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Patterns of plant use in religious offerings of Odisha

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ABSTRACT: The study was conducted within the course of two years (2016-2018) to explore the indigenous knowledge and traditional utilization pattern of plant species for the worship of the goddess Durga in coastal districts of Odisha, India. This article aims to document traditional methods of use of plant species which provides new insights and opportunities for sustainable and multipurpose use of resources and offers contemporary strategies for preserving cultural and ecological diversity. The information was gathered from literature as well as field-collected data and interviewed informants. Altogether 53 plant species belonging to 31 families and 49 genera are recorded. Roots, stems, leaves, inflorescence, seeds, and fruit are the most commonly used part for the worship of the goddess Durga. Most of the plants have curative properties. These plant species have been instrumental for indigenous people in providing substantial livelihood support. The present study may be used to motivate the general public to cultivate, preserve, and judicious utilization of such important plants for the conservation of nature and ecological research.

Keywords: Biodiversity; Coastal Odisha; Goddess Durga; Indigenous knowledge; Ritual.

1. INTRODUCTION

The relationship between culture and ecology is an integral part of ancient societies. Traditional knowledge is profoundly linked with natural resources and constitutes an essential facet of ancient cultural groups. This knowledge arises from a complex interaction between human beings and their natural resources covering immense and diverse scopes for information generation [1]. It is adapted to the local culture and environment and held by individuals or communities. The socio-cultural life of different societies is generally anchored on recognition of traditional norms and practices, ancestral worship, and religious cults [2, 3]. Following such traditional practices as beliefs, taboos, myths, proverbs, and songs, the indigenous people of different communities have been able to conserve their plant resouces for generations [4]. Many indigenous peoples have shown evidence of their beliefs through practicing rituals and worships. They worship their deities with pressie offerings for the well-being of society. In this context, Hinduism placed marked value to plants [5], and recognizes the importance of nature which has been described in Hindu literatures [6-7]. In consequence, amongst Hindu, plants are used in religious functions, rituals, worshipped and associated with deities [5, 8]. In Hindu religion, people treat most of the useful plants as sacred [9] and are offered to the

particular deity during different festivals [10, 11], for instance, Belpatra *(Aegle marmelos*) offered to god Shiva. Throughout India a variety of gods and goddesses are worshipped in diverse religions. Durga Puja is one such major festival of Hinduism that celebrates the worship of goddess Durga [12]. It is a significant festival in the Shaktism custom of Hinduism [13] and predominantly celebrated in West Bengal, Assam, Odisha and other state of India. It is customarily observed for 10 days in the month of Ashwina (September–October) [14, 15]. Festivities start five days later with the observance of Shashti, Shaptami, Ashtami, Nabami and Vijaya Dasami. Besises temples, temporary puja mandap (called as pandal) are made using available materials such as bamboo, cloth, plastics etc. The pandals are built in all conceivable forms and complex structure which symbolize the replicas of famous temples, parliament houses, mansions, forts, etc. Durga's legend is described in a number of scriptures that exalt her demon-slaying feats [16]. The name Durga, and related terms, appear in Vedic literature (Rigveda and Atharvaveda), Mahabharata and in the Harivamsa Purana [17, 18]. Santiko [18] stated that the hymns to Durga in the Mahabharata were a later interpolation inspired by the Devi Mahatmya section of the Markandeya Purana that was added to the Mahabharata sometime in the 3^{rd}-4^{th} centuries CE. The origin of the goddess and its iconographic representations, and the spread of the worship have been well studied [19-25]. In the context of Odisha, the King of Chaitra/Chedi dynasty Raja Suratha started rituals of Durga Puja during 300 BC, as evidenced from Markandaya Purana [26]. Although, Durga puja is celebrated throughout Odisha, but studies on the indigenous knowledge on the use of plants in such ritual practice is nil. The current investigation tries to document the plants used during the rituals of Durga puja in coastal districts of Odisha and focuses the significance of indigenous knowledge on ritual practice in the conservation of plants.

