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Ethnobotanical study on *Daksina* constituent plants on Lombok Island, West Nusa Tenggara, Indonesia

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Abstract. *Sutraningsih NKA, Sukenti K, Sukiman, Aryanti E. 2019. Ethnobotanical study on* Daksina *constituent plants on Lombok Island, West Nusa Tenggara, Indonesia. Asian J Ethnobiol 2: 78-83.* Lombok Island is located between Bali and Sumbawa Island in Lesser Sunda, Indonesia. About 80% of the population is inhabited by the original tribe called Sasak. Another tribe with a close cultural relationship is Bali, whose various Hinduism traditional rituals still exist, both religious and ancestral beliefs. In carrying out a traditional ritual, the Balinese required several means to support the ceremony, one of which is *Daksina*. *Daksina* is a kind of offerings in Hindu ceremonies composed of various plants. This research aims to explore the ethnobotanical aspects of plants that comprise *Daksina.* The study was conducted in several Balinese-Hindu villages in 5 regions in Lombok Island, i.e., Mataram City, West Lombok Regency, North Lombok Regency, Central Lombok Regency, and East Lombok Regency. Field data collection was done through participatory observation, interviews, and documentation. Informants were selected based on purposive sampling and snowball sampling methods. Reported Use (RU) and Index of Cultural Significance (ICS) were calculated to obtain the cultural importance value of the species. The result records that 46 plant species of 27 families are utilized to compose Daksina used in 13 traditional ceremonial rituals in Balinese-Hindu communities on Lombok Island. In general, traditional rituals have some valuable ethnobotanical aspects that should be revealed to preserve natural and cultural resources and support ecotourism.

Keywords: ethnobotany, *Daksina*, Lombok Island, traditional ritual

INTRODUCTION

Indonesia is a pluralistic society, one of the consequences of such pluralism is that there are a variety of traditional rituals or ceremonies, both religious and ancestral beliefs carried out and preserved by each adherent (Hariyono 2012). The traditional ceremony is a sacred activity carried out from generation to generation, which applies in an area. According to, efforts to explore customs and culture are needed to strengthen the community base in protecting their culture (Handyani 2003 in Purwanto 1999). However, in line with the development of time and modern culture, ancestral wealth is increasingly abandoned and forgotten. A traditional culture that is alleged to have a lot of environmental wisdom has experienced tremendous erosion. Most of the present generation no longer knows and cares about their ancestral heritage. With various ethnic groups, Indonesia has manifold wisdom related to plant utilization (Artha et al. 2016). The progress of science and technology is inseparable from the outstanding contribution of local knowledge owned by traditional communities, which have been applied for generations to survive and develop their culture (Surata et al., 2015).

Ethnobotany is one of the scientific disciplines and is the principle of the community's conception of environmental resources that can be used to protect cultural values. Humans, with their environment, are one entity that cannot be separated with surroundings. Humans can influence and be influenced by the environment. The relationship will describe the level of human knowledge in utilizing and managing plants in the form of garden plants, gardens, fields, or forests that are generally not cultivated (Pramita et al., 2013). The results of ethnobotany studies can be developed and integrated into various aspects of human life to contribute to the development of science and technology and the preservation of local wisdom (Adiputra 2011).

Traditional ceremonies are one element of regional culture and are universal, where each region has its own variety (Rahyuni et al., 2013). They are actions bound by specific rules according to customs, aiming to maintain the continuity and harmony between living things and their environment. Traditions in cultural ceremonies continue to exist, guarded, and passed down from generation to generation (Rohmah et al., 2014). In carrying out a traditional ritual, local people required several facilities to support the implementation of the ceremony. Some parts of plants, such as stems, leaves, flowers, and fruit, can be used as a means of the ceremony, referred to as *upakara*, and plants used as a complement of this ceremony are called *upakara* plants (Yaniasti 2015). There are hundreds of plant species used in various traditional ceremonies in Bali, of which 14.1% are included in the category of rare or protected plants (Mustaid et al. 2004).

