Researchers discover key functions of plasma membrane–cell wall adhesion in rice and critical genes involved

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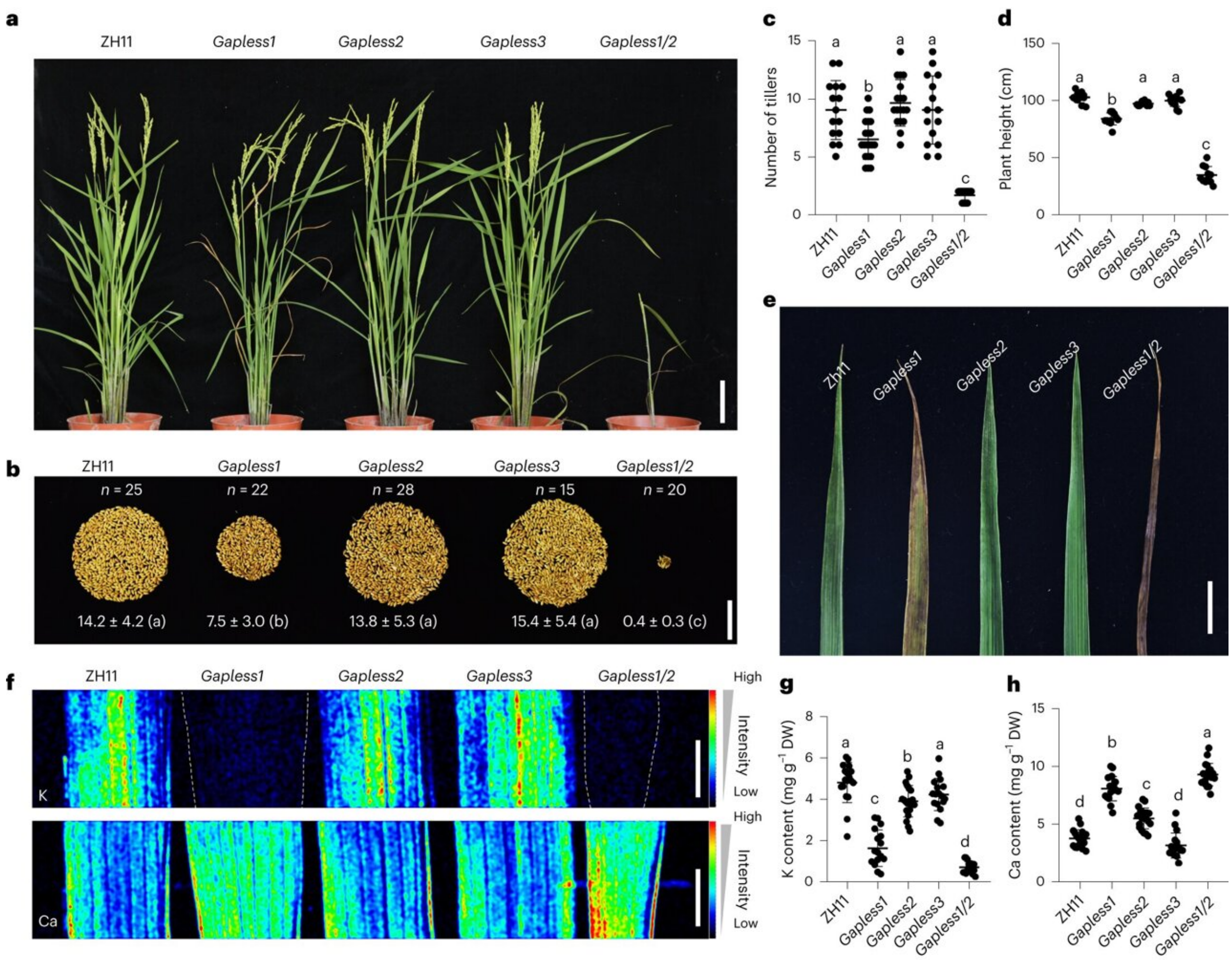

GAPLESS proteins are required for rice growth, yield and nutrient homoeostasis. a, Representative images of ZH11 and different gapless mutants grown in paddy fields at the heading stage. The mutants of gapless1, gapless2, gapless3 and gapless1/2 are the lines of gapless1-1, gapless2-1, gapless3-1 and gapless1-1/2-1, respectively. The photo was taken after the plants were dug out from the paddy field. b, Representative images of grains from one plant of the different genotypes. Statistics of grain weight per plant are indicated. c,d, Quantification of tiller numbers (c) and heights (d) of ZH11 and the different gapless mutants. Data points are independent samples. In c, n = 15 for ZH11 and gapless3, n = 21 for gapless1, n = 18 for gapless2, n = 19 for gapless1/2; in d, n = 12 for ZH11 and gapless1, n = 11 for gapless2 and gapless1/2, n = 13 for gapless3. e, Representative images of old leaves from ZH11 and different gapless mutants grown in paddy fields. f, Representative images of micro-X-ray fluorescence showing distribution of potassium and calcium in leaves of the different genotypes. g,h, Potasium (g) and calcium (h) concentrations in old leaves of ZH11 and the mutants, as revealed by ICP–MS. Data points are independent samples. In g and h, n = 18 for ZH11 and gapless1/2, n = 17 for gapless1 and gapless3, n = 20 for gapless2. Scale bars, 10 cm (a), 5 cm (b), 2 cm (e) and 5 mm (f). Data represent mean ± s.d. The different letters in c, d, g and h indicate significant differences at P

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