

RESEARCH ARTICLE

Cultural Significance and Sustainable Use of *Loxococcus rupicola* (Thw.) H. Wendl. and Drude in Sri Lanka: Implications for Conservation and Religious Practices

G.G.T. Chandrathilake^{1*}, Dilini Wickramasinghe¹ and R.A.M.P.M. Rajatewa²

¹Department of Forestry and Environmental Science, Faculty of Applied Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

²Environmental Conservation, Educational and Rehabilitation Organization, (ECERO), Gampaha, Sri Lanka

Abstract: *Loxococcus rupicola* (“Ran-Dothalu”), is a nationally endangered palm species found in the southwestern rainforests, central highlands, and Knuckles regions of Sri Lanka. With a predominant Buddhist population, Ran-Dothalu holds sacred reverence among Buddhists. Thus, the present study aimed to elucidate the impact of cultural practices and religious beliefs on their conservation. Comprehensive semi-structured interviews were conducted selecting Buddhist clergy, flower collectors, and devotees (n=114), while data were also extracted from social media platforms. Our findings reveal the multifaceted role of *L. rupicola* within religious and cultural contexts. Notably, *L. rupicola* flowers emerge as offerings to the Buddha and deities as an integral component of rituals and medicine, while their seeds are being used as a substitute for the Areca nut. Despite these diverse applications, users were unaware of *L. rupicola*’s conservation status. Although there are legislative measures, the popularity of *L. rupicola* as an ornamental species triggers the over-exploitation of seedlings and saplings from natural habitats forming a threat to the population. This study underlines the urgency of aligning conservation strategies with local religious practices, emphasizing the imperative of immediate conservation measures.

Keywords: Biodiversity conservation, Endangered species, *Loxococcus rupicola*, Sacred groves, Religious beliefs, Sri Lanka

Introduction

In recent years, there has been a growing recognition of the intricate relationship between traditional religious and cultural practices and their impact on biodiversity conservation (Berkes et al., 2000, Kellert et al., 2000, Ranil et al., 2021, Gadgil et al., 2022). This recognition is especially relevant in countries like Sri Lanka, where rich biological diversity interacts with deeply integrated cultural and religious beliefs (Antons, 2010, Goonatilake and Ekanayake, 2016). Sri Lanka, known for its high biodiversity, boasts a diverse range of ecosystems, from lush rainforests to arid dry zones, each harbouring a unique array of species (Pethiyagoda and Sudasinghe, 2021). Admitting this ecological diversity, the country’s cultural landscape is equally rich, with an array of

traditions and religious practices that have been an integral part of the lives of people for centuries (Hongmao et al., 2002).

Despite this recognition, there remains a notable research gap in understanding the specific mechanisms through which traditional beliefs and cultural practices influence biodiversity conservation in Sri Lanka (Wickramasinghe, 2006, Bandara, 2009). Several studies have highlighted the importance of traditional ecological knowledge in conservation efforts (Negi, 2005, Wickramasinghe, 2006, Antons, 2010, Ministry of Environment, 2020).

While general principles have been established in the literature, such as the importance of understanding sociocultural relationships with biodiversity

*corresponding author: thilakawansa@sjp.ac.lk

 <https://orcid.org/0000-0001-8227-8599>



This article is published under the Creative Commons CC-BY-ND License (<http://creativecommons.org/licenses/by-nd/4.0/>). This license permits commercial and non-commercial reuse, distribution, and reproduction in any medium, provided the original work is not changed in any way and is properly cited.

conservation (Berkes et al., 2000, Kellert et al., 2000, Berkes, 2007a, Gadgil et al., 2022), the unique context of Sri Lanka necessitates a more focused examination, particularly through ethnobotanical studies that highlight the intricate links between traditional knowledge and plant conservation (Martin, 1995, Jain, 2010, Pei, 2010).

