RESULTS

Statistics from two-way ANOVA analyses are shown for all measurements in Table 1.

Table 1.



*Gas exchange and water use efficiency*

Elevated CO2 significantly increased leaf-level photosynthesis for all three species (*A. floribunda*, p = 0.074, Fig. 1a; *C cunninghamiana*, p = 0.002, Fig. 1b; *E. camaldulensis*, p = 0.037, Fig. 1c). Photosynthetic rate in *E. camaldulensis* was significantly greater in recovery treatment plants than control plants (p = 0.008, Tukey’s HSD, Fig. 1c). No significant interactions were found between CO2 level and waterlogging status for photosynthetic rate, although waterlogged *A. floribunda* exhibit a only small difference in mean photosynthetic rate between CO2 treatments (20.9 and 22.6 umol blah, respectively, Fig. 1a).

A significant interaction effect was identified for transpiration rate of A. floribunda (p = 0.075, Fig. 1d): no differences were significant upon post-hoc analysis, however. Elevated CO2 significantly increased transpiration rate in C. cunninghamiana (p = 0.009, Fig. 1e), but not E. camaldulensis (Fig. 1f). eCO2 stimulation of transpiration in waterlogged C. cunninghamiana also appears diminished, despite non-significance of the interaction term (Fig. 1e). Waterlogging status influenced transpiration rate in E. camaldulensis (Fig. 1f): control plants transpired less than waterlogged plants (p = 0.019, Tukey’s HSD) and recovery plants (p = 0.0005, Tukey’s HSD).

Water use efficiency in A. floribunda was different between control and waterlogged (p = 0.002, Tukey’s HSD), and control and recovery (p = 0.04, Tukey’s HSD), but not waterlogged and recovery plants (Fig. 1g). WUE increased under elevated CO2 as a main effect for E. camaldulensis (p = 0.002, Fig. 1h), and interactively with CO2 level for C. cunninghamiana (p = 0.063): WUE was higher under eCO2 for waterlogged plants (p = 0.022, Tukey’s HSD, Fig. 1i) but not control or recovery plants.

