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Differences in seedling growth of tree species in relation to simulated light environments in a Sri Lankan lowland rain forest

Differences in seedling growth of five species belonging to genera *Mesua*, *calophyllum*, *Garcinia* (Clusiaceae) and eight species of *Shorea* (Dipterocarpaceae) under different light levels in shade houses were investigated over a period of one year from January 2000 to January 2001 at the Sinharaja field research station.

Seedlings were grown under four light environments ($1200 \mu\text{mol m}^{-2}\text{s}^{-1}$, $800 \mu\text{mol m}^{-2}\text{s}^{-1}$, $350 \mu\text{mol m}^{-2}\text{s}^{-1}$, $50 \mu\text{mol m}^{-2}\text{s}^{-1}$) that represented a range of PPFD (photosynthetic photon flux density) found within the forest. Five seedlings of each species were grown in each light environment, which was replicated three times. At the end of one year the height increments and percentage survival of seedlings were measured.

The study revealed that *Garcinia*, *Calophyllum*, and *Mesua* species showing the lowest height increments when grown in $50 \mu\text{mol m}^{-2}\text{s}^{-1}$ light level. The greatest relative height growth was observed in $350 \mu\text{mol m}^{-2}\text{s}^{-1}$. Plasticity (ratio between highest and lowest values among light treatments) measurement of height increment was greatest in *Garcinia hermonii* (18.59), lower in *Calophyllum trapezifolium* (4.63) compared to *Calophyllum bracteatum* and lower in *Mesua nagassarium* (6.109) than *Mesua ferrea* (7.39). Percentage seedling survival of *Garcinia hermonii* ($50, 350, 800 \mu\text{mol m}^{-2}\text{s}^{-1}$, 86.61%; $350 \mu\text{mol m}^{-2}\text{s}^{-1}$, 93.4%) was lower than that of the other four species (100%) in all four different light treatments. The mean relative height increments of all eight *Shorea* species were higher at $350 \mu\text{mol m}^{-2}\text{s}^{-1}$ except *Shorea congestiflora* and *Shorea disticha* compared to that in each of the three light treatments. The greatest mean height increment was observed in $800 \mu\text{mol m}^{-2}\text{s}^{-1}$ light level in *Shorea congestiflora* and *Shorea disticha*. *Shorea cordifolia* exhibited the greatest (12.81) plasticity in height among different light levels. Percentage seedling survival of *Shorea megistophylla* was higher (100%) than that of the other species in all light treatments.

The results suggest that $350 \mu\text{mol m}^{-2}\text{s}^{-1}$ light level favours growth of all species in the Clusiaceae except *Mesua ferrea* and in Dipterocarpaceae except *Shorea congestiflora* and *Shorea disticha* in seedling stage.