Traditional agroecosystems play a pivotal role in conserving biodiversity outside protected areas, as they often harbor significant species diversity and contribute to preserve the traditional knowledge (Halladay and Gilmour, 1995). This phenomenon is particularly relevant for species like *Loxococcus rupicola*, which are intricately coupled with the cultural and religious practices of certain Sri Lankan communities. Under this context, *Loxococcus rupicola* (Thw.) H. (Wendl. and Drude, commonly known as “Ran-Dotalu”), has been identified as an important species that needs an effort to protect (Ministry (Miththapala, 2014, Ministry of Environment, 2020, De Silva et al., 2022), as this endemic palm species of Sri Lanka holds immense cultural and religious significance among Buddhists, who consider it sacred (Dharmadasa et al., 2016). 2015). Further, this palm species is listed as Critically Endangered on the global red list (IUCN., 2021) and Endangered on the national red list of Sri Lanka (Ministry of Environment, 2020)), owing to its limited distribution and overutilization (Miththapala, 2014). Although there is protective legislation, this species faces significant pressure from local communities on the long-term survival of *L. rupicola* due to overexploitation and a lack of awareness of the importance of conservation (Ministry of Environment, 2020).

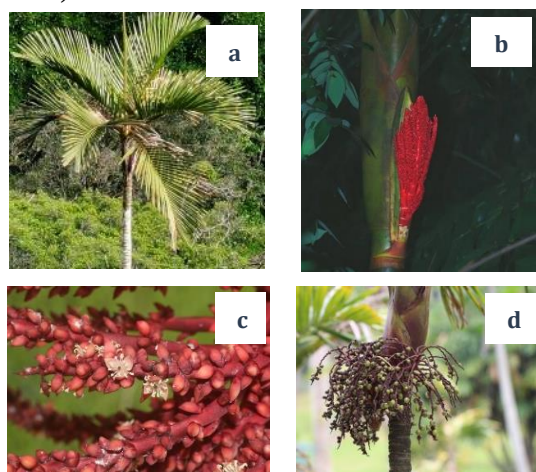


Figure 1 *Loxococcus rupicola*, a rare and beautiful sight in Sri Lanka's forests; (a) mature tree in the wild, (b) the vibrant red inflorescence before opening, (c)

flowers after opening the inflorescence, and (d) mature fruits before ripening

Sustainability in this context requires striking a balance between the needs of local communities and the imperative of resource preservation (Berkes (Maffi, 2005, Berkes, 2007b). understanding the cultural and religious value of a species can enhance conservation efforts while fostering greater local community involvement (Ostrom, 1990, Agrawal and Gibson, 1999, Noss et al., 2002). However, the application of such principles to the Sri Lankan context, particularly concerning the sociocultural implication of *L. rupicola*, is yet to be explored.

Therefore, this study aimed to fill this research gap by elucidating how cultural practices and religious beliefs influence the conservation of *L. rupicola*, a palm species of vital importance to both biodiversity and cultural heritage in Sri Lanka, to formulate effective conservation strategies for *L. rupicola* by considering the complex relationship between religious belief, cultural practices, and biodiversity.

Methods

Study area

The study was conducted nationwide across Sri Lanka. Participants for the questionnaire survey were recruited from diverse regions to ensure a comprehensive representation of various geographical, cultural, and socio-economic backgrounds. This geographic diversity allowed for a holistic understanding of traditional beliefs and cultural practices related to biodiversity conservation across the country.

Data collection

Participants were selected through a stratified sampling method. Key informants, such as local community leaders, environmentalists, and academics, were initially approached to participate and assist in identifying other potential respondents who possess relevant traditional knowledge and practices. A purposive sampling approach was used to identify participants with relevant knowledge and/or experience concerning the use and conservation of *L. rupicola*, reflecting the species' cultural and ecological significance. Key informants included Buddhist priests, plant collectors, and worshipers closely connected with the species.

Interviews were conducted face-to-face, over the telephone, and online, adapting to the COVID-19 pandemic situation (Dillman et al., 2014). Open-ended

questions were designed to elicit comprehensive responses regarding participants' perceptions of *L. rupicola*, its cultural significance, and its role in traditional practices.

