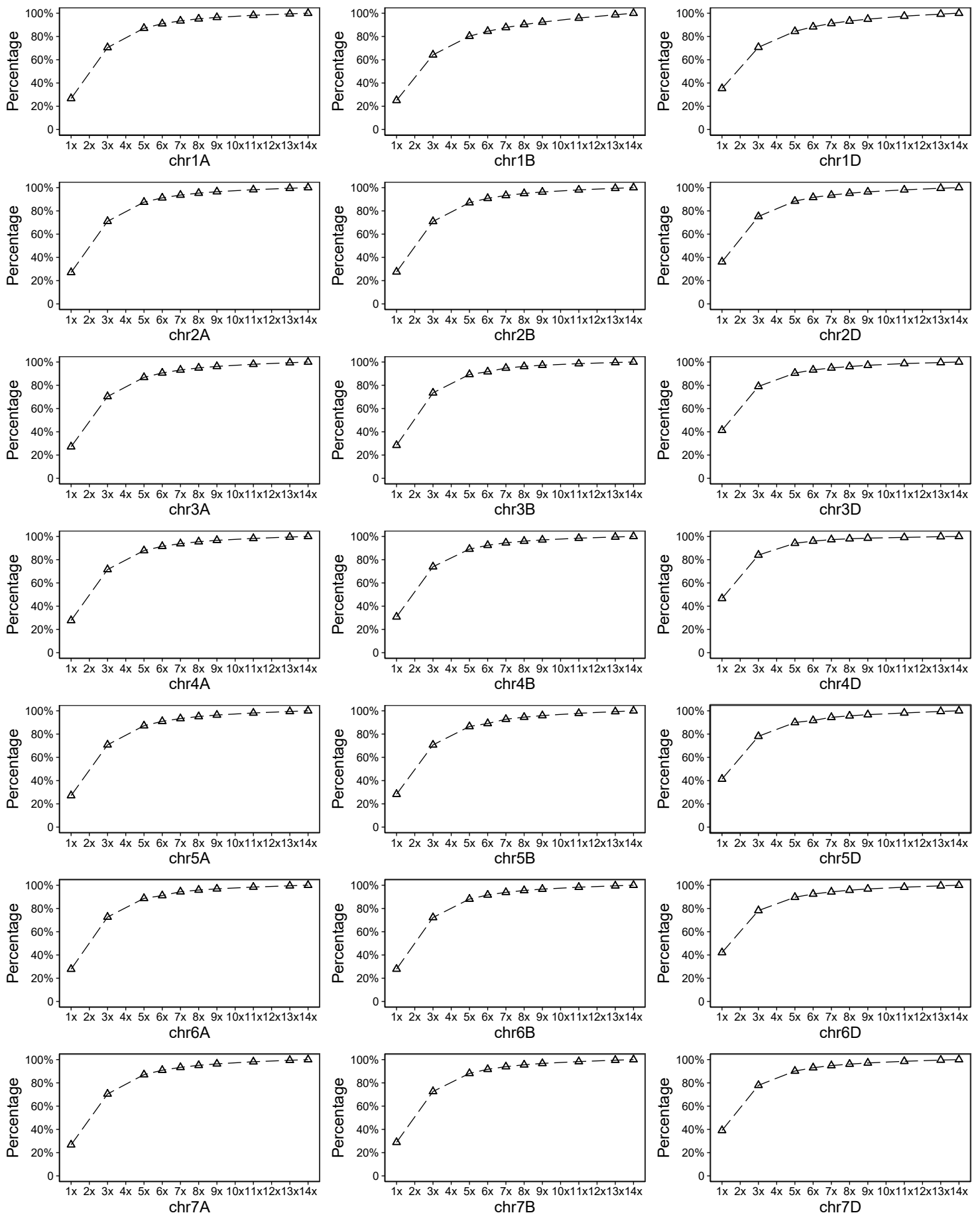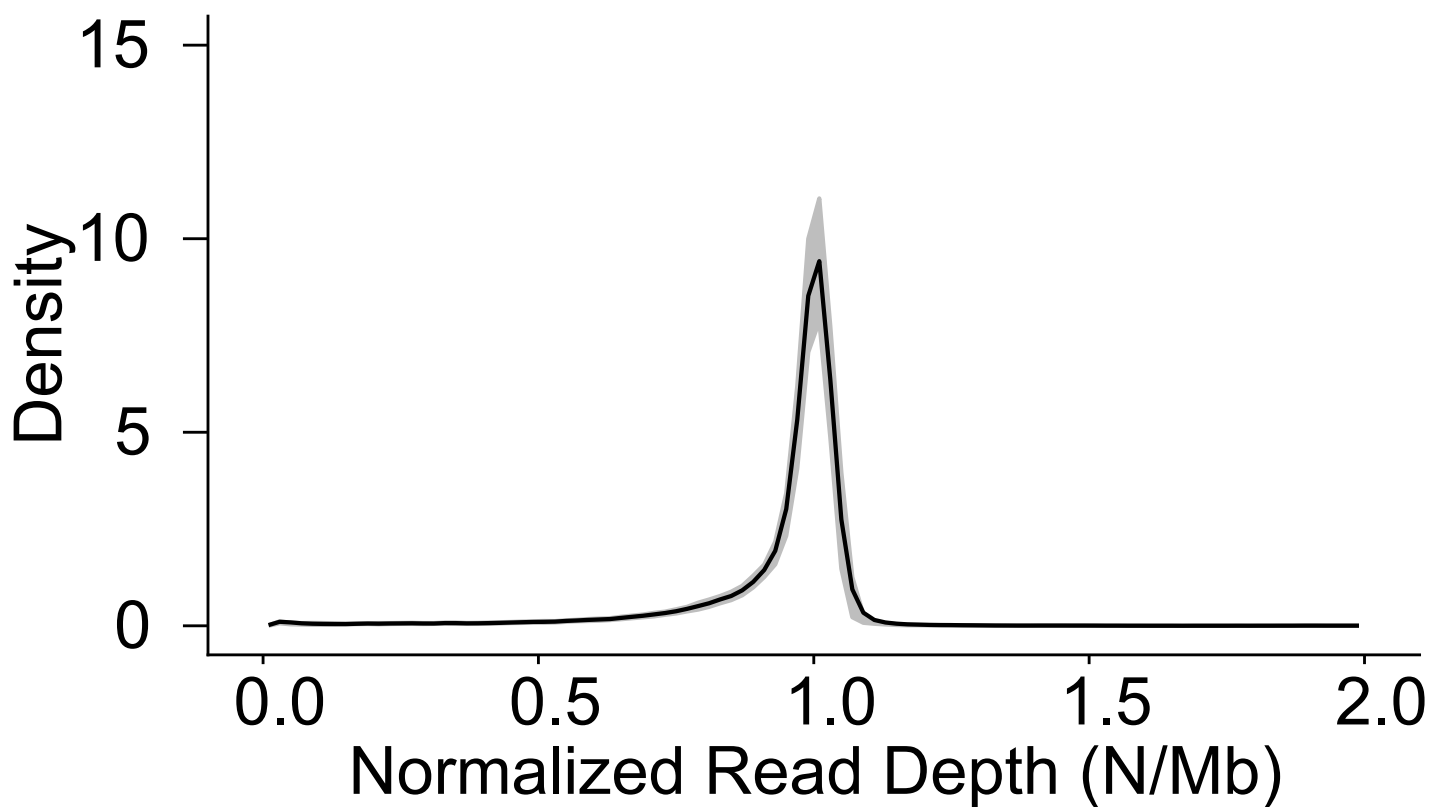Supplemental Figure S1. Geographic distribution of wheat accessions by country or region of origin. Bubble sizes and pie proportions are proportional to the sample sizes. C, cultivar; L, landrace; W, semi-wild.

Supplemental Figure S2. The effect of mapping depth on SNP recall rate.
The proportions of detected homozygous SNP in different sequencing coverage were compared to the full data.

Abbreviatino: SNP: Single-nucleotide polymorphism

Supplemental Figure S3. Distribution of normalized read depth per bin along whole genome of all accessions. N refers to reads number of each bin after normalized. Black curveindicates the mean of each plot bins and gray shade illustrates the 45%-75% density of each normalized read depth.
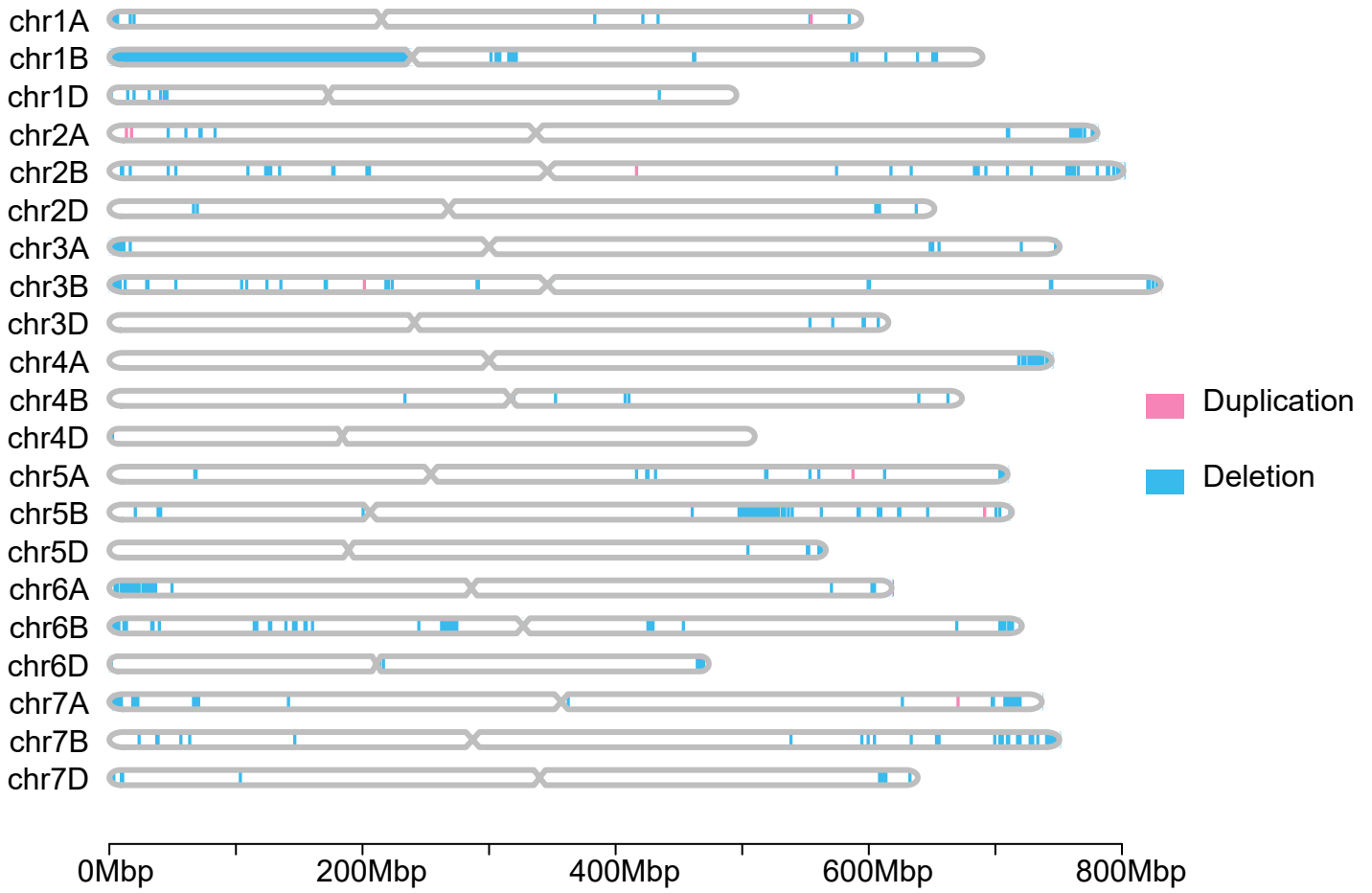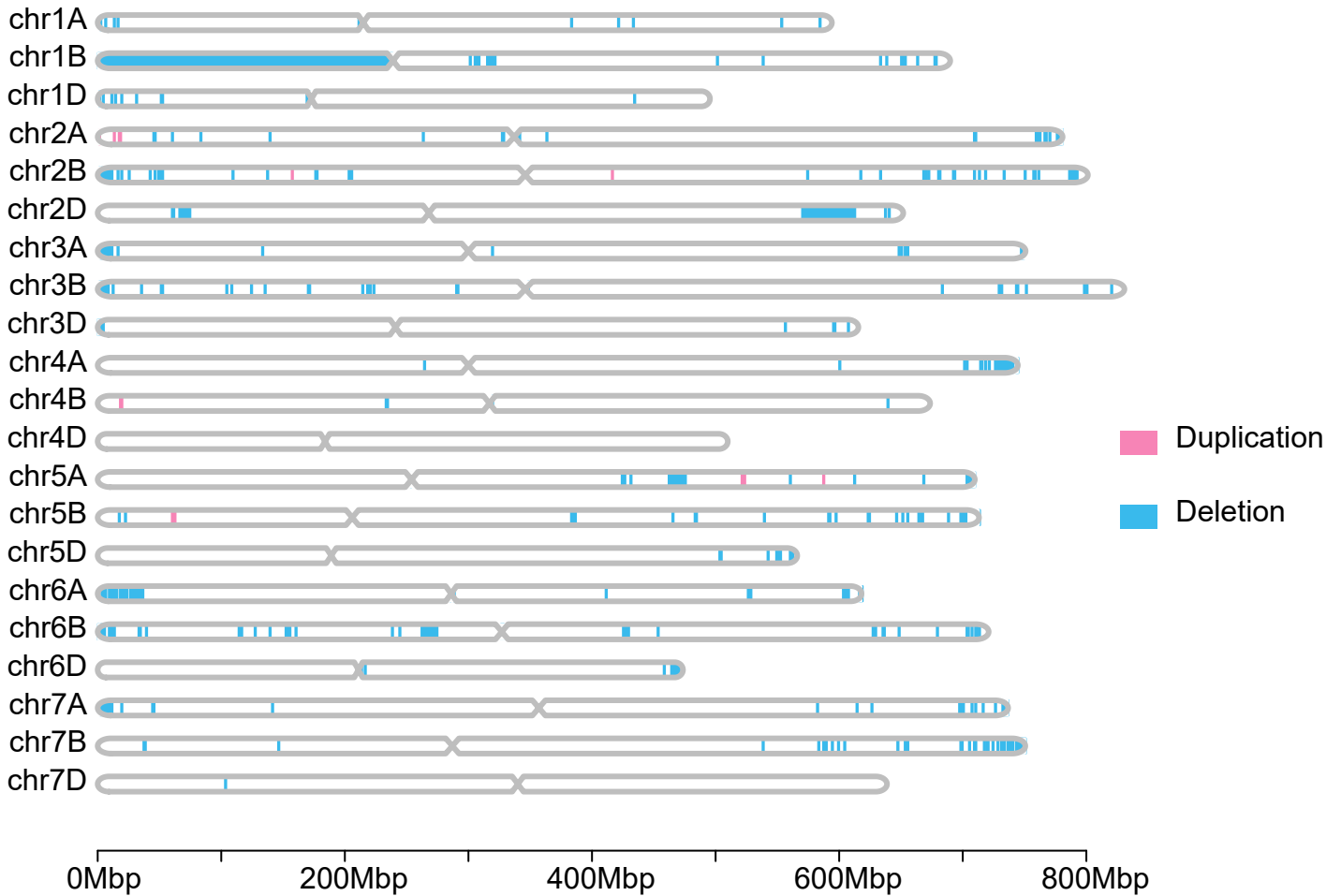
Supplemental Figure S4. CNV block distribution of Aikang58 and Lovrin10.
(A) Aikang58, (B) Lovrin10. Blue, CNV-deletion blocks; Pink, CNV-duplication blocks

Abbreviation: CNV: Copy number variation
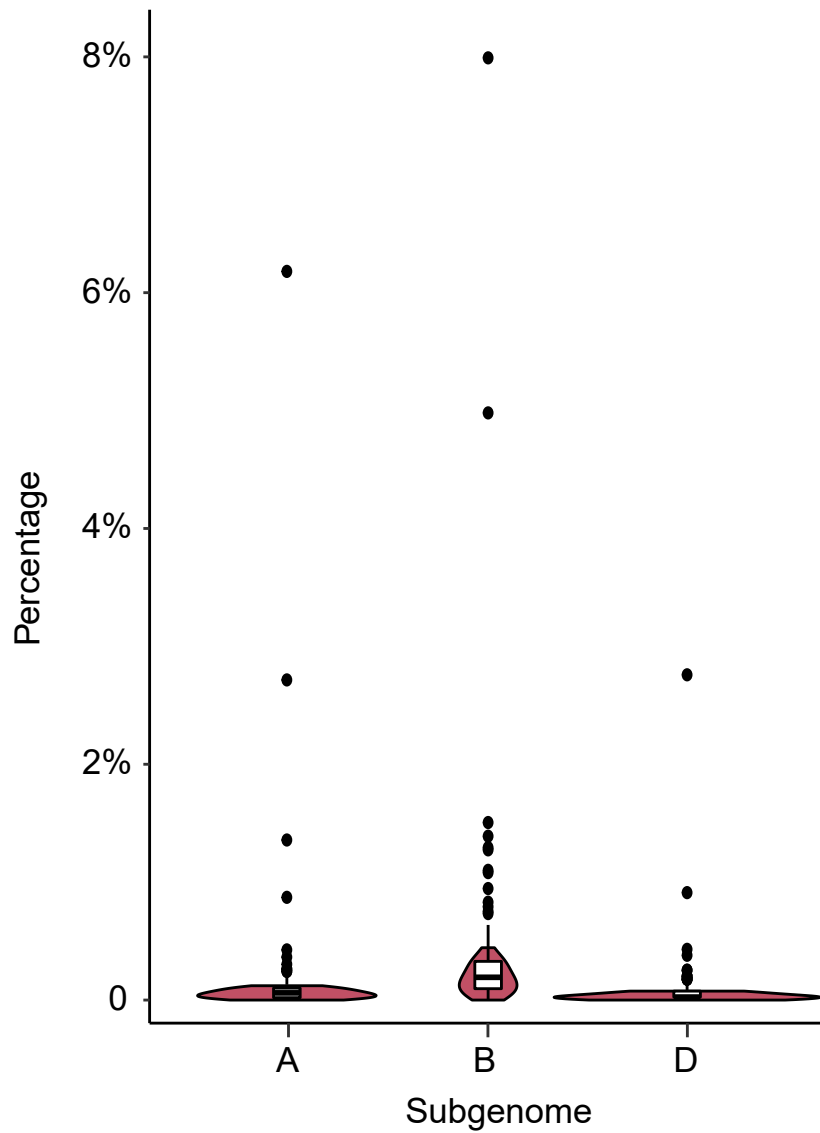
Supplemental Figure S5. Distribution of CNV-duplication blocks ratios in A, B, D subgenomes. Horizontal line indicates the median value.