2. MATERIALS AND METHODS

2.1. Study area

Odisha, an Indian state, is situated in the eastern coast of India (17.48^0 – 22.34^0 N and 81.24^0 – 87.29^0 E) with 481 km of coastline. The state is bordered by West Bengal on the north-east, Jharkhand on the north and Chhatisgarh on the west, Andhra Pradesh on the south and Bay of Bengal on the east. On the basis of physiographical characteristics, the state is divided into five parts i.e. the coastal plains, middle mountainous and highlands region, central plateaus, western rolling upland, and the river valleys and the subdued plateaus. The coastal plains are stretched from the Subarnarekha in the North to Rushikulya in the South. The coastal plains are the gift of six major rivers, which bring silt from their catchments, have reclaimed this area from the depths of the Bay of Bengal. The rivers from North to South are the Subarnarekha, the Budha Balanga, the Baitarani, the Brahmani, the Mahanadi and the Rushikulya. Climate is tropical monsoon type. The average temperature in the summers is up to 40°C and the winter temperature being almost around 12-14°C. With respect to the vegetation of the state, the tropical-moist-deciduous type dominates in the northeast region, and the tropical-dry-deciduous type is abundant in the southwest [27]. Hindu represents the dominant population of the state. Odisha plays a very conspicuous and vital role in the cultural matrix of Indian civilization.

2.2. Data collection

This study was carried out in different locations across ten districts of Odisha (Fig. 1) from September 2016 to October 2018. The methodology was based on interviews using semi-structured and open-ended questionnaires and group discussions to document the local ethnobotanical knowledge on uses of plant resources in Durga puja [28, 29]. The information was collected (79 informants) from diverse groups of the area, i.e. Hindu priests, agricultural laborers, skilled/semi-skilled workers, daily wage laborers, housewives,

shopkeepers, Govt. employees and students. Field surveys were made periodically and information on religious beliefs, cultural practices, plants used in the Durga puja, source of collection, local names if any and parts used were collected. Plants were identified in the field with the help of informants. During the field study, some of the field characters like habit, habitat, and flowering period were collected and recorded from the informants. From each selected site, plant specimens were collected for the authentication and herbarium preparation. Plant specimens were identified using relevant floras and taxonomic literature [30, 31]. The vouchers were deposited at Botany Department, S.G College, Kanikapada.

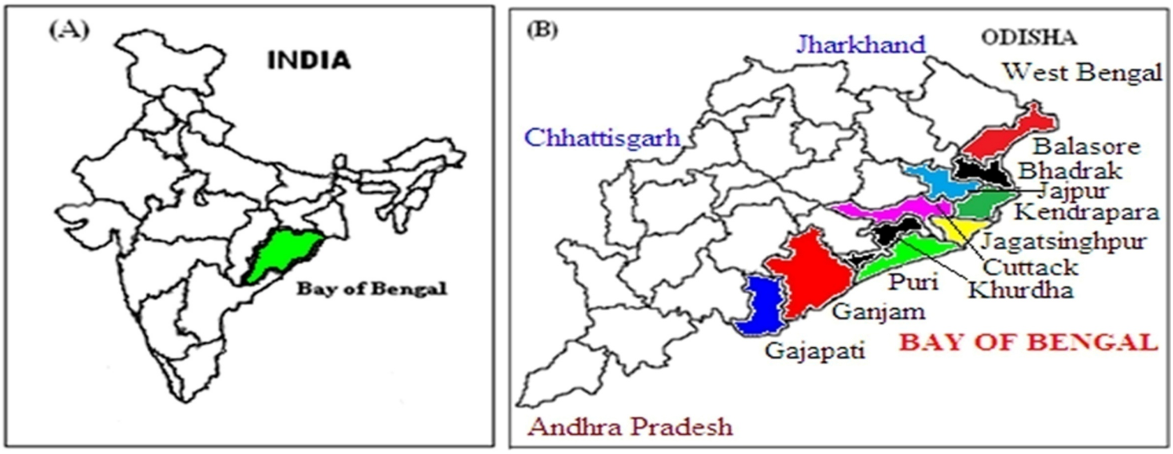

Figure 1. A – Location of Odisha state in the eastern region of India, B – study area showing different coastal districts of Odisha.