Data on the religious beliefs and diverse uses of *L. rupicola* in rituals and other cultural practices were gathered using Facebook. The widespread use of Facebook in Sri Lanka as a platform for discussions and information sharing related to *L. rupicola* was particularly valuable for capturing real-time and community-driven discussions (Wilson et al., 2012). We conducted Keyword-based searches within Facebook using specific keywords related to *L. rupicola*, including "*Loxococcus rupicola*," "Ran Dothalu," "Dothalu" and "රන් දොතල" (Dothalu). Facebook's search functionality generated results that included public posts, comments, and discussions. These results encompassed a range of content shared by individuals, groups, and pages. We explored individual posts, comments, and discussions related to *L. rupicola* within the search results. This process allowed us to access publicly available content and gather insights into the cultural, religious, and conservation aspects of *L. rupicola*. Our data collection from Facebook adhered to ethical standards and Facebook's terms of service. We exclusively accessed publicly available content and did not breach privacy or engage in unauthorized data collection.

Data analysis

The data were analyzed using a combination of qualitative and quantitative methods. For data handling and analysis, MS Excel was utilized for initial data cleaning, organization, and descriptive statistical analysis. The statistical software environment R was employed to further process the data, enabling efficient management and advanced statistical analyses.

Results

Social Media Data Collection (Facebook)

According to the Facebook survey, the number of posts in line with the keywords of "*Loxococcus rupicola*, Ran Dothalu, රන් දොතල (Ran Dothalu)", were 17 (25.8%), 9 (13.6%) and 40 (60.6%) respectively (Fig. 2a). Among these, 53% was found in Personal Profiles, while the remaining posts were (47%) in Facebook Groups (Fig. 2b). All these data spanned from 2017 to 2023, with the highest number of posts (23) recorded in 2021 (Fig. 2c). Notably, every post described the religious significance or folk narratives intertwined with Buddhist culture and *L. rupicola*. Three posts specifically highlighted its

medicinal value within traditional practices, while only two posts underscored its role as a vital flower for warding off evil. Additionally, a solitary post illustrated the use of *L. rupicola* as a significant floral element in ceremonial decorations. However, only a few (16) of them described its conservation status and the need for efforts in conserving natural populations.

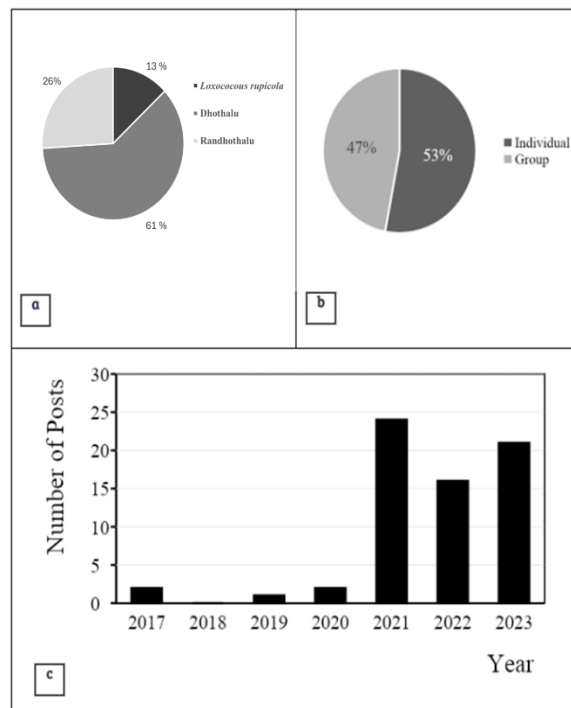


Figure 2: Distribution of Facebook Posts on *Loxococcus rupicola* (Ran-Dothalu) Over Time and Platforms. Results from (a) Facebook survey, conducted using the keywords '*Loxococcus rupicola*, Ran Dothalu, රන් දොතල (Ran Dothalu)', illustrates the percentage distribution of posts, (b) Platform Distribution (Personal profiles and Facebook Groups) as a percentage, and (c) yearly distribution of posts from 2017 to 2023.

