Assoc. Prof.
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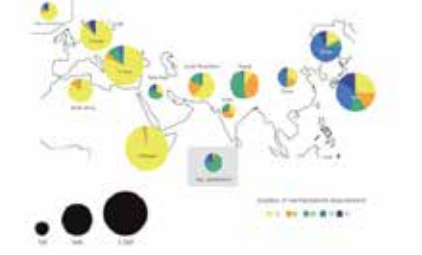
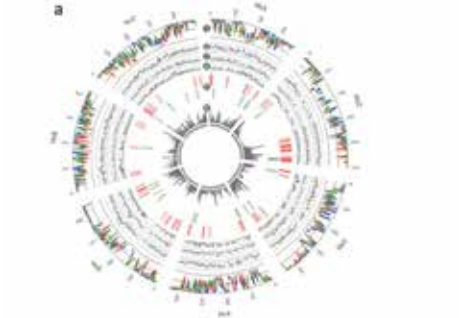
Study on genetic diversity of crop species toward achieving sustainable crop productivity

Genetic diversity of target species is indispensable sources to breed new crop varieties to overcome food shortages under global environmental changes and population explosions. IPSR preserves more than 10,000 barley germplasm as not only for the research materials for plant science but also future resources to improve this crop species. The aims of our seed-bank activity as well as our research projects are to grasp the degree of the variation of traits associated with stress tolerance and 'high-yield' productivity and to understand genetic structure of the trait for mining the phenotypic diversity.

Deciphering the genetic diversity of domesticated barley spreading the entire world, we are evaluating agronomic traits such as vernalization requirement and salt tolerance at the germination stage. Genomic variation of the barley materials is explored using the next generation sequencing (NGS) technologies to make advances in our barley domestication history research. To uncover the genetic structure of the agronomic traits, multiple mapping populations such as recombinant inbred lines (RIL), chromosome segment substitution lines (CSSL) and nested association mapping population (NAM) are also developing, and the quantitative trait loci (QTL) corresponding to the agronomic traits are identifying.



Geographic distribution of vernalization requirement grades in barley.
Saisho et al. *Plant and Cell Physiology* vol. 52 (2011)



Overview of the genomic diversity in domesticated barley sub-populations.
Takahagi et al. *Scientific Reports* volume 6, Article number: 33199 (2016)