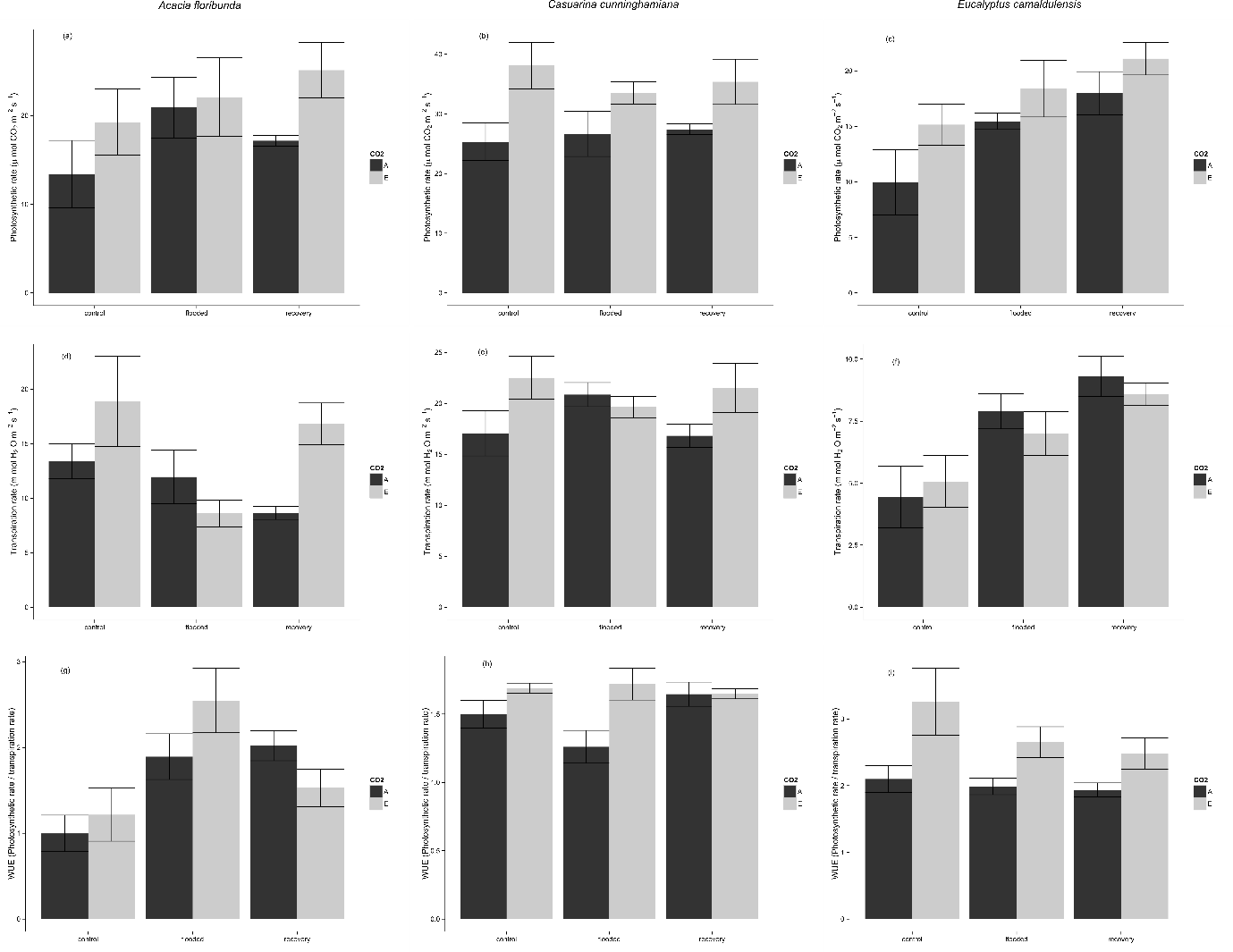


Figure 1

*Biomass allocation*

Total root biomass of plants recovering from waterlogging was lower than control plants for A. floribunda (p = 0.028, Fig. 2a). A significant interaction effect was identified for C. cunninghamiana (p = 0.049): total root biomass was substantially increased under eCO2 for control (p = 0.011, Tukey’s HSD) but not recovery plants (Fig. 2b). Neither CO2 level nor waterlogging had an effect on E. camaldulensis total root biomass (Fig. 2c).

Fine root biomass was lower in recovery plants than control plants (p = 0.005), with no CO2 effect (Fig. 2d). A marginally significant interaction effect was also present for C. cunninghamiana fine root biomass (p = 0.076); post-hoc analysis confirmed a significant difference between control plants under eCO2 (p = 0.008, Tukey’s HSD) but not recovery plants (Fig. 2e). Waterlogging stimulated fine root growth in E. camaldulensis (p = 0.046), but CO2 level had no effect (Fig. 2f).

Neither CO2 level nor waterlogging had any effect on shoot biomass for A. floribunda (Fig. 2g) or E. camaldulensis (Fig. 2i). As with total root biomass and fine root biomass, CO2 level and waterlogging influenced C. cunninghamiana biomass interactively (p = 0.009): shoot biomass was higher under eCO2 for control (p = 0.015, Tukey’s HSD) but not recovery plants (Fig. 2h).

Root mass fraction of waterlogged A. floribunda was decreased following recovery, compared with control plants (p = 0.025, Fig. 2j). RMF was not different control following recovery from waterlogging for C. cunninghamiana (Fig. 2k) or E. camaldulensis (Fig. 2l). RMF of C. cunninghamiana was increased under eCO2 (p = 0.004).