Questionnaire Survey

The study sample consisted of 114 participants covering multiple regions across Sri Lanka, including 3 Buddhist priests, 7 flower collectors, and 104 worshipers. From the studied sample, 36% (41) were male and 64% (73) were female and the age of the participants ranged from 18 to 65 years with a mean age of 35 (Figure 3 a).

Although the majority of respondents (61, 53%) were aware of *L. rupicola*, they haven't seen any part of the species (Figure 3b). The primary uses of *L. rupicola* include being used as flowers for religious activities including offerings to Buddha and divinity, as a

medicinal ingredient, for certain traditional rituals termed as “Shanthi Karama” and for exorcism. The seed of *L. rupicola* is identified as a substitute for Areca nut for chewing (Figure 3 c). Adam’s Peak (Sri Padasthanaya), Temple of Tooth, “Ruwanweliya Stupa”, “Srimaha Bhodiya” the Great Saman Temple (Saman Devalaya), and Katharagama Temple (Kataragama Devalaya) and Bodh Gaya (in India) were identified as the main places where flowers are frequently being offered. Worshipers believe that offering *L. rupicola* flowers is a superior form of charity believed to absolve sins. According to the findings of present research, each location (local religious places excluding Bodh Gaya) received an average of 10 to 15 flowers per month. Flower collectors reported harvesting 10-12 flowers per month and selling each at prices ranging from 500 to 5000 Sri Lankan Rupees (LKR). In some cases, flowers are being sold over 5000 LKR for Bodhgaya pilgrims in Sri Lanka (Table 1). However, the responses to the question “What are threats for *L. rupicola*” were relatively low (22 participants). Among these respondents, major threats identified included flower collection, deforestation, habitat fragmentation, and seed collection (Figure 3 d).

Table 1: Selling Prices of Ran-Dotalu (*Loxococcus rupicola*) Flowers at Various Religious Sites in Sri Lanka

Religious places	Prize (LKR)
Adam’s Peak (Sri Padasthanaya)	500 (small flower) to 1000 (large flower)
Temple of Tooth	3000-4000
Katharagama Temple	2000- 3000
Ruwanweliya Stupa, Srimaha Bhodiya,	2500-3500
Great Saman Temple (Saman Devalaya)	1000-1500
For Sri Lankan pilgrims visiting Bodha Gaya (India)	>5000

According to the respondents, despite being a protected species, they collect seedlings and saplings from the wild as this is one of the popular ornamental plants in the market. Seedlings, saplings and seeds are collected from several protected areas, including Peak Wilderness Sanctuary, Erantha-Gilimale Forest Reserve, and Knuckles Forest Reserve. However, the study revealed that 78% of the respondents were not

aware of the conservation status of *L. rupicola* indicating the need for awareness and education on biodiversity conservation.

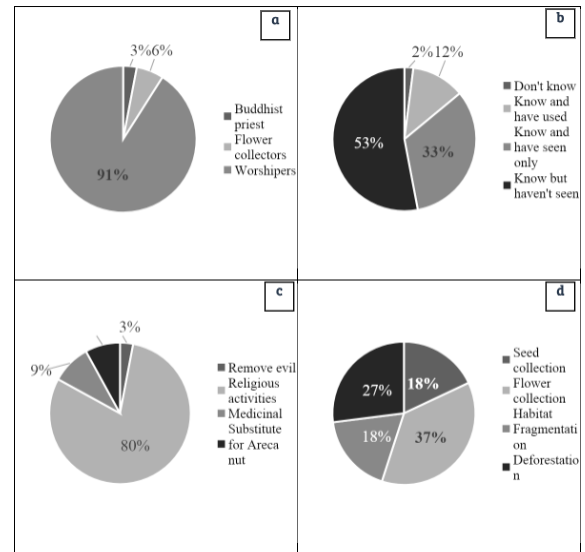


Figure 3: Percentage values of; (a) Composition of Study Participants (b) Knowledge Status of Participants about *L.rupicola*, (c) different use of *L.rupicola*, and (d) identified threats for *L.rupicola*