Abbreviation: CNV, Copy number variation
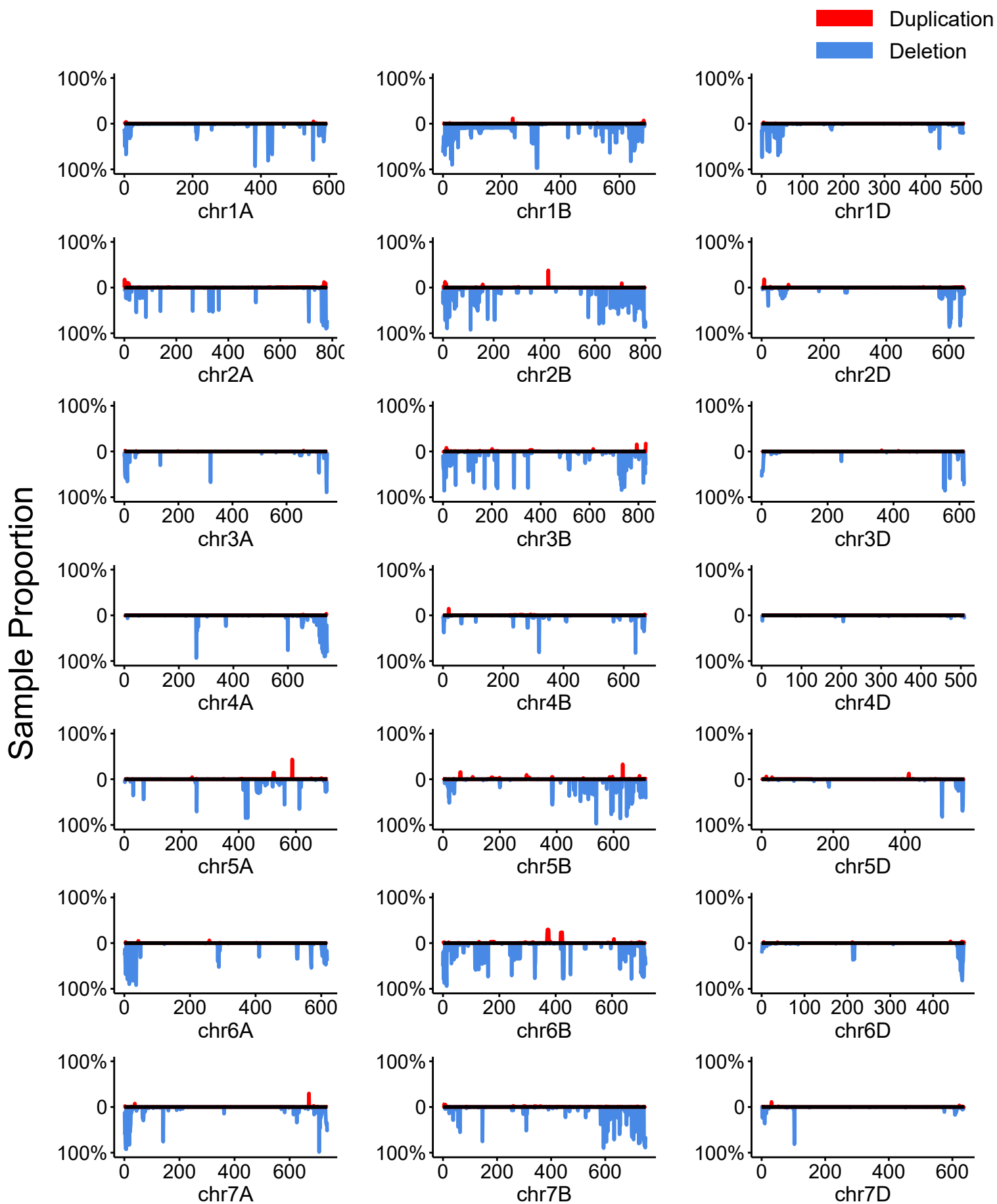
Supplemental Figure S6. Frequency of CNV-deletion blocks (blue) and CNV-duplication blocks (red) in each window of all accessions along whole genome compared with the Chinese Spring reference genome.

Abbreviation: CNV, Copy number variation
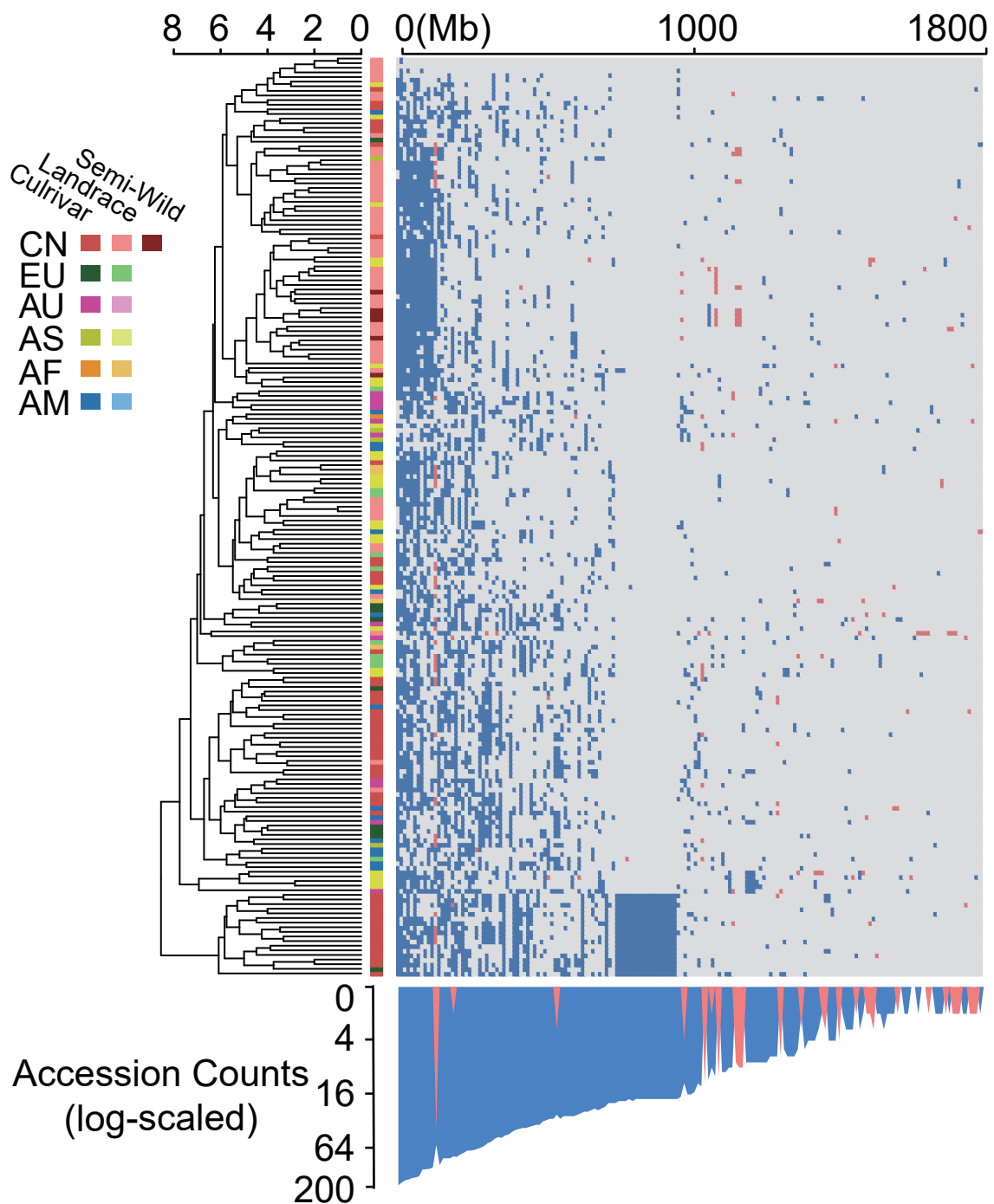
Supplemental Figure S7 Profile of CNV segments distribution in wheat accessions.
Left panel: Hierarchical cluster tree based on CNV blocks information of all accessions (left).
CNV-deletion blocks, CNV-duplication blocks and un-CNV blocks are encoded as 0,2,1 into matrix
to calculate distance between accessions. Mid bar indicates geographic origin of accession in each
row (CN, Chinese accessions; EU, European accessions; AU, Australian accessions; AF: African
accessions; AM, American accessions) and historical groups (cultivar, landrace, semi-wild).
Upright panel: distribution pattern of CNV blocks shared with at least two accessions along whole
genome. The order of CNV blocks was sorted according to their frequencies. Red box,
CNV-duplication block; Blue box, CNV-deletion blocks. Bottom: Distribution of sample count in
each bin along CNV distribution pattern. Red pattern, CNV-duplication block; Blue pattern,
CNV-deletion blocks.

Abbreviation: CNV, Copy number variation

A

B
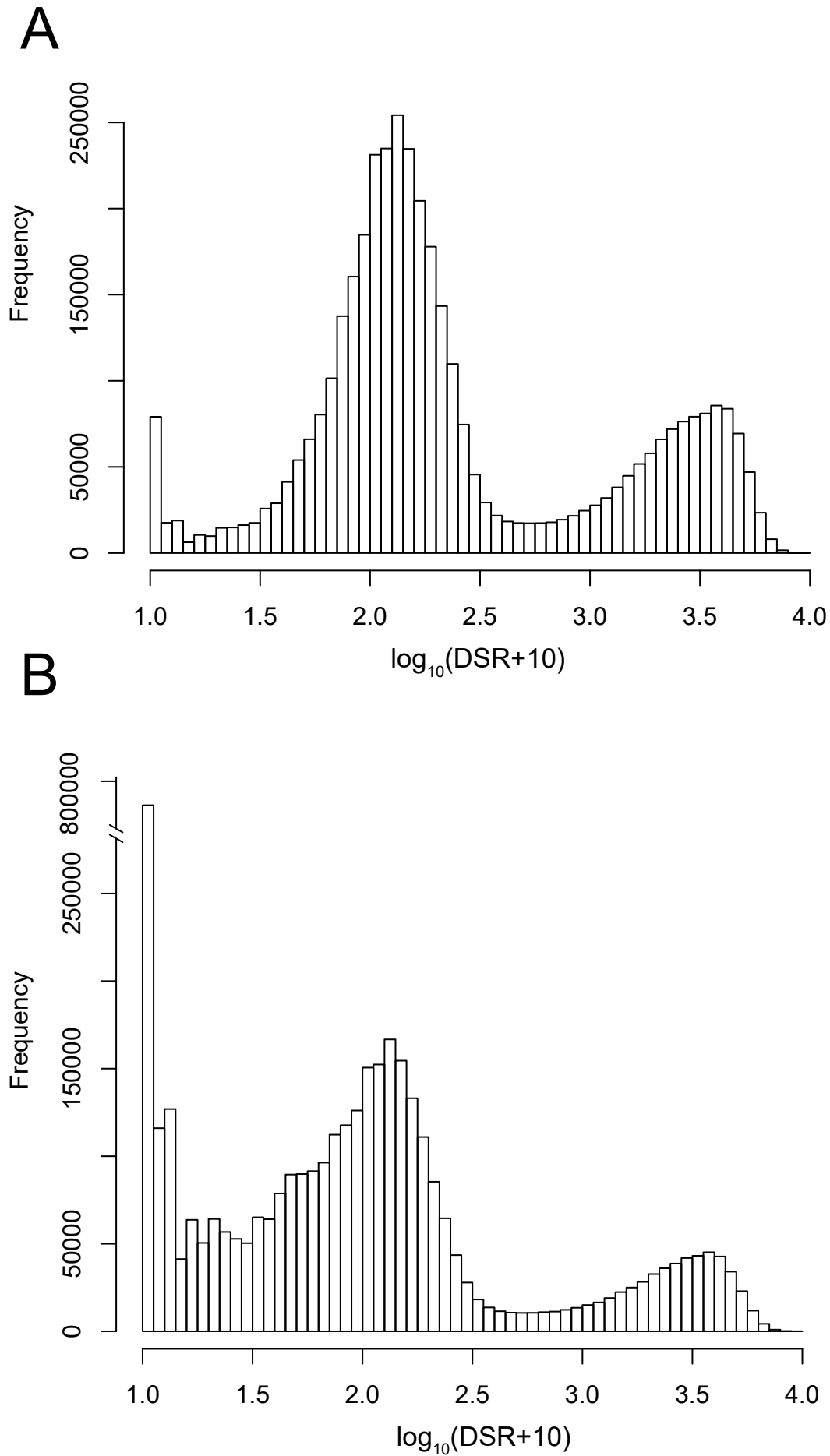
Supplemental Figure S8. Distribution of $\log_{10}(DSR+10)$ in each window (1-Mbp length). (A), 300 acession pairs random selected from all accessions pairs; (B), accession pairs of 212 accessions with their top 2 nearest IBS genetic distances accessions.

Abbreviations: DSR, different SNP ratio; IBS, identical by state; SNP: Single-nucleotide polymorphism
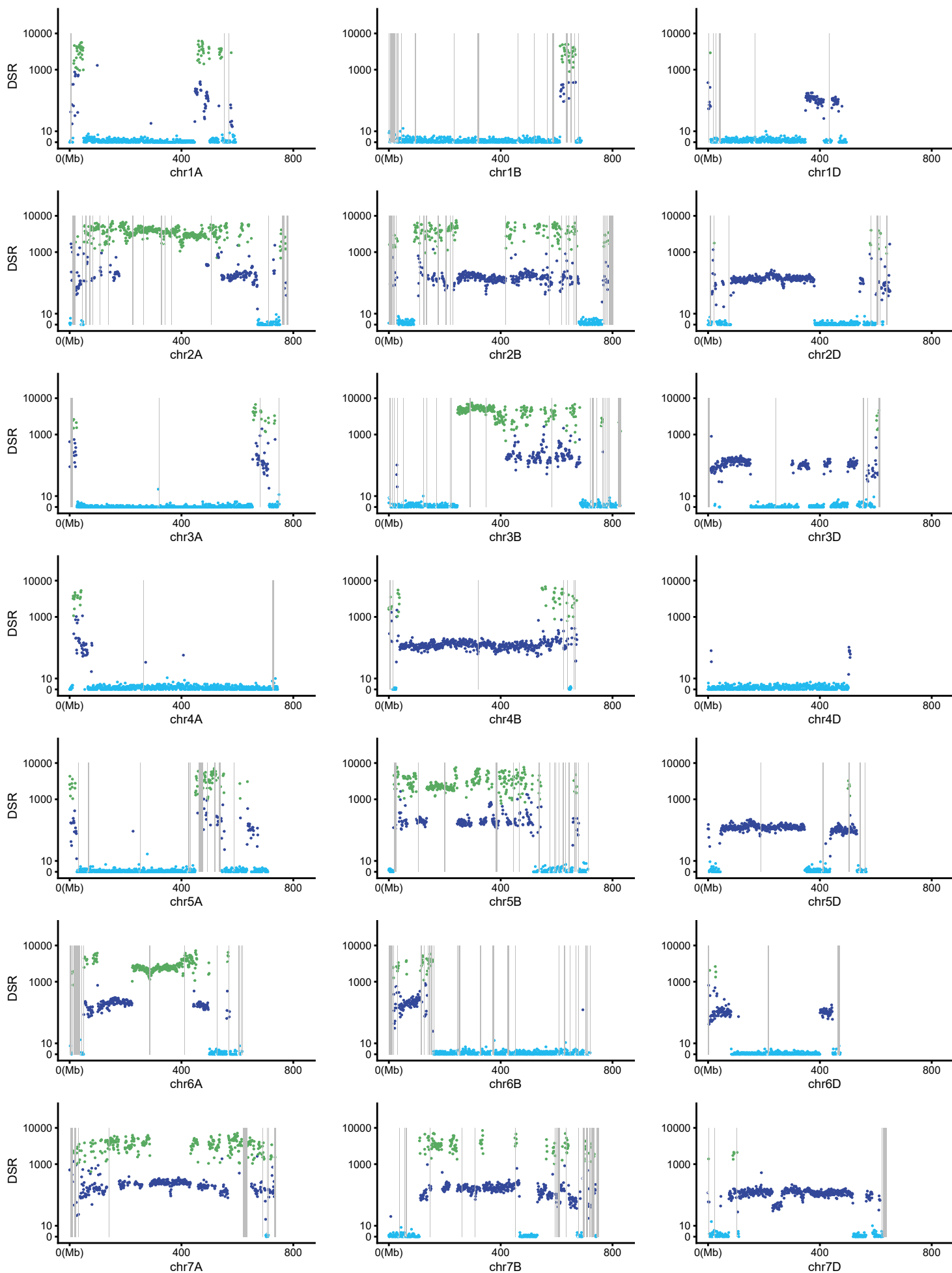
Supplemental Figure S9 Distribution of bin-wise SNP density between Bima4 and Bima1 along whole genome.Point colors correspond with the fitted low-, mid-, high- density of log10(DSR+10) distributions.Grey shadows indicate CNV blocks. Y-axis is log-scaled.