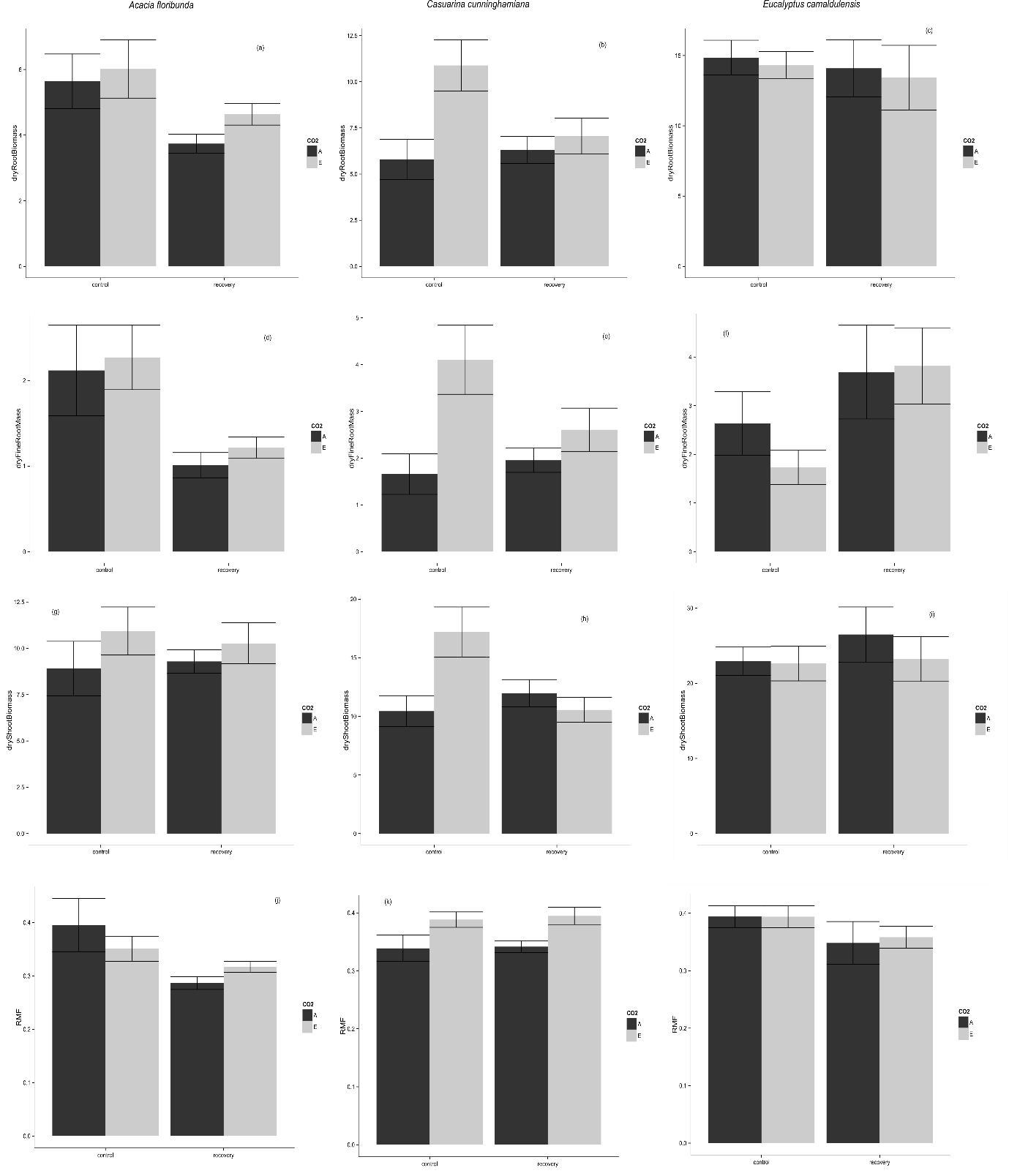


Figure 2

*Functional traits*

Table 2