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Faunal Assemblages in *Myristica* Swamps of Central Western Ghats, Karnataka, India

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**INTRODUCTION**

Tropical forests, which harbour most of the world’s plant diversity, continue to be destroyed at unprecedented rates (Myers et al., 2000; Pitman & Jorgenson, 2002). The faunal species associated with these forests are also affected due to one or another reason. The wet evergreen forests of the Western Ghats of India are one of the global biodiversity hotspots, being rich in biodiversity and endemic species (Myers et al., 2000), it is also under the threat of deforestation. It harbours some of the relic elements in the remnant forests, which are in patchy distribution. Myristica swamps are one such threatened ecosystems occurring in these remnant forests of Western Ghats. They are undoubtedly priceless assets for the evolutionary biologist, since many features of Myristicaceae are primitive in origin and hence regarded as ‘living fossils’.

**What are Myristica Swamps?**

Swamps are wetlands dominated by woody plants. They have a fairly deep settlement of water and minimal growth of emergent plants. A marsh, though sometimes used synonymously with swamp, is more applicable to a large area of wetland where the dominant vegetation consists of low-lying grasses, rushes and sedges. Swamps have a high water table and occur near rivers, streams, and lakes. The soils are saturated (or soaked) with water. The soil is thick, black, and nutrient-rich, providing an environment for water tolerant trees and other organisms. Freshwater swamps occur in many parts of the world, namely, Valleys of Mississippi, Odzala National Park, Congo, tributaries of Amazon, etc. In India, freshwater swamps are reported from the Siwalik and Doon Valley and the Brahmaputra Valley (Rao, 1994).

Myristica swamp is any freshwater swamp where any one or both of the exclusive swamp growing trees of the family Myristicaceae namely Gymnocarpos champaca or Myristica fatua var. magnaica are present. These swamp species may occur in association with some other, usually evergreen trees having varied degrees of flood tolerance.

**Distribution of Myristica Swamps**

Davis et al. (1934), in their working plan for North Mangalore Forest Division Madras reported about “swampy evergreens” with Myristica spp confined to low lying poorly drained areas, without specifying the exact locations. However, Krishnamoorthy (1960) reported Myristica swamps, for the first time, as a special type of habitat from Trivancore. These swamps were found in the valleys of Shendurney, Kulathupuzha and Anchal forest ranges in the southern Western Ghats. Champion and Seth (1968) classified such swamps under a newly introduced category ‘Myristica Swamp Forests’ under the Sub Group 4C. Talbot (1911), in *The Forest Flora of the Bombay Presidency and Sind vol II*, reported just one locality, near Malemune, in Siddapur of Uttara Kannada for *Myristica magnaica*. The northernmost swamp that is known is associated with a sacred grove in the Satari taluk of Goa (Santhakumar et al., 1995). However, they have not reported *M. fatua* or *G. canarica* from the Goa locality. The photographs in their paper, however, are indicative of the presence of *G. canarica*, thereby meriting the classification of the habitat as a Myristica swamp.

Varghese and Kumar (1997) differentiate between two types of swamps having Myristicaceae, in the Trivancore region: 1. *Myristica* swamp forest, restricted to below 300 m, fringing sluggish streams. 2. Tropical sub montane hill valley swamp forest found as narrow strips of water-logged areas. Whereas, the former has *M. fatua* as well as *G. canarica*, in the latter, *G. canarica* is found along with *M. champaca* and several others. Such bifurcation of these swamps does not have enough justification. *The Atlas of Endemics of the Western Ghats (India)* by Ramesh and Pascal (1997) shows that *G. canarica* and *M. fatua* occur from sea level to 700 m and 1000 m altitudes respectively.

More detailed studies on the *Myristica* swamps of Uttara Kannada in Central Western Ghats have been made recently. These swamps are isolated and situated in localities from near sea level to about 450 m altitude (Fig 1) (Chandran et al., 1999; Chandran and Mesta, 2001).
STUDY AREA

The Uttara Kannada district, formerly North Kanara (13°22' to 15°30'N and 74°05' to 75°5'E), is located towards the centre of the Western Ghats. The district with 10,250 km² of area is one of the most forested in South India with about 70% of the land under forest cover, including forest plantations. Here, the Western Ghats seldom exceed 700 m in altitude. The district is a maze of steep hills with narrow valleys. Tropical evergreen to semi-evergreen forests form the natural climax vegetation in most parts of the district, which receive 200 to 500 cm of rainfall. The survey has been carried out in five localities of Honnavar and Siddapur taluk (Fig. 2).

