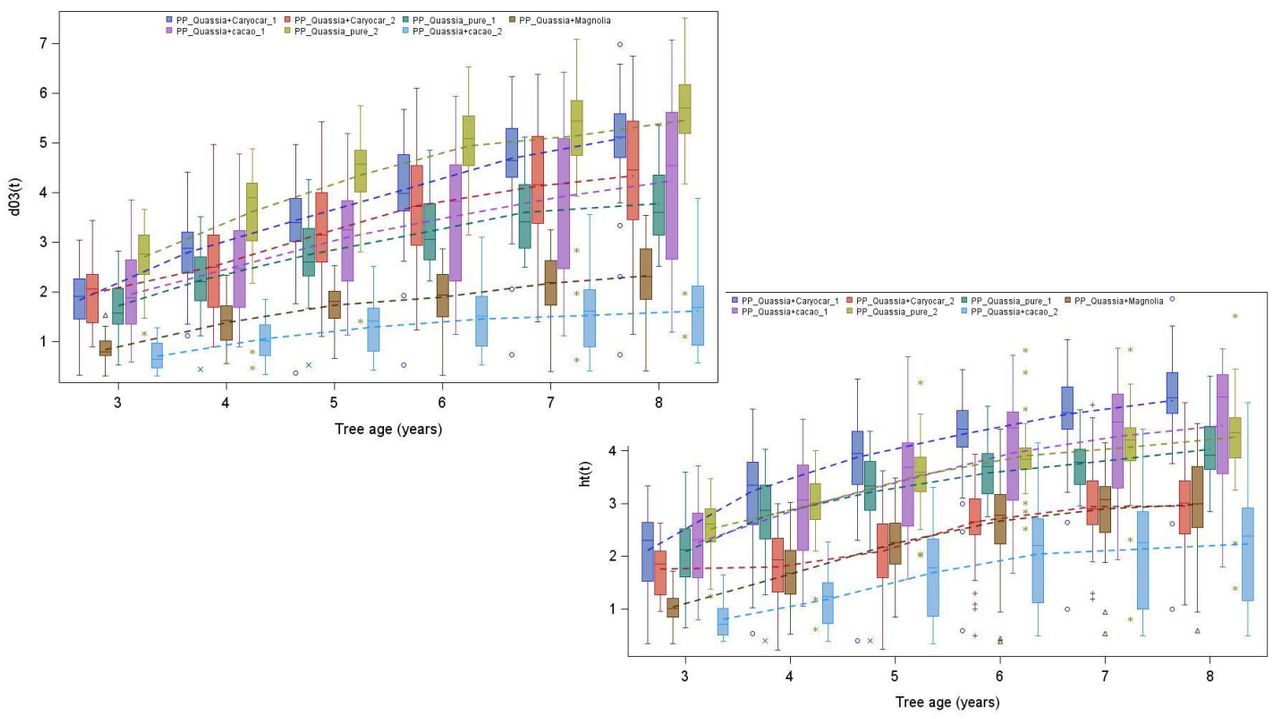
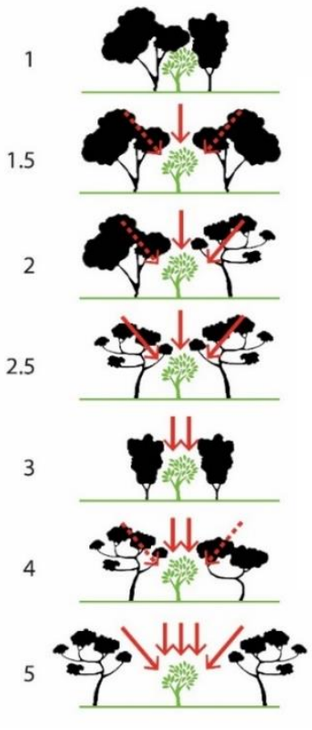
Quassia amara L. growth under different shading conditions: implications for the management of Costa Rica natural and planted forests

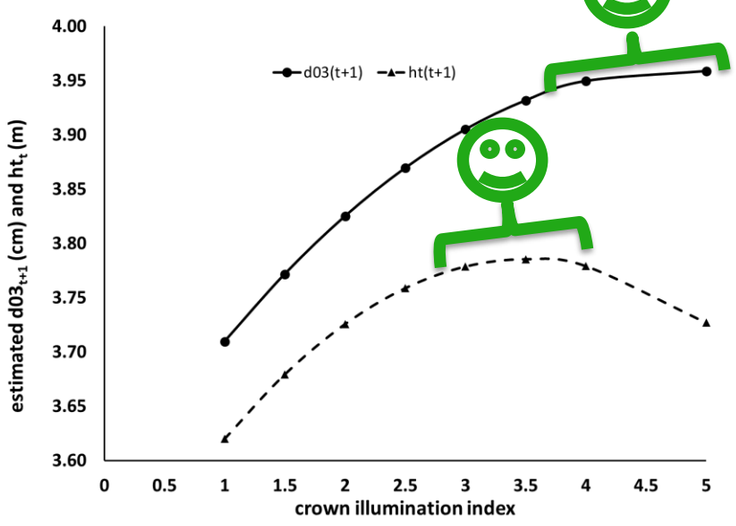
Joana Amaral Paulo (CEF/ISA) joanaap@isa.ulisboa.pt, Roger Villalobos (CATIE) rvillalo@catie.ac.cr

Quassia amara L. is a semi sciophyte species that can be found growing as a large shrub or a small tree in Neotropical rainforests. The objective of the present work was to compare tree growth in distinct plots, and research the impact of light conditions in diameter and total height growth.

- Permanent plot data set – 8 permanent plots, measured annually from 1992/1993 to 2000. Plots differ in topographic location and forest structure type, representing a diverse range of growth conditions. In mixed stands three additional tree species occur in cultivation with *Quassia amara* L.: *Caryocar glabrum*, *Magnolia Mexicana* or *Theobroma cacao*.
- Kekoldi data set – collected in the natural forest of the Kekoldi indigenous reserve in 1997, and repeated in 1998, 1999 and 2000.
- Annual measurements of tree diameter at 0.3 m (d03), tree total height (ht), number of branches at 0.3m (nbt) and light conditions using the ordinal crown illumination index (cii) proposed by Clark and Clark (1992) (cii).
- Mixed model approach for the development of d03 and ht linear growth models, testing the significance of the cii in the parameters: i) Linear (the more the better) ii) Parabolic (an optimum condition exists) iii) Hyperbolic (a maximum/optimum and asymptotic condition exists).







- **Best illumination conditions are different for diameter and total height growth: cii value of 5.0 (tree crown completely exposed to overhead and lateral direct solar radiation) and cii value of 3.5 (tree crown exposed to some vertical/overhead direct solar radiation and low direct solar radiation received) respectively.**
- **New agroecosystems including the *Quassia amara* L. species should be implemented guaranteeing intermediate illumination conditions, characterized by a cii value of 3.5 or 4.0.**