Abbreviations: DSR, different SNP ratio; SNP: Single-nucleotide polymorphism; CNV: Copy number varation
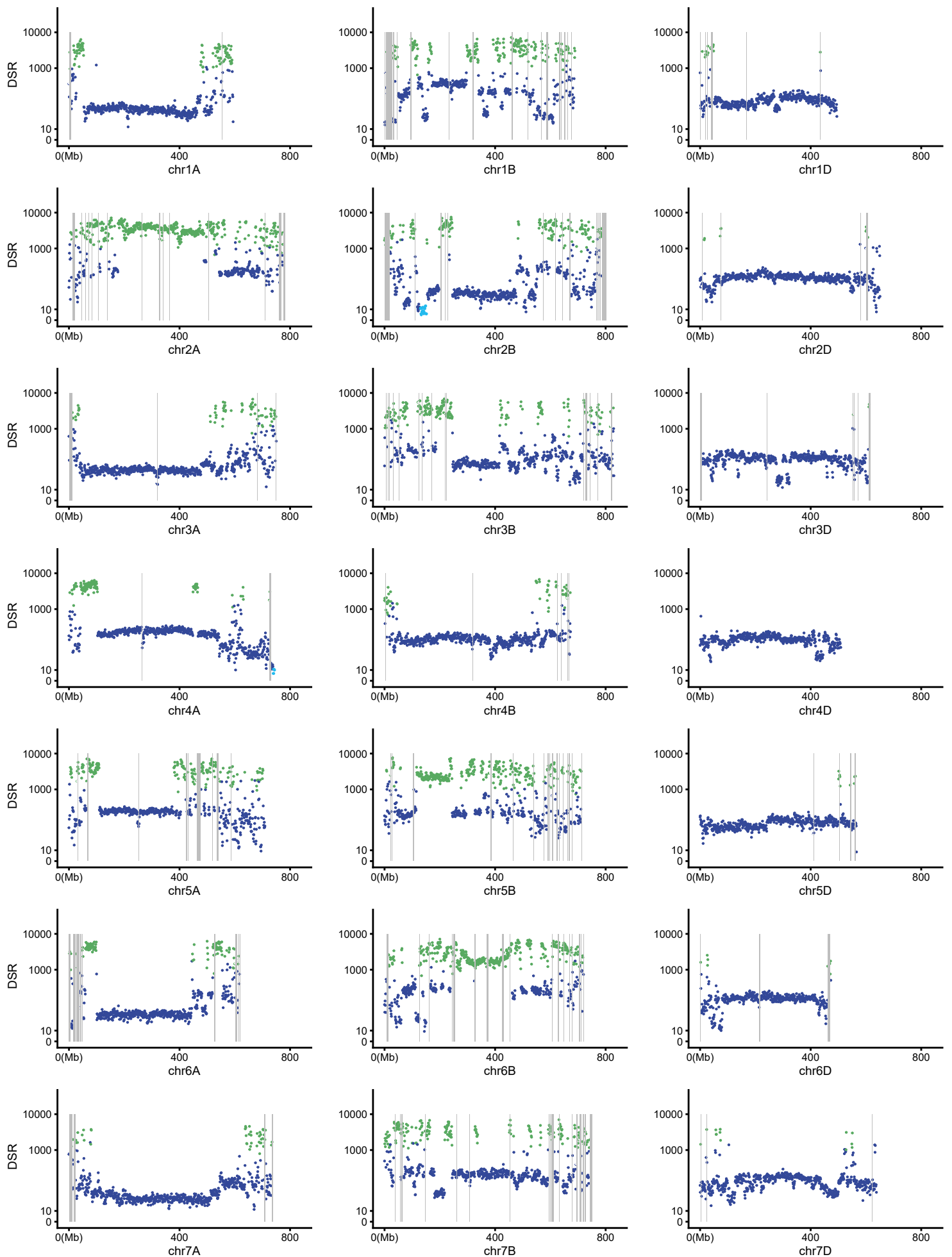
Supplemental Figure S10. Distribution of bin-wise SNP density between Bima4 and
Chinese Spring along whole genome. Point colors correspond with the fitted low-, mid-,
high- density of log10(DSR+10) distributions. Grey shadows indicate CNV blocks. Y-axis is log-scaled.

Abbreviations: DSR, different SNP ratio; SNP: Single-nucleotide polymorphism; CNV: Copy number varation
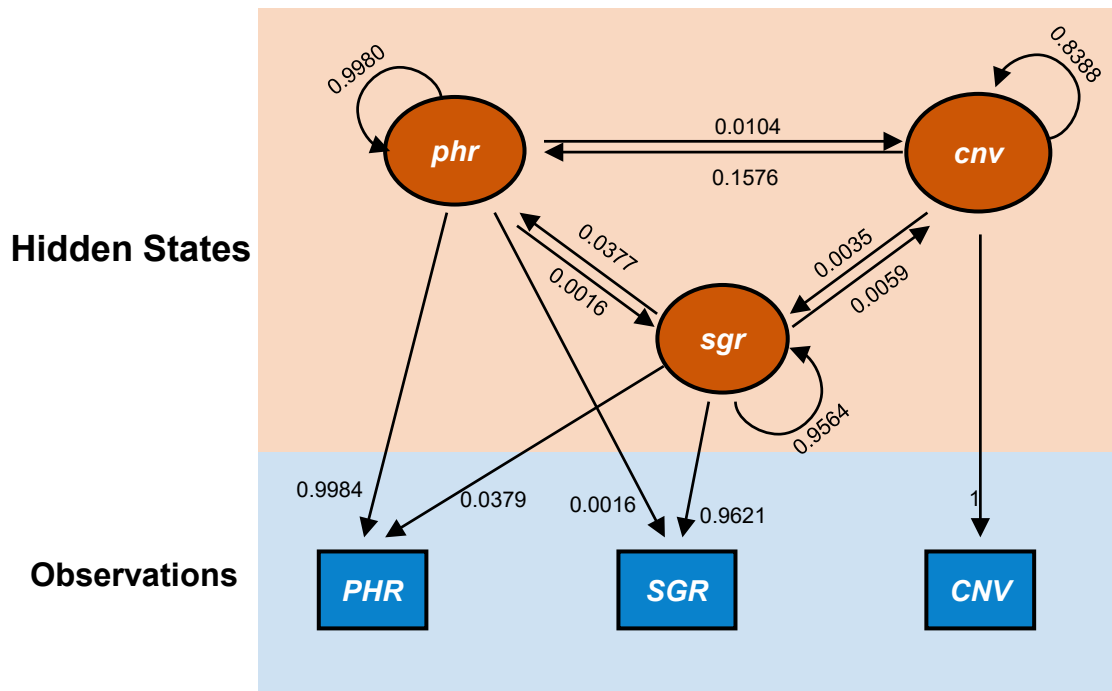
Supplemental Figure S11 Layout of the Hidden Markov Model.In the smoothing process, raw sharing statuses were considered as observations (*PHR*,*SGR*and*CNV*in blue zone), and the model was used to find their real status (phr,sgrandcnvin the orange) underlying potential noise signals. The transition (arrows between orange circles) probabilities and emission (arrows from orange circles to blue boxes) probabilities we used are annotated on the figure.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation
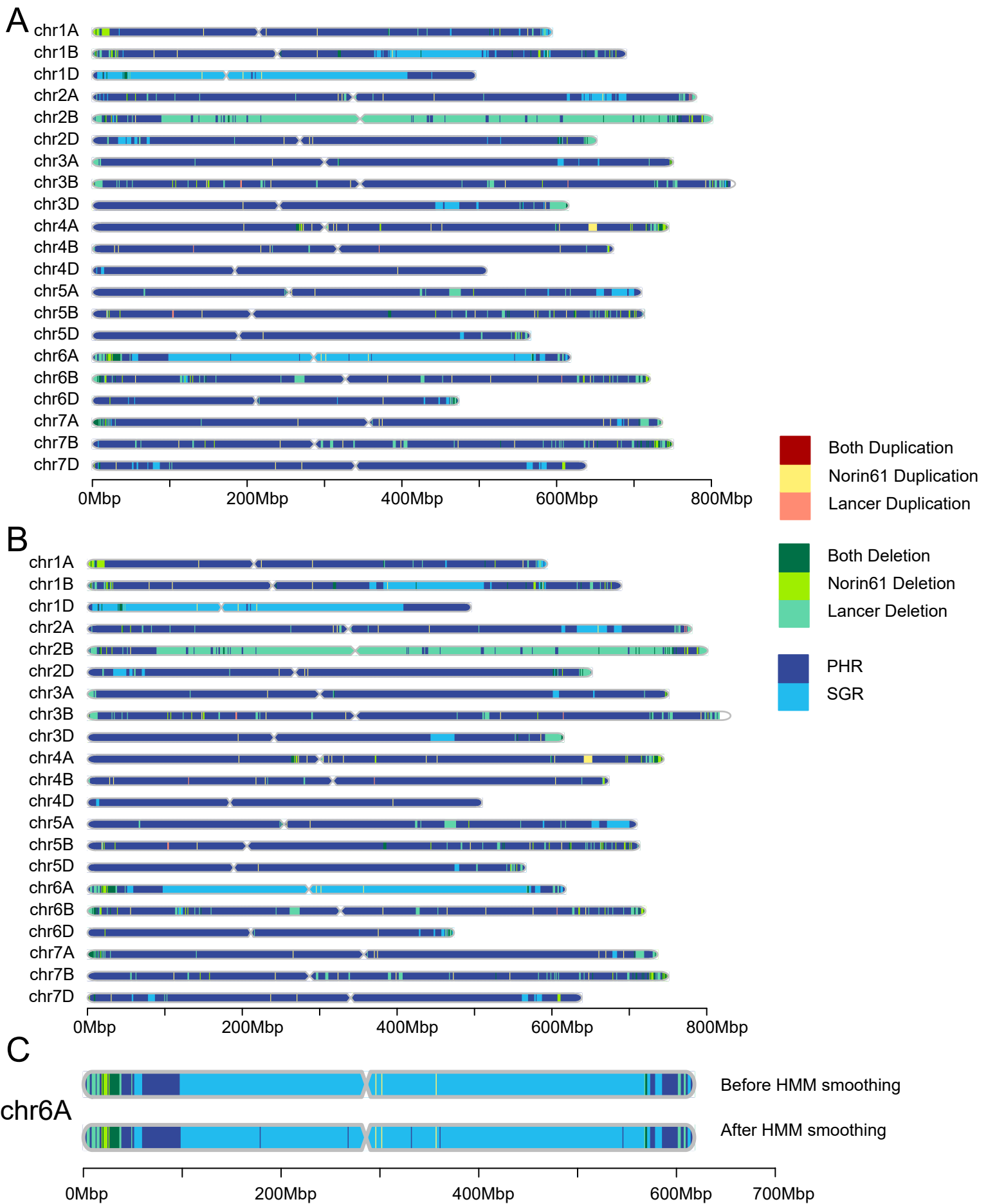
Supplemental Figure S12. Comparison of the distributions of PHR, SGR and CNV blocks between Lancer and Norin61 before and after applying HMM strategy. (A), before HMM smoothing. (B), after HMM smoothing. The chromosome 6A is highlighted in (C).

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation; HMM, Hidden Markov Model
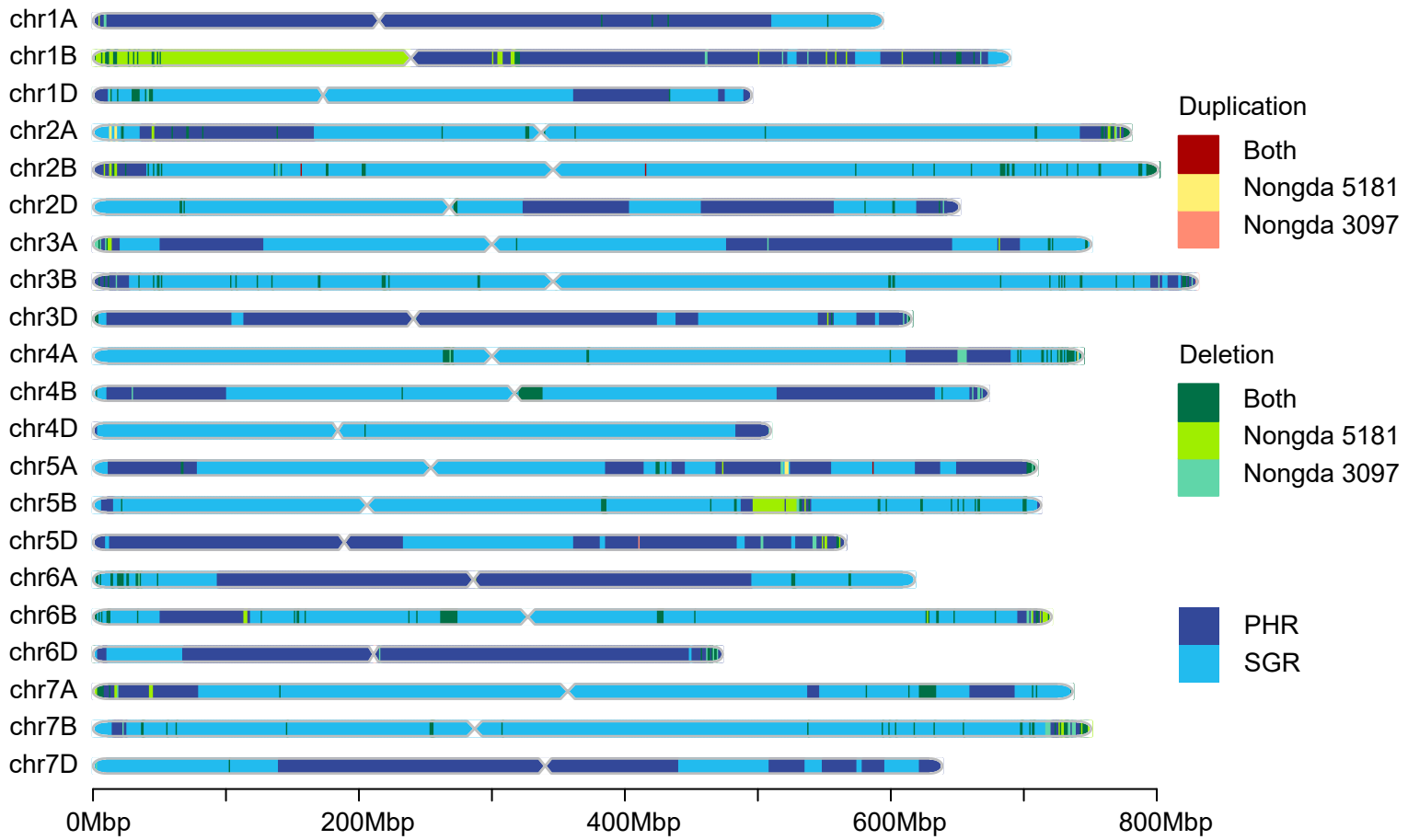
Supplemental Figure S13. Distribution of PHR, SGR and CNV blocks between Nongda5181 and Nongda3097.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;

Supplemental Figure S14 Distribution of PHR, SGR and CNV blocks between Nongda5181 and Lunxuan987.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;

Supplemental Figure S15. Dissect the inherited genomic blocks of Nongda5181 from parents. The bottom chromosome-shape track is the recombination events of Nongda5181 from its parental lines, Nongda987 (purple) and Nongda3097 (green). The source of genomic blocks shared between Nongda3097 and Lunxuan987 in Nongda5181 is determined by the donor of adjacent regions.

Abbreviation: SGR, Shared Genomic resource Regions;

Supplemental Figure S16 Distribution of PHR, SGR and CNV blocks between Nongda3097 and Jingdong6.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;

Supplemental Figure S17 Distribution of PHR, SGR and CNV blocks between Nongda3097 and Nongda3338.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;
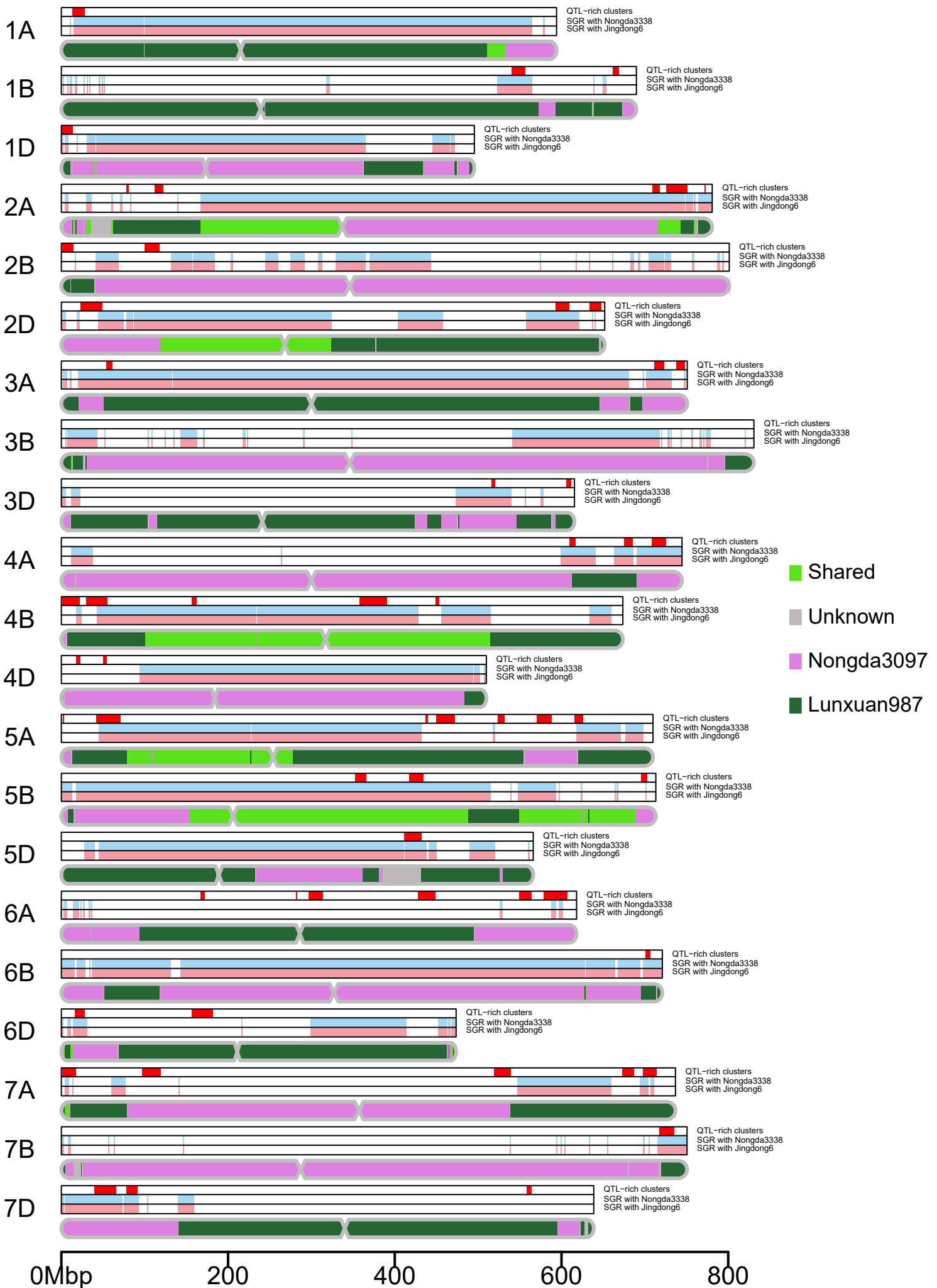
Supplemental Figure S18 Dissect the inherited genomic blocks of Nongda5181. The bottom chromosome-shape track, reconstructed recombination events of Nongda5181 from its parental lines, Nongda987 (purple) and Nongda3097 (green). Descended blocks from great-grandparental line Nongda3338 (blue) and grandparental line Jingdong6 (pink) were showed in independent tracks. QTL-rich cluster annotated by Cao et al. are marked (red track). Abbreviation: SGR, Shared Genomic resource Regions;

Supplemental Figure S19 Genome similarity hierarchical clustering based on ward's hierarchical clustering method on a scale of log2(gIBD proportion). CN, Chinese accessions; EU, European accessions; AU, Australian accessions; AF: African accessions; AM, American accessions. C, cultivar; L, landrace; W: semi-wild. Heat map shows the value of log2(1/gIBD proportion) between each accession.