MATERIALS AND METHODS

The sampling has been carried out in five Myristica swamp localities namely, Kathalekan, Malemane, Torme, Habsoli and Mundigethagu. The survey was a random opportunistic sampling visiting all the swamps and listing all the information regarding flora and fauna. For amphibians, time constrained samplings were carried out (2 x 2 man hours) from 17:30 to 19:30 hrs in five localities. During the survey, amphibians were searched using torchlight and also their vocal calls. Microhabitats like litter, wood logs, waterbodies, rocks, bushes, etc., were thoroughly searched. Keys of Daniel (1963a and b, 1975); Daniel and Sekhar (1989) and Daniels (1997a, b and c) were used for species identification.

Photographs and geographical co-ordinates of occurrence using Global positioning system (GPS) were noted. Specimens were identified with the help of regional and other floras for plants and faunal elements were identified with the help of literature and experts.
RESULTS AND DISCUSSION

Flora

The survey resulted in 64 trees, 24 species of shrubs and herbs (which include eight species of pteridophytes) (see Tables 1 and 2) As per the Myristica swamp definition it should have one or both exclusive swamp species viz., Gymnacranthera canaica or Myristica patna var. magnifica All five swamps have these trees as prominent tree species. Apart from these species Myristica swamps are also associated with some of the flood tolerant evergreen like, Mastixia arborea, Calophyllum apetalum, Diplocarpus indicus, Elaeocarpus tuberculatus, and Lophopetalum wightianum. Recently one new species was described from the Myristica swamps of Uttara Kannada viz., Semecarpus kathalekanensis (Swammanth, 2000). Three surveyed swamps have this species in an isolated patch of few trees. The swamp has high level of Western Ghats endemic among trees; 34 species are endemics

Table 1 Checklist of tree species found in the five Myristica swamps

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Plant species</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gymnacranthera canaica</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>2</td>
<td>Mastixia arborea</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>3</td>
<td>Lophopetalum wightianum</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>4</td>
<td>Myristica patna var. magnifica</td>
<td>Western Ghats endemic (New species)</td>
</tr>
<tr>
<td>5</td>
<td>Semecarpus kathalekanensis</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>6</td>
<td>Diplocarpus indicus</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>7</td>
<td>Hopea weigendiana</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>8</td>
<td>Hopea ponga</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>9</td>
<td>Glioloma dubia</td>
<td>Western Ghats &amp; N.E. India</td>
</tr>
<tr>
<td>10</td>
<td>Dihocarpus longan</td>
<td>Tropical Asia</td>
</tr>
<tr>
<td>11</td>
<td>Garcinia guammi-gutta</td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>12</td>
<td>Elaeocarpus tuberculatus</td>
<td>India - Malaysia</td>
</tr>
<tr>
<td>13</td>
<td>Caryota arens</td>
<td>Central Asia</td>
</tr>
<tr>
<td>14</td>
<td>Persea macranda</td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>15</td>
<td>Hydnocarpus laurifolia</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>16</td>
<td>Holigarna grahamii</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>17</td>
<td>Syzygium lactum</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>18</td>
<td>Diospyros candelacea</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>19</td>
<td>Syzygium hemisepicium</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>20</td>
<td>Callicarpa tomentosa</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>21</td>
<td>Holigarna mortisiana</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>22</td>
<td>Euonymus indicus</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>23</td>
<td>Syzygium macrantha</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>24</td>
<td>Anthocephalus cadamba</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>25</td>
<td>Vitis baccarum</td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>26</td>
<td>Alstonia scholaris</td>
<td>Western Ghats endemic</td>
</tr>
</tbody>
</table>

(contd.)