Discussion

The present study aimed to identify the relationship between cultural and religious practices and biodiversity conservation related to *L. rupicola* in Sri Lanka. Our findings suggest that *L. rupicola* flowers are frequently used in religious practices and rituals. According to legends, God Sumana-Saman offered Ran-Dotalu flowers to Buddha to establish “Sri Padasthanaya”. Therefore, worshipers believe that offering Ran-Dotalu flowers is a great act of charity and pays off all sin. These beliefs and practices underscore the cultural and religious significance of *L. rupicola*, which is consistent with the published literature (Johnson, 1996, Haynes and McLaughlin, 2000); which highlighted the cultural importance and commercial use of *L. rupicola* flowers.

There are potential threats to the natural populations of *L. rupicola* due to the traditional, religious, and cultural practices of certain Sri Lankan communities. This threat is not unique to Sri Lanka, as similar issues have been observed in other countries where culturally significant flora is harvested. For example, in Mexico, the wild collection of Peyote (*Lophophora williamsii*) for use in traditional and religious ceremonies has led to significant population declines (Kimber and McDonald, 2004).

The root causes of these harvesting practices are complex and rooted in socio-cultural, political, and economic contexts. In Sri Lanka, offering flowers, including those of *L. rupicola*, in Buddhist rituals is a symbol of respect and devotion to the Buddha. This practice has been reinforced by religious teachings and cultural norms that have persisted for centuries (Gombrich and Obeyesekere, 1988, Bandara, 2009, Seneviratne and Nilusha, 2014, Nanayakkara and Kudavidanaga, 2018). Additionally, socio-cultural and political influences, often driven by nationalist sentiments, emphasize the importance of maintaining these rituals. Such influences can overshadow environmental concerns, leading to increased demand for *L. rupicola*. Religious leaders, in promoting these practices, may do so to reinforce national identity and unity, thereby inadvertently driving up the demand for culturally significant species like *L. rupicola*.

The economic benefits associated with the collection and sale of these plants cannot be overlooked. For many local communities, the harvesting of *L. rupicola* provides a vital source of income. This economic incentive, coupled with cultural and religious motivations, exacerbates the pressure on wild populations.

Despite its protected status under the Fauna and Flora Protection Act of 2009, *L. rupicola* remains threatened due to unsustainable harvesting practices, habitat loss, and climate change-related impacts (Johnson, 1996, Government of Sri Lanka, 2009, Miththapala, 2014, Viduranga. and Kathriarchchi, 2023). Similar threats to other palm species have also been documented globally (Ticktin, 2004, Jha and Bawa, 2006).

Community-based conservation approaches could be an effective strategy to conserve and manage *L. rupicola* populations as such practices globally successful in conserving various species (Berkas, 2004, 2007a, Galvin et al., 2018). Under community-based management schemes, local communities could be one of the stakeholders of the conservation scheme where they have powers in decision-making and management. Further, providing them with the necessary resources and incentives can help mitigate the impacts of human activities on *L. rupicola* populations. In South America, community-based management strategies have successfully conserved the palm species *Astrocaryum chambira* (Jha and Bawa, 2006). In West Africa, the establishment of protected areas and community-based management have also been successful in conserving the palm species; *Raphia hookeri* (Mollet et al., 2000, Idohou et al., 2017).

Domestication efforts for threatened palm species have been successful in the past, as demonstrated by the recovery of the Chilean wine palm (*Jubaea chilensis*) and the Ivory Coast oil palm (*Elaeis guineensis*), which were also threatened by overexploitation but were saved by domestication efforts (Zeven, 1972, Bernal et al., 2011, León-Lobos et al., 2022), 1972; Bernal et al 2011; León-Lobos et al 2022). Therefore, domestication could potentially be a successful conservation strategy to reduce the threat on *L. rupicola*. However, ex-situ conservation efforts, such as the establishment of botanical gardens and seed banks, are also crucial for the conservation of plant species threatened with extinction in their natural habitats. Ex-situ conservation can provide an alternative source of plant material for commercial and religious purposes, reducing pressure on wild populations (Kadam and Pawar, 2020).

