



## Conservation status of *Hildegardia populifolia* (Roxb.) Schott & Endl. (Malvaceae: Sterculioideae: Sterculieae), an endemic of southern peninsular India

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**Abstract:** *Hildegardia populifolia* (Roxb.) Schott & Endl. an endemic tree of southern peninsular India is assessed in terms of the IUCN Red List status. New data from field surveys indicated Vulnerable species categorization for *H. populifolia*.

**Keywords:** *Hildegardia populifolia*, Red List status, Vulnerable.

Conservation status of a species is an indicator of the likelihood of that species continuing to survive in nature. The International Union for the Conservation of Nature (IUCN) is the world's main authority on the conservation status of species (Mrosovsky 1997) and the IUCN Red List provides an objective evidence-based system for classifying species in terms of the risk

of extinction. Such conservation assessments are useful tools to prioritize species for conservation action and to monitor the change in status of species over time. The IUCN system assesses the threat to a species based on five core criteria: decline in populations over a period that is relevant for the species (based on generation time); the distribution of the species together with factors that may influence ongoing survival within its current distribution; small population size and continuing decline; very small populations or small distribution area; and quantitative assessment of extinction risk (e.g. modeling) (IUCN 2001). Assessments are always done using the best available information, but often only partial information is available for many taxa. Recently, Babu & Rao (2009) and Rao et al. (2009, 2010) provided valuable field data for the current global population status of *Cycas beddomei* Dyer and categorized it as Endangered. In the present study, we attempt to assess the current population status of *Hildegardia populifolia* (Roxb.) Schott & Endl., a southern Indian endemic (Ahmedullah & Nayar 1987).

*Hildegardia populifolia*, a deciduous forest tree species belongs to the family Malvaceae, subfamily Sterculioideae, tribe Sterculieae. The species was earlier known to be represented by a sole surviving population comprising about 20 trees in Kalarayan Hills of Tamil Nadu (Ahmedullah 1990). It is an enigmatic species in that its conservation status has been variously assessed as Critically Endangered (Sarcar & Sarcar 2002), Endangered (Ahmedullah 1990; Walter & Gillet 1998; Rao et al. 2003). Rao et al. (1998) recognized five subpopulations of this Endangered species in Rayalaseema District of Andhra Pradesh. Jadhav et al. (2001) categorized it as Vulnerable. The World

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Conservation Monitoring Centre (1998) assessed the conservation status of this species as Critically Endangered. After conducting intensive explorations for the past 15 years, our research team located the species in Anantapur, Kadapa and Chittoor districts in southern Andhra Pradesh, Salem Hills in northern Tamil Nadu and a small patch in Karnataka bordering Anantapur District of Andhra Pradesh. The present study focuses on a critical evaluation of the *H. populifolia* population and revision of the current conservation status based on the latest IUCN Red List Criteria (version 3.1; IUCN 2001).

### Materials and Methods

*Hildegardia populifolia* is a deciduous tree growing up to 20m (Image 1). The plant is recognizable for its pale green bark. Leaves are ovate-cordate, 3–5-lobed and digitately 7-nerved. Flowers are purple, and erect with leathery perianth. Follicles are winged, erect, thinly woody, falcately ovate-reniform and inflated, with 1 or 2 seeds, affixed from base of the follicle and conspicuously wrinkled when dry. The species is locally known as Galibuduga, Pichipoliki, Buddapoliki in Telugu and Malaipuvarasu in Tamil.

The study area cover all the known localities of the species distribution, i.e., southern Anantapur, western Kadapa, and northern Chittoor districts of Andhra Pradesh; Devikunta area in Karnataka and Salem Hills in Tamil Nadu (Fig. 1). The study area was stratified into grids of 6.25×6.25 km using IRS-1C satellite data. The whole study area falls in the hill ranges of southern Eastern Ghats (11°52′–14°16′N & 77°45′–78°59′E) with an altitudinal variation of 420–982 m. Preliminary explorations revealed the presence of *H. populifolia* in 29 grids in the study area comprising 354 grids. Transects of 1000×5 m were laid down in all the 29 grids. This amounts to approximately 0.019% of the total area, an adequate sampling intensity according to Shivaraj et al. (2000). In all the 29 grids, the plants of ≥30cm gbh were counted and considered for the analysis. Wherever the species was found in the grids, geographic coordinates were recorded and the shortest continuous boundary for the species population was been drawn on the grid map.