One of the facilities in Hinduism traditional ceremonies that are routinely used is *daksina*. *Daksina* means Brahma, or Brahmana, which means *Sang Hyang Widhi* (God) and is composed of various plants (Sudarsana 2010).

Most Hindus in Lombok Island always use *daksina* in traditional rituals at certain times, for example, in marriage ceremonies, cutting teeth, and other major holidays. Various plant species are involved in daksina making, but scientific study has not been done. The utilization of plants as *upakara* (offerings) in various traditional ceremonies is a reminder for humans to preserve natural resources, which is indirectly related to the continuity of the implementation of these traditional ceremonies (Darma 2012). This research needs to reveal ethnobotanical aspects related to daksina that could be essential data in supporting wise efforts in preserving natural resources and culture.

MATERIALS AND METHODS

The study was conducted in March-May 2019 in several Balinese-Hindu villages in 5 regions in Lombok Island, i.e., Mataram City, West Lombok Regency, North Lombok Regency, Central Lombok Regency, and East Lombok Regency (Figure 1). The selected areas were based on the consideration that those areas have Balinese-Hindu communities that routinely use daksina for their religious ceremonies. This study was descriptive exploratory research using qualitative and quantitative methods in ethnobotany; data were obtained through direct observation, participatory-observation, interview, documentation, and literature review (Cotton 1996; Martin 2007). Semi-structured and open-ended interviews were directed to informants who have knowledge related to *Daksina*, which was chosen through purposive and snowball sampling methods (Endraswara 2006). Quantification was based on the calculation of Reported Use (RU) and Index of Cultural Significance (ICS) by Turner 1988 (Hoffman and Gallaher 2007). All data was analyzed holistically related to ethnobotanical data that revealed plant diversity, utilization, social-cultural, and other aspects.

RESULTS AND DISCUSSION

Role of *Daksina* on Lombok Island

Daksina in Lombok Island is a means in a Hinduism ceremonial ritual that is composed of various plants that has meaning as *linggih* (place) for Ida Sang Hyang Widhi (God) who will bless His people (Figure 2a). A *daksina* consists of some parts or components that made from plants and other materials, for example, *canang sari* (lotus-shaped symbol made from young coconut leaves) (Figure 2b), *bedogan* (container made from *Cocos nucifera* leaves) (Fig.2c), *tapak dara* (cross symbol made from *C. nucifera* leaves), *porosan* (symbol made from *Piper betle* leaf), duck eggs wrapped in coconut leaves, *gegantusan* (symbol made from plant parts wrapped in corn leaves), *papeselen* (rolled leaves made from five plants species), yarn or cotton, coins, *sampyan payasan* (triangle symbol made from young coconut leaves), and *tadah sukla* (square-shaped symbol made from young coconut leaves, filled with beans, bulbs, and others).

