpoint resistance genes against cereal viruses. The objective of this research topic is to provide and share the information which can contribute to advances in cereal virology by covering recent progresses in areas such as: 1) characterization of emerging viruses, 2) analyses of genetic and biological diversities within particular viruses, 3) development of experimental systems applicable to cereal viruses, 4) elucidation of the molecular interactions among viruses, vector organisms, and host plants, 5) identification of traits and genes linked to virus resistance in cereal crops, 6) development of novel genetic approaches for virus resistance, and 7) assessment of epidemiological factors affecting the incidences of cereal virus diseases. Synergistic integration of ideas from such areas under this research topic should help to formulate practical alternatives to the current management options for virus diseases in cereal crops.