

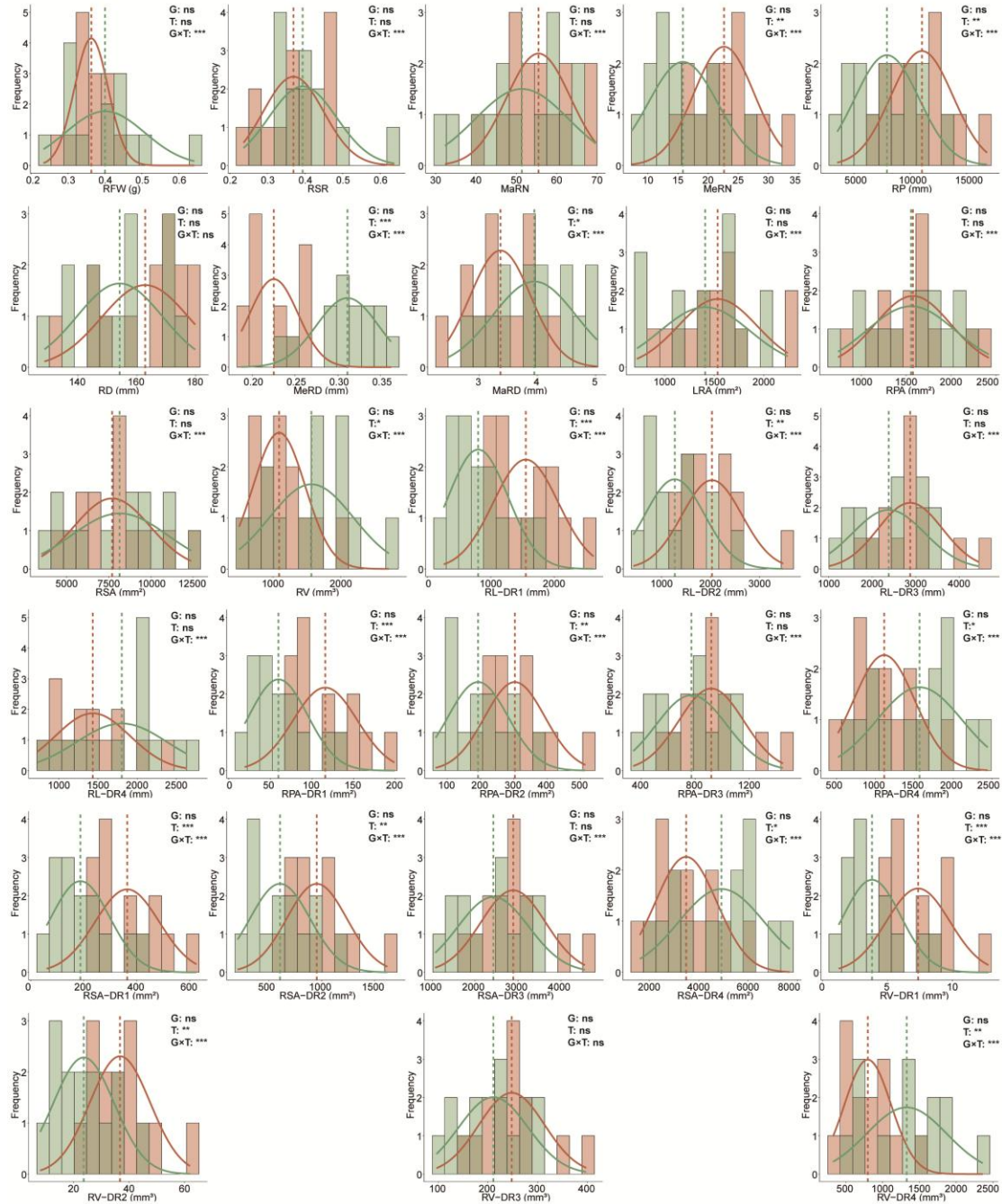


Fig. S3 Histogram of root trait distribution in rice under different direct seeding methods at the 5th leaf stage. Histograms show the frequency distribution of traits under each treatment, with green bars representing WDSR and orange bars representing DDSR; brown bars indicate the overlapping range between the two treatments. Overlaid normal distribution curves reflect the population distribution characteristics for WDSR (green) and DDSR (orange), with green and orange dashed lines marking the population means of the respective treatments. The significance levels from linear mixed-effects models are indicated in the top-right corner of each panel, including genotype (G), treatment (T), and genotype-by-treatment interaction (G×T) effects. *, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; ns, not significant.