The assessment is carried out as per the IUCN Red List Categories and Criteria (IUCN 2001). The Extent of Occurrence (EOO) is estimated as a minimum convex polygon containing all the localities of species

occurrence. Area of Occupancy (AOO) of the species within the grids is studied taking into account the terrain features with respect to altitude. The population size of the species is estimated by extrapolating the recorded individuals in the individual transect.

### Results and Discussion

The overall distribution of the species falls within an area of ca. 228×90 km. A conservative approach would therefore be to consider this as one location, however, since the threats could vary between different populations, it cannot be considered so. Observations in the field indicated that at least 12 locations identified for the species are separated by reasonably unoccupied areas (Fig. 2). In total, 376 individuals of *H. populifolia* were counted in all the sampled transects of 29 grids (Table 1). It was observed that the species was found mostly above 420m, restricted to top hills and rock boulders, growing in sandy red soil. Taking these observations into consideration, a grid map has been prepared for measuring the EOO of the species. The EOO is calculated as 14,160km<sup>2</sup> (Fig. 2). The species has a patchy distribution within the grids and substantial areas in the individual grids (more than 95% area) do not have this species (Fig. 2). The AOO thus is calculated to about 14.6km<sup>2</sup> (1460ha). The population size of the species is estimated to comprise 23,100 individuals. Results pertaining to the AOO and the number of individuals recorded in transects extrapolation for the whole estimated population is presented in Table 1.

### Applying IUCN criteria

**Criterion A:** The available data does not provide any indicators of change in population size over time and hence this criterion is not applied to *H. populifolia*.

#### Criterion B:

**Criterion B1:** The EOO of *H. populifolia* is estimated to be 14,160km<sup>2</sup> and considered to occur at more than 10 locations (sub-criterion a). Further, there are no extreme fluctuations observed with respect to any of (i) to (iv). It qualifies only under the sub-criterion (b) for continuing decline in terms of (iii) area, extent and quality of habitat. Hence, it does not qualify for any of the threatened categories under B1.

**Criterion B2:** The AOO is 14.6km<sup>2</sup>. However, it does not qualify for either (a) and (c). It qualifies only for the sub-criterion (b) for continuing decline in terms of (iii) area, extent and quality of habitat. Hence, it is



Image 1. *Hildegardia populifolia*  
A - Habit;  
B - Wild population;  
C - Fruits;  
D - Seeds

