Types of Plants Used as Nest of Curik Bali in Bali Barat National Park

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Abstract

Endemic birds of Curik Bali, Jalak Bali or Balinese Starling (Leucopsar rothschildi Stresemann) is very well known throughout the world, but the knowledge of the types of plants used as nest building for reproductive purposes has not been known yet. Natural habitat of Curik Bali is in the forests of Bali Barat National Park. The result showed that there were 16 species from 13 families and 16 genera of plants that are used as nest building for the preparation of breeding. The Fabaceae, Tiliaceae, Euphorbiaceae and Meliaceae families are the most used as nest constituents with two species each. Parts of the plants that are used as nest constituents mostly twigs, leaves, buds and flower parts such as the dried stamens. Beside woody flora and shrubs, grasses are also used as nest constituents. Species characteristic of flora that is used as nest constituents of Curik Bali in Bali Barat National Park will be discussed in this paper.

Keywords: Flora, Nest, Curik Bali, Bali Barat National Park.

Introduction

Curik Bali or Balinese Starling (Leucopsar rothchildii) is one of endemic birds in Bali. Among foreigners, this bird is known as Bali Starling. It is very famous all around the world due to its beautiful shape and colors, its endemicity, and its limited population. The natural habitat of Balinese Starling is Bali Barat National Park. Forest region of the park is located in Jembrana and Buleleng district. Geographically, it is located between 8˚ 05’ 20” to 8˚ 15’ 25” S and 114˚ 25’ 00” to 114˚ 56’ 30” E [1]. The decrease of Balinese Starling population has attracted attention from all over the world to think about its sustainability. Many efforts have been conducted to recover its population, but it has not shown significant results. Regulations efforts, propagations, breeding and also releasing to its natural habitat have been conducted. Regulations, provisions and maintenance of infrastructures such as water containers, building of artificial gook, and also water provisions have been prepared. Ecological and flora diversity research in its natural habitat have been conducted. According to [2], not least than 149 flora species exist in forest area of Labuan Lala and its vicinity which are Balinese Starling’s natural habitat. Some of those plant species are food sources, places to perch on and to take shelter. Foods can be fruits or insects which are produced by the plants. In spite of as food sources, the bird also needs the plant parts to fulfill its necessities such as nesting materials to prepare its reproduction. Types of plants and their parts which are needed by the bird to make nests have not been known by many people. Knowledge on types of plants and their parts which are used as gook and nest materials is still rare, almost is not known by people. This research aimed at knowing types of plants which are used as gook and nest materials of Balinese Starling. By knowing types of plants which are utilized to built its nest, it is expected that Balinese Starling and its environment in natural habitat can be conserved by applying suitable floristic and zoological conservation management.

Materials and Methods

Research to reveal types of plants which are used as nests of Balinese Starlings had been conducted in an area of Labuan Lala forest – Bali Barat National Park. Random exploration in the field was conducted to get 3 samples of used nests which were no longer inhabited for identification [3]. Nest materials which were found were taken from gook (holes in the tree), identified and tabulated alphabetically according to families in Developmental Station of PT. Trimbawan Swastama Sejati – Bali Barat National Park and in Bali Botanic Garden’s herbarium, from 20 – 26 July 2010. Types of plants
which were used as nest materials were recorded, so was the parts of the plant. In the field exploration, floristic characters which were used as nest materials were also recorded and its population was estimated.

Results and Discussion

Types of plant constitutes Balinese Starling nests

Results of inventory and identification show that there are 16 types of plants, which consist of 13 families, 16 genus that are used as nest materials and Balinese Starling gook in Bali Barat National Park as shown in Table 1. The most frequent plants types which are used as nest materials and gook are trees, namely 9 species, shrubs and bushes 2 species, creeping and climbing 3 species and the others 2 grasses.