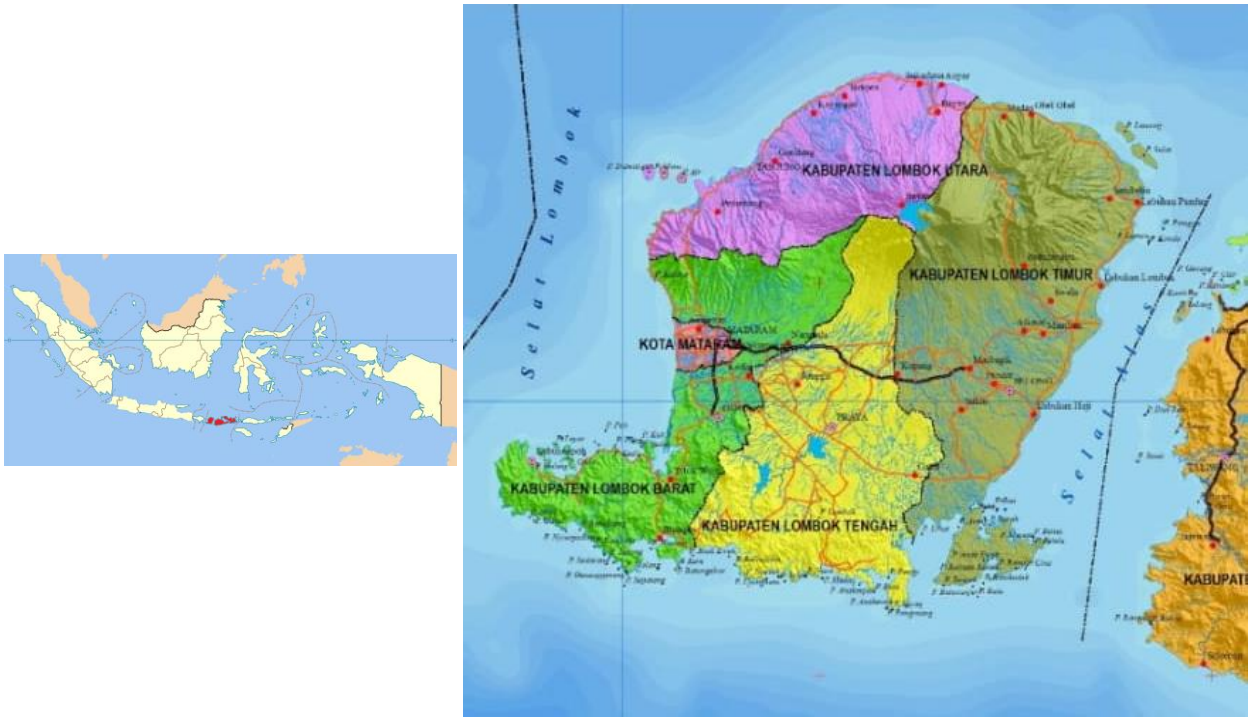

Figure 1. Research area. West Nusa Tenggara Island mark in red-colored (*left*). Map of Lombok Island (*right*)

A **B** **C** **D**

Figure 2. A. Daksina, B. Canang sari, C. Bedogan, D. Tadah sukla

Table 1. Plants species used in preparing *Daksina* based on highest *Index of Cultural Significance*