Abbreviation: gIBD, germplasm resource-based Identity-By-Descent

Supplemental Figure S20. Distribution of PHR, SGR and CNV blocks between Bima1 and Bima4.

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;
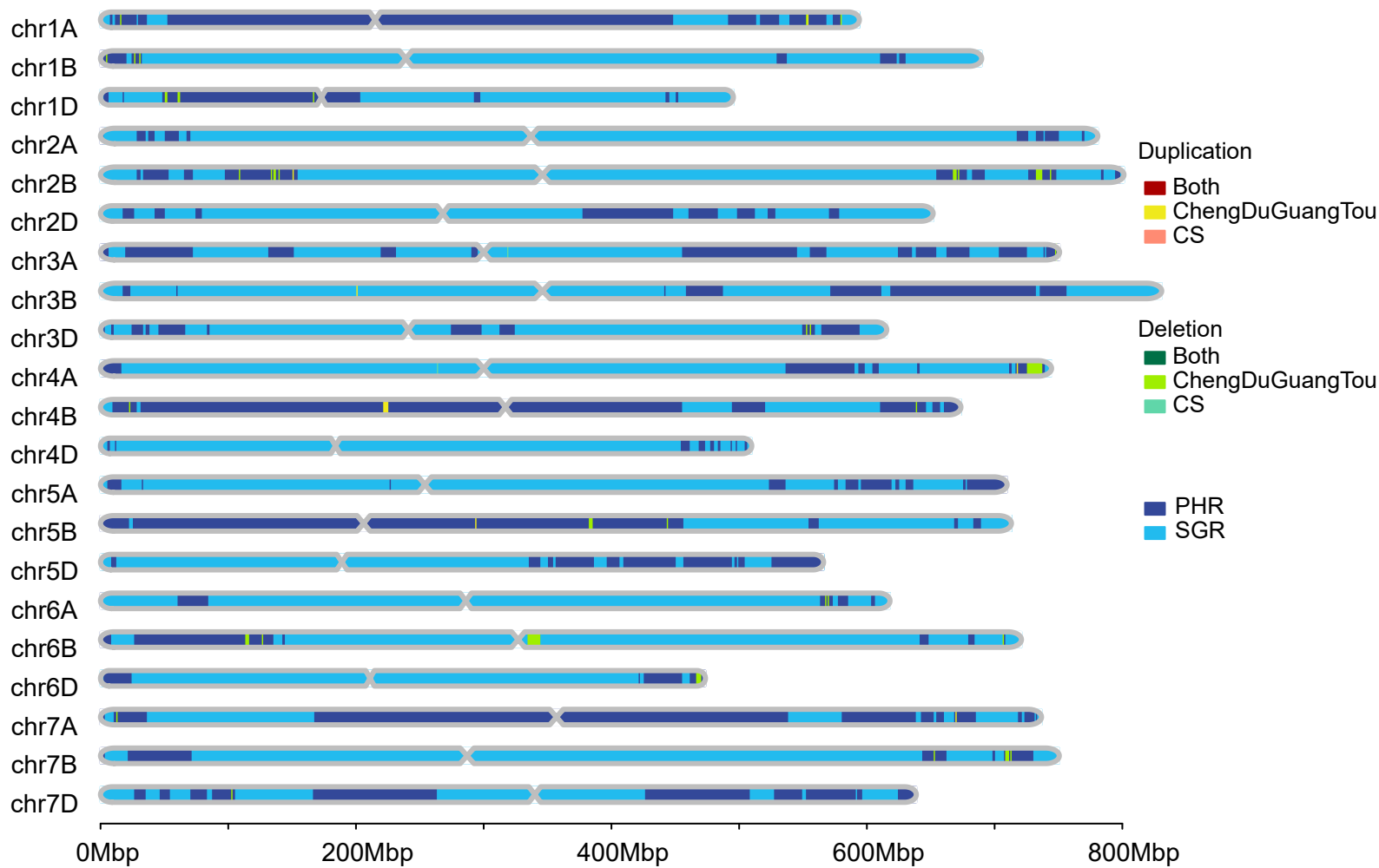
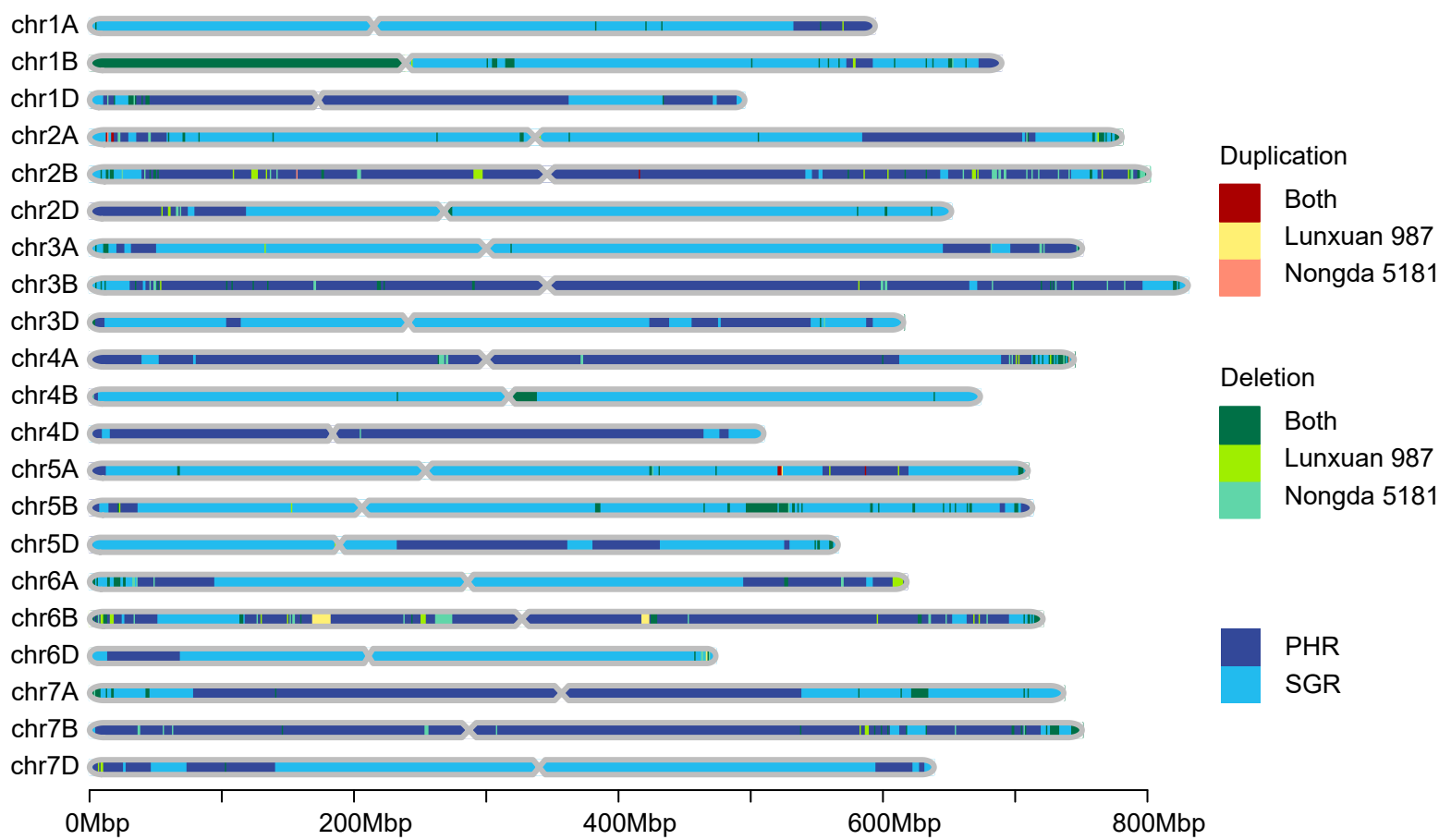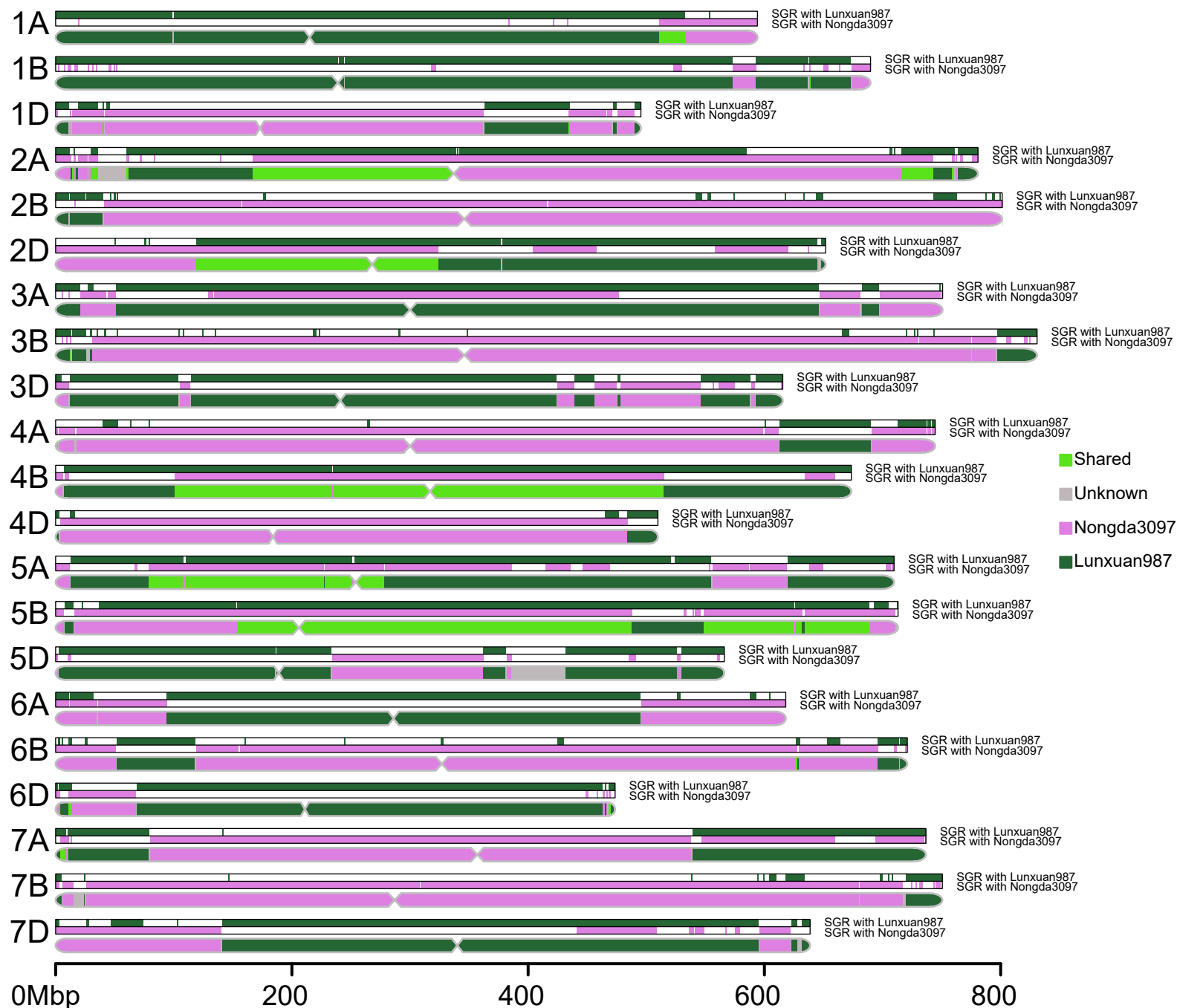Supplemental Figure S21 Distribution of PHR, SGR and CNV blocks between Chengduguangtou and CS (Chinese Spring).

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation
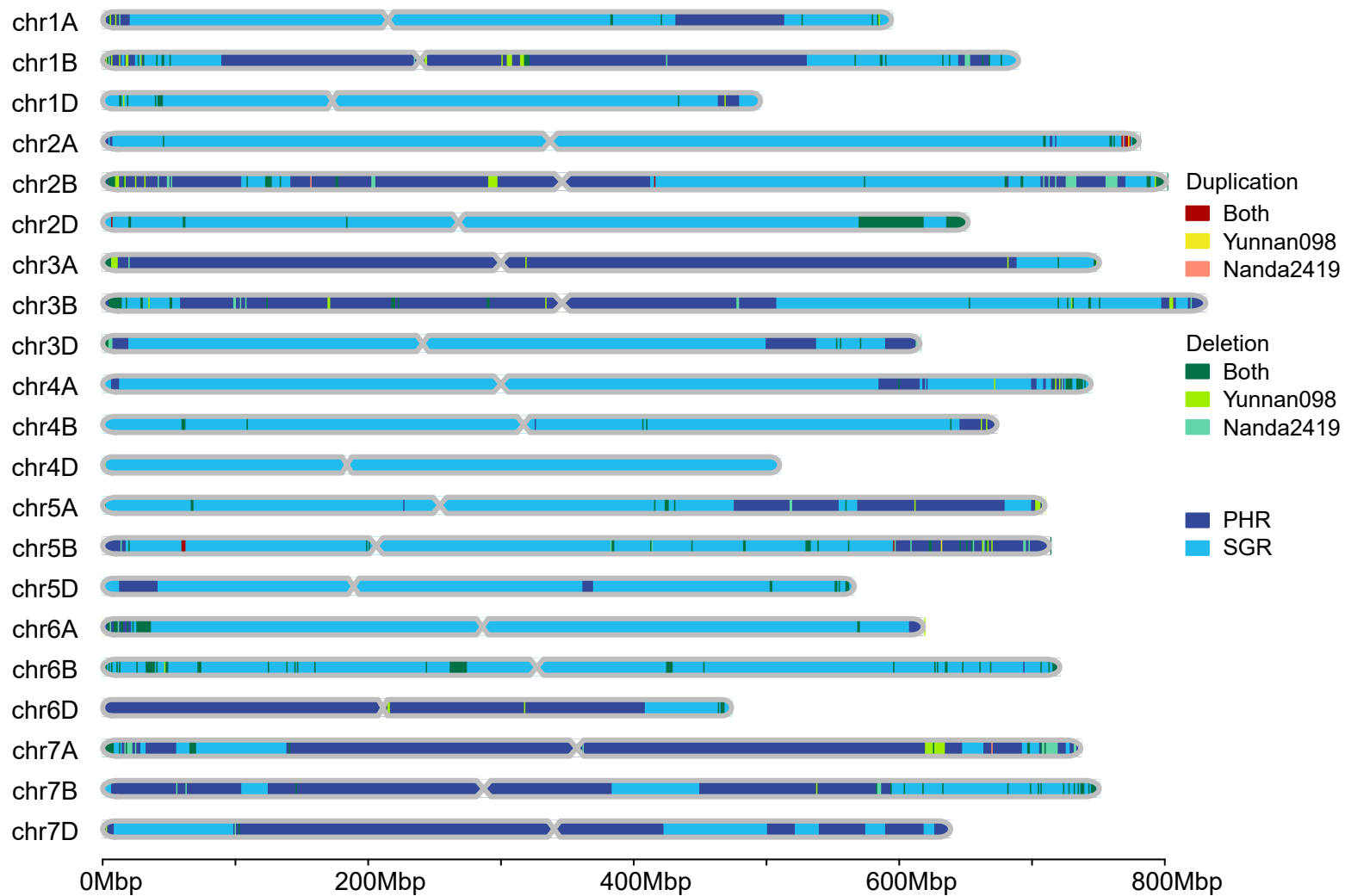
Supplemental Figure S22 Distribution of PHR, SGR and CNV blocks between Yunnan098 and Nanda2419.

