

Original Paper

Is *Euphorbia susan-holmesiae* Binojk and Gopalan a Narrow Endemic or Non-Native Species in Kalakkad-Mundanthurai Tiger Reserve, Western Ghats, India?

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Abstract: The presence of the rare cactus *Euphorbia susan-holmesiae* within the Kalakkad-Mundanthurai Tiger Reserve (KMTR) prompts questions about its origin and habitat preferences. This study investigates the distribution and ecological characteristics of *E. susan-holmesiae*, primarily found in the vicinity of the Sorimuthu Iyyanar temple within KMTR. Through field explorations and GPS mapping, we assessed the population status and habitat of *E. susan-holmesiae*. Our findings reveal 34 clusters of *E. susan-holmesiae*, indicating its presence in the study area, with no apparent damage due to protective measures. However, essential baseline data regarding population structure and regeneration status are lacking, emphasizing the need for conservation efforts. We discuss possible factors influencing its habitat preference and suggest collaboration between forest officials and local communities for restoration initiatives. Urgent conservation strategies are needed to safeguard this species both within and outside protected areas.

Keywords: *Euphorbia susan-holmesiae*, species, conservation, habitat preference, KMTR

Introduction

Nature-based tourism and recreation in protected areas has seen a significant increase globally, as highlighted by (Pickering and Hill 2007), drawing in substantial numbers of enthusiasts. However,

numerous of these locations suffer from insufficient visitor facilities, while others have undergone substantial development, including the addition of amenities such as picnic areas, lodging, campsites, and restroom facilities. *E.susan-holmesiae*, indigenous to South Africa, is predominantly found in the provinces of Limpopo and Mpumalanga. *Euphorbia susan-holmesiae*, described by (Binoj and Gopalan 1993). *E. susan-holmesiae* is exclusively found in the Sorimuthu Iyyanar temple and its adjacent forest land, thriving at altitudes between 180-200m on gentle to moderate rocky slopes with rocky to gravelly substrates. It typically exhibits a shrub or small tree-like growth pattern, characterized by elongated stems and branches with grayish-green coloration and shorter spines (Figure 1). These spines, originating from the epidermis, serve as a defense mechanism, while the leaves are reduced to spines, possibly to deter browsing animals. As the plant matures, its branches become fleshy, imparting a cactus-like appearance. Earlier research has documented the reduction of trees, poles, and canopy coverage because of activities such as gathering firewood and visiting the Sorimuthayanar temple (Sunderraj and JohnSingh 2001). The population and distribution of *E. susan-holmesiae* have not yet been investigated throughout its range. Therefore, this study aims to assess the population and distribution of *E. susan-holmesiae* within the forests of the Kalakkad-Mundanthurai Tiger Reserve (KMTR).



Figure 1: Vegetative parts (Photo credit: Dr. S. Mutheeswaran)

Study area

The Sorimuthu Iyyanar temple is situated within the geographical boundaries of the Kalakad Mundanthurai Tiger Reserve (KMTR) in the Tirunelveli District of Tamil Nadu, India (Figure 2), spanning from longitudes 77°10' to 77°35' E and latitude 8°25'53" N. Within this area, a population of *E. susan-holmesiae* Binojk. &Gopalan, comprising both pure and mixed specimens, is present on the land surrounding the temple. This study site is adjacent to the Tambiraparani river, which is the primary river in the Tirunelveli District. As identified by (Mudappa et al., 2001), the study area experiences three distinct seasons: the dry season (February–May), the southwest monsoon (June–September), and the northeast monsoon (October–January).

