Ecology of tropical forests studied using 50-ha permanent plant plots

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Start of the most successful ecological research in tropical botany:
in 1980, Stephen Hubbell has a successful inventory

1 ha stems with DBH>5cm
~1,000 stems

50 ha stems with DBH>1cm
~300,000 stems
MAPPING DIVERSITY

How do all the different species coexist in the same forest?

Theories:
1) Neutral
2) Niche
3) Density-dependence
4) Dispersal limitation
Center for Tropical Forest Science forest plots

34 Plots 20 Countries 3.5 Million Trees 7,500 Species
Forest Dynamics Plots

- Large scale (16-52 ha)
- All stems ≥1 cm mapped, measured, tagged, and identified to species
- Entire plot recensused every 5 years
- Standardized method used by all CTFS research sites
50 ha plant plot, Wanang,
Quadrats (20 mx 20 m) & Subquadrats (5 m x 5 m)

column & row coordinates from 0101 to 5025

Quadrat 0101

Quadrat 4924
1,250 quadrats & 20,000 suquadrats in 50 hectares!
20 x 20 survey principals

distance along ground

horizontal distance
Topography measurements to establish 20 x 20 m grid
Community phylogeny of a lowland rainforest plot in New Guinea
T. Whitfeld, G. Weiblen, J. Kress et al., in preparation
## Plots: Species Diversity

<table>
<thead>
<tr>
<th>Region</th>
<th>Area</th>
<th>Species</th>
<th>Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>LATIN AMERICA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td>50</td>
<td>300</td>
<td>213,800</td>
</tr>
<tr>
<td>ASIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia (peninsula)</td>
<td>50</td>
<td>822</td>
<td>340,000</td>
</tr>
<tr>
<td>Malaysia (Borneo)</td>
<td>52</td>
<td>1,172</td>
<td>370,600</td>
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<tr>
<td>India</td>
<td>50</td>
<td>68</td>
<td>25,500</td>
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<tr>
<td>Thailand (central)</td>
<td>50</td>
<td>241</td>
<td>81,000</td>
</tr>
<tr>
<td>AFRICA</td>
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</tr>
<tr>
<td>Cameroon</td>
<td>50</td>
<td>494</td>
<td>329,000</td>
</tr>
</tbody>
</table>
CTFS Global Earth Observatories: the next 25 years