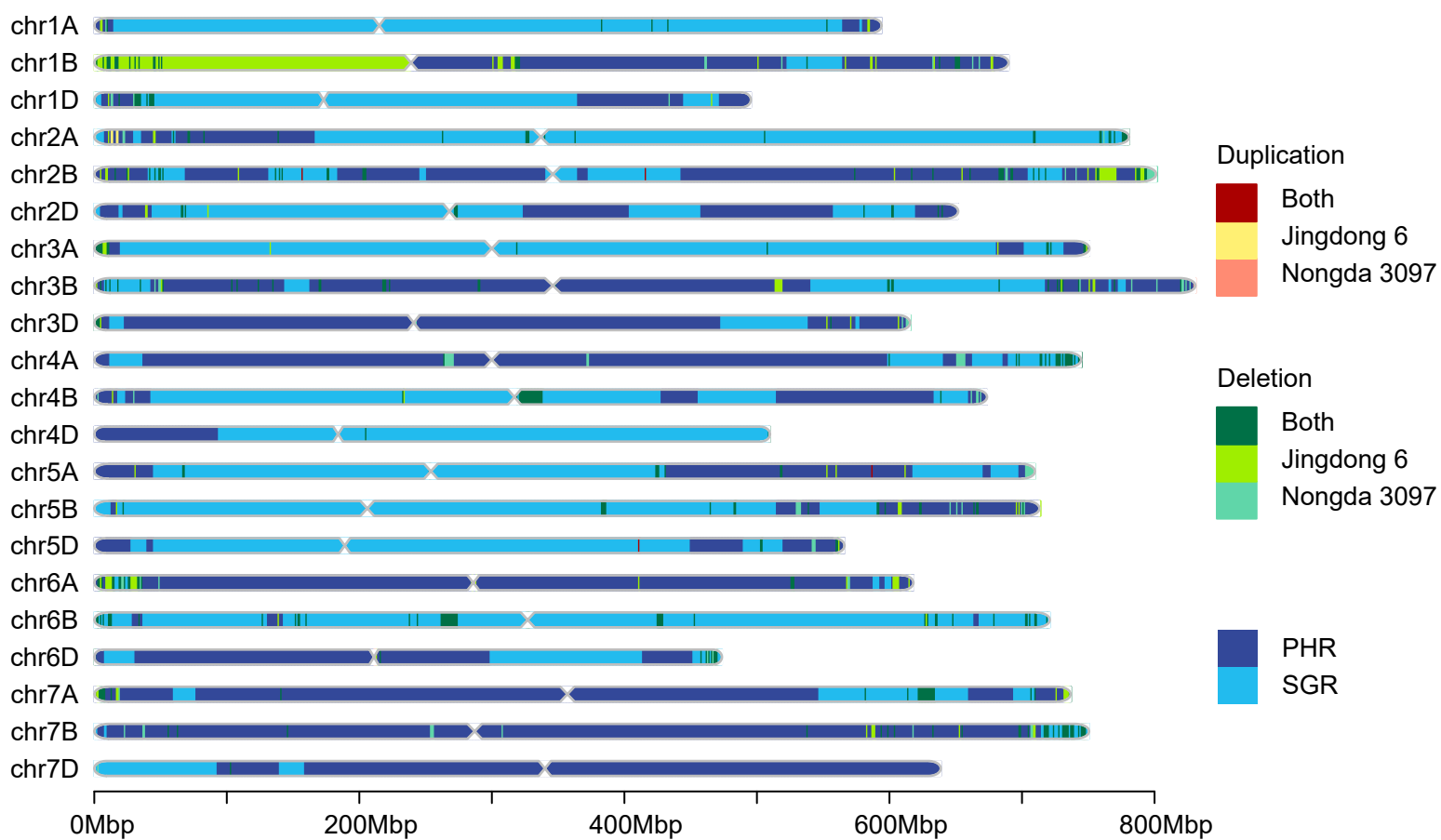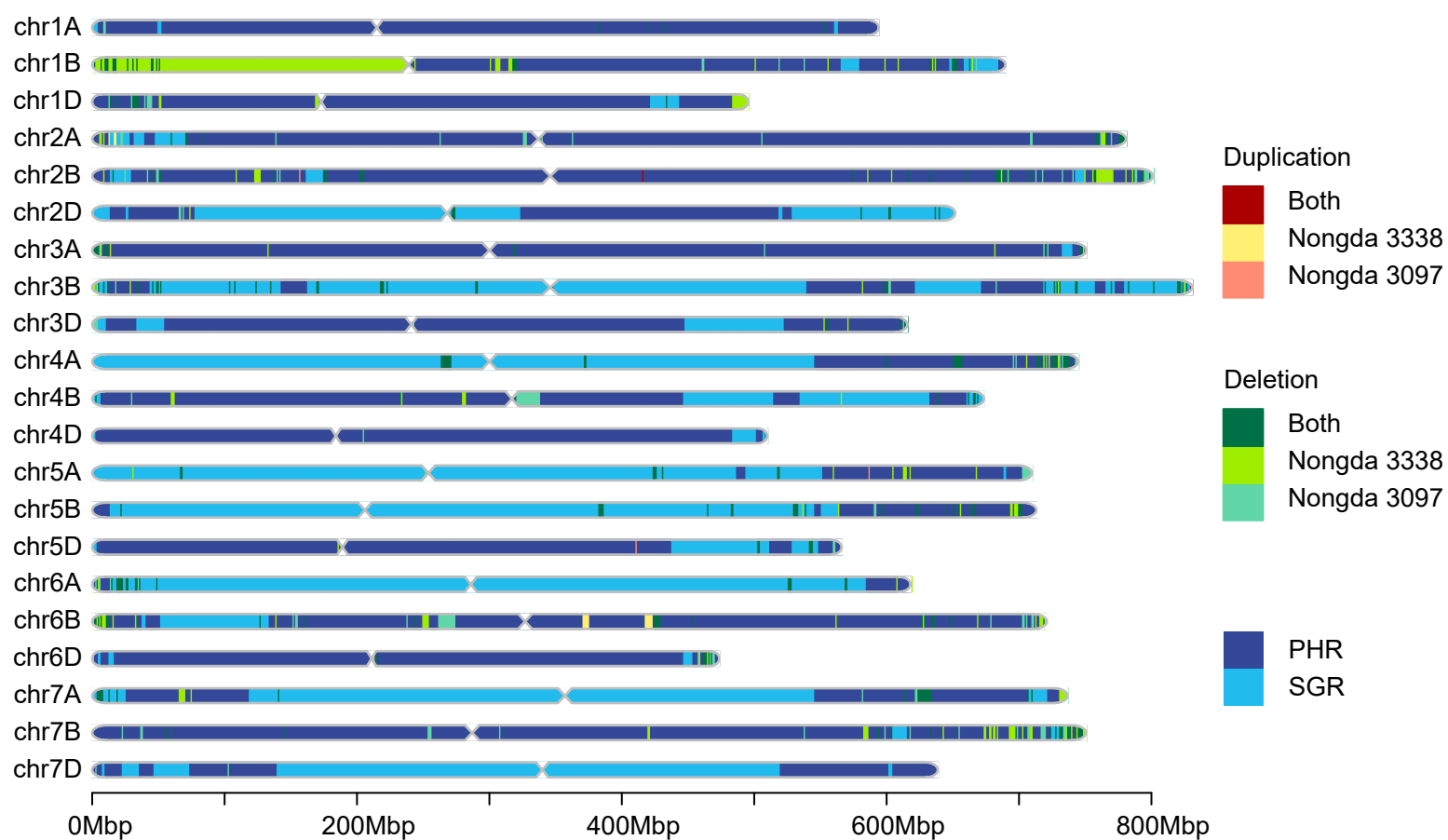Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;
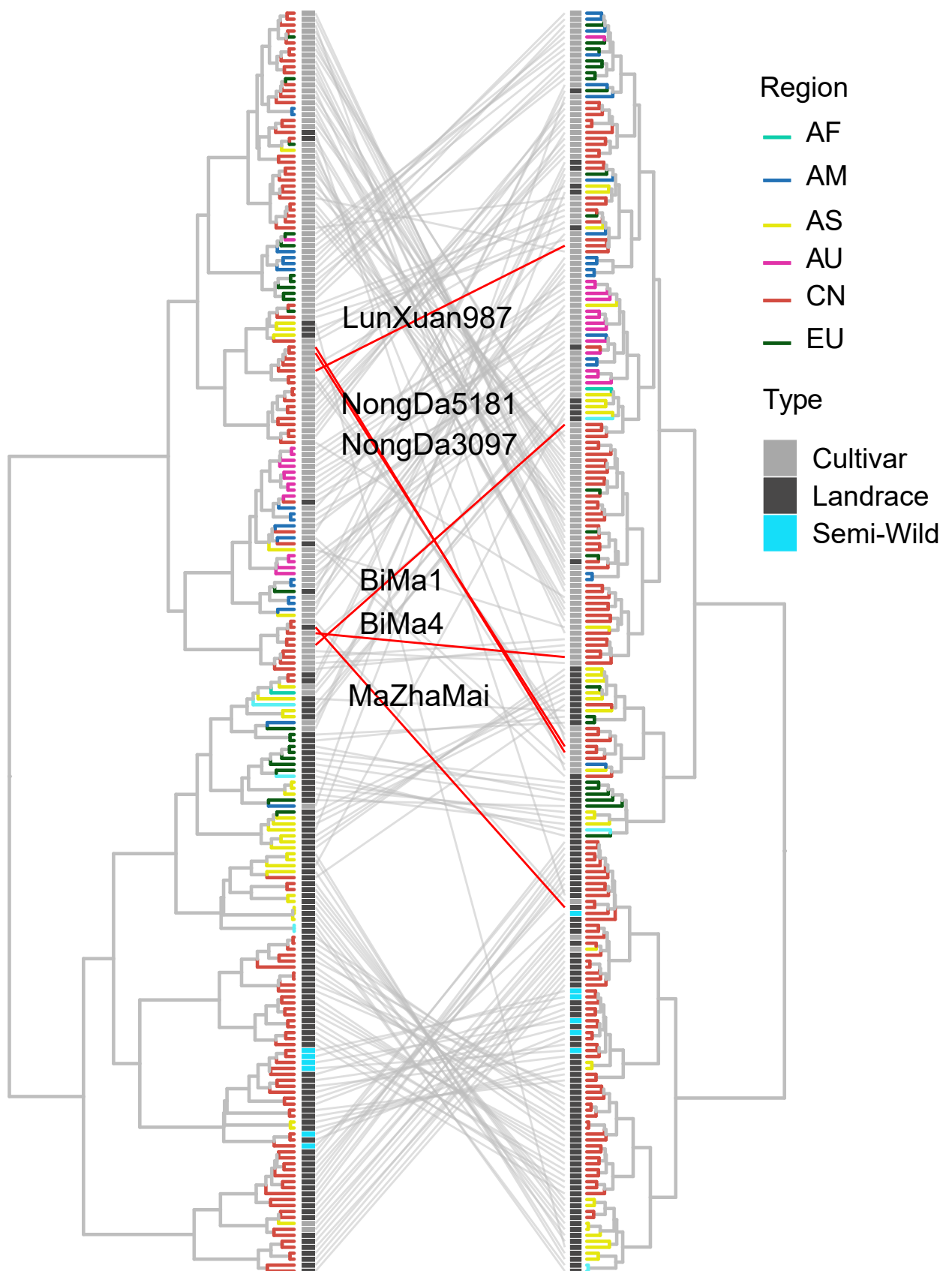
Supplemental Figure S23 Comparison between gIBD-based (left) and IBS-based (right) hierarchical clustering results. Both trees based on ward's hierarchical clustering method and gIBD-based tree on a scale of log2(1/gIBD proportion). Leaves are colored based on regions of accessions. CN, Chinese accessions; EU, European accessions; AU, Australian accessions; AF: African accessions; AM, American accessions.

Abbreviations: gIBD, germplasm resource-based Identity-By-Descent; IBS, identical by state
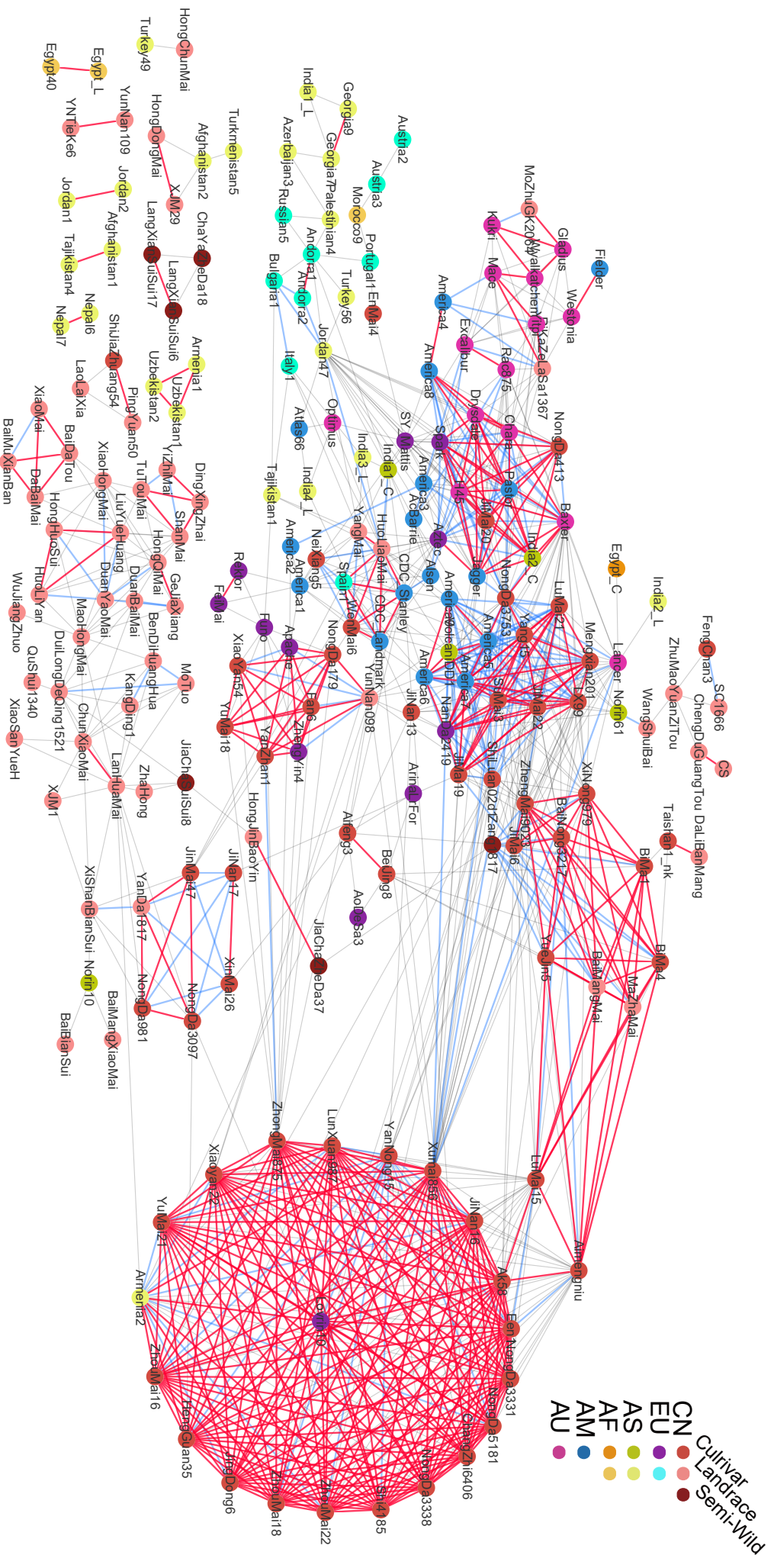
Supplemental Figure S24. The chromosome scale GGNet of 1B chromosome. The edge colours indicate the ranges of the gIBD ratio (genome similarity) for accession pairs. Blue edges: 50% ≥ gIBD-ratio ≥ 40%; Red edges: gIBD-ratio ≥ 50%. A node represents an accession The right annotation bar shows the geographic origin (CN, Chinese accessions; EU, European accessions; AU, Australian accessions; AF: African accessions; AM, American accessions) and historical groups (cultivar, landrace, semi-wild) of each accession.
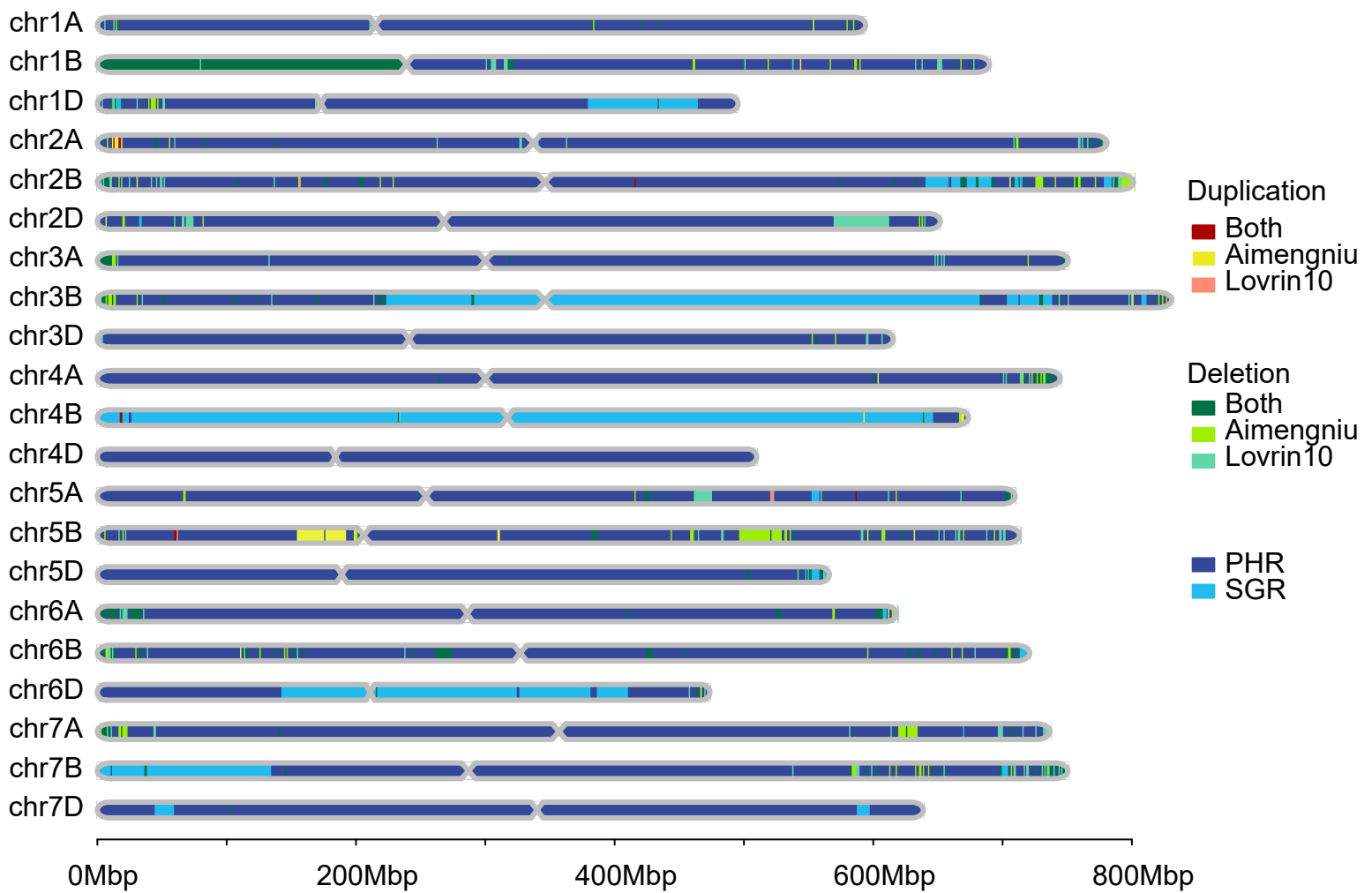
Supplemental Figure S25. Distribution of PHR, SGR and CNV blocks between Aimengniu and lovrin10.

