The growth-survival and stature-recruitment trade-offs structure the majority of tropical forests.

Stephan Kambach[1], Richard Condit[2], Salomón Aguilar[3], Helge Bruelheide[4], Sarayudh Bunyavejchewin[5], Chia-Hao Chang-Yang[6], Yu-Yun Chen[7], George Chuyong[8], Stuart Davies[3], Sisira Ediriweera[9], Corneille Ewango[10], Edwino Fernando[11], Savitri Gunatilleke[12], Nimal Gunatilleke[12], Stephen Hubbell[13], Akira Itoh[14], David Kenfack[15], Somboon Kiratiprayoon[16], Yiching Lin[17], Jean-Remy Makana[18], Mohizah Mohamad[19], Nantachai Pongpattananurak[20], Rolando Perez[21], Lilian Rodriguez[22], Ifang Sun[23], Sylvester Tan[24], Duncan Thomas[25], Jill Thompson[26], Maria Uriarte[27], Renato Valencia[28], Christian Wirth[29], S. Joseph Wright[3], Shu-Hui Wu[6], Takuo Yamakura[14], Tzeleong Yao[30], Jess Zimmerman[31], and Nadja Rüger[32]

[1]Martin-Luther-University Halle-Wittenberg
[2]Field Museum of Natural History
[3]Smithsonian Tropical Research Institute
[4]Martin Luther University Halle Wittenberg
[5]Department of National Parks, Wildlife and Plant Conservation
[6]National Sun Yat-sen University
[7]National Dong Hwa University
[8]University of Buea
[9]Uva Wellassa University
[10]Wildlife Conservation Society
[11]University of the Philippines Los Baños College of Agriculture
[12]University of Peradeniya
[13]University of California
[14]Osaka City University
[15]Harvard University
[16]Thammasat University
[17]Tunghai University
[18]University of Kisangani
[19]Forest Department Sarawak
[20]Kasetsart University
[21]Smithsonian Tropical Research institute
[22]University of the Philippines Diliman
[23]National Dong Hwa University College of Science and Engineering
[24]Smithsonian Tropical Research Institute Washington DC Offices
[25]Oregon State University
[26]Centre for Ecology and Hydrology -Edinburgh,
[27]Columbia University
[28]Pontifical Catholic University of Ecuador

[29]Leipzig University Faculty of Life Sciences
[30]Forest Research Institute Malaysia
[31]University of Puerto Rico
[32]Universität Leipzig

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Abstract

All species must balance their allocation to growth, survival and recruitment. Among trees, evolution has resulted in different strategies of partitioning resources to these key demographic processes, i.e. demographic trade-offs. It is unclear whether the same demographic trade-offs structure tropical forests worldwide. Here, we used data from 13 large-scale and long-term tropical forest plots to estimate the principal trade-offs in growth, survival, recruitment, and tree stature at each site. For ten sites, two trade-offs appeared repeatedly. One trade-off showed a negative relationship between growth and survival, i.e. the well-known fast-slow continuum. The second trade-off distinguished between tall-statured species and species with high recruitment rates, i.e. a stature-recruitment trade-off. Thus, the fast-slow continuum and tree stature are two independent dimensions structuring most tropical tree communities. Our discovery of the consistency of demographic trade-offs and strategies across forest types in three continents substantially improves our ability to predict tropical forest dynamics worldwide.

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