Notable of the ground layer are rare shrubs and herbs like Apuma siliquosa, Osmania scabra, Coloma spp., Arenga pinnata, Pandanus spp., Neoboeoottis robusta, Alpinia malaccensis, Jeronita indica, Neurocalyx calycinus Begonia maambrella and Schumanniartus virgatus. An arbores Lagenandra ovata, and Elatosperma inleolatum and Peltillia helenae, both members of Urticacea, are found abundantly in all the surveyed swamps Pinanga dicksonii, a slender endemic palm of the Western Ghats, grows gregariously in all the swamps. In case of ground layer seven species are
endemic to Western Ghats. The notable of the Pteridophytes are *Angiopteris evecta*, *Bobitis appendiculata*, *Ctenitis nigritiensis*, *Osmunda regalis*, *Porephyrium triphyllum*, *Selaginella*, *Pteris*, *Stenochlaena palustris* and *Tectaria wightii*.

Table 2 Checklist of shrubs and herbs (including pteridophytes) species found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Plant species</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Alpinia malaccensis</em></td>
<td>Indo-Malaysia</td>
</tr>
<tr>
<td>2</td>
<td><em>Jerdonia indica</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>3</td>
<td><em>Neurocalyx calycinus</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>4</td>
<td><em>Schumannianthus virgatus</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>5</td>
<td><em>Lagenandra ovata</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>6</td>
<td><em>Elaphoglossum lineolatum</em></td>
<td>India</td>
</tr>
<tr>
<td>7</td>
<td><em>Pellionia heymenna</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>8</td>
<td><em>Pinanga dicksonii</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>9</td>
<td><em>Aparna villosa</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>10</td>
<td><em>Ochtandra scriptoria</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>11</td>
<td><em>Calamus sp.</em></td>
<td>Western Ghats, Sri Lanka</td>
</tr>
<tr>
<td>12</td>
<td><em>Arringa wightii</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>13</td>
<td><em>Pandanus sp.</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>14</td>
<td><em>Notrophylax foetida</em></td>
<td>China, India, Malaysia</td>
</tr>
<tr>
<td>15</td>
<td><em>Begonia madacarica</em></td>
<td>Western Ghats endemic</td>
</tr>
<tr>
<td>16</td>
<td><em>Argostemma cortallense</em></td>
<td>Western Ghats endemic</td>
</tr>
</tbody>
</table>

**Pteridophytes**

1. *Angiopteris evecta*
2. *Bobitis appendiculata*
3. *Ctenitis nigritiensis*
4. *Osmunda regalis*
5. *Porephyrium triphyllum*
7. *Stenochlaena palustris*
8. *Tectaria wightii*

**Fauna**

These swamps also harbour many endemic and endangered fauna of the Western Ghats. The survey resulted in 15 species of mammals, 59 species of birds, 22 species of reptiles (including snakes), 29 species of amphibians, 16 species of fishes, 109 species of butterflies and six species of damselflies. About six species of damselflies are found in these swamps (see Table 3) including *Phyllimonera westermannii*, which is a range extension from Coorg and Wayanad. Other species are, Clear-winged Forest glory (*Vestalis gracilis*), Malabar torrent dart (*Euphaea fraseri*), Stream ruby (*Rhinocypa visignata*), Black-tipped forest glory (*Vestalis apicalis*) and Pied reed tail (*Proosticta gravelyi*). Most of the species are found along the perennial stream inside the swamp. Clear-winged Forest glory (*Vestalis gracilis*) is found in the undergrowth of interior forest areas.

Table 3 Checklist of Damselflies found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Phyllimonera westermannii</em></td>
<td><em>Myristica</em> swap Bamboo tail</td>
</tr>
<tr>
<td>2</td>
<td><em>Vestalis gracilis</em></td>
<td>Clear-winged Forest glory</td>
</tr>
<tr>
<td>3</td>
<td><em>Vestalis apicalis</em></td>
<td>Black-tipped Forest glory</td>
</tr>
<tr>
<td>4</td>
<td><em>Rhinocypa visignata</em></td>
<td>Stream ruby</td>
</tr>
<tr>
<td>5</td>
<td><em>Euphaea fraseri</em></td>
<td>Malabar torrent dart</td>
</tr>
<tr>
<td>6</td>
<td><em>Proosticta gravelyi</em></td>
<td>Pied reed tail</td>
</tr>
</tbody>
</table>