Results also showed that the majority of respondents (78%) were not aware of the conservation status of *L. rupicola*. This lack of awareness indicates the need of conservation education and awareness programs that specifically target religious practitioners and collectors of *L. rupicola* flowers and other plant materials. The involvement of religious leaders and organizations in conservation efforts could help raise awareness and promote conservation practices (Negi, 2005, Nanayakkara and Kudavidanaga, 2018).

Our study raises questions about the role of religion in biodiversity conservation. While religious practices and beliefs can play a significant role in promoting conservation and preserving species, they can also lead to unsustainable collection and overexploitation of natural resources (Wickramasinghe, 2003). Hence, it is imperative to carefully examine the relationship between religion and conservation and to identify ways in which religion can be integrated with sustainable resource utilization and conservation practices.

Conclusions and Recommendation

Our study reveals that religious practices and beliefs significantly influence the use and exploitation of *L. rupicola*, including its use in religious rituals, medicinal applications, and as a substitute for areca nut. The popularity of *L. rupicola* as an ornamental plant has also led to the extraction of seeds and seedlings from the wild, threatening its survival. This underscores the urgent need for enhanced conservation efforts for this culturally and religiously significant plant species in Sri Lanka.

To mitigate the conservation challenges faced by *L. rupicola*, we recommend increasing targeted education and awareness programs for religious practitioners and collectors, with the involvement of religious leaders and organizations to promote conservation practices. Strict enforcement of laws and regulations is crucial to prevent the extraction and sale of *L. rupicola* collected from protected areas. Additionally, promoting the domestication of *L. rupicola* can reduce pressure on wild populations and serve as an ex-situ conservation strategy. Further research is also needed to better understand how religious and cultural practices can be integrated into sustainable resource utilization and conservation strategies.

Acknowledgment

The authors like to express their sincere gratitude to all the participants who contributed to the questionnaire survey.

Conflict of Interest Statement

The authors like to express their sincere gratitude to all the participants who contributed to the questionnaire survey.

Funding

All authors contributed to the study without receiving any financial support.

References

- Agrawal, A., and C. C. Gibson. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* **27**:629-649.
- Antons, C. (2010). The role of traditional knowledge and access to genetic resources in biodiversity conservation in Southeast Asia. *Biodiversity and Conservation* **19**:1189-1204.
- Bandara, M. (2009). Exploring the link between culture and biodiversity in Sri Lanka. *SANSAI: An Environmental Journal for the Global Community* **4**:1-23.
- Berkes, F. (2004). Rethinking Community-Based Conservation. *Conservation Biology* **18**:621-630.
- Berkes, F. (2007a). Community-based conservation in a globalized world. *Proceedings of the National academy of sciences* **104**:15188-15193.
- Berkes, F. (2007b). Community-based conservation in a globalized world. *Proceedings of the National academy of sciences* **104**:15188-15193.
- Berkes, F., J. Colding, and C. Folke. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* **10**:1251-1262.
- Bernal, R., C. Torres, N. García, C. Isaza, J. Navarro, M. I. Vallejo, G. Galeano, and H. Balslev. (2011). Palm Management in South America. *The Botanical Review* **77**:607-646.
- De Silva, M., N. Aberathne, M. Gunasinghe, M. Gunawardana, M. Ranjula, and J. Gunawardana. (2022). Wildlife Trade on Cyber Space As a New Barrier To Biodiversity Conservation in Sri Lanka. *WILDLANKA* **10**:123-137.
- Dharmadasa, R. M., G. C. Akalanka, P. R. M. Muthukumarana, and R. G. S. Wijesekara. (2016). Ethnopharmacological survey on medicinal plants used in snakebite treatments in Western and Sabaragamuwa provinces in Sri Lanka. *Journal of Ethnopharmacology* **179**:110-127.
- Dillman, D. A., J. D. Smyth, and L. M. Christian. (2014). Internet, phone, mail, and mixed-mode surveys: The tailored design method. John Wiley & Sons.
- Gadgil, M., B. Fikret, and F. Carl. (2022). Indigenous knowledge for biodiversity conservation. Pages 506-511 in W. R. Burnside, S. Pulver, K. J. Fiorella, M. L.