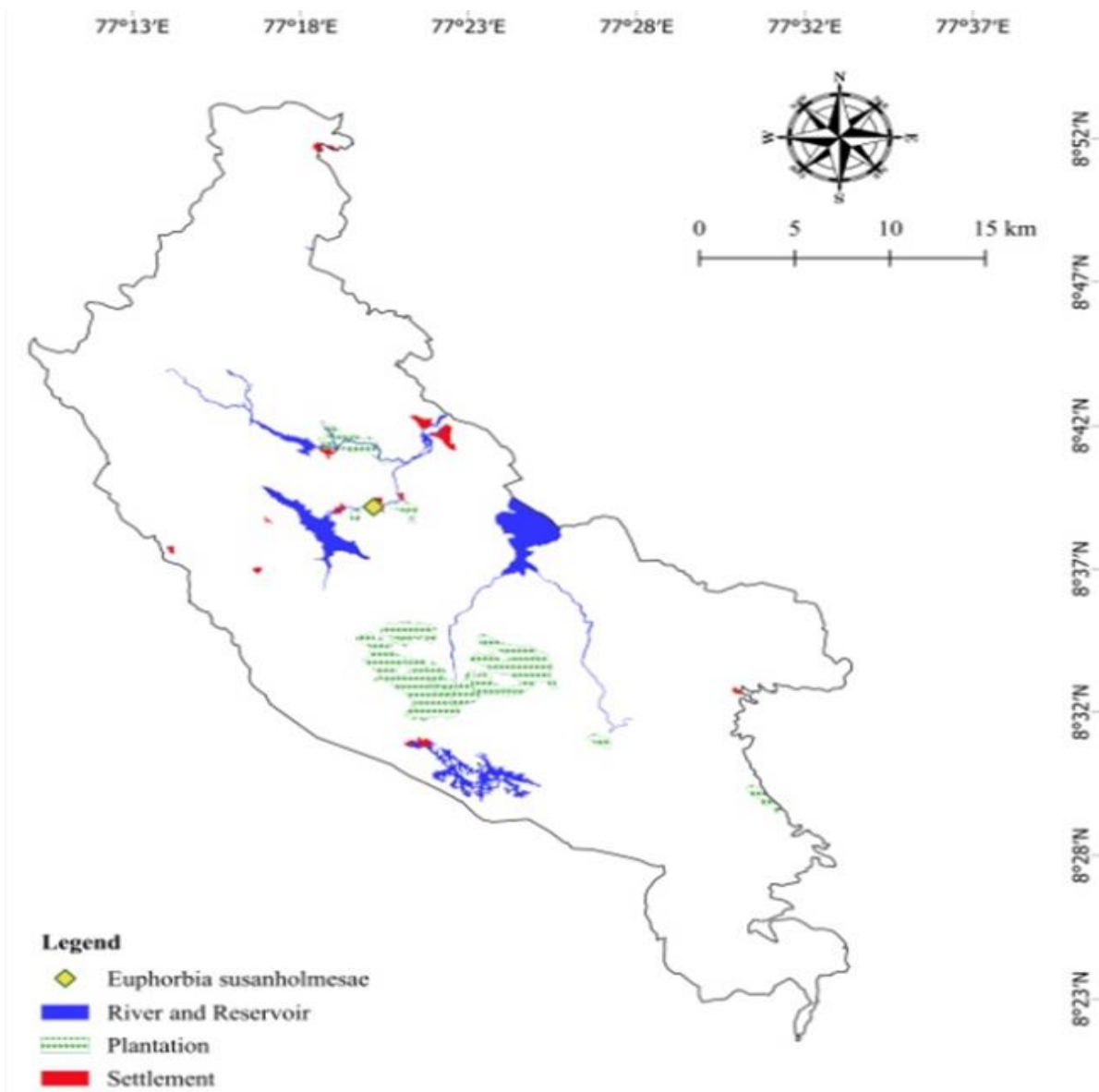


Figure 2: The distribution of rare endemic cactus *E. susan-holmesiae* in KMTR



Figure 3: Conservation of *E. susan-holmesiae*

Methods

In this study, we conducted intensive and extensive field explorations across various forest ranges within the Kalakkad-Mundanthurai Tiger Reserve. Frequent field visits were organized to survey the rare and endemic *E. susan-holmesiae*. Plant specimens were identified with the assistance of floras and existing literature. The population status and distribution of *E. susan-holmesiae* were evaluated using GPS coordinates within the confines of the KMTR. The study site was situated near the Karaiyar River, near the Sorimuthu Iyyanar Temple (SIT). Photographs of *E. susan-holmesiae* were captured from a location along the Karaiyar River, adjacent to the land surrounding the SIT.

Results and discussion

During the observation study, 34 clusters of *E. susan-holmesiae* were recorded at the study site, with no observed damage due to the high level of protection afforded in the area (Figure 1). Additionally, forest officials were regularly seen within the premises of Sorimimuthu Iyyanar Temple, annually emphasizing the severe penalties for forest damage, and stressing the importance of conserving *E. susan-holmesiae* (Figure 3). However, crucial baseline information regarding the current population structure, shrub regeneration status, and other biological factors necessary for its persistence is lacking. During our formal interview with the Kaanis local community, they mentioned those slender lorises are regular visitors to the *E. susan-holmesiae* cluster area, particularly during the flowering season, as observed by them personally. This data is vital for making informed recommendations for managing this rare species and the biodiversity it sustains within the KMTR. The narrow endemic species *E. susan-holmesiae* is confined to very small areas within its native range, exhibiting a narrow range of environmental tolerance with almost no suitable habitat elsewhere in the world. The observation study has provided insights into the distribution of *E. Susan-holmesiae*, prompting the question of why it thrives in the Sorimuthu Iyyanar Temple Area rather than elsewhere. Possible explanations may lie in the species' tolerance range, its structural characteristics, and past paleoecological events (Billing 1964). Although no natural regenerations were officially documented, field observations revealed abundant natural regenerations in close proximity to *E. susan-holmesiae*. Consequently, artificial reproduction techniques will be utilized, including both seeds and stem cuttings. Local inhabitants of KMTR and nearby villages traditionally use the sap extracted from the stems to heal foot cracks. We suggest that forest department officials collaborate with local village communities to implement restoration and enhancement efforts, including planting in forest fringes, margins of farmlands, villages, and schools. Therefore, there is an urgent need for innovative conservation strategies to protect this species both within and outside protected areas.

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References

- Billings WD. (1964). *Plants and the Ecosystem*. United Kingdom: Macmillan.
- Binojkumar MS and Gopalan V. (1993). *Euphorbia susanholmsiae*. *Cactus and Succulent Journal*, 65(4): 277.
- Mudappa D, Kumar A and Chellam R. (2001). Abundance and habitat selection of the Malabar spiny dormouse in the rain forests of the Southern Western Ghats, India. *Current Science*, 80(3): 424-427.
- Pickering CM and Hill W. (2007). Impact of recreation and tourism on plant biodiversity and vegetation in protected areas in Australia. *Australian Journal of Environmental Management*. (85): 791-800.
- Sunderraj SFW and Johnsingh AJT. (2001). Impact of biotic disturbances on Nilgiri langur habitat, demography and group dynamics. *Current Science*. 80 (3): 428-436