

# A novel approach to assess the status of endemic woody plants

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## INTRODUCTION

Carrying out species assessments and assigning threat status is crucial for prioritizing species for conservation.

Like many other taxa, the status of > 50% of the tree species endemic to the Western Ghats (WG) is yet to be assessed.

Lack of systematic information on distribution and population has been an impediment in carrying out species assessments in an objective manner.

Conventionally, such assessments were based largely on opportunistic records and people's perceptions.

Based on comprehensive field surveys covering the entire WG, we propose an objective approach for carrying out threat status assessment of endemic woody plants.

## OBJECTIVES

1. To generate a comprehensive database of the distribution and population status of endemic woody plants of the Western Ghats
2. To carry out species assessments and assign IUCN threat status to the endemic woody plants of the Western Ghats

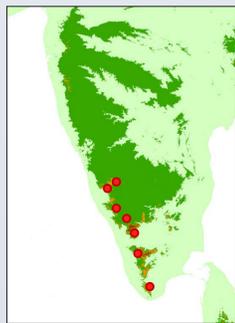
## METHODS

### STEP 1 - Data Collection

- A total of 6500 occurrence points of ca. 250 species of endemic woody plants was collated based on -
- i. Primary data: 160 plots (0.06 ha) covering the entire evergreen forests.
  - ii. Secondary data: 70 plots (1 ha) across evergreen forests of Karnataka and 48 plots (0.25 ha) laid from Karnataka to the southern tip of Tamil Nadu.



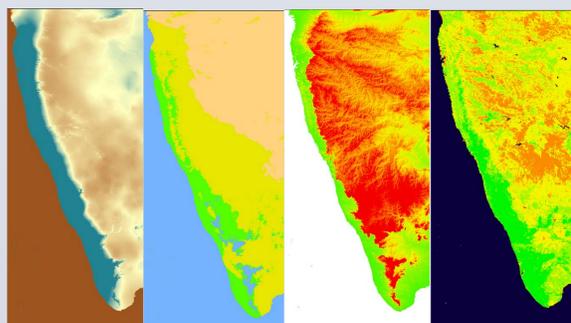
*Baccaurea courtallensis*



Occurrence points of *B. courtallensis*

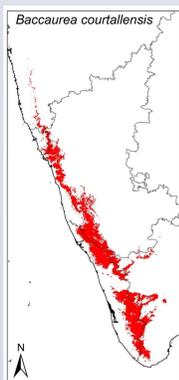
### STEP 2 - Species distribution modeling (SDM)

Potential distribution of species was predicted using observed occurrence records and a set of 11 environmental layers in MAXENT<sup>1</sup>.



Rainfall Temperature Topography Forest cover

SDM

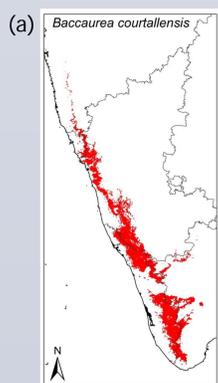


Predicted distribution

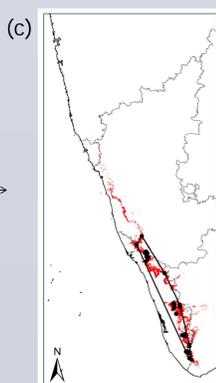
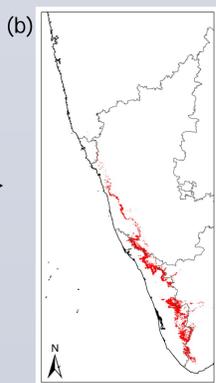
### STEP 3 - Refining the predicted distribution

SDMs often over-predict the actual distribution of a species. This over-prediction was minimized by:

- i. Including only those areas with high probability of species occurrence (>0.5 prob) (Fig b)
- ii. Clipping the predicted area outside the bounds of the species' known distribution (Fig c)



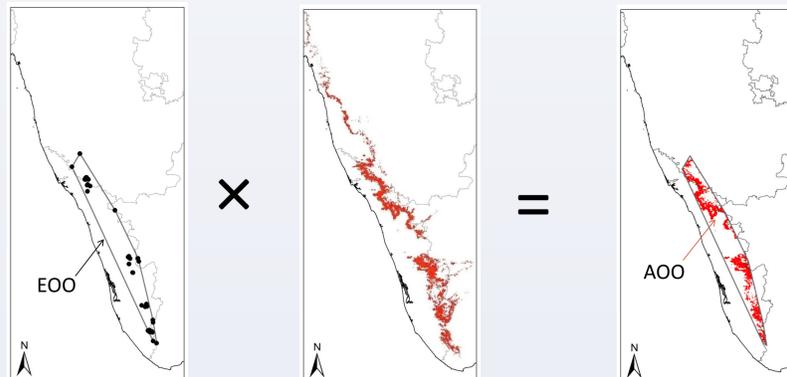
Original prediction



### STEP 4 - Quantifying species ranges

The area bounded by the outermost occurrence points (minimum convex polygon) was used to estimate the extent of occurrence (EOO).

The predicted distribution within the EOO was used to estimate area of occupancy (AOO).



### STEP 5 - Population estimates

Using the average density values of species from the plot data, the global population was estimated by extrapolating the density to the AOO.

### STEP 6 - Assessment of threat status

Threat status for each species was assigned based on criteria B (range size) and D (population size) as outlined in the IUCN guidelines<sup>2</sup>.

A scenario of severe fragmentation and continuous decline in species geographic range was assumed<sup>3,4,5</sup>.



Status assessment of *Baccaurea courtallensis* (\*Proposed status)

## RESULTS

The threat status ca. 200 species of endemic woody plants of the Western Ghats was assigned, many of which were evaluated for the first time.

The database generated from this study consists of information on distribution, range size, population status.

Among these, 53% species were classified as threatened ( 36% Vulnerable & 17% Endangered)

## SUMMARY

This is the first study to have carried out species assessments based on comprehensive field surveys and objective criteria, making this approach robust and reliable.

The data generated from this study will serve as a benchmark for monitoring future changes in range size and population status of endemic woody plants.

Despite the intensive sampling effort, we could not collect sufficient data for 40% of the endemic species.

More focused field surveys are required for these rare and narrowly endemic species, that are more likely to qualify for the threatened category.

## REFERENCES

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