About 109 species of butterflies representing five families (see Table 4) are found in the *Myristica* swamps. Family *Nymphalidae* is dominated by 43 species followed by *Papilionidae*, *Pieridae*, *Lycenidae* and *Hesperiidae* 19 species. Many species are found basking in the open canopy areas. Malabar tree nymph (*Idia malabarica*), an endemic species found in moist, shady areas and in two swamps was observed to form congregations. Evening brown and Bush brown of family *Nymphalidae* are found in the thick litter covered areas and in the vicinity of *Ochtandra scriptoria*, *Calamus* spp. The members of the family *Hesperiidae* are found in the swamp edges, grasslands and open canopy areas.

Table 4 Checklist of butterflies found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Troides minos</em> Cramer</td>
<td>Southern Birdwing (WG)</td>
</tr>
<tr>
<td>2</td>
<td><em>Pachliopta aristolochiae</em></td>
<td>Fabricius, Common Rose</td>
</tr>
<tr>
<td>3</td>
<td><em>Pachliopta hector L.</em></td>
<td>Crimson Rose (P&amp;SL)</td>
</tr>
<tr>
<td>4</td>
<td><em>Graphium rarpedi L.</em></td>
<td>Common Bluebottle</td>
</tr>
<tr>
<td>5</td>
<td><em>Graphium disson C&amp;R Felder</em></td>
<td>Common Jay</td>
</tr>
<tr>
<td>6</td>
<td><em>Graphium Agamemnon L.</em></td>
<td>Tailed Jay</td>
</tr>
<tr>
<td>7</td>
<td><em>Graphium nomius</em> Esper</td>
<td>Spot Sword Tail</td>
</tr>
<tr>
<td>8</td>
<td><em>Graphium antiphates</em> Cramer</td>
<td>Fivebar Swordtail</td>
</tr>
<tr>
<td>9</td>
<td><em>Papilio ilionides</em> Moore*</td>
<td>Malabar Banded Swallow Tail (WG)</td>
</tr>
<tr>
<td>10</td>
<td><em>Papilio dravidorum</em> Wood-Mason</td>
<td>Malabar Raven (WG)</td>
</tr>
<tr>
<td>11</td>
<td><em>Papilio helena</em> L.</td>
<td>Red Helen</td>
</tr>
<tr>
<td>12</td>
<td><em>Papilio polytes</em> L.</td>
<td>Common Mormon</td>
</tr>
<tr>
<td>13</td>
<td><em>Papilio polymnestor</em> Cramer</td>
<td>Blue Mormon (P&amp;SL)</td>
</tr>
<tr>
<td>14</td>
<td><em>Papilio paris</em> L.</td>
<td>Paris Peacock</td>
</tr>
<tr>
<td>15</td>
<td><em>Papilio Budda</em> Westwood</td>
<td>Buddha Peacock</td>
</tr>
<tr>
<td>16</td>
<td><em>Papilio crino</em> Fabrelius</td>
<td>Common Banded Peacock</td>
</tr>
</tbody>
</table>

(contd)
<table>
<thead>
<tr>
<th>SL No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Catopsilia pomona Fabricius</td>
<td>Common Emigrant</td>
</tr>
<tr>
<td>2</td>
<td>Eurema brigitta Cramer</td>
<td>Small Grass Yellow</td>
</tr>
<tr>
<td>3</td>
<td>Eurema laeta Boisduval</td>
<td>Spotless Grass Yellow</td>
</tr>
<tr>
<td>4</td>
<td>Eurema hecabe L</td>
<td>Common Grass Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Delias eucharis Drury</td>
<td>Common Jozefel (PI &amp; SL)</td>
</tr>
<tr>
<td>6</td>
<td>Leptosia nina Fabricius</td>
<td>Peacock</td>
</tr>
<tr>
<td>7</td>
<td>Appias albina Boisduval</td>
<td>Common Albatross</td>
</tr>
<tr>
<td>8</td>
<td>Colotis etria Boisduval</td>
<td>Small Orange Tip</td>
</tr>
<tr>
<td>9</td>
<td>Colotis danae Fabricius</td>
<td>Crimson Tip</td>
</tr>
<tr>
<td>10</td>
<td>Ixias pyrene L</td>
<td>Yellow Orange Tip</td>
</tr>
<tr>
<td>11</td>
<td>Pereronia valeria Cramer</td>
<td>Common Wanderer (PI &amp; SL)</td>
</tr>
<tr>
<td>12</td>
<td>Pereronia ceylanica C&amp;R Felder</td>
<td>Dark Wanderer (PI &amp; SL)</td>
</tr>
<tr>
<td>13</td>
<td>Habomoea glaucippe L</td>
<td>Great Orange Tip</td>
</tr>
</tbody>
</table>