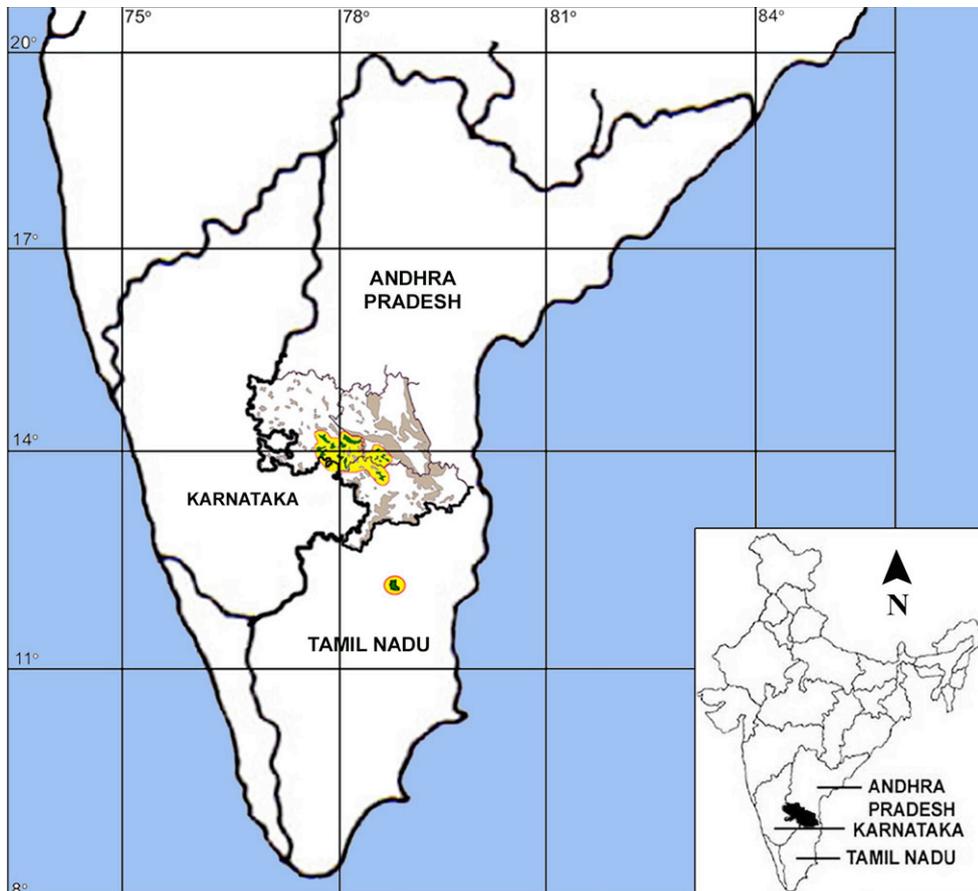


Figure 1. Distribution pattern of *Hildegardia populifolia*

**Table 1. Grid-wise population of *Hildegardia populifolia***

Locations	Grid number	Location	Average altitude of the grid	No. of individuals	AOO (in km <sup>2</sup> ) within the grid (40 km <sup>2</sup> )	Estimated individuals in the whole grid
Location-1	57F16NW3	Bukkapatnam	630	14	0.9	2268
	57F16NW4	Vengalammacheruvu	622	12	0.4	384
	57F16NE1	Yerlampalli	650	16	0.8	2048
	57F16NE2	Tummalamala	655	13	0.4	416
	57F16NE3	Narsampalli	633	16	0.5	800
	57F16NE4	Tummalamala	654	14	0.6	1008
Location-2	57F16SW1	Amagondapalem	652	9	0.3	162
	57F16SW3	Amagondapalem	666	16	0.8	2048
	57F16SE1	Amagondapalem	643	12	0.5	600
Location-3	57G13NE1	Gounuvaripalli	754	15	0.4	480
	57G13NE2	Devikunata	642	22	0.4	352
Location-4	57J3SE4	Chinapalli	459	35	0.2	280
	57J4NE1	Nigidi RF	674	18	0.9	2916
	57J4NE3	Batrepalli	680	18	0.7	1764
Location-5	57K1NW3	Tummala RF	579	12	0.3	216
	57K1NW4	Tummala RF	620	16	0.7	1568
	57K1NE2	Tummala RF	592	13	0.7	1274
Location-6	57K5NW1	Kokkanty RF	544	15	0.6	1080
Location-7	57K5NW3	Ishwaramala	640	12	0.5	600
Location-8	57K9NW1	Papepalli	624	8	0.4	288
	57K9NW3	Kalibanda	650	9	0.5	400
Location-9	57K9NW4	Rekkalakonda	672	8	0.6	576
Location-10	57K9NE1	Kalibanda	596	4	0.4	128
Location-11	57K14NW3	Kottala	620	4	0.2	32
	57K14NW4	Nagiripalli	522	12	0.4	384
	57K14NE1	Ankalammagudi	622	11	0.2	88
	57K14NE2	Kanchamvaripalli	630	8	0.2	64
Location-12	58I13NW3	Mulakkadu	458	8	0.6	576
	58I13NW4	Pudupalapatti	423	6	0.5	300
Total				376	14.6	23100

not threatened under subcriterion B2.