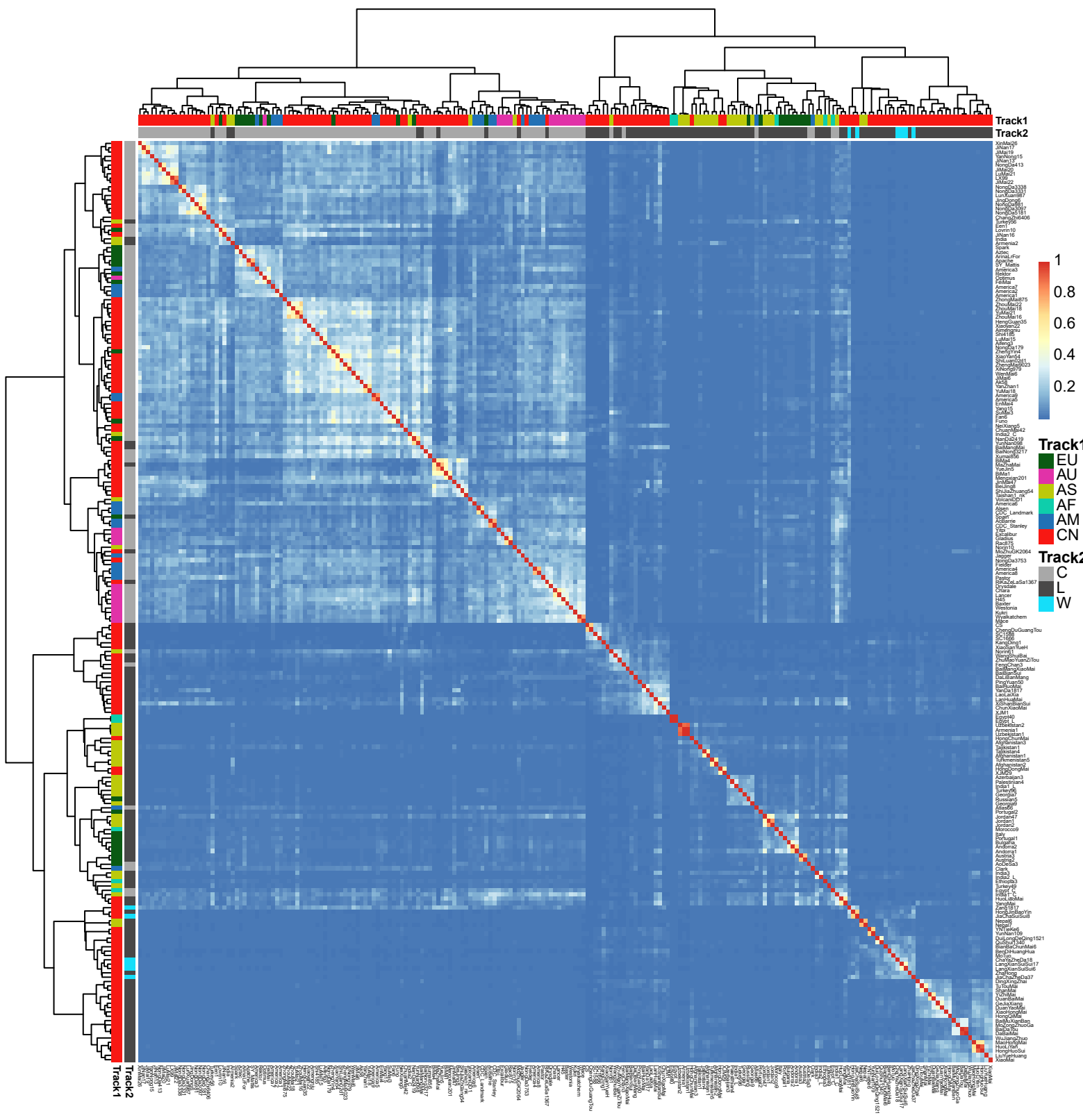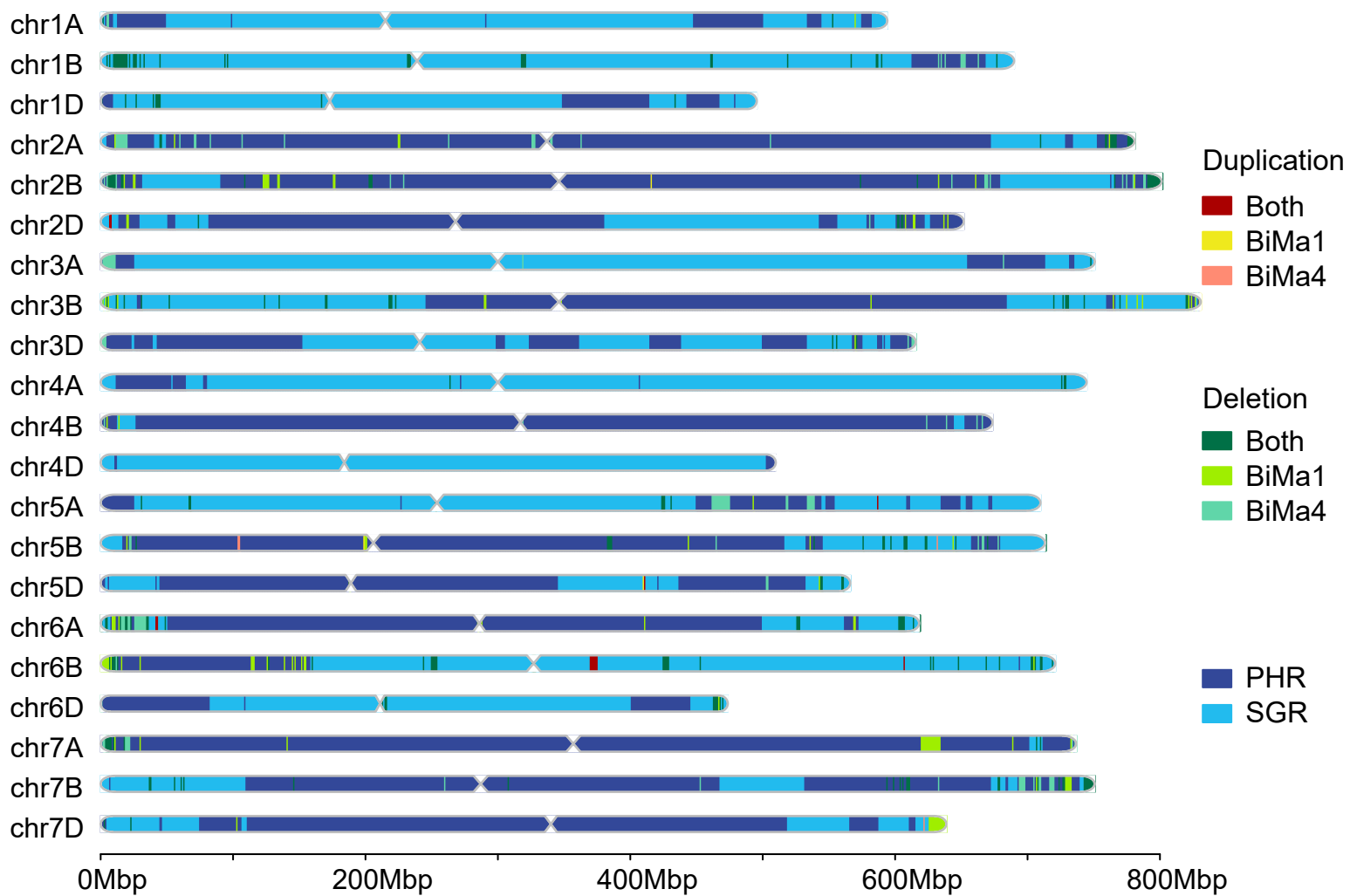Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation;
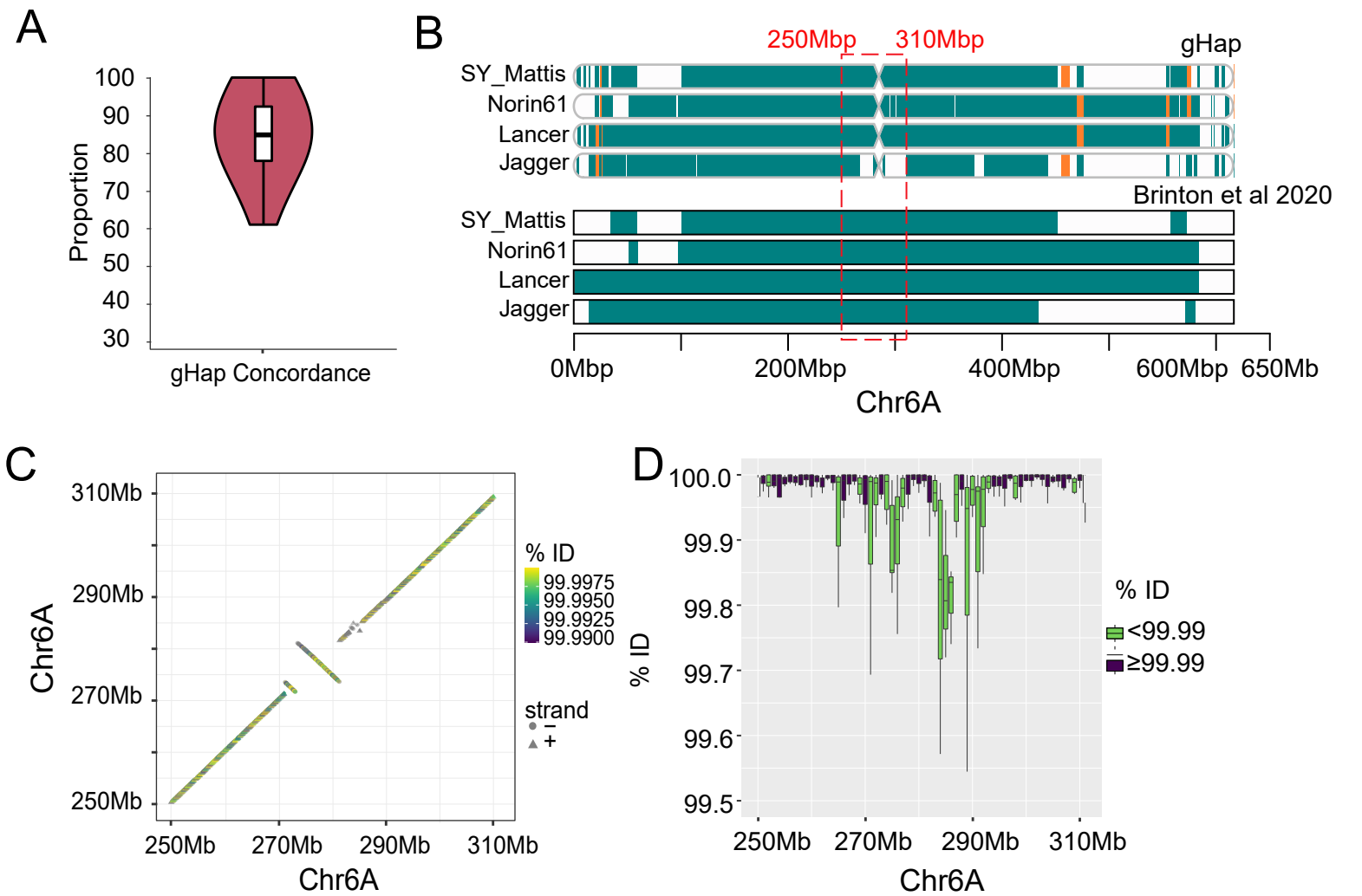
Supplemental Figure S26.
A, Distribution of concordance ratio between gHap and haplotype identified by Brinton et al. among ArinaLrFor, Jagger, Lancer, Landmark, Mace, Norin61, CDC Stanley and SY Mattis. The concordance ratio refers to the ratio between the haplotype length that both identified by gHap and Brinton et al. and the total haplotype length that identified by Brinton et al.in each sample pairs. B, Diagrammatic representation of all gHaps on chromosome 6A in the 4 accessions (upper) and haplotypes shared among 4 accessions defined in Brinton et al 2020 (lower). Regions with the same colour at the same position share common haplotypes (except for white regions which are not contained gHap blocks). C, NUCmer alignments (≥20 Kbp length) between region highlighted by red dashed box in (B) of the Jagger and SY Mattis assemblies. Each data point represents a single pairwise alignment, with the position corresponding to the midpoint of the alignment with respect to the Jagger (x-axis) and SY Mattis (y-axis) assemblies. D, Boxplots show the pairwise NUCmer alignments between chr6A of Jagger and SY Mattis from (B) grouped into 5-Mbp bins with respect to the position in the SY Mattis assembly. Purple-filled boxplots indicate bin median ≥99.99% sequence identity and green-filled boxplots indicate bin median <99.99% sequence identity. E, Diagrammatic representation of all gHaps on chromosome 6A pythiscal position from 200Mb to 400Mb in the 8 accessions. Regions with the same colour at the same position share common haplotypes (except for white regions which are not contained gHap blocks).
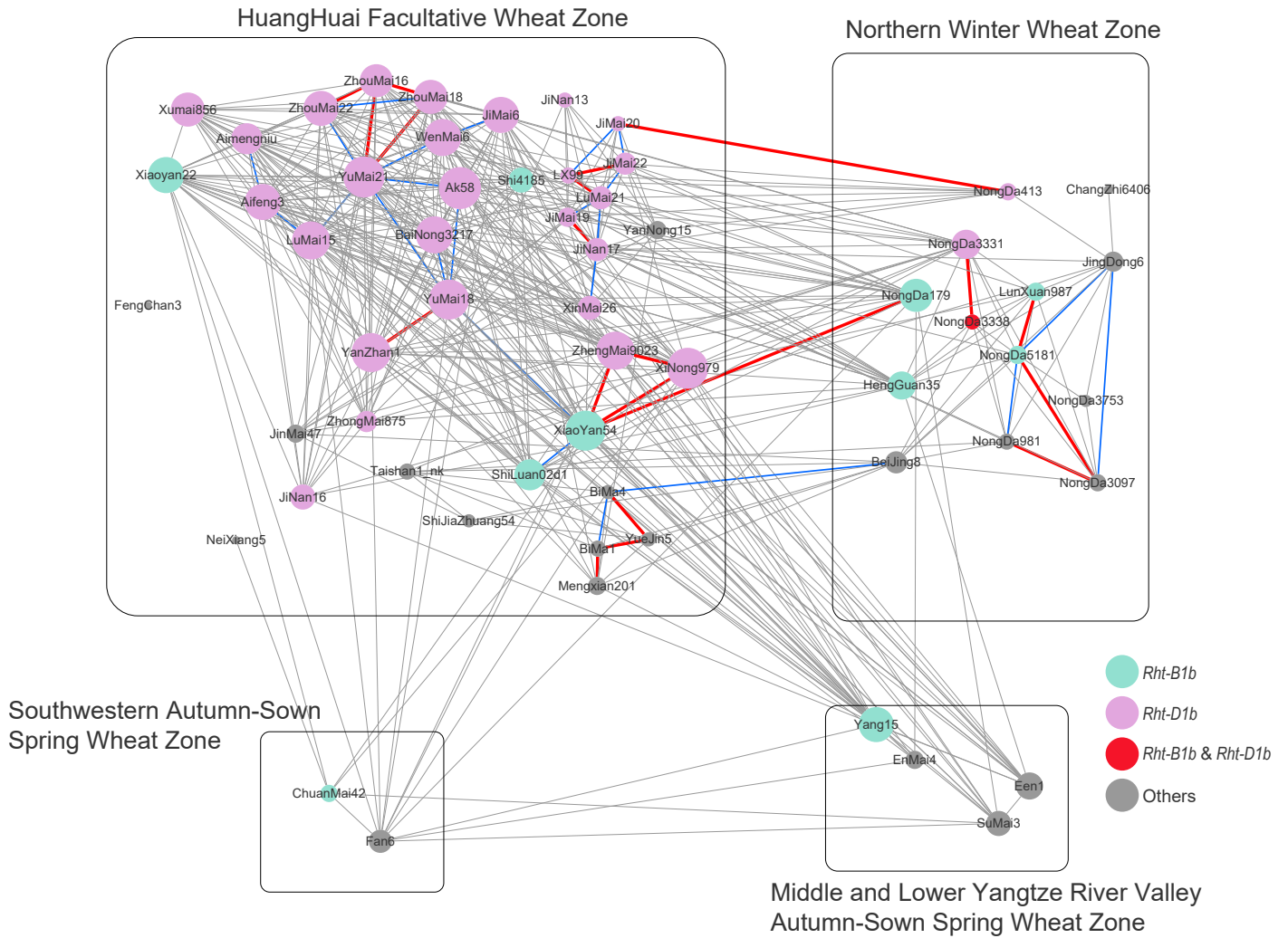
Supplemental Figure S27. The trajectories of semi-dwarf alleles Rht-B1b and Rht-D1b utilization in Chinese cultivars were presented in context of GGNet.

