Median 800 600 400 200 0 Mean 2500 2000 1500 1000 500 0 Proportion of introduced Ns 0.25 0.20 0.15 0.10 0.05 0.00 DL174 GY37 HJC419 HJC419 HY85 JZH152 NJ2195 NJ219 PL TBS195 TY118 XN444 12.4 13.16 16.9 BEL5 FR50 HRB132 IRRU2 RK32 SE14 SE14 ST33 STA4 STJ2 VLA3 5.16 70.5 39-12-28 AL87 JO56 TR73 WAC5

**S19 Figure.** Variation in the length of phased fragments and proportion of unsuccessfully phased positions across samples. Mean and median of the fragment length distribution in each sample are shown in absolute numbers. The introduced missing data (Ns) is presented relative to the total number of heterozygous sites that were used for phasing. ASI, EUR and ME accessions are colored by green, red, and blue, respectively.