3. RESULTS AND DISCUSSION

Through the centuries, rituals have been a socio-cultural force in India. It is also pointed out that it is due to these rituals the tradition has been protected. The execution of rituals maintains the balance of the five major elements (sky, wind, fire, water, and earth) affording sun-shine and rain in reasonable measures, resulting in proper growth of crops and plenty of food. Some ceremonial and ritual acts are common in every religion, which focuses on sacred objects and symbols with supernatural power [32]. People worship them as icons of Gods and Goddesses, thereby grown or protected with special care [33]. The idols of Devi Durga were made of rice straw (*Oryza sativa*) and clay. The configuration of the idol is made on a bamboo (*Bambusa vulgaris* Schrad.) frame wrapped with a layer of straw over which fine clay layers are applied to give a definite shape. The different body parts such as face, fingers etc. are structured in a mold. After painting and drawing of eyes, the idol is adorned with appropriate clothing and ornaments made of sola pith (*Aeschynomene aspera*) and imitation jewelry. The utilization of plant species for the traditional image of Durgā is also reported [34]. In the present study, we successfully identified 53 plant species from 49 genera belonging to 31 families that have been used in rituals of offerings in Durga puja (Table 1, Figure 2). The use of reported plants during Durga puja is mentioned by various authors [11, 35-36]. There are 15 wild species, 25 cultivated species, and 13 species are both wild and cultivated. Two families were considered particularly important mentioned by the local inhabitants; Poaceae (7 species) and Fabaceae (7 species). The dominant life forms are herbs, followed by trees, shrubs, and climbers.

Table 1. List of plants used in Durga puja of coastal Odisha.