<table>
<thead>
<tr>
<th>No</th>
<th>Family</th>
<th>Species Name</th>
<th>Habitus</th>
<th>Parts used</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Annonaceae</td>
<td>Uvaria rufa Bl.</td>
<td>Kalak pisang</td>
<td>Small twig</td>
<td>Abundant</td>
</tr>
<tr>
<td>2</td>
<td>Capparaceae</td>
<td>Capparis micracantha DC.</td>
<td>Ketket kayu joh</td>
<td>Liana</td>
<td>Abundant</td>
</tr>
<tr>
<td>3</td>
<td>Convolvulaceae</td>
<td>Merremia tridentata (L.) Hallier. f.</td>
<td>-</td>
<td>Dry pistil and peduncle</td>
<td>Limited</td>
</tr>
<tr>
<td>4</td>
<td>Cyperaceae</td>
<td>Cyperus kyllingia Endl.</td>
<td>Teki gandul</td>
<td>Grass</td>
<td>Abundant</td>
</tr>
<tr>
<td>5</td>
<td>Euphorbiaceae</td>
<td>Bridelia monoica (Lour.) Merr.</td>
<td>Asuli</td>
<td>Tree</td>
<td>Abundant</td>
</tr>
<tr>
<td>6</td>
<td>Euphorbiaceae</td>
<td>Phyllanthus officinalis Gaertn.</td>
<td>Kalimoko, Kemloko</td>
<td>Tree</td>
<td>Limited</td>
</tr>
<tr>
<td>7</td>
<td>Fabaceae</td>
<td>Acacia leucophloea (Roxb.) Willd.</td>
<td>Pilang, pelang</td>
<td>Small twig, pediole, pedicel, hole in the trunk is utilized as gook (To set the nest)</td>
<td>Medium</td>
</tr>
<tr>
<td>8</td>
<td>Fabaceae</td>
<td>Albizia lebbekoides (DC.) Bth.</td>
<td>Tekik, Ketek</td>
<td>Fruit skin, peduncle and petiole. Hole in the trunk is utilized as gook (To set the nest)</td>
<td>Medium</td>
</tr>
<tr>
<td>9</td>
<td>Lamiaceae</td>
<td>Anisomeles indica (L.) O. K</td>
<td>Kebokeboan</td>
<td>Peduncle</td>
<td>Abundant</td>
</tr>
<tr>
<td>10</td>
<td>Meliaceae</td>
<td>Azadirachta indica A.Juss.</td>
<td>Intaran, mimba</td>
<td>Tree</td>
<td>Medium</td>
</tr>
<tr>
<td>11</td>
<td>Meliaceae</td>
<td>Toona sinensis (A.Juss.) Roem.</td>
<td>Suren</td>
<td>Tree</td>
<td>Limited</td>
</tr>
<tr>
<td>12</td>
<td>Poaceae</td>
<td>Cynodon dactilon (L.) Pers.</td>
<td>Padang kawat</td>
<td>Grass</td>
<td>Abundant</td>
</tr>
<tr>
<td>13</td>
<td>Rubiaceae</td>
<td>Musaenda sp.</td>
<td>-</td>
<td>Shrub</td>
<td>Abundant</td>
</tr>
<tr>
<td>14</td>
<td>Sapindaceae</td>
<td>Schlechtera oleosa (Lour.) Oken</td>
<td>Kesambi</td>
<td>Tree</td>
<td>Abundant</td>
</tr>
<tr>
<td>15</td>
<td>Tiliaceae</td>
<td>Grewia eriocarpa Juss.</td>
<td>Talok</td>
<td>Tree</td>
<td>Abundant</td>
</tr>
<tr>
<td>16</td>
<td>Tiliaceae</td>
<td>Schootenia ovata Korth.</td>
<td>Kalikukun, Walikukun</td>
<td>Tree</td>
<td>Abundant</td>
</tr>
</tbody>
</table>

Plant of tree habitus from Euphorbiaceae plays important role to preserve and reproduction of Balinese Starling due to two types of plants as nest constituents, namely asuli (Bridelia monoica) which is abundant and kalimoko (Phyllanthus officinalis) which population is degrading (rare). Plants of Fabaceae such as pilang (Acacia leucophloea) and keteketek (Albizia lebekoides) play important roles not only because the plant parts constitute the nest but also because its stem is preferred as hole/ gook, to set the
nest. These two types are categorized as plant with habitus of big trees and small until medium individual abundance, which are available around Labuhan Lalang – Bali Barat National Park. These kinds of trees are chosen and preferred due to the existence of termites, worms and other insects, which act as main food of the bird. Natural gook on these two trees was found on the main trunk around 10 – 15 meters above the ground. The holes formerly were created by woodpeckers such as Pelatuk tunggir emas (Chrysocolaptes lucidus), Pelatuk besi jari tiga (Dinopium javanense) etc, which are doing reproduction \[^4\]. In addition of the natural hole, National Park officers have provided artificial hole in preparation of Balinese Starling reproduction period, which are scattered in many places which can be observed easily. 