**Family Nymphalidae**

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Malanitis leda L</td>
<td>Common Evening Brown</td>
</tr>
<tr>
<td>2</td>
<td>Malanitis pheida Stoll</td>
<td>Dark Evening Brown</td>
</tr>
<tr>
<td>3</td>
<td>Elymnias hypermenstra L</td>
<td>Common Palmfly</td>
</tr>
<tr>
<td>4</td>
<td>Mycalesis anaxier Hewitson</td>
<td>White-bew Bushbrown</td>
</tr>
<tr>
<td>5</td>
<td>Mycalesis perseur Fabricius</td>
<td>Common Bushbrown</td>
</tr>
<tr>
<td>6</td>
<td>Mycalesis pamia Moore</td>
<td>Glad-eye Bushbrown (PI &amp; SL)</td>
</tr>
<tr>
<td>7</td>
<td>Orsotrichus medus Fabricius</td>
<td>The Nigger</td>
</tr>
<tr>
<td>8</td>
<td>Zipoets satis</td>
<td>Tamil Catsyoe (WG)</td>
</tr>
<tr>
<td>9</td>
<td>Ypthima asteringe Klug</td>
<td>Common Three-ring</td>
</tr>
<tr>
<td>10</td>
<td>Ypthima kiehleri Kithy</td>
<td>Common Four-ring</td>
</tr>
<tr>
<td>11</td>
<td>Polyura athamas Drury</td>
<td>Common Nawab</td>
</tr>
<tr>
<td>12</td>
<td>Acraea violae Fabricius</td>
<td>Iwany Coster</td>
</tr>
<tr>
<td>13</td>
<td>Cathosia nieteri C&amp;R Felder</td>
<td>Tamil Lacewing (PI &amp; SL)</td>
</tr>
<tr>
<td>14</td>
<td>Pseudola evora Fabricius</td>
<td>Cruiser</td>
</tr>
<tr>
<td>15</td>
<td>Capha eramasshis Drury</td>
<td>Rustic</td>
</tr>
<tr>
<td>16</td>
<td>Phalantha phalantha Drury</td>
<td>Common Leopard</td>
</tr>
<tr>
<td>17</td>
<td>Cirrochroa thais Fabricius</td>
<td>Tamil Yeoman (PI &amp; SL)</td>
</tr>
<tr>
<td>18</td>
<td>Neptis jambal Mooroe</td>
<td>Chestnut-streaked Sailer</td>
</tr>
<tr>
<td>19</td>
<td>Neptis hylas Moore</td>
<td>Common Sailer</td>
</tr>
<tr>
<td>20</td>
<td>Pantoporia hordonia Stoll</td>
<td>Common Lascar</td>
</tr>
<tr>
<td>21</td>
<td>Athisma pierus L</td>
<td>Common Sergeant</td>
</tr>
<tr>
<td>22</td>
<td>Limenitis procris Cramer</td>
<td>Commander</td>
</tr>
<tr>
<td>23</td>
<td>Parthenos sylvia Cramer</td>
<td>Clipper</td>
</tr>
<tr>
<td>24</td>
<td>Tanaecia leptidea Butler</td>
<td>Grey Count</td>
</tr>
<tr>
<td>25</td>
<td>Euthalia acomheus Cramer</td>
<td>Common Baron</td>
</tr>
<tr>
<td>26</td>
<td>Daphne olivia Stoll</td>
<td>Common Castor</td>
</tr>
<tr>
<td>27</td>
<td>Ariadne marione Cramer</td>
<td>Angled Castor</td>
</tr>
<tr>
<td>28</td>
<td>Ariadne aridane L</td>
<td>Map</td>
</tr>
</tbody>
</table>