Local name	Species	Family	Plant part	ICS
Pinang	*Areca catechu* L	Arecaceae	fruit	1220
Nyiuh	*Cocos nucifera* L	Arecaceae	fruit, leaf	1220
Gumitir	*Tagetes erecta* L	Compositae	flower	1220
Daun kayu	*Codiaeum variegatum* (L.) Rumph. Ex A. Juss.	Euphorbiaceae	leaf	1220
Kapas	*Gossypium herbaceum* L	Malvaceae	fruit	1220
Pudak	*Pandanus amaryllifolius* Roxb.	Pandanaceae	leaf	1220
Base	*Piper betle* L	Piperaceae	leaf	1220
Padi	*Oryza sativa* L	Poaceae	seed	1220
Jagung	*Zea mays* L	Poaceae	seed, fruit skin	1100
Pacar Air	*Impatiens balsamina* L	Balsaminaceae	flower	1028
Biu	*Musa paradisiaca* L	Musaceae	fruit	988
Kedele	*Glycine max* (L.) Merr.	Leguminosae	seed	976
Bambu	*Schizostachyum silicatum* Widjaja	Poaceae	stem	876
Nusa Indah	*Mussaenda pubescens* Dryand.	Rubiaceae	leaf	732
Bawang	*Allium cepa* L	Amaryllidaceae	bulb	706
Jambu biji	*Psidium guajava* L	Myrtaceae	fruit, leaf	641
Talas	*Colocasia esculenta* (L.) Schott	Araceae	bulb	626
Kesune	*Allium sativum* L	Amaryllidaceae	bulb	622
Jepun	*Plumeria alba* L	Apocynaceae	flower	588
Salam	*Syzygium polyanthum* (Wight) Walp.	Myrtaceae	leaf	584
Belimbing Bintang	*Averrhoa carambola* L	Oxalidaceae	fruit	582
Kacang Mentik	*Vigna unguiculata* (L.) Walp.	Leguminosae	seed	566
Kacang Komak	*Lablab purpureus* (L.) Sweet	Leguminosae	seed	556
Kemiri	*Aleurites moluccanus* (L.) Willd.	Euphorbiaceae	fruit	553
Tabie	*Capsicum annuum* L.	Solanaceae	fruit	553
Laos	*Alpinia galanga* (L.) Willd.	Zingiberaceae	rhizome	553
Kunyit	*Curcuma longa* L	Zingiberaceae	rhizome	553
Cekuh	*Kaempferia galanga* L	Zingiberaceae	rhizome	553
Jahe	*Zingiber officinale* Roscoe	Zingiberaceae	rhizome	553
Ketan	*Oryza sativa var. Glutinosa*	Poaceae	seed	542
Tingkih/pangi	*Pangium edule* Reinw.	Achariaceae	fruit	539
Sandat	*Cananga odorata*	Annonaceae	flower	372
Sabo/Sawo	*Manilkara zapota* (L.) P.Royen	Sapotaceae	fruit	329
Jambu Air	*Syzygium aqueum* (Burm.f.) Alston	Myrtaceae	leaf	316
Kompyong	*Hydrangea macrophylla* (Thunb.) Ser.	Hydrangeaceae	flower	300
Mangga	*Mangifera indica* L	Anacardiaceae	leaf	218
Enau	*Arenga pinnata* (Wurmb) Merr.	Arecaceae	leaf	218
Manggis	*Garcinia mangostana* L	Clusiaceae	leaf	218
Buluan	*Nephelium lappaceum* L	Sapindaceae	leaf	217
Bunga Terompet	*Allamanda cathartica* L	Apocynaceae	flower	170
Duren	*Durio zibethinus* L	Malvaceae	young fruit, leaf	149
Ceruring	*Lansium domesticum* Corrêa	Meliaceae	leaf	141
Tebu	*Saccharum officinarum* L	Poaceae	stem	122
Tal	*Borassus flabellifer* L	Arecaceae	leaf	114
Bunga Kertas	*Bougainvillea spectabilis* Willd	Nyctaginaceae	flower	74
Salak	*Salacca zalacca* (Gaertn.) Voss	Arecaceae	leaf	28

Based on research and interviews conducted with 45 informants in 5 areas in Lombok Island (Mataram City, West Lombok Regency, North Lombok Regency, Central Lombok Regency, and East Lombok Regency), there are similarities in the ceremonial process and plants species used in preparing *daksina* to be served in 13 reported uses (RU) or ceremonial rituals. The rituals are *ngaben* (cremation ceremony), *odalan* (birthday of a Hindu temple), *pawiwahan* (marriage ceremony), *otonan* (traditional birthday ceremony), *purnama* (full-moon ceremony), *ngelungsur tambe* (healing ceremony), *ngaturang pemangku* (preliminary ceremony/ask for permission before the main ceremony), *mayah munyi* (votive paying ceremony), *mecaru* (praying for the harmony of nature and living things), *mepandes* (teeth cutting ceremony), *ngadegan merajan* (ceremony for an establishment of a holy site), *melukat* (sacred bathing), and *mepiuning* (ceremony for asking blessing and salvation).

Botanical aspects of *daksina*

46 plants belonged to 27 families used by the local Balinese-Hindu communities to prepare *daksina* as a means in 13 traditional ceremonies (Table 1).

