Previous-year reproduction reduces photosynthetic capacity and slows lifetime growth in females of a neotropical tree

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Females of dioecious plant species typically invest more in reproduction than males because they produce seeds, fruits, and associated structures in addition to flowers. If females are unable to compensate by up-regulating rates of photosynthesis or by reproducing less frequently than males, their greater reproductive investment may result in reduced growth or higher mortality. Here we provide evidence of the cost of reproduction in *Ocotea tenera* (Lauraceae), a dioecious neotropical tree common in lower montane forests of Monteverde, Costa Rica. Over periods of 12–21 years, females grew more slowly than males in a natural population and in two experimental plots where we were able to control for genotype, age, habitat, and reproductive history. Simultaneous measurements of 10 matched pairs of sibling trees of the opposite sex but same age demonstrated that the photosynthetic capacities of females were 13% lower than those of males. Among females, photosynthetic capacity was negatively correlated with fruit production during the most recent reproductive season but not with lifetime fruit production. Sexual size dimorphism in adult *O. tenera* trees appears to be a nonadaptive consequence of trading off recent reproduction against maintenance of the photosynthetic apparatus, with long-term negative effects on growth.

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($t_{2\ 2}$ ▫ 3.01, P ▫ 0.003) 1 (t_{210} ▫ 1. 2, P ▫ 0.071). - ,

($F_{,261}$ ▫ 5.657, P ▫ 0.0001, $F_{12,1\ 0}$ ▫ 2.146, P ▫ 0.016, 1).

(t_{23} ▫ 0.30, P ▫ 0.77). ,

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, (t_{166} ▫ 0.31, P ▫ 0.76 $F_{12,144}$ ▫ 0.26 , P ▫ 0. , -). -

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1 (t_{11} ▫ 2.46, P ▫ 0.03, t).

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(4, 6, 7, 11).

O. tenera.

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