

# A bibliometric analysis of trends in tropical ecology research across a 15-year span

Ricard Arasa Gisbert · Biologia Ambiental 2014-2015 · Facultat de Biociències (Universitat Autònoma de Barcelona)

## Introduction

### The bibliometric analysis

Bibliometric collect and analyze information from a set of research articles. Its use has grown recently.

### What is the main objective?

Its purpose is to provide relevant information about a topic to get an overview of the global state of the arts of the discipline to identify gaps in knowledge.

### Our aim

We compared the two specialized journals on tropical ecology with largest impact to evaluate (1) the state of research in tropical ecosystems worldwide, (2) determine trends of the last two decades and (3) identify disparities in the attention that different regions, ecosystems and taxonomic groups have received by scientists.

## Materials & Methods

### Journals



**Biotropica.** It is an American journal focusing on ecology, conservation and management of all tropical ecosystems. Impact Factor: 2,082



**Journal of Tropical Ecology.** It is a British journal, that publishes research on the ecology of tropical regions. Impact Factor: 1,222

### Methodology followed

- 1 We chose eight individual volumes for each journal, spanning from 1997 to 2012. We reviewed the content of all abstracts.
- 2 Total number of articles reviewed: 1235 (Biotropica: 557; Journal of Tropical Ecology: 678).
- 3 Data collection was conducted by 5 different registers in an excel spreadsheet.
- 4 We recorded information for 6 different fields: (1) taxonomic group, (2) study countries, (3) region, (4) biome, (5) nationality of institutions and (6) subject.
- 5 Statistical analysis consisted on *t-student*, with a minimum significance of 0,05 to accept  $H_0$ . SPSS program was used.

## Results

### Comparing journals

**Place of study.** 8 out of the 10 most studied countries published in Biotropica are in the Americas, the other two in Asia (Fig. 1a). In Journal of Tropical Ecology, the distribution is more equitable: 6 American countries, 3 from Asia and 1 from Oceania (Fig. 1b). Results were significant for 4 countries: Costa Rica ( $p = 0.006$ ), Puerto Rico ( $p = 0.046$ ), United States ( $p = 0.018$ ) and Australia ( $p = 0.018$ ).

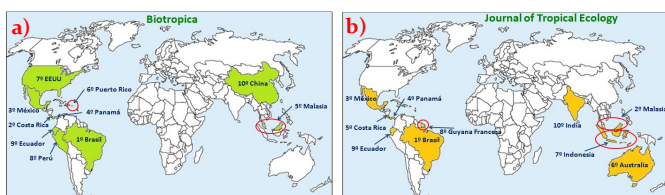


Fig. 1. The map on the left (a) shows the top 10 study countries of articles published by BTP. The map on the right (b) shows the top 10 study countries of articles published by JTE.

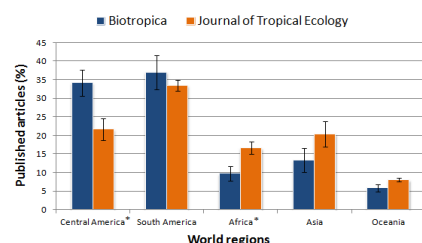


Fig. 2. Comparison of relative frequency between the two journals in the 5 world regions. The values are represented with  $\pm$  SEM (standard error of the mean). With \*, the regions with significant differences.

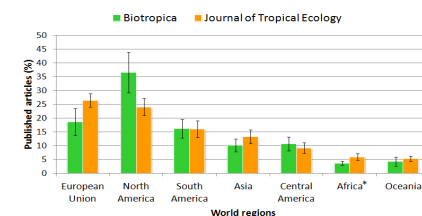


Fig. 3. Comparison of relative frequency between the two journals in the 7 major research regions. The values are represented with  $\pm$  SEM (standard error of the mean). With \*, the region with significant differences.

**The contribution of regions.** Studies conducted in South and Central America make 71.1% of total publications in Biotropica, but only 55% of those in JTE. We found significant differences for Central America ( $p = 0.016$ ) and Africa ( $p = 0.02$ ).

