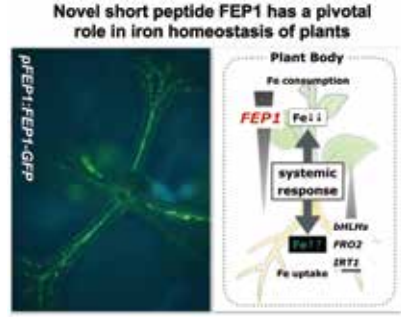
Prof.
HIRAYAMA Takashi

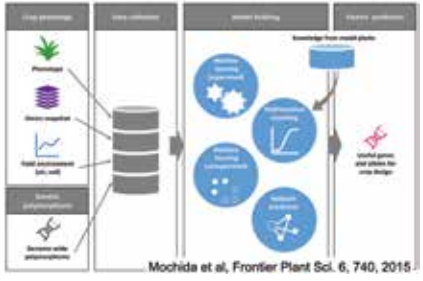
Molecular genetic studies on the mechanisms for stress sensing and response in plants.

As autotrophic sessile organism, plants have developed unique systems to regulate biological phenomena such as development, environmental stress responses, and reproduction process. To understand and manipulate the plant behavior, we have been trying to describe the regulatory system for these molecules, deciphering the information possessed by these plant signaling molecules by molecular genetic approaches using model plants such as Arabidopsis. In these years, we are investigating novel short-peptide factors involved in the regulation of iron homeostasis responding to environmental changes.



Establishment of data driven crop design technology.

It has been known that useful agronomical traits of crops are dependent on both the genetic factors the crop possesses and environmental factors the crop lives. Importantly, these two factors are not independent and affect each other in a complex manner.



We have been trying to identify the genetic factors and environmental factors critical to useful traits by describing the life-course dynamics in physiological status of field crops associated with the environment data. Using these isolated determinants, we successfully built models that can predict the agronomical traits at high accuracy. Such the models enable us to design the crops with suitable genetic factors to a given filed condition including the forecasted climates in the near future.