Sl. No	Scientific name of the plants	Family Name	Local name	Parts used
1	*Aegle marmelos* (L.) Corr.	Rutaceae	Bel	Leaf
2	*Aeschynomene aspera* L.	Fabaceae	Sola	Stem
3	*Areca catechu* L.	Arecaceae	Gua	Fruit
4	*Alocacia macrorrhizos* (L.) G.Don.	Araceae	Manakachu	Whole plant
5	*Bambusa arundinacea* (Retz.)Willd.	Poaceae	Baunsa	Stem/ flower
6	*Benincasa hispida* (Thumb.) Cogn.	Cucurbitaceae	Pani Kakharu	Fruit
7	*Brassica juncea* (L.) Czern. &Coss.	Brassicaceae	Dhalasorisa	Seed
8	*Butea monosperma* (Lam.) Kuntz.	Fabaceae	Palasa	Wood
9	*Cascabela thevetia* (L.) Lippold	Apocynaceae	Kaniara	Flower
10	*Clitoria ternatea* L.	Fabaceae	Aparajita	Flower
11	*Citrus sinensis* (L) Osbeck	Rutaceae	Kamala	Fruit
12	*Cocos nucifera* L.	Arecaceae	Nadia	Nut & leaf
13	*Colocasia esculenta* (L.) Schott	Araceae	Saru	Whole plant
14	*Corchorus olitorius* L.	Malvaceae	Jhota	Fibre
15	*Cucumis sativus* L.	Cucurbitaceae	Kakudi	Fruit
16	*Curcuma longa* L.	Zingiberaceae	Haladi	Rhizome
17	*Cynodon dactylon* (L.) Pers.	Poaceae	Duba	Whole plant
18	*Desmostachya bipinat*a (L) Stapf	Poaceae	Kusa	Stem/leaf
19	*Ervartimia divarticata* (L) Burkil	Apocynaceae	Tagara	Flower
20	*Ficus benghalensis* L.	Moraceae	Bara	Twig
21	*Ficus racemosa* L.	Moraceae	Aidambaru	Twig
22	*Ficus religiosa* L.	Moraceae	Osta	Twig
23	*Gardenia florida* L.	Rubiaceae	Sugandharaj	Flower
24	*Gossypium herbaceum* Mast.	Malvaceae	Kapa	Cotton
25	*Hibiscus rosa-sinensis* L.	Malvaceae	Mandara	Flower
26	*Hordeum vulgare* L.	Poaceae	Jaba	Grain
27	*Malus domestica* Borkh.	Rosaceae	Apple	Fruit
28	*Mangifera indica* L.	Anacardiaceae	Amba/amrah	Twig
29	*Mesua ferrea* L.	Clausiaceae	Nageswara	Flower
30	*Michelia champaca* L.	Magnoliaceae	Champa	Flower
31	*Musa paradisiaca* L.	Musaceae	Kadali	Fruits & Leaf
32	*Nelumbo nucifera* Gaeten.	Nelumbonaceae	Padma	Flower
33	*Nyctanthes arbortristis* L.	Oleaceae	Singarahara	Flower
34	*Nymphaea nouchali* Burm. f.	Nymphaeaceae	Kain	Flower
35	*Oryza sativa* L.	Poaceae	Dhana	Grain
36	*Phyllanthus emblica* L.	Phyllanthaceae	Amla	Fruit
37	*Piper betel* L.	Piperaceae	Pana	Leaf
38	*Polyanthes tuberosa* L.	Asparagaceae	Rajanigandha	Flower
39	*Punica granatum* L.	Lythraceae	Dalimba	Fruit/Twig
40	*Sachharum bengalense* Retz.	Poaceae	Anakha	Stem
41	*Sachharum officinarum* L.	Poaceae	Akhu	Stem
42	*Santalum album* L.	Santalaceae	Chandana	Stem
43	*Sarca asoca* (Roxb,) de Willd.	Fabaceae	Ashoka	Twig
44	*Sesamum orientale* L.	Pedaliaceae	Khasa	Seeds
45	*Sesbania sesban* (L.) Merr.	Fabaceae	Jayanta	Twig
46	*Shorea robusta* Gaertn.	Dipterocarpaceae	Sala	Wood
47	Syzygium cumini (L.) Skeels	Myrtaceae	Jamu	Twig
48	*Tagaetes petula* L.	Asteraceae	Gendu	Flower
49	*Vigna mungo* (L) Hepper	Fabaceae	Biri	Seed
50	*Vigna radiata* (L.) Wilczek	Fabaceae	Muga	seed
51	*Vitex venifera* L.	Vitaceae	Anguru	Fruit
52	*Zingiber officinale* Rosc.	Zingiberaceae	Ada	Rhizome
53	*Zizyphus mauritiana* Lam.	Rhamnaceae	Barakoli	Leaf