**Family Hesperidae**

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hesperia chroma Cramer</td>
<td>Common Banded Awl</td>
</tr>
<tr>
<td>2</td>
<td>Hesperia badra Moore</td>
<td>Common Awl</td>
</tr>
<tr>
<td>3</td>
<td>Badomia exclamationis Fabricius</td>
<td>Common Spotted Flat</td>
</tr>
<tr>
<td>4</td>
<td>Celenororrhina leucocera Kollar</td>
<td>Malabar Spotted Flat</td>
</tr>
<tr>
<td>5</td>
<td>Celenororrhina amaraeusa Moore</td>
<td>Water Snow Flat</td>
</tr>
<tr>
<td>6</td>
<td>Tegidodes litigosa Moschius</td>
<td>Common Small Flat</td>
</tr>
<tr>
<td>7</td>
<td>Sarongsa dasakha Moore</td>
<td>Spotted Small Flat (WG)</td>
</tr>
<tr>
<td>8</td>
<td>Sarangsa parendra Moore</td>
<td>Indian Grizzled Skipper</td>
</tr>
<tr>
<td>9</td>
<td>Spialia galba Fabricius</td>
<td>Bush Hopper</td>
</tr>
<tr>
<td>10</td>
<td>Amplitia discorides</td>
<td>Chestnut Bob</td>
</tr>
<tr>
<td>11</td>
<td>Laminix saltala Moore</td>
<td>Restricted Demon</td>
</tr>
<tr>
<td>12</td>
<td>Notocrypta curvifascia C &amp; R Felder</td>
<td>(contd)</td>
</tr>
</tbody>
</table>
**Table 4 (cont.)**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Udaspes folius Cramer</td>
<td>Grass Demon</td>
</tr>
<tr>
<td>14</td>
<td>Sustius gremius Fabricius</td>
<td>Indian Palm Bob</td>
</tr>
<tr>
<td>15</td>
<td>Gangara thyris Fabricius</td>
<td>Giant Redeye</td>
</tr>
<tr>
<td>16</td>
<td>Taricbrocera maeviae Fabricius</td>
<td>Common Grass Dart</td>
</tr>
<tr>
<td>17</td>
<td>Talocus colom Fabricius</td>
<td>Pale Palm Dart</td>
</tr>
<tr>
<td>18</td>
<td>Borbo cineraria Wallce</td>
<td>Rice Swift</td>
</tr>
<tr>
<td>19</td>
<td>Pelopidanii mathias</td>
<td>Small branded swift</td>
</tr>
</tbody>
</table>

*Note:* * indicates Endangered species.

Sixteen species of fishes are found in the perennial streams of these swamps (see Table 5). Most of them are generalist species found in the Western Ghats. *Garra goltia stenohynchus*, *Rasbora daniconius* and *Dano aequipinnatus* are prominent species.