Abbreviation: GGNet, genomic-based germplasm network

Supplemental Table S1: Detailed information of the whole genome resequencing data of wheat used in this study.

Sample ID	Vcf ID	Accession name	Origin	Accession type	Source
C37	S24	Zhumaoyuanzitou	Zhejiang, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C29	36-44210	Uzbekistan1	Uzbekistan	ASL	fastq from Cheng et al., Genome Biology, 2019
C30	37-44211	Uzbekistan2	Uzbekistan	ASL	fastq from Cheng et al., Genome Biology, 2019
C11	18-40978	America1	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C12	19-40979	America2	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C13	20-40982	America3	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C14	21-40983	America4	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C15	22-40984	America5	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C16	23-40985	America6	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C17	24-40989	America7	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C18	25-40990	America8	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C19	26-40991	America9	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C49	ALS	Alsen	USA	AMC	fastq from Cheng et al., Genome Biology, 2019
C7	7-87821	Spain1	Spain	EUL	fastq from Cheng et al., Genome Biology, 2019
C38	S26	Chengduguangtou	Sichuan, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C45	S10	Chuanmai42	Sichuan, China	CNC	fastq from Cheng et al., Genome Biology, 2019
CS	CS	CS	Sichuan, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C43	S8	Xinong979	Shannxi, China	CNC	fastq from Cheng et al., Genome Biology, 2019
C47	XIA	Xiaoyan54	Shannxi, China	CNC	fastq from Cheng et al., Genome Biology, 2019
C44	S9	Jimai6	Shandong, China	CNC	fastq from Cheng et al., Genome Biology, 2019

C9	9-76299	Portugal1	Portugal	EUL	fastq from Cheng et al., Genome Biology, 2019
C10	10-83979	Portugal2	Portugal	EUL	fastq from Cheng et al., Genome Biology, 2019
C58	PAS	Pastor	Mexico	AMC	fastq from Cheng et al., Genome Biology, 2019
C24	31-44196	Jordan1	Jordan	ASL	fastq from Cheng et al., Genome Biology, 2019
C25	32-44203	Jordan2	Jordan	ASL	fastq from Cheng et al., Genome Biology, 2019
C41	S6	Yang15	Jiangsu, China	CNC	fastq from Cheng et al., Genome Biology, 2019
C8	8-82678	Italy1	Italy	EUL	fastq from Cheng et al., Genome Biology, 2019
C60	VOL	Volcanidd1	Israel	ASC	fastq from Cheng et al., Genome Biology, 2019
C40	S25	Huoliaomai	InnerMongolia, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C31	11-43461	India1_C	India	ASC	fastq from Cheng et al., Genome Biology, 2019
C32	13-90293	India2_C	India	ASC	fastq from Cheng et al., Genome Biology, 2019
C33	12-82173	India1_L	India	ASL	fastq from Cheng et al., Genome Biology, 2019
C34	14-108679	India2_L	India	ASL	fastq from Cheng et al., Genome Biology, 2019
C35	15-108680	India3_L	India	ASL	fastq from Cheng et al., Genome Biology, 2019
C46	S11	Aikang58	Henan, China	CNC	fastq from Cheng et al., Genome Biology, 2019
C36	S23	Baimangmai	Heilongjiang, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C39	S22	Yangmai	Heilongjiang, China	CNL	fastq from Cheng et al., Genome Biology, 2019
C22	28-42030	Egypt_C	Egypt	AFC	fastq from Cheng et al., Genome Biology, 2019
C23	29-82283	Egypt_L	Egypt	AFL	fastq from Cheng et al., Genome Biology, 2019
C48	ACB	AcBarrie	Canada	AMC	fastq from Cheng et al., Genome Biology, 2019
C4	4-87909	Bulgaria1	Bulgaria	EUL	fastq from Cheng et al., Genome Biology, 2019
C2	2-90377	Austria2	Austria	EUL	fastq from Cheng et al., Genome Biology, 2019

C3	3-90350	Austria3	Austria	EUL	fastq from Cheng et al., Genome Biology, 2019
C50	YIT	Yitpi	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C51	BAX	Baxter	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C52	CH7	Chara	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C53	DRY	Drysdale	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C54	EXC	Excalibur	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C55	GLA	Gladius	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C56	H45	H45	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C57	KUK	Kukri	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C59	RAC	Rac875	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C61	WES	Westonia	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C62	WYA	Wyalkatchem	Australia	AUC	fastq from Cheng et al., Genome Biology, 2019
C21	17-44520	Armenia2	Armenia	ASL	fastq from Cheng et al., Genome Biology, 2019
C5	5-43363	Andorra1	Andorra	EUL	fastq from Cheng et al., Genome Biology, 2019
C6	6-43390	Andorra2	Andorra	EUL	fastq from Cheng et al., Genome Biology, 2019
C26	33-83965	Afghanistan1	Afghanistan	ASL	fastq from Cheng et al., Genome Biology, 2019
C27	34-99221	Afghanistan2	Afghanistan	ASL	fastq from Cheng et al., Genome Biology, 2019
C28	35-90184	Afghanistan3	Afghanistan	ASL	fastq from Cheng et al., Genome Biology, 2019
SRR10766588	SRR10766588	Aifeng3	Shannxi, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766624	SRR10766624	Xiaoyan22	Shannxi, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766512	SRR10766512	Aimengniu	Shandong, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766631	SRR10766631	Taishan1	Shandong, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020

SRR10766628	SRR10766628	Xumai856	Jiangsu, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766529	SRR10766529	Funo	Italy	EUC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766564	SRR10766564	Een1	Hubei, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
SRR10766583	SRR10766583	Mengxian201	Henan, China	CNC	fastq from Chenyang Hao, et al. Molecular Plant, 2020
S6	ZY-6	Yntieke6	Yunnan, China	CNL	bam from Guo et al., Nature Communications, 2020
S175	S175	Yunnan098	Yunnan, China	CNC	bam from Guo et al., Nature Communications, 2020
S176	S176	Yunnan109	Yunnan, China	CNL	bam from Guo et al., Nature Communications, 2020
S17	ZY-17	Jiachasuisui8	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020
S24	ZY-24	Langxiansuisui17	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020
S31	ZY-31	Chayazheda18	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020
S75	S75	Rikazelasa1367	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S78	S78	Qushui1340	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S83	S83	Mozhugongka2064	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S91	S91	Duilongdeqing1521	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S143	S143	Langxiansuisui6	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020
S147	S147	Jiachazheda37	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020
S243	S243	Zhahong	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S244	S244	Motuo	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S245	S245	Bianbachunmai6	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S247	S247	Wujiangzhuo	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
S248	S248	Mozongzhuoga	Xizang, China	CNL	bam from Guo et al., Nature Communications, 2020
Zang1817	Zang1817	Zang1817	Xizang, China	CNW	bam from Guo et al., Nature Communications, 2020

S170	S170	Xjm1	Xinjiang, China	CNL	bam from Guo et al., Nature Communications, 2020
S172	S172	Xjm29	Xinjiang, China	CNL	bam from Guo et al., Nature Communications, 2020
S252	S252	Hongchunmai	Xinjiang, China	CNL	bam from Guo et al., Nature Communications, 2020
S253	S253	Hongdongmai	Xinjiang, China	CNL	bam from Guo et al., Nature Communications, 2020
S254	S254	Hongjinbaoyin	Xinjiang, China	CNL	bam from Guo et al., Nature Communications, 2020
S231	S231	Clark	USA	AMC	bam from Guo et al., Nature Communications, 2020
S232	S232	Atlas66	USA	AMC	bam from Guo et al., Nature Communications, 2020
S234	S234	Spark	UK	EUC	bam from Guo et al., Nature Communications, 2020
S133	S133	Turkmenistan5	Turkmenistan	ASL	bam from Guo et al., Nature Communications, 2020
S123	S123	Turkey96	Turkey	ASL	bam from Guo et al., Nature Communications, 2020
S131	S131	Turkey56	Turkey	ASL	bam from Guo et al., Nature Communications, 2020
S203	S203	Turkey49	Turkey	ASL	bam from Guo et al., Nature Communications, 2020
S126	S126	Tajikistan1	Tajikistan	ASL	bam from Guo et al., Nature Communications, 2020
S127	S127	Tajikistan4	Tajikistan	ASL	bam from Guo et al., Nature Communications, 2020
S94	S94	Sc1666	Sichuan, China	CNL	bam from Guo et al., Nature Communications, 2020
S97	S97	Sc1588	Sichuan, China	CNL	bam from Guo et al., Nature Communications, 2020
S216	S216	Fan6	Sichuan, China	CNC	bam from Guo et al., Nature Communications, 2020
S242	S242	Bendihuanghua	Sichuan, China	CNL	bam from Guo et al., Nature Communications, 2020
S246	S246	Baimangxiaomai	Sichuan, China	CNL	bam from Guo et al., Nature Communications, 2020
S249	S249	Kangding1	Sichuan, China	CNL	bam from Guo et al., Nature Communications, 2020
S180	S180	Dingxingzhai	Shanxi, China	CNL	bam from Guo et al., Nature Communications, 2020
S181	S181	Baihuomai	Shanxi, China	CNL	bam from Guo et al., Nature Communications, 2020

S209	S209	Changzhi6406	Shanxi, China	CNC	bam from Guo et al., Nature Communications, 2020
S182	S182	Chunxiaomai	Shannxi, China	CNL	bam from Guo et al., Nature Communications, 2020
S183	S183	Mazhamai	Shannxi, China	CNL	bam from Guo et al., Nature Communications, 2020
S184	S184	Xiaosanyueh	Shannxi, China	CNL	bam from Guo et al., Nature Communications, 2020
S213	S213	Bima4	Shannxi, China	CNC	bam from Guo et al., Nature Communications, 2020
S214	S214	Fengchan3	Shannxi, China	CNC	bam from Guo et al., Nature Communications, 2020
S136	S136	Yannong15	Shandong, China	CNC	bam from Guo et al., Nature Communications, 2020
S137	S137	Lumai21	Shandong, China	CNC	bam from Guo et al., Nature Communications, 2020
S185	S185	Xishanbiansui	Shandong, China	CNL	bam from Guo et al., Nature Communications, 2020
S186	S186	Baibiansui	Shandong, China	CNL	bam from Guo et al., Nature Communications, 2020
S187	S187	Dalibanmang	Shandong, China	CNL	bam from Guo et al., Nature Communications, 2020
S188	S188	Laolaixia	Shandong, China	CNL	bam from Guo et al., Nature Communications, 2020
S215	S215	Jinan17	Shandong, China	CNC	bam from Guo et al., Nature Communications, 2020
S130	S130	Russian5	Russia	EUL	bam from Guo et al., Nature Communications, 2020
S237	S237	Aodesa3	Russia	EUC	bam from Guo et al., Nature Communications, 2020
S212	S212	Lovrin10	Romania	EUC	bam from Guo et al., Nature Communications, 2020
S110	S110	Xiaohongmai	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020
S111	S111	Xiaomai	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020
S112	S112	Maohongmai	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020
S113	S113	Liuyuehuang	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020
S114	S114	Duanbaimai	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020
S241	S241	Gejiaxiang	Qinghai, China	CNL	bam from Guo et al., Nature Communications, 2020

S132	S132	Palestinian4	Palestine	ASL	bam from Guo et al., Nature Communications, 2020
S108	S108	Shanmai	Ningxia, China	CNL	bam from Guo et al., Nature Communications, 2020
S109	S109	Tutoumai	Ningxia, China	CNL	bam from Guo et al., Nature Communications, 2020
S206	S206	Nepal6	Nepal	ASL	bam from Guo et al., Nature Communications, 2020
S207	S207	Nepal7	Nepal	ASL	bam from Guo et al., Nature Communications, 2020
S124	S124	Morocco9	Morocco	AFL	bam from Guo et al., Nature Communications, 2020
S204	S204	Jordan47	Jordan	ASL	bam from Guo et al., Nature Communications, 2020
S210	S210	Sumai3	Jiangsu, China	CNC	bam from Guo et al., Nature Communications, 2020
S238	S238	Norin10	Japan	ASC	bam from Guo et al., Nature Communications, 2020
S219	S219	Nanda2419	Italy	EUC	bam from Guo et al., Nature Communications, 2020
S223	S223	Zhengyin4	Italy	EUC	bam from Guo et al., Nature Communications, 2020
S208	S208	India4_L	India	ASL	bam from Guo et al., Nature Communications, 2020
S211	S211	Enmai4	Hubei, China	CNC	bam from Guo et al., Nature Communications, 2020
S10	ZY-10	Pingyuan50	Henan, China	CNL	bam from Guo et al., Nature Communications, 2020
S135	S135	Zhoumai18	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S139	S139	Yumai18	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S217	S217	Zhengmai9023	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S218	S218	Yanzhan1	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S221	S221	Yumai21	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S224	S224	Bainong3217	Henan, China	CNC	bam from Guo et al., Nature Communications, 2020
S64	ZY-64	Shi4185	Hebei, China	CNC	bam from Guo et al., Nature Communications, 2020
S142	S142	Shiluan02D1	Hebei, China	CNC	bam from Guo et al., Nature Communications, 2020

S227	S227	Shijiazhuang54	Hebei, China	CNC	bam from Guo et al., Nature Communications, 2020
S233	S233	Rektor	Germany	EUC	bam from Guo et al., Nature Communications, 2020
S128	S128	Georgia7	Georgia	ASL	bam from Guo et al., Nature Communications, 2020
S129	S129	Georgia9	Georgia	ASL	bam from Guo et al., Nature Communications, 2020
S101	S101	Hongqimai	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S102	S102	Duanyaomai	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S103	S103	Dabaimai	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S104	S104	Baimuxianban	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S105	S105	Honghuosui	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S106	S106	Baidatou	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S240	S240	Lanhuamai	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S250	S250	Yizhimai	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S251	S251	Huoliyan	Gansu, China	CNL	bam from Guo et al., Nature Communications, 2020
S12	ZY-12	Apache	France	EUC	bam from Guo et al., Nature Communications, 2020
S235	S235	Aztec	France	EUC	bam from Guo et al., Nature Communications, 2020
S125	S125	Ethiopia3	Ethiopia	AFL	bam from Guo et al., Nature Communications, 2020
S205	S205	Egypt40	Egypt	AFL	bam from Guo et al., Nature Communications, 2020
S11	ZY-11	Yanda1817	Beijing, China	CNL	bam from Guo et al., Nature Communications, 2020
S67	ZY-67	Nongda3338	Beijing, China	CNC	bam from Guo et al., Nature Communications, 2020
S3331	s3331	Nongda3331	Beijing, China	CNC	bam from Guo et al., Nature Communications, 2020
S6554	s6554	Jingdong6	Beijing, China	CNC	bam from Guo et al., Nature Communications, 2020
S140	S140	Nongda5181	Beijing, China	CNC	bam from Guo et al., Nature Communications, 2020

S225	S225	Beijing8	Beijing, China	CNC	bam from Guo et al., Nature Communications, 2020
S134	S134	Azerbaijan3	Azerbaijan	ASL	bam from Guo et al., Nature Communications, 2020
S239	S239	Optimus	Australia	AUC	bam from Guo et al., Nature Communications, 2020
S122	S122	Armenia1	Armenia	ASL	bam from Guo et al., Nature Communications, 2020
PH46	WXB2	Bima1	Shannxi, China	CNC	this study
PH49	WXB10	Jimai19	Shandong, China	CNC	this study
PH51	WXB21	Jinan13	Shandong, China	CNC	this study
PH52	WXB22	Jinan16	Shandong, China	CNC	this study
PH56	WXB44	Lumai15	Shandong, China	CNC	this study
PH68	WXB89	Yuejin5	Shandong, China	CNC	this study
PH148	WXB472	Wangshuibai	Jiangsu, China	CNL	this study
PH95	WXB206	Xinmai26	Henan, China	CNC	this study
PH105	WXB268	Zhoumai16	Henan, China	CNC	this study
PH108	WXB273	Zhoumai22	Henan, China	CNC	this study
PH135	WXB409	Zhongmai875	Henan, China	CNC	this study
PH151	WXB562	Wenmai6	Henan, China	CNC	this study
PH153	WXB576	Neixiang5	Henan, China	CNC	this study
PH126	WXB331	Hengguan35	Hebei, China	CNC	this study
PH132	WXB387	Nongda179	Beijing, China	CNC	this study
PH133	WXB394	Nongda413	Beijing, China	CNC	this study
PH09	Fielder	Fielder	USA	AMC	this study
XM01	S47-1	Jinmai47	Shanxi, China	CNC	this study
PH10	JM20	Jimai20	Shandong, China	CNC	this study
NZ05	LX987	Lunxuan987	Beijing, China	CNC	this study
YM05	LX99-1-1	Liangxing99	Shandong, China	CNC	this study
YM02	N981-1	Nongda981	Beijing, China	CNC	this study
YM07	s3753-1	Nongda3753	Beijing, China	CNC	this study
YM03	s3097-1	Nongda3097	Beijing, China	CNC	this study
NZ10	C4-2	Jimai22	Shandong, China	CNC	this study
S141	S141	Feimai	Denmark	EUC	this study
Jagger	Jagger	Jagger	USA	AMC	fastq from Walkowiak, et al. Nature, 2020
CDC_Landmark	CDC_Landmark	CDC_Landmark	USA	AMC	fastq from Walkowiak, et al. Nature, 2020
CDC_Stanley	CDC_Stanley	CDC_Stanley	USA	AMC	fastq from Walkowiak, et al. Nature, 2020
ArinaLrFor	ArinaLrFor	Arinalrfor	Switzerland	EUC	fastq from Walkowiak, et al. Nature, 2020
Norin61	Norin61	Norin61	Japan	ASC	fastq from Walkowiak, et al. Nature, 2020

SY_Mattis	SY_Mattis	SY_Mattis	France	EUC	fastq from Walkowiak, et al. Nature, 2020
Lancer	Lancer	Lancer	Australia	AUC	fastq from Walkowiak, et al. Nature, 2020
Mace	Mace	Mace	Australia	AUC	fastq from Walkowiak, et al. Nature, 2020

Abbreviations: CNC, Chinese cultivar; CNL, Chinese landrace; CNW, Chinese semi-wild; EUC, European cultivar; EUL, European landrace; AUC, Australian cultivar; AFC, African cultivar; AFL, African landrace; AMC, American cultivar; ASC, Asian cultivar; ASL, Asian landrace.