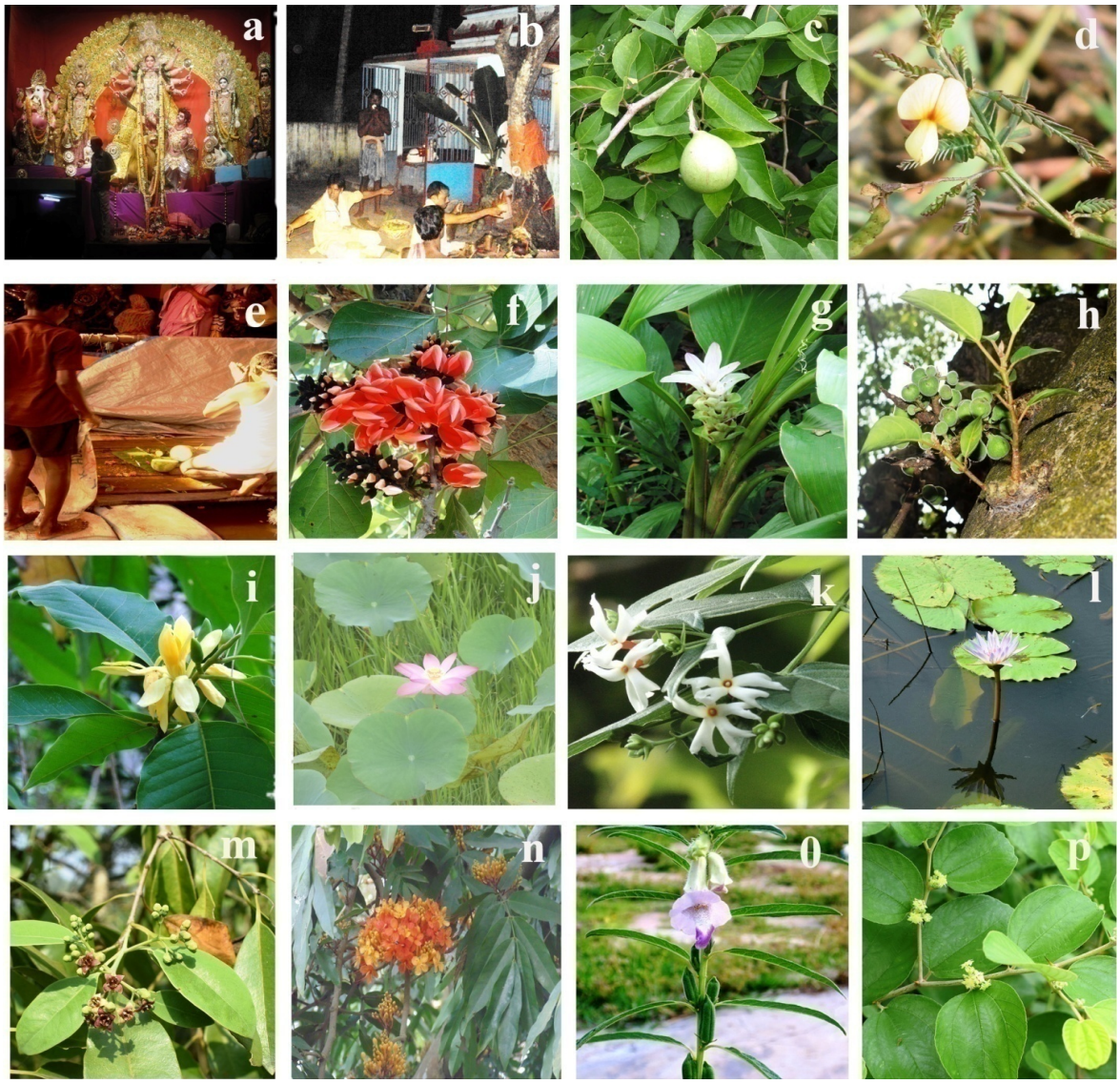

Figure 2. a – Idol of Durga made from Bamboo, clay and imitation jewellary, b – Bel barani (worshiping of bel tree), c – *Aegle marmelos* (L.) Corr., d – *Aeschynomene aspera* L., e – use of *Benincasa hispida* (Thumb.) Cogn. fruit for the purpose of Bali, f – *Butea monosperma* (Lam.) Kuntz., g – *Curcuma longa* L., h – *Ficus racemosa* L., i – *Michelia champaca* L., j – *Nelumbo nucifera* Gaeten., k – *Nyctanthes arbortristis* L., l – *Nymphaea nouchali* Burm. f., m – *Santalum album* L., n – *Sarca asoca* (Roxb,) de Willd., o – *Sesamum orientale* L., p – *Zizyphus mauritiana* Lam.