Based on ICS values calculation, 8 species have the highest value (1220), i.e., *C. Nucifera, Gossypium herbaceum, P. betle, Oryza sativa, Areca catechu, Codiaeum variegatum, Tagetes erecta*, and *Pandanus amaryllifolius*. This indicates that these species have high intensity of use (i) and have a high priority and preference (e) in the community. The ICS value of a species is also influenced by the fact of reported use (RU), where the more RUs owned by a species, the higher its ICS value. In this study, the RU for all plant species was relatively similar because almost all plant species were utilized in nearly all of 13 ceremonial types in all 5 study areas. An exception is *Salacca zalacca* which is only used in the East Lombok Regency in 12 traditional ceremonies. This causes *S. zalacca* to have the lowest ICS value, but it is more due to local preference. In general, the community has no difficulty providing plant species for arranging *Daksina* because they have cultivated plants used in *daksina* in the yard or garden around their house. This is a kind of implementation of knowledge that the community understands that the sustainable use of plant resources in daily life will depend on how they manage and preserve it. The community's ability informs biodiversity and reflects local communities' life experiences and lifestyles with the norms contained therein (Tupan 2011).

Table 1 also shows that plant species used in *daksina* are dominated by Poaceae, Arecaceae, and Zingiberaceae. Besides being widely cultivated in community yards, plants in these families are easily found growing in the surrounding forests and traded on the local market. The most commonly used plant part is leaves and fruit. Apart from being a constituent of *Daksina*, leaves are also widely used as ingredients for *daksina* containers.

Socio-cultural aspects of daksina and community conservation efforts

Daksina plays an important role because it is always used in various traditional rituals that must be carried out routinely and continuously. Ritual is a mechanism for maintaining the ecological balance in the local environment and/or for redistributing food (Mintz and Du Bois 2012). Most Hindus in Lombok Island learn how to make *daksina* from generation to generation from their parents. In some places like Mataram City, the composition of *daksina* has begun to change due to the limitations of plant species because it is hard to find, for example, the *pisang keladi* (taro banana). In today's life, most people start replacing them with other bananas, such as *pisang ketip* (other varieties of *Musa paradisiaca*). This indicates that efforts are needed to maintain the preservation of certain species, especially those that play an important role in the routine activities of the community.

Some species of plants are prohibited from making *daksina* based on myths believed by local people. An example is the *pisang kepok* (*M. paradisiaca* var. Kepok), which is believed to be produced from Dewi Durga's milk. Goddess Durga in Hinduism is dualistic with seemingly conflicting characters. Meanwhile, from the aesthetic aspect, *M. paradisiaca* var. Kepok has a large box-like fruit shape so that it does not look good enough when arranged in a means container. This causes *M. paradisiaca* var. Kepok has never been used in making ceremonial facilities such as *daksina*.

Regarding the use of *daksina*, the community has conservation efforts and preserve the surrounding environment. Communities in the Sekotong Barat sub-district (West Lombok Regency) replanted *C. Nucifera* used in *daksina* in their yard. This more or less affects the availability of coconuts in the region, which, according to the community, purposed to make *daksina*. Meanwhile, most Hindu communities in Bayan, Gangga, Tanjung, and Kayangan (North Lombok District) regions have gardens to grow various plants to compose *daksina*, especially coconuts and fruits. In addition to fulfilling the personal needs of making *daksina*, this garden is also used to complement the needs of Hindu fellows. It is also to be sold to supplement the family income, such as coconut leaves (*C. Nucifera* L) and palm leaves (*Arenga pinnata* L). Another tradition is to bury *daksina* that has been used under a tree. In addition to respecting the sacred value of *daksina*, biologically, this can contribute to the fertility of the surrounding soil because it can act as an organic fertilizer. Compost or organic fertilizer made from leaves accelerates the decomposition process in the ground to increase soil fertility (Sulistyorini 2005). These actions and behaviors of the community show that the community utilizes plants for their daily needs and takes responsibility for protecting the environment so that the availability of plants is well maintained. The use of plants in *daksina* aims to instill the value of preserving nature for the welfare of nature and humanity. With all the socio-cultural norms and values, local wisdom allows humans to balance the environment's carrying capacity, lifestyle, and needs.

