GenoBaits®

MOL BREEDING

Wheat 40K Panel

The research group at the Institute of Crop Science, Chinese Academy of Agricultural Sciences, under the guidance of Xia Xianchun, is responsible for the development of the wheat 40K liquid chip. The team constructed and optimized 40,017 segments (comprising a total of 202,970 SNP markers) for the creation of the wheat 40K liquid chip using resequencing data from 50 germplasm materials to filter SNPs. This chip is especially made for a variety of small-scale wheat breeding research applications.

Product Highlight

- **Multiple single-nucleotide-polymorphism(mSNP) detection technique**

  A significant improvement in marker use as well as the precision and sensitivity of marker identification through "one point and multiple markers" has been made as a result of the over four-fold increase in the number of detectable SNP data points.

- **Low application cost and high throughput detection**
  Pricing for this product is predicated on the mSNP segment, ensuring that at least five times as many SNP segments can really be delivered for the typing effect. This substantially lowers breeding expenses while ensuring the necessary number of locations for scientific research and applications.

Application

Genetic diversity analysis

Genetic map construction
Genetic diversity analysis
QTL analysis
Genome-wide association study
Functional gene mapping and cloning

Breeding selection and screening

Varietiy authentication
Germplasm resources assessment and conservation
Molecular marker assisted selection
Genome-wide selective breeding

Service process

Submit sample for DNA QC

Library construction and sequence capture

High-throughput sequencing

Data quality control and sequence trimming

Automatic Bioinformatics analysis on cloud

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Report visualization

Figure 1 Distribution of SNP numbers on all wheat chromosomes

In Figure 1, the 40,017 mSNP marker regions (202,970 SNP markers) evenly distributed on wheat chromosome.
Definition of ruler: Core SNP numbers of each sliding window in genome (along a window size of 0.3M).

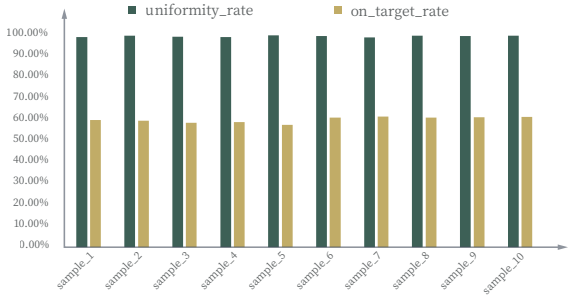

Figure 2 Uniformity and Ontarget of performance in different wheat varieties

In Figure 2, the uniformity_rate10 ranged from 97.15% to 98.92%.

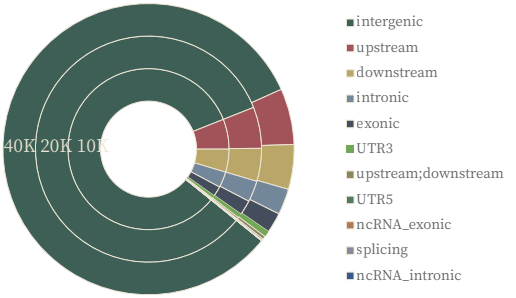

Figure 3 Annotation statistics of target SNP sites

The selection of cost-effective products can be tailored to specific breeding requirements and the practical applications of scientific research.

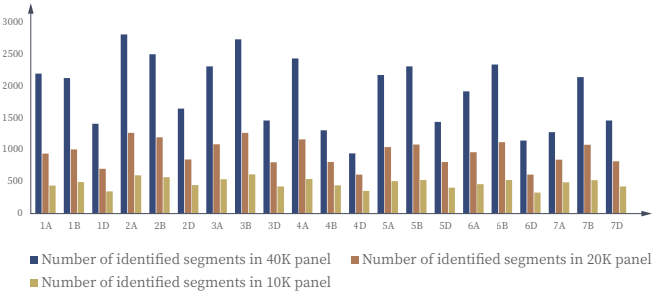

Figure 4 Distribution of the number of 40K, 20K and 10K liquichip markers on chromosomes

In Figure 4, The wheat 40K liquichip identified a total of 202,970 SNP markers distributed across 40,017 marker segments, based on the capture efficiency and uniformity of their distribution on chromosomes. The wheat 20K liquichip derived from 20,047 marker segments contained a total of 104,751 SNP markers. Additionally, the wheat 10K liquichip consisted of 53,831 SNP markers within 10,002 marker segments.

Bioinformatics analysis

GBTS Basic analysis

QC and reference sequence comparison: sequencing data QC, reference sequence comparative analysis, sequencing depth and coverage statistics;
Detection and Annotation of the variation loci include SNP, indel, STR/SSR.

Advanced analysis

Phenotypic analysis;
Population genetic study;
Species identification, Species fingerprint construction;
Genome-wide selection;
Genome-wide association study;
Genetic map construction and QTL mapping;
BSA mixed pool sequencing analysis.

According to customer requirements, customized bioinformatics analysis content can be confirmed in the project stage.