**Table 5** Checklist of fishes found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Family</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bagridae</td>
<td>Mystus malabaricus</td>
<td>Endemic to Western Ghats</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cyprinidae</td>
<td>Garra goltia stenohynchus</td>
<td>Endemic to Western Ghats</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cyprinidae</td>
<td>Salmoorna bologa</td>
<td>Endemic to Western Ghats</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Channidae</td>
<td>Cheima orientalis</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cyprinidae</td>
<td>Puntius ticto</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cyprinidae</td>
<td>Rasbora daniconius</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Siluridae</td>
<td>Ompok bimaculatus</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Aplocheilidae</td>
<td>Aplocheilus lineatus</td>
<td>Southern India</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Balitoridae</td>
<td>Schistura demsonii demsonii</td>
<td>Southern India</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Cyprinidae</td>
<td>Dano aequipinnatus</td>
<td>Southern India</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Cyprinidae</td>
<td>Puntius fasciatus</td>
<td>Southern India</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Cyprinidae</td>
<td>Puntius filamentosus</td>
<td>Southern India</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Cyprinidae</td>
<td>Puntius sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Balitoridae</td>
<td>Schistura sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Balitoridae</td>
<td>Schistura sp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Synbranchidae</td>
<td>Monopterus sp.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6** Checklist of amphibians found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Distribution</th>
<th>IUCN status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulonidae</td>
<td>Bafu scaber</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Boulonidae</td>
<td>Bafu melanostictus</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Microhyliidae</td>
<td>Rammella montana</td>
<td>Western Ghats</td>
<td>NT</td>
</tr>
<tr>
<td>Microhyliidae</td>
<td>Microhyla ornata</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Micruridae</td>
<td>Micrurus saxicola</td>
<td>Western Ghats</td>
<td>VU</td>
</tr>
<tr>
<td>Nectribrachidae</td>
<td>Nectribrachus aliaca</td>
<td>Western Ghats</td>
<td>EN</td>
</tr>
<tr>
<td>Nectribrachidae</td>
<td>Nectribrachus major</td>
<td>Western Ghats</td>
<td>VU</td>
</tr>
<tr>
<td>Nectribrachidae</td>
<td>Nectribrachus petraeus</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Pelophodidae</td>
<td>Indriana beddomi</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Pelophodidae</td>
<td>Indriana semiplumata</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Dicroglossus brevicalmaea</td>
<td>Western Ghats</td>
<td>DD</td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Dicroglossus limnocharis</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Dicroglossus syharensea</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Fejervarya rufescens</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Sphenarchela breviceps</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Hoplobatrachus tigrinus</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Dicroglossidae</td>
<td>Euphryctes cyanocephalys</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>Ranidae</td>
<td>Hydrothele malabarica</td>
<td>Western Ghats</td>
<td>NT</td>
</tr>
<tr>
<td>Ranidae</td>
<td>Sylvinae temporalis</td>
<td>Sylvinae sp.</td>
<td></td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Phlaudus tuberhomerus</td>
<td>Western Ghats</td>
<td>DD</td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Phlaudus leucobrunius</td>
<td>Western Ghats</td>
<td>DD</td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Phlaudus sp</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Phlaudus nates</td>
<td>Western Ghats</td>
<td>DD</td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Polypedates pseudocruciger</td>
<td>Western Ghats</td>
<td>CR</td>
</tr>
<tr>
<td>Rhacophoridae</td>
<td>Rhacophorus malabaricus</td>
<td>Western Ghats</td>
<td>NT</td>
</tr>
<tr>
<td>Ichthyophiidae</td>
<td>Ichthyophis beddomei</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
<tr>
<td>Ichthyophiidae</td>
<td>Ichthyophis sp.</td>
<td>Western Ghats</td>
<td>LC</td>
</tr>
</tbody>
</table>


