

Temperature-induced variations in gas exchange and chlorophyll-a fluorescence of invasive *Acacia mangium* and two co-occurring tropical heath forest species (*Dillenia suffruticosa* and *Buchanania arborescens*) in Brunei Darussalam

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Summary The better performance of exotic alien plants compared to co-occurring native flora, which facilitates their successful invasion to new habitats, often depends on microhabitat conditions. We investigated photosynthetic characteristics of alien invasive tree *Acacia mangium* Willd. and two co-occurring tropical heath forest species (*Dillenia suffruticosa* (Griff. ex Hook.f. & Thomson) Martelli and *Buchanania arborescens* (Blume) Blume) in response to varying temperatures by measuring their gas exchange at 25°C and 30°C, and fast chlorophyll *a* fluorescence kinetics at 25°C, 30°C and 42°C respectively. Invasive *A. mangium* exhibited higher maximum photosynthesis than *D. suffruticosa* and *B. arborescens* at 30°C but not at 25°C. At comparable temperatures (25°C, 30°C

or 42°C), *A. mangium* showed higher maximum quantum yield of primary photochemistry, higher quantum yield of electron transport and lower quantum yield of energy dissipation. Elevated temperature scenarios (exposure to 42°C for 1 h) significantly influenced the chlorophyll *a* fluorescence kinetics of *A. mangium*, but did not affect those of the native plants *D. suffruticosa* and *B. arborescens*. The contrasting differences shown in relation to plasticity, capacity and responses of photosynthetic apparatus to heat stress by *A. mangium* and two cohabiting native plant species investigated here provide insights into the efficacious spread of exotic Acacias into Bornean tropical heath forests.

Keywords Competitive advantage, alien invasive plants, OJIP test, light harvesting efficiency.