- Avolio, and S. M. Alexander, editors. Foundations of Socio-Environmental Research: Legacy Readings with Commentaries. Cambridge University Press, Cambridge.
- Galvin, K. A., T. A. Beeton, and M. W. Luizza. (2018). African community-based conservation. *Ecology and Society* **23**.
- Gombrich, R., and G. Obeyesekere. (1988). Buddhism Transformed Religious Change in Sri Lanka. Princeton University Press.
- Goonatilake, S., and S. Ekanayake. (2016). Traditional knowledge use in Sri Lankan agroecosystems for livelihoods and adaptation to climate change. BACC Project, Department of Agriculture: Peradeniya, Sri Lanka:67.
- Government of Sri Lanka. (2009). Fauna and Flora Protection (Amendment) Act, No. 22 of 2009. Retrieved from http://www.documents.gov.lk/Extgzt/2009/PDF/Apr/1608_1/1608_1E.pdf.
- Halladay, P., and D. Gilmour, A., (1995). Conserving biodiversity outside protected areas: the role of traditional agro-ecosystems. IUCN.
- Haynes, J., and J. McLaughlin. (2000). Edible palms and their uses. Fact Sheet MDCE-00-50-1 November 2000:1-13.
- Hongmao, L., X. Zaifu, X. Youkai, and W. Jinxiu. (2002). Practice of conserving plant diversity through traditional beliefs: a case study in Xishuangbanna, southwest China. *Biodiversity & Conservation* **11**:705-713.
- Idohou, R., A. E. Assogbadjo, R. G. Kakai, and A. T. Peterson. (2017). Spatio-temporal dynamic of suitable areas for species conservation in West Africa: eight economically important wild palms under present and future climates. *Agroforestry Systems* **91**:527-540.
- IUCN. (2021). The IUCN Red List of Threatened Species. Version 2021-1. Retrieved from <https://www.iucnredlist.org/>.
- Jain, S. K. (2010). Manual of ethnobotany. Scientific publishers.
- Jha, S., and K. S. Bawa. (2006). Population Growth, Human Development, and Deforestation in Biodiversity Hotspots. *Conservation Biology* **20**:906-912.
- Johnson, D. V. (1996). Palms: Their conservation and sustained utilization: Status survey and conservation action plan. IUCN.
- Kadam, S. T., and A. D. Pawar. (2020). Conservation of medicinal plants: A review. *International Ayurvedic Medical Journal* **8**:3890-3895.
- Kellert, S., R., J. N. Mehta, S. A. Ebbin, and L. L. Lichtenfeld. (2000). Community Natural Resource Management: Promise, Rhetoric, and Reality. *Society & Natural Resources* **13**:705-715.
- Kimber, C., and D. McDonald. (2004). Sacred and Profane Uses of the Cactus *Lophophora Williamsii* from the South Texas Peyote Gardens. Pages 182-208 in M. K. Steinberg, J. J. Hobbs, and Kent Mathewson, editors. *Dangerous Harvest: Drugs Plants and the Transformation of Indigenous Landscapes*.
- León-Lobos, P., J. Díaz-Forestier, R. Díaz, J. L. Celis-Diez, M. Diazgranados, and T. Ulian. (2022). Patterns of Traditional and Modern Uses of Wild Edible Native Plants of Chile: Challenges and Future Perspectives. *Plants* **11**:744.
- Maffi, L. (2005). Linguistic, Cultural and Biological diversity. *Annual Review of Anthropology* **34**:599-617.
- Martin, G. J. (1995). *Ethnobotany: a methods manual*. Routledge.