**Criterion C:** Small population size and decline. The total estimated population of *H. populifolia* is >23100 mature individuals. Since the number of mature plants exceed the requirements for Vulnerable status (i.e. <10 000), the species is not considered as threatened under this criterion.

**Criterion D:** Very small or restricted populations. Although the species population comprises a large number of individuals, it is found restricted to < 20km<sup>2</sup> and is prone to human activities in terms of fire hence qualifying for Vulnerable category under D2.

**Criterion E:** No demographic modeling has been undertaken for the species and hence this criterion does not apply for the species.

The final assessment for *Hildegardia populifolia* based on the present study is: VU D2.

*Hildegardia populifolia* assessed under three threatened categories in different works, is currently categorized as Vulnerable based on primary data from the field. The present study also provides significant data pertaining to its distribution in peninsular India- in the states of Andhra Pradesh (Anantapur, Kadapa and Chittoor districts) Tamil Nadu (Salem Hills) and Karnataka (in areas bordering Anantapur District of Andhra Pradesh).

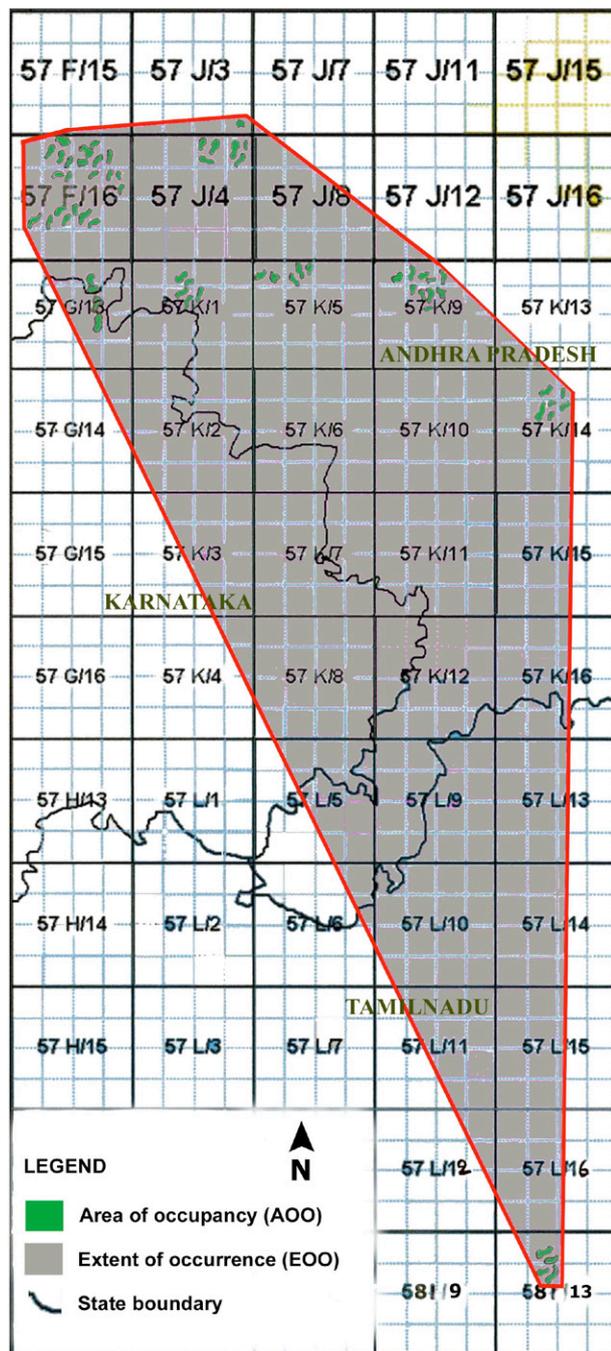


Figure 2. Minimum convex polygon of *Hildegardia populifolia*

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