Supplementary Table S2. Chromosomal crossover counts in Nongda5181 between its parents Nongda3097 and Lunxuan987

Chromosome	Number of crossovers
chr1A	1
chr1B	3
chr1D	6
chr2A	9
chr2B	1
chr2D	1
chr3A	5
chr3B	2
chr3D	11
chr4A	2
chr4B	3
chr4D	2
chr5A	7
chr5B	7
chr5D	7
chr6A	2
chr6B	5
chr6D	7
chr7A	4
chr7B	3
chr7D	3

Supplementary Table S3. Accessions that carried 1RS chromosome

Accession name	Released year
Nongda3331	-
Nongda3338	1985
Lumai15	1996
Jingdong6	1991
YuMai21	1982
Shi4185	2014
JiNan16	1998

ZhouMai16	2002
LunXuan987	2003
ZhouMai18	2004
HengGuan35	2004
Ak58	2005
ZhouMai22	2007
ZhongMai875	2014
NongDa5181	2014
Een1	1985
Xiaoyan22	1998
Xumai856	2004
Changzhi6406	1982
Lovrin10	1971 (introduced into China)
Aimengniu	1983

Supplementary Table S4. *Rht-B1* and *Rht-D1* allele types in wheat accessions

Accession name	*Rht-B1* type	*Rht-D1* type
AcBarrie	*Rht-B1a	others*	*Rht-D1a	others*
Afghanistan1	*Rht-B1a	others*	*Rht-D1a	others*
Afghanistan2	*Rht-B1a	others*	*Rht-D1a	others*
Afghanistan3	*Rht-B1a	others*	*Rht-D1a	others*
Aifeng3	*Rht-B1h*	*Rht-D1b*
Aimengniu	*Rht-B1a	others*	*Rht-D1b*
Aikang58	*Rht-B1m*	*Rht-D1b*
Alsen	*Rht-B1b*	*Rht-D1a	others*
America1	*Rht-B1i*	*Rht-D1a	others*
America2	*Rht-B1b*	*Rht-D1n2*
America3	*Rht-B1i*	*Rht-D1n2*
America4	*Rht-B1i*	*Rht-D1b*
America5	*Rht-B1a	others*	*Rht-D1n2*
America6	*Rht-B1h*	*Rht-D1b*
America7	*Rht-B1i*	*Rht-D1b*
America8	*Rht-B1i*	*Rht-D1b*
America9	*Rht-B1a	others*	*Rht-D1b*
Andorra1	*Rht-B1a	others*	*Rht-D1a	others*
Andorra2	*Rht-B1a	others*	*Rht-D1a	others*
Aodesa3	*Rht-B1a	others*	*Rht-D1a	others*
Apache	*Rht-B1a	others*	*Rht-D1a	others*
Arinalrfor	*Rht-B1i*	*Rht-D1a	others*
Armenia1	*Rht-B1a	others*	*Rht-D1a	others*
Armenia2	*Rht-B1a	others*	*Rht-D1a	others*
Atlas66	*Rht-B1a	others*	*Rht-D1a	others*

Austria2	*Rht-B1a	others*	*Rht-D1a	others*
Austria3	*Rht-B1a	others*	*Rht-D1a	others*
Azerbaijan3	*Rht-B1a	others*	*Rht-D1a	others*
Aztec	*Rht-B1h*	*Rht-D1b*
Baibiansui	*Rht-B1a	others*	*Rht-D1n1*
Baidatou	*Rht-B1a	others*	*Rht-D1a	others*
Baihuomai	*Rht-B1a	others*	*Rht-D1a	others*
Baimangmai	*Rht-B1h*	*Rht-D1n1*
Baimangxiaomai	*Rht-B1a	others*	*Rht-D1a	others*
Baimuxianban	*Rht-B1a	others*	*Rht-D1a	others*
Bainong3217	*Rht-B1h*	*Rht-D1b*
Baxter	*Rht-B1b*	*Rht-D1n1*
Beijing8	*Rht-B1a	others*	*Rht-D1a	others*
Bendihuanghua	*Rht-B1a	others*	*Rht-D1a	others*
Bianbachunmai6	*Rht-B1a	others*	*Rht-D1a	others*
Bima1	*Rht-B1a	others*	*Rht-D1a	others*
Bima4	*Rht-B1m*	*Rht-D1a	others*
Bulgaria	*Rht-B1a	others*	*Rht-D1a	others*
CDC_Landmark	*Rht-B1b*	*Rht-D1a	others*
CDC_Stanley	*Rht-B1a	others*	*Rht-D1a	others*
Changzhi6406	*Rht-B1a	others*	*Rht-D1a	others*
Chara	*Rht-B1b*	*Rht-D1a	others*
Chayazheda18	*Rht-B1a	others*	*Rht-D1a	others*
Chengduguangtou	*Rht-B1a	others*	*Rht-D1a	others*
Chuanmai42	*Rht-B1b*	*Rht-D1a	others*
Chunxiaomai	*Rht-B1a	others*	*Rht-D1n1*
Clark	*Rht-B1b*	*Rht-D1a	others*
CS	*Rht-B1a	others*	*Rht-D1a	others*
Dabaimai	*Rht-B1a	others*	*Rht-D1a	others*
Dalibanmang	*Rht-B1i*	*Rht-D1a	others*
Dingxingzhai	*Rht-B1a	others*	*Rht-D1a	others*
Drysdale	*Rht-B1a	others*	*Rht-D1b*
Duanbaimai	*Rht-B1a	others*	*Rht-D1a	others*
Duanyaomai	*Rht-B1a	others*	*Rht-D1a	others*
Duilongdeqing1521	*Rht-B1a	others*	*Rht-D1a	others*
Een1	*Rht-B1a	others*	*Rht-D1n2*
Egypt	*Rht-B1a	others*	*Rht-D1a	others*
Egypt	*Rht-B1a	others*	*Rht-D1a	others*
Egypt40	*Rht-B1a	others*	*Rht-D1a	others*
Enmai4	*Rht-B1a	others*	*Rht-D1n2*
Ethiopia3	*Rht-B1a	others*	*Rht-D1a	others*
Excalibur	*Rht-B1a	others*	*Rht-D1b*
Fan6	*Rht-B1m*	*Rht-D1n2*
Feimai	*Rht-B1h*	*Rht-D1a	others*

Fengchan3	*Rht-B1a | others*	*Rht-D1a | others*
Fielder	*Rht-B1b*	*Rht-D1a | others*
Funo	*Rht-B1a | others*	*Rht-D1n2*
Gejiaxiang	*Rht-B1a | others*	*Rht-D1a | others*
Georgia7	*Rht-B1a | others*	*Rht-D1a | others*
Georgia9	*Rht-B1a | others*	*Rht-D1a | others*
Gladius	*Rht-B1m*	*Rht-D1b*
H45	*Rht-B1b*	*Rht-D1n1*
Hengguan35	*Rht-B1b*	*Rht-D1n1*
Hongchunmai	*Rht-B1a | others*	*Rht-D1a | others*
Hongdongmai	*Rht-B1a | others*	*Rht-D1a | others*
Honghuosui	*Rht-B1a | others*	*Rht-D1a | others*
Hongjinbaoyin	*Rht-B1a | others*	*Rht-D1a | others*
Hongqimai	*Rht-B1a | others*	*Rht-D1a | others*
Huoliaomai	*Rht-B1a | others*	*Rht-D1a | others*
Huoliyan	*Rht-B1a | others*	*Rht-D1a | others*
India4_L	*Rht-B1a | others*	*Rht-D1a | others*
India1_L	*Rht-B1a | others*	*Rht-D1a | others*
India1_C	*Rht-B1a | others*	*Rht-D1b*
India2_L	*Rht-B1a | others*	*Rht-D1a | others*
India2_C	*Rht-B1b*	*Rht-D1n1*
India3_L	*Rht-B1i*	*Rht-D1a | others*
Italy	*Rht-B1a | others*	*Rht-D1a | others*
Jagger	*Rht-B1b*	*Rht-D1n2*
Jiachasuisui8	*Rht-B1a | others*	*Rht-D1a | others*
Jiachazheda37	*Rht-B1a | others*	*Rht-D1a | others*
Jimai19	*Rht-B1a | others*	*Rht-D1b*
Jimai20	*Rht-B1a | others*	*Rht-D1b*
Jimai22	*Rht-B1i*	*Rht-D1b*
Jimai6	*Rht-B1m*	*Rht-D1b*
Jinan13	*Rht-B1m*	*Rht-D1b*
Jinan16	*Rht-B1a | others*	*Rht-D1b*
Jinan17	*Rht-B1a | others*	*Rht-D1b*
Jingdong6	*Rht-B1a | others*	*Rht-D1a | others*
Jinmai47	*Rht-B1a | others*	*Rht-D1a | others*
Jordan1	*Rht-B1a | others*	*Rht-D1a | others*
Jordan2	*Rht-B1a | others*	*Rht-D1a | others*
Jordan47	*Rht-B1a | others*	*Rht-D1a | others*
Kangding1	*Rht-B1a | others*	*Rht-D1a | others*
Kukri	*Rht-B1a | others*	*Rht-D1b*
Lancer	*Rht-B1b*	*Rht-D1a | others*
Langxiansuisui17	*Rht-B1a | others*	*Rht-D1a | others*
Langxiansuisui6	*Rht-B1a | others*	*Rht-D1a | others*
Lanhuamai	*Rht-B1a | others*	*Rht-D1a | others*

Laolaixia	*Rht-B1a	others*	*Rht-D1n1*
Liuyuehuang	*Rht-B1a	others*	*Rht-D1a	others*
Lovrin10	*Rht-B1a	others*	*Rht-D1n1*
Lumai15	*Rht-B1h*	*Rht-D1b*
Lumai21	*Rht-B1a	others*	*Rht-D1b*
Lunxuan987	*Rht-B1b*	*Rht-D1n2*
Lx99	*Rht-B1a	others*	*Rht-D1b*
Mace	*Rht-B1m*	*Rht-D1b*
Maohongmai	*Rht-B1a	others*	*Rht-D1a	others*
Mazhamai	*Rht-B1a	others*	*Rht-D1a	others*
Mengxian201	*Rht-B1a	others*	*Rht-D1n2*
Morocco9	*Rht-B1a	others*	*Rht-D1a	others*
Motuo	*Rht-B1a	others*	*Rht-D1a	others*
Mozhugk2064	*Rht-B1a	others*	*Rht-D1b*
Mozongzhuoga	*Rht-B1a	others*	*Rht-D1a	others*
Nanda2419	*Rht-B1a	others*	*Rht-D1n1*
Neixiang5	*Rht-B1a	others*	*Rht-D1n1*
Nepal6	*Rht-B1a	others*	*Rht-D1a	others*
Nepal7	*Rht-B1a	others*	*Rht-D1a	others*
Nongda179	*Rht-B1b*	*Rht-D1n1*
Nongda3097	*Rht-B1a	others*	*Rht-D1n1*
Nongda3331	*Rht-B1a	others*	*Rht-D1b*
Nongda3338	*Rht-B1b*	*Rht-D1b*
Nongda3753	*Rht-B1a	others*	*Rht-D1a	others*
Nongda413	*Rht-B1a	others*	*Rht-D1b*
Nongda5181	*Rht-B1b*	*Rht-D1n1*
Nongda981	*Rht-B1h*	*Rht-D1n1*
Norin10	*Rht-B1b*	*Rht-D1b*
Norin61	*Rht-B1a	others*	*Rht-D1b*
Optimus	*Rht-B1i*	*Rht-D1a	others*
Palestinian4	*Rht-B1a	others*	*Rht-D1a	others*
Pastor	*Rht-B1b*	*Rht-D1n2*
Pingyuan50	*Rht-B1a	others*	*Rht-D1n1*
Portugal1	*Rht-B1a	others*	*Rht-D1a	others*
Portugal2	*Rht-B1a	others*	*Rht-D1a	others*
Qushui1340	*Rht-B1a	others*	*Rht-D1a	others*
Rac875	*Rht-B1m*	*Rht-D1b*
Rektor	*Rht-B1h*	*Rht-D1a	others*
Rikazelasa1367	*Rht-B1b*	*Rht-D1a	others*
Russian5	*Rht-B1a	others*	*Rht-D1a	others*
Sc1588	*Rht-B1a	others*	*Rht-D1a	others*
Sc1666	*Rht-B1a	others*	*Rht-D1a	others*
Shanmai	*Rht-B1a	others*	*Rht-D1a	others*
Shi4185	*Rht-B1b*	*Rht-D1a	others*

Shijiazhuang54	*Rht-B1a | others*	*Rht-D1a | others*
Shiluan02D1	*Rht-B1b*	*Rht-D1n1*
Spain	*Rht-B1a | others*	*Rht-D1a | others*
Spark	*Rht-B1m*	*Rht-D1a | others*
Sumai3	*Rht-B1a | others*	*Rht-D1n2*
Sy_Mattis	*Rht-B1b*	*Rht-D1a | others*
Taishan1_Nk	*Rht-B1m*	*Rht-D1n1*
Tajikistan1	*Rht-B1a | others*	*Rht-D1a | others*
Tajikistan4	*Rht-B1a | others*	*Rht-D1a | others*
Turkey49	*Rht-B1a | others*	*Rht-D1a | others*
Turkey56	*Rht-B1a | others*	*Rht-D1a | others*
Turkey96	*Rht-B1a | others*	*Rht-D1a | others*
Turkmenistan5	*Rht-B1a | others*	*Rht-D1a | others*
Tutoumai	*Rht-B1a | others*	*Rht-D1a | others*
Uzbekistan1	*Rht-B1a | others*	*Rht-D1a | others*
Uzbekistan2	*Rht-B1a | others*	*Rht-D1a | others*
Volcanidd1	*Rht-B1a | others*	*Rht-D1b*
Wangshuibai	*Rht-B1a | others*	*Rht-D1n1*
Wenmai6	*Rht-B1m*	*Rht-D1b*
Westonia	*Rht-B1a | others*	*Rht-D1b*
Wujiangzhuo	*Rht-B1a | others*	*Rht-D1a | others*
Wyalkatchem	*Rht-B1a | others*	*Rht-D1b*
Xiaohongmai	*Rht-B1a | others*	*Rht-D1a | others*
Xiaomai	*Rht-B1a | others*	*Rht-D1a | others*
Xiaosanyueh	*Rht-B1a | others*	*Rht-D1a | others*
Xiaoyan22	*Rht-B1b*	*Rht-D1n2*
Xiaoyan54	*Rht-B1b*	*Rht-D1n1*
Xinmai26	*Rht-B1a | others*	*Rht-D1b*
Xinong979	*Rht-B1h*	*Rht-D1b*
Xishanbiansui	*Rht-B1a | others*	*Rht-D1a | others*
Xjm1	*Rht-B1a | others*	*Rht-D1a | others*
Xjm29	*Rht-B1a | others*	*Rht-D1a | others*
Xumai856	*Rht-B1h*	*Rht-D1b*
Yanda1817	*Rht-B1a | others*	*Rht-D1a | others*
Yang15	*Rht-B1b*	*Rht-D1n2*
Yangmai	*Rht-B1a | others*	*Rht-D1a | others*
Yannong15	*Rht-B1a | others*	*Rht-D1n2*
Yanzhan1	*Rht-B1a | others*	*Rht-D1b*
Yitpi	*Rht-B1m*	*Rht-D1b*
Yizhimai	*Rht-B1a | others*	*Rht-D1a | others*
Yntieke6	*Rht-B1a | others*	*Rht-D1a | others*
Yuejin5	*Rht-B1a | others*	*Rht-D1a | others*
Yumai18	*Rht-B1a | others*	*Rht-D1b*
Yumai21	*Rht-B1a | others*	*Rht-D1b*

Yunnan098	*Rht-B1a	others*	*Rht-D1n1*
Yunnan109	*Rht-B1a	others*	*Rht-D1a	others*
Zang1817	*Rht-B1a	others*	*Rht-D1a	others*
Zhahong	*Rht-B1a	others*	*Rht-D1a	others*
Zhengmai9023	*Rht-B1h*	*Rht-D1b*
Zhengyin4	*Rht-B1b*	*Rht-D1n2*
Zhongmai875	*Rht-B1a	others*	*Rht-D1b*
Zhoumai16	*Rht-B1a	others*	*Rht-D1b*
Zhoumai18	*Rht-B1a	others*	*Rht-D1b*
Zhoumai22	*Rht-B1a	others*	*Rht-D1b*
Zhumaoyuanzitou	*Rht-B1a	others*	*Rht-D1a	others*

Supplementary Table S5. Initial transition frequency matrix between observations

	SGR	PHR	CNV
SGR	0.8082	0.1415	0.0503
PHR	0.0442	0.9409	0.0149
CNV	0.208	0.1889	0.6031

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation

Supplementary Table S6. Trained state transition probability matrix and emission probability matrix

	state transition probabilities			emission probabilities		
	SGR	PHR	CNV	SGR	PHR	CNV
sgr	0.9564	0.0377	0.0035	0.9621	0.0379	0
phr	0.0016	0.9980	0.0104	0.0016	0.9984	0
cnv	0.0035	0.1576	0.8388	0	0	1

Abbreviations: PHR, polymorphism hotspot regions; SGR, Shared Genomic resource Regions; CNV, Copy number variation

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