There were two kinds of plants from family of Meliaceae which were used as nest constituents, namely intaran (Azadirachta indica) which quite abundant and evergreen even in long dry seasons, and suren (Toona sinensis) with very limited population and its leaves fall within dry seasons. There were two types of plants from family of Tiliaceae, namely talok (Grewia koordersii) dan kalikukun (Schoutenia ovata) which fall-off their leaves in dry seasons. In addition, these two plants are preferred by worms so they act as food sources for the birds. Their population is quite abundant. Furthermore, Kesambi (Schleichera oleosa) from family of Sapindaceae is a tree, drought tolerant and evergreen, its population is quite abundant, plays important roles in sustaining ecosystem of Balinese Starling.

Plants which are categorized as shrubs and bushes are represented by two kinds from different families. Kebo-keboan (Anisomeles indica) of Lamiaceae is a kind of shrub with abundant population, chosen by the bird as its nests constituents. Musaenda sp. of Rubiaceae is a kind of bush with abundant population, also plays important roles and is chosen by the bird to build its nests.

There were 3 kinds of lianas or climbing plants, from different families, which were recorded as constituents Balines Starling’s nests. Ketket kayu joh (Capparis micracantha) of Capparaceae plays important roles not only because it constitutes the nests, but also as shelters for the bird from predators because of its dense and thorny stems. The occurrence of this plant in its natural habitat is abundant. As for types of pisang kalak (Uvaria rufa) of Annonaceae its occurrence is still abundant, but Merremia tridentata from Convolvulaceae is not very common. These plants play important roles due to its ovary stalks are constituents of Balinese Starling’s nests.

From grass group, there were two important types in its contribution to the constituents of the bird’s nests, namely teki gandul (Cyperus kyllinga) from family of Cyperaceae and padang kawat (Cynodon dactylon) from family of Poaceae. These two kinds of grasses are still abundant in savannah region of Labuan Lalang. Flower stalk of teki gandul and stem internodes of padang kawat were found to constitute upper parts of the nests.

From the observation of nest constituents in Table 1 above, it seems that Balinese Starlings build their nests carefully and systematically. In bottom parts, nests are built from rough plant parts such as small twigs, petiole from: kalak pisang (Uvaria rufa), ketket kayu joh (Capparis micracantha), intaran (Azadirachta indica), suren (Toona sinensis), kesambi (Schleichera oleosa), talok (Grewia koordersii), kalikukun (Schoetenia ovata) and Musaenda sp. On the upper parts, there are smoother plant parts such as fruit skins, grass stems, dry pistil and peduncle and pedicel from Merremia tridentata, teki gandul (Cyperus kyllinga), ketkek (Albizia lebekoides) and pilang (Acacia leocophloea). Besides that, types of another plants used as nest of Balinese Starling are Laban (Vitex pebescens) and Kelumprit (Terminalia microcarpa) and some bird feathers \[^5\].

**Floristic Characters of Balinese Starling Nest Constituents**

Over the 16 types of plants which are known as constituents of the bird’s nest, only eight types which are prioritized to be described, namely from tree and shrub. Eight types from grasses group, shrubs and non woody climber such as: Merremia tridentata, teki gandul (Cyperus kyllinga), padang kawat (Cynodon dactylon) and kebo-keboan (Anisomeles indica), Musaenda sp., kalak pisang (Uvaria rufa), kesambi (Schleichera oleosa) and suren (Toona sinensis) are not described. The eight species characters which were prioritized to be described are presented as follow.
Talok (*Grewia eriocarpa* Juss.) (*Tiliaceae*)

Generally, this plant is known locally as talok. Tree of height up to 15 m, stem diameter up to 30 cm, fall-off its leaves during dry seasons and able to grow in lime soils, rocky soils, gorges and drought resistant. In Bali it is found to grow in the forests along lowland to mountain in Buleleng, Jembrana and Karangasem districts in elevation of 10 – 1.700 m above sea level (asl). Leaves ovate-oval-oblong, base obtuse to cordate, apex obtusish to acutely acuminate, sparsely to densely stellate-pubescent, 2-26 cm by 2-10 cm. petiole 0,5-1,5 cm. Inflorescences, branchlets and petioles densely covered with short yellow-brown to grayish green hairs [6]. According to field observation in region of PT. Trimbawan Swastama Sejati (TSS) Bali Barat National Park, individual population is still abundant. Fruits or seeds of these plants are food sources of the birds especially in dry seasons. On the other hand, dry small twigs are usually used naturally as its nests constituents.

