Table S1 Nine major traits and their component traits in Gramene Rice database (<http://www.gramene.org/>).

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| --- | --- |
| Major Trait | Component Trait |
| Yield | 100-grain weight, 100-seed weight, 1000-grain weight, 1000-seed weight, biomass yield, brown rice yield, filled grain number, filled grain percentage, flower number, grain number, grain yield, grain yield per panicle, grain yield per plant, harvest index, large vascular bundle number to spikelet number ratio, leaf area to spikelet number ratio, panicle number, panicle tiller ratio, panicle weight, seed number, seed set percent, seed weight, spikelet number, spikelet weight, total biomass yield, yield |
| Vigor | callus induction, germination speed, green plantlet differentiation frequency, green plantlet yield frequency, invitro regeneration ability, plant height, ratooning ability, root activity, root dry weight, root number, root to shoot ratio, seed dormancy, seed longevity, seedling vigor, tiller number |
| Anatomy | abaxial stomatal frequency, adaxial stomatal frequency, anther length, apiculus hair length, awn length, basal root thickness, culm length, culm thickness, grain shattering, internode length, large vascular bundle number, large vascular bundle number to leaf area ratio, leaf angle, leaf area, leaf height, leaf length, leaf length to width ratio, leaf perimeter, leaf width, mesocotyl length, panicle base to lowest branch, panicle length, peduncle top diameter, primary branch, primary branch length, rhizome branching angle, rhizome branching number, rhizome dry weight, rhizome internode length, rhizome internode number, rhizome length, rhizome number, root branching, root length, root thickness, root volume, secondary branch, seed shattering, seminal root length, small vascular bundle number, space, space to culm ratio, specific leaf area, spikelet density, spikelets per panicle length, stigma exsertion, tiller angle  |
| Development | albino plantlet differentiation frequency, basic vegetative phase, days to flower, days to heading, days to maturity, leaf senescence, photoperiod sensitivity, phyllochron, reproductive growth time, shoot elongation rate, tiller bud dormancy, vegetative growth time |
| Abiotic stress | aluminum sensitivity, cell membrane stability, cold tolerance, deep root dry weight, deep root to shoot ratio, drought susceptibility index, drought tolerance, dry mass, elongation ability, iron sensitivity, KClO3 resistance, leaf drying, leaf necrosis tolerance, leaf rolling, leaf rolling time, leaf rolloing tolerance, leaf yellowing tolerance, lodging incidence, osmotic adjustment capacity, penetrated root dry weight, penetrated root length, penetrated root number, penetrated root thickness, penetrated to total root ratio, phosphorus uptake, phosphorus sensitivity, plant survival percentage under submergence, potassium concentration, potassium sensitivity, potassium uptake, relative growth rate, relative phosphorus distribution between shoot and root, relative root length, relative shoot elongation under submergence, relative water content, root dry weight to tiller number ratio, root penetration index, root pulling force, root weight, rooting depth, salt sensitivity, sodium concentration, sodium to potassium ratio, sodium uptake, stomatal closure rate, stomatal closure time, stomatal resistance, submergence sensitivity, submergence tolerance, total shoot elongation under submergence, ultraviolet-b resistance, zinc sensitivity |
| Quality | alkali digestion, amylose content, ash content, breakdown viscosity, brown rice protein, brown rice ratio, chalkiness of endosperm, colored grain percentage, consistency viscosity, cooked kernel elongation, cool paste viscosity, cracked grain percentage, crushed grain percentage, culm strength, fat content, flour color, gel consistency, gelatinization temperature, grain belly percent white, grain core area white, grain core percent white, grain length, grain length to width ratio, grain weight, grain width, groat percentage, head rice, hot paste viscosity, hull color, magnesium to potassium content ratio, milled rice ratio, peak viscosity, pericarp color, potassium content, rice bran percentage, scent, seed density, seed length, seed length to width ratio, seed shape, seed thickness, seed width, setback, white rice protein content |
| Sterility or fertility | embryosac abortion, f2-generation sterility, hybrid incompatibilty, male fertility restoration, panicle exsertion, photoperiod sensitive genic male sterility, pollen fertility, pre-flowering floret abortion, seed fertility, spikelet fertility, spikelet sterility |
| Biotic stress | allelopathic effect, bacterial blight disease resistance, blast disease resistance, brown planthopper resistance, green leafhopper resistance, rice yellow mottle virus resistance, sheath blight disease resistance, white-backed planthopper resistance |
| Biochemical | acid phosphatase activity, alpha amylase activity, carbohydrate content, carbon content, chlorophyll content, chlorophyll ratio, ferulic acid content, glutamine synthetase content, H2O2 content, leaf nitrogen content, nadh-dependent glutamate synthase content, photosynthetic ability, protein content, reducing sugar content, relative acid phosphatase activity, rubisco content, rubisco to chlorophyll ratio, rubisco to nitrogen content ratio, rubisco to soluble protein content, soluble protein content, total amylase activity |