**Nationality of institutions.** In Biotropica, more than 35% of institutions were from North America. In JTE, the same area were only of 25%. Instead, JTE shows more European production (26%) than BTP (19%). Only one region differ significantly (Africa,  $p = 0.495$ ).

### Global data

Table 1. The top 3 categories for each research field. In parenthesis, the number of items by category

TOP	Taxonomic group	Place of study	Region	Biome	Nationality of researchers	Subject
1	Woody plants (678)	Brazil (210)	South America (412)	Tropical rainforest (781)	United States (636)	Biology (80%)
2	Arthropod (261)	Costa Rica (112)	Central America (331)	Tropical dry forest (140)	Brazil (215)	Conservation (20%)
3	Mammals (238)	Mexico (92)	Asia (193)	Cloud forest (120)	Mexico (124)	

**Countries preferences.** French and United Kingdom institutions conduct research in countries with historical relations (Fig. 4). Brazil and Mexico lead in domestic research and Japan, US and Canada focus their research in countries within their continent. In contrast, researchers from Germany and The Netherlands conduct research in countries with no past colonial links.

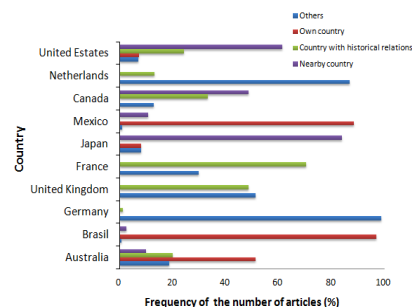


Fig. 4. Top 10 researchers countries and the place of study chosen.

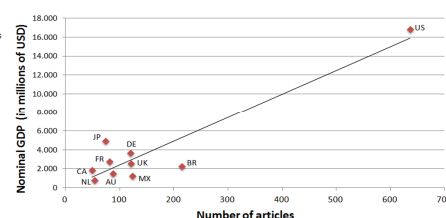


Fig. 5. Top 10 researchers countries and their Nominal GDP.

I found a link between the top 10 researchers countries and their Nominal GDP (Gross Domestic Product)(Fig.5). I got a  $R^2$  of 0,8719.

**Trends in taxonomic group.** Woody plants, arthropods and herbaceous plants showed the biggest decline in number of publications from 1997 to 2012. Vertebrates and abiotic factors showed the greatest increase in the same period (Fig. 6).

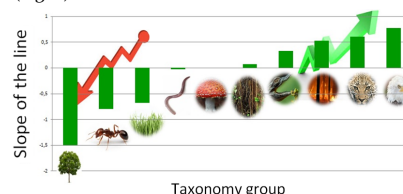


Fig. 6. Trends in taxonomic groups with more publications.

**Trends in biome.** Cloud forest, mangroves and tropical rainforest show a decrease in number of studies in recent years. In contrast, studies of savanna, agroecosystems and, to a lesser extent dry forest, increased significantly from 1997 to 2012 (Fig. 7)

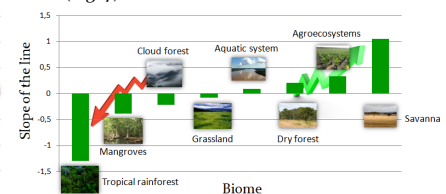


Fig. 7. Trends in biomes with more publications.

## Discussion & Conclusion

- Biotropica has a strong bias toward the American continent, presumably by the tendency of American researchers to conduct their studies in the Neotropics. In contrast, JTE has a more equitable distribution worldwide.

- The top categories of taxonomic group and biome are headed by charismatic groups. The trend has been increasing in the case of taxonomic groups, but for biomes a significant increase is observed in the study of savannas and agroecosystems, biomes poorly researched until recently. The latter have proven to be very important for biodiversity conservation.

- The richest nations produce more articles, and each country have very distinct historical, political and geographical research preferences.

**Limitations of this study.** Including additional journals, especially from other regions, would probably improve the study.

**Conclusion.** Research should be encouraged in developing countries and regions to improve research and 'in situ' conservation, which is essential for long-term conservation of tropical ecosystems.