Ketekek (*Albizia lebbeckoides* Benth.) (*Fabaceae*)

This plant is recognized locally as Tekik, Kedinding, Tarisi and Reng. Big tree which able to reach height of 8 – 32 m and stem diameter of 75 cm. The wood is dark brown. The bark contains alkaloid (poison). Upper branches usually stick together, so it looks dense. It has compound leaves with 3 – 8 pairs and that support 16 – 35 pairs, oblong-linear, often painitly curved, rather acute to rather obtuse, at first appressed-pubescent on both surfaces, soon becoming glabrous. Flowering and fruiting seasons usually starts in March – June. It can grow in dry soil, bushes and small forests in elevation of 1 – 500 m above sea level (asl). It is available all over the Java Island [8]. It is evenly distributed across Bali, but recently its population is rare. According to field observations in the research area, individual population is not abundant or in category of medium. It is also often used as shade plant in open field. Dry sub leaf stalks and fruit skins are used naturally as nest constituents by Balinese Starlings.

Kalikukun (*Schoutenia ovata* Korth.) (*Tiliaceae*)

This plant is called locally with almost identical name as: Walikukun, Harikukun, Kokon, Walekokon. It is tree with height up to 12 – 25 m with stem diameter up to 30 cm. It is able to grow in lime soils, rocky soils, gorges and drought resistant. In Bali it is commonly found growing in low land forests up to elevation of 900 m asl in Buleleng, Jembrana and Karangasem districts. According to field observation in the research area, individual population is still abundant. The wood can be used as building materials and the bark can be used to create knitting such as bags, nets, ropes, decorations, etc due to its strength and flexibility. Worms which is often found in the leaves, flowers and twigs is used by the birds as food. In addition, dry petioles are used naturally as nests constituents.

Kalimoko (*Phyllanthus officinalis* Gaertn.) (*Euphorbiaceae*)

This plant is called locally in almost identical terms such as: Kemloko, Kemlaka, Malak, Mlaka, Laka-laka dan Melaka and their latin name is *Phyllanthus emblica*. According to Backer & van den Brink [8] said the correct name then will be *Phyllanthus officinalis*. This tree can reach height of 10 – 25 m with stem diameter up to 40 cm. It is usually flowering and fruiting in August. The fruits are abundant and fallen together, so it shows beautiful fruit floor. In prolonged dry seasons, the leaves are totally fallen down. It can grow in lime soil, rocky soils, gorse in teak forest, grass lands, shrubs and road along villages and drought resistant. It is almost evenly distributed in Java, from West Java, Central Java and East Java even to Madura Island. Its distribution in Bali is limited to region with dry climate at elevation of 20 – 1200 m asl such as in Buleleng and Karangasem. However, its population is decreasing because it is used as fire woods. According to field observation in the research area, individual population is not abundant or in category of minimum. The fruits can be eaten, it tastes sour – bitter, can be used as cures for ulcer and bleeding gum. Dry petioles are naturally used as nests constituents by the birds especially of Balinese Starling. In addition, its dense branches are usually used to perch on.
Pelang (*Acacia leucophloea* (Roxb.) Willd.) (*Fabaceae*)