- Ministry of Environment. (2020). The 2020 National Red List of Sri Lanka; Conservation Status of the Fauna and Flora. Colombo, Sri Lanka: Ministry of Environment and IUCN Sri Lanka.
- Miththapala, S. (2014). Sri Lanka's nature: Red alert! lecture delivered at the National Trust Lecture Series, Colombo, January 23rd, 2014.
- Mollet, M., F. Herzog, Y. E. N. Behi, and Z. Farah. (2000). Sustainable Exploitation of *Borassus aethiopum*, *Elaeis guineensis* and *Raphia hookeri* for the Extraction of Palm Wine in Côte d'Ivoire. *Environment, Development and Sustainability* 2:45-59.
- Nanayakkara, S. I., and E. P. Kudavidanaga. (2018). Reinforcing Conservation with Faith and Beliefs: The Potential of the Peak Wilderness Sanctuary in the Central Highlands of Sri Lanka World Heritage Site. *Journal of the World Heritage Studies Special Issue*:17-25.
- Negi, C. S. (2005). Religion and biodiversity conservation: not a mere analogy. *International Journal of Biodiversity Science & Management* 1:85-96.
- Noss, R. F., M. O'Connell, and D. D. Murphy. (2002). The Science of Conservation Planning: Habitat Conservation Under The Endangered Species Act. Island press.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge university press.
- Pei, S. (Year) of Conference. Ethnobotany and modernisation of traditional Chinese medicine. Pages 15-20 in Paper at a Workshop on Wise Practices and Experiential Learning in the Conservation and Management of Himalayan Medicinal Plants, Kathmandu, Nepal.
- Pethiyagoda, R., and H. Sudasinghe. (2021). The ecology and biogeography of Sri Lanka: A context for freshwater fishes. WHT publications.
- Ranil, R. H. G., R. M. S. R. Chamara, D. K. N. G. Pushpakumara, and R. W. Bussmann. (2021). Exploration, Conservation, and Utilization of Ethnobotanical Knowledge: Sri Lankan Perspective. Pages 409-431 in A. M. Abbasi and R. W. Bussmann, editors. *Ethnobiology of Mountain Communities in Asia*. Springer International Publishing, Cham.
- Seneviratne, H., and R. Nilusha. (2014). Influence of Ancient Environmental Ethics on Conservation of Biodiversity in Sri Lanka: with a Special Reference to Conservation of Floristic Diversity: A Review. *International Journal of Novel Research in Humanity and Social Sciences* 1:50-56.
- Ticktin, T. (2004). The ecological implications of harvesting non-timber forest products. *Journal of Applied Ecology* 41:11-21.
- Viduranga., W., and H. Kathriarchchi. (Year) of Conference. Predicting Current and Future Potential Distribution of Endemic Plant Genera in Sri Lanka Through Ecological Niche Modelling. Page 25 in *Proceedings of International Forestry and Environment Symposium*. University of Sri Jayawardanapura.
- Wickramasinghe, A. (Year) of Conference. Adam's Peak in the cultural landscape of Sri Lanka: evidence for an eco-cultural basis for conservation. Pages 52-57 in *The Role of Sacred Natural Sites and Cultural Landscapes*, Tokyo, Japan.
- Wickramasinghe, A. (2003). Conservation innovations of peripheral communities: case study of Adam's Peak Wilderness. *Journal of the National Science Foundation of Sri Lanka* 31.

- Wilson, R. E., S. D. Gosling, and L. T. Graham. (2012). A review of Facebook research in the social sciences. *Perspectives on psychological science* 7:203-220.
- Zeven, A. C. (1972). The Partial and Complete Domestication of the Oil Palm (*Elaeis guineensis*). *Economic Botany* 26:274-279.