Bel-baran is the first ritual step to invoke the goddess Durga through the worship of the bel-tree (*Aegle marmelos*). It is a ritual invocation to the goddess Durga inside the tree. People think that the bel-tree symbolizes the abode of the goddess Durga as a wife of the god Siva, and she usually stays with him. During the Bel-baran, branches and leaves of nine trees (*Aegle marmelos, Alocacia macrorhizos, Colocasia esculenta, Cucurma longa, Musa paradisiaca, Oryza sativa, Punica granatum*, *Sarca asoca,* and *Sesbania sesban*) were worshipped with the chanting of mantras under the bel (*Aegle marmelos*) tree. A similar pattern of use of plants is also reported in different regions of India [9, 36, 37]. Plant species present in offerings are easily reachable because they are cultivated in home gardens, otherwise commonly sold in traditional markets [38]. These plant species have been instrumental for indigenous people in providing substantial livelihood support. Several plant species in India occupies a significant position in Hindu mythology, relating to symbolize the

god and goddess in rural folklore. Plants such as ficus (*Ficus religiosa*), banyan (*Ficus bengalensis*), mango (*Mangifera indica*), sandalwood (*Santalum album*), wood apple (*Aegle marmelos*), coconut (*Cocos nucifera*). ashoka (*Saraca asoca*), arjuna (*Terminalia arjuna*), kadamba (*Anthocephalus cadamba*), black berry (*Syzygium cumini*), emblica (*Emblica officinalis*), nimba (*Azadirachta indica*), agastya (*Sesbania grandiflora*), tamarind (*Tamarindus indica*), mandar (*Hibiscus rosasinensis*), yellow kaner (*Thevetia nerifolia*), doba (*Cynodon dactylon*) and bamboo (*Bambusa* spp.) are accepted as sacred by Hindus. Accordingly, human beings have been conventionally reliant on these plants for a variety of purposes such as food, shelter, fodder, timber, religious and cultural functions, ceremonies and festivals, and medicine [39-41]. As a consequence, religious beliefs, tradition, and culture serve as an instrument for protection and conservation of natural resources in several indigenous communities.

The diversity of plants used in Durga puja has profound medicinal properties. For instance, the bark of *Saraca asoca* (Roxb) de Wilde is one of the most important and widely used ingredients in Ayurvedic preparations like 'Ashokrishtam' and 'Ashokaghritham', which are prescribed as pharmaceuticals for several gynaecological disorders especially menorrhagia [42, 43]. The bark is also used as an astringent, anthelminthic, styptic, stomachic, antipyretic, and demulcent and to treat for halting excessive menstrual bleeding, bleeding hemorrhoids, bleeding ulcers, hemorrhagic dysentery and disorders associated with the menstrual cycle [44, 45]. Furthermore, reports have shown the ethno-medicinal use of several herbal remedies for various ailments and have confirmed potentials for *Aegle marmelos, Butea monosperma, Curcuma longa, Cynodon dactylon, Mangifera indica, Mesua ferrea, Nyctanthes arbortristis, Nymphaea nouchali, Phyllanthus emblica, Piper betel, Punica granatum, Santalum album* and *Zingiber officinale* [46-53].

4. CONCLUSIONS

This study indicates that people of coastal districts have their own culture, practice/belief systems, and traditionally use 53 plant species in Durga puja rituals. Durga puja festival is linked with religion; which controls and binds the members of the community. Indigenous socio-cultural activities and ritual practices can foster the continuous existence of local natural environments and the sustained relationship between man and the ecosystem. Interestingly the majority of plant species used in Durga puja rituals possess curative properties. It reflects that medicinal plants and people have strong adhesive force. The respondents of the region opined that the reported plants are indispensable for a variety of purposes. As a consequence, this creates an environment for the conservation and maintenance of biodiversity of the region.

Authors' Contributions: SKS and TP conceived and designed the experiment. TP studied and analyzed the data. SKS helped sample preparation and data collection. TP and SKS wrote the manuscript. All authors read and approved the final manuscript.

Conflict of Interest: The authors has no conflict of interest to declare.

Availability of data and materials: The datasets used and/or analyzed during this study are available from the corresponding author on reasonable request.

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