It is also known locally with many names such as Pilang, Opilan, Kai basak, Han besa, Kabesa etc. It can reach height of 10 – 35 m with stem diameter up to 1 m. Its bark is yellowish and strong. Stipule is like thorn, brown to black in color, long and strong attached to young stem and gradually diminished as the tree is getting older. Thorns which are sharper and shorter usually located on the branches. It has compound leaves with 4 – 12 sub leaf stalks and each supports 10 – 30 pairs of leaflets. It’s flowering and fruiting seasons is in March to July. It grows in dry region, shrubs, teak forest on elevation of 1 – 500 m asl. In Java can only be found in low land of Sumedang. On the other hand, in Bali it can be found in north western part from Gondol (Penyabangan) towards west to Bali Barat National Park. According to field observations in the research area, individual population is not abundant or in category of medium. Its wood can be used as building materials and the young leaves can be used as cattle fodder. The leaves are often attacked by worms which are food sources for the birds. Furthermore, on its branches, it often can be found termites or grasshoppers which are also food for the bird especially of Balinese Starling. Dry leaflets nerves are common constituents of Balinese Starling nests. In addition to be used to perch on, the stems or branches are preferred to be used as places to lay eggs.

**Asuli (*Bridelia monoica* (Lour.) Merr.) (*Euphorbiaceae*)**

Besides known as Asuli. This plant is recognized with other local names such as Kenidal, Kanderi, Kanyere, Kandi dan Gandri. Tree with height up to 5 – 20 m and stem diameter of 40 cm. Bottom leaf surface and tips hairy, stipule in leaf base are easily fallen down or stick stronger. Its bark contains tannin. Flowering and fruiting seasons is in February to September, but in Bali Barat National Park it had been found mature fruits in July. It grows in bushes, mixed forests, teak forest on elevation of 1 – 1,400 m asl. In Bali, it grows in north western parts until Jembrana region. According to field observations in the research area, individual population is abundant. Its bark and leaf are used as traditional medicine. Fruit/seed is food source for Balinese Starling. Mature twigs have been used as nest materials.

**Ketket kayu joh (*Capparis micracantha* DC.) (*Capparaceae*)**

This plant is known in many local names as: Klencung, Laak, Balung, Kencuran, Kledung, Klidung, Tledung, Sanek dan Kamalo-malowan. This plant is grouped as shrub, height up to 1 – 6 m, stems and branches thorny, young branches zig-zag arranged, leaves vary from oval to lanceolatus, flowers appear a little bit upper of leaf axillary, in pairs, blossom alternate each other, fruits dark green change into yellowish and orange as mature. Flowering seasons happen from March to September. It can grow from dry to wet soil in primary or secondary forests, open area and partly shaded on elevation of 1 -1.400 m asl. Its population in Java is rare, so is in Bali it only exists in Northern and Eastern Bali. According to field observation in the research area, individual population is abundant. Mature fruits can be eaten; it tastes sweet and fragrant, leaves for asthma medicine and its root for treating urinaria.

**Intaran (*Azadirachta indica* A.,Juss) (*Meliaceae*)**

Some local names are known as Mimba, Imba, Mimba, Menbha dan Mampheuh. It is tree of 8 – 15 m in height and stem diameter can be more than 1 m. Stems are usually not straight, and its barks roughly wrinkled. This plant has compound leaves with its leaflets asymmetrical as of eyebrow. Almost of this plant’s parts, leaves, fruits and seeds, are very bitter. Flowering and fruiting seasons usually start in March to December. The flowers are white yellowish, fragrant. It can stand growing in dry area, rocky soils, sandstones, road edges, small forests, open forests on elevation of 1 – 300 m asl. In Bali, this plant exists in dry areas such as Northern Bali, Karangasem, Klungkung. According to field observations in the research area, individual population is categorized as medium. In Java, it is reported only exists near Jakarta, East Java including Madura. This plant can also be used as traditional medicine. Its leaves can be used to increase food appetite; its oil to cure exim, and its bark to cure stomachache. In Bali, this leaflet is needed as *alis* (eyebrow) symbol in mourning (*ngaben) ceremony. This plant is protected by constitution according to decision letter of ministry of
agriculture No.54/Kpts/Um/2/1972. Fruits/seeds are source of food for Balinese Starling. Dry twigs and petioles are used as nest materials.

Conclusions
1. There were 16 species of plants used as constituents of Balinese Starling’s nests in Bali Barat National Park.
2. Habitus of the plants is 9 of trees, 2 of shrubs and bushes, 3 of woody lianas and 2 of grasses.
3. Individual populations of most of the plants are abundant (10 species), 3 types are medium, and 2 types are limited.
4. In terms of conservation, the availability of plants which are used to build the nests in Bali Barat National Parks is safe and sustainable.

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References