Twenty-one species of reptiles include 13 species of snakes found in the surveyed swamps (see Table 7). The notable snakes are Python (*Python molurus*), King cobra (*Ophiophagus hannah*), Hungnosed pit viper (*Hypnale hypnale*), Malabar pit viper (*Trimerus malabaricus*), Trinket snake (*Elaphe helena helena*), etc.
Table 7: Checklist of reptiles found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Common name</th>
<th>Scientific name</th>
<th>IUCN status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Common Indian Monitor Lizard</td>
<td>Varanus bengalensis</td>
<td>VU</td>
</tr>
<tr>
<td>2</td>
<td>Flapshell turtles</td>
<td>Litteyns punctata</td>
<td>LRnt</td>
</tr>
<tr>
<td>3</td>
<td>Gurnther's Supple Skink</td>
<td>Lygosoma guentheri*</td>
<td>LRnt</td>
</tr>
<tr>
<td>4</td>
<td>King Cobra</td>
<td>Ophiopogon hannah</td>
<td>LRnt</td>
</tr>
<tr>
<td>5</td>
<td>The Cobra</td>
<td>Naja naja</td>
<td>LRnt</td>
</tr>
<tr>
<td>6</td>
<td>Hump-nosed Pit Viper</td>
<td>Hynale hypnale</td>
<td>LRnt</td>
</tr>
<tr>
<td>7</td>
<td>Malabar Pit Viper</td>
<td>Trimeresurus malabaricus*</td>
<td>LRnt</td>
</tr>
<tr>
<td>8</td>
<td>Bronzebacked tree Snake</td>
<td>Dendrelaphis tristis</td>
<td>LRnc</td>
</tr>
<tr>
<td>9</td>
<td>The Vine Snake</td>
<td>Ahaetulla navata</td>
<td>LRnt</td>
</tr>
<tr>
<td>10</td>
<td>Indian Ornate Flying Snake</td>
<td>Chrysopelia ornata</td>
<td>LRnt</td>
</tr>
<tr>
<td>11</td>
<td>Common Indian Trinket Snake</td>
<td>Elaphe helena helena</td>
<td>LRnt</td>
</tr>
<tr>
<td>12</td>
<td>Checkered Keelback</td>
<td>Xenochrophis piscator piscator</td>
<td>LRnc</td>
</tr>
<tr>
<td>13</td>
<td>Common Sand Boa</td>
<td>Erys conicus conicus</td>
<td>LRnt</td>
</tr>
<tr>
<td>14</td>
<td>Shieldtail</td>
<td>Uropeltis sp.*</td>
<td>LRnt</td>
</tr>
<tr>
<td>15</td>
<td>The Rat Snake</td>
<td>Pyas macrurus</td>
<td>LRnt</td>
</tr>
<tr>
<td>16</td>
<td>Python</td>
<td>Python molurus</td>
<td>LRnt</td>
</tr>
<tr>
<td>17</td>
<td>Lizard</td>
<td>Calotes sp</td>
<td>LRnt</td>
</tr>
<tr>
<td>18</td>
<td>Roux's Forest Lizard</td>
<td>Calotes rouxi</td>
<td>LRnt</td>
</tr>
<tr>
<td>19</td>
<td>Deccan Ground Gecko</td>
<td>Geckolma delkenmensis</td>
<td>LRnt</td>
</tr>
<tr>
<td>20</td>
<td>Gecko</td>
<td>Cnemaspis sp</td>
<td>LRnt</td>
</tr>
<tr>
<td>21</td>
<td>Western Ghats Flying Lizard</td>
<td>Draco dusemissat</td>
<td>LRnt</td>
</tr>
</tbody>
</table>

*Note: Indicating Western Ghats endemic
VU: Vulnerable, LRnt: Lower risk near threatened, LRnc: Lower risk least concern

About 59 species of birds are found in these swamps (see Table 8). Some of the endemic species like, Wynaad Laughing thrush (*Garrulax delesserti*), Great pied hornbill (*Bucerovia bicorinii*), and Blue-winged parakeet (*Psittacula columboides*) are found in all five surveyed swamps. Indian great horned owl (*Bubo bubo* L.) is a common species found in the riparian vegetation of Kathalekan, Halsoll and Forme swamps. Other species like, Fairy bluebird (*Irena puella*), Malabar whistling thrush (*Myiotrimus horsfieldii*) and Wagtails are found along the perennial streams.

Table 8: Checklist of birds found in the five *Myristica* swamps

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Family</th>
<th>Sub-family</th>
<th>Common name</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accipitriformes</td>
<td>Subfamily</td>
<td>Crested serpent eagle</td>
<td>Spilornis cheela (Latham)</td>
</tr>
<tr>
<td>2</td>
<td>Phasianidae</td>
<td>Subfamily</td>
<td>Grey jungle fowl</td>
<td>Gallus sonnerati Temminck</td>
</tr>
</tbody>
</table>

(Contd.)

3 Common pea fowl Pavo cristatus L.
4 Columbidae
5 Orange-breasted green pigeon *Treron pompadoura* (Jerdon)
6 Grey-roseted green pigeon *Treron pompadoura* (Gmelin)
7 Green imperial pigeon *Ducula aenea* L.
8 Psittacidae
9 Blossom-headed parakeet *Psittacula cynocephala* (L.)
10 Lorikeet *Lorius varnalis* (Sparman)
11 Blue-winged parakeet *Psittacula columboides* (Figor)
12 Cuckoo *Cuculus canorus* L.
13 Koel *Eudynamys scolopacea* L.
14 Sirkeer cuckoo *Taccocua lutchowdii* Lesson
15 Crow-phantail *Centropus sinensis* Stephens
16 Forest eagle-owl *Bubo nipalensis* Hodgson
17 Indian great horned owl *Bubo bubo* L.
18 Alcedinidae
19 Meropidae
20 Upupidae
21