Preservation and development of the Daksina tradition as support for Ecotourism

Ethnobotany tradition can be interpreted as plant utilization activity, carried out for generations and maintained by a traditional community since ancient times. The tradition is created from combining the community's social culture with the plant's diversity in each region. Each tribe in an area has a unique plant utilization system and is different from other regions. Therefore, the variety of plant species is essential in the ethnobotany tradition (Setyowati and Wardah 2007).

Ecotourism is defined as tourism activities that prioritize the principle of nature conservation, providing economic benefits, increasing the empowerment of local communities, and maintaining the integrity of the local culture (Sastrayuda 2010). In its development, ecotourism is widely accepted by the global community and is increasingly perspective because ecotourism sells attractions and offers local philosophy or culture. Balinese tribe has a wide variety of cultures, as stated in their traditional ceremonies. Most of the Balinese in the Hindu community uphold the traditional ritual culture. Each ritual ceremony always uses plants believed to connect humans with God. This belief teaches humans to treat nature, plants, water, and animals like humans. *Daksina* as an offering at Balinese tribal ceremonies can develop ecotourism, especially in plant utilization and preservation and cultural preservation.

The Balinese ethnobotany tradition uses *Daksina* to harmonize human interaction with plant diversity. By developing the concept of ethnobotany ecotourism, the ethnobotany tradition, which was previously a routine in meeting daily needs, can become an activity that has economic, social, and environmental benefits. As one of the essential parts of ecotourism, ethnobotany tradition has principles that are inseparable from conservation efforts, empowering local communities, potentially providing economic benefits for local communities, and encouraging high appreciation of indigenous cultures. The ethnobotany tradition of the local community is a distinctive native culture. It is expected to be a competitive service product because it has high originality and specificity value (Ramadhan et al., 2017).

Regarding the use of *daksina*, ethnobotany ecotourism will encourage preserving the plant's diversity that composes *daksina.* In the concept of ethnobotany ecotourism, the availability of plant diversity in a sustainable manner is a requirement for continuing the tradition. In addition, the ethnobotany tradition also creates a sense of concern for local people towards the preservation of natural resources, including in the forest environment. Many plant species used in *daksina* grow naturally in the forest, for example, *Borassus flabellifer* L. and *A. pinnata* (Wurmb) Merr. On spiritual tourism, Tourists will enjoy religious places that provide a sense of peace and spiritual satisfaction (Aggarwal 2008).

Figure 3. Sacred bath at Suranadi Village, Lombok Island, Indonesia

This is what distinguishes spiritual tourism from other types of tourism alone. One of the potential tourist attractions in developing and preserving the *Daksina* tradition is the sacred bathing ritual at Suranadi spring, Suranadi Village, West Lombok Regency (Figure 3). In this area, tourists can enjoy sacred bathing, which is believed to clean themselves physically and spiritually. In this ritual, the tourist must use one of the ritual facilities: daksina. This causes *Daksina* to be sold around the bathing location by the local community and used as an income source. Besides, tourists are also presented with natural and clean forest conditions, storing high biodiversity. Forest areas in this area are also widely planted with *daksina* constituent plants by local communities, for example, *Allamanda cathartica* L., *A. catechu* L, *C. Nucifera* L, *S. zalacca* (Gaertn.) Voss, *Garcinia mangostana* L., *C. variegatum* (L. Clump. ex A.Juss., *Durio zibethinus* L., *Lansium domesticum* Corrêa, *Nephelium lappaceum* L., and *Manilkara zapota* (L.) P. Royen.

Another thing that can be a tourist attraction in this area is the activity of making *Daksina* by the sellers and artisans, from the preparation process, the selection of materials and plants, the arrangement, and its use in sacred bath rituals in the area. The tourists will benefit from spiritual tourism and additional knowledge related to biodiversity and culture. In general, the preservation of *daksina* traditions will contribute to preserving biodiversity and conserving traditional culture. Based on all ethnobotanical aspects revealed in this study, it can be concluded that *Daksina* stores information on the diversity of plant species and the richness of Indonesia's traditional culture and information about the local wisdom of the community in managing natural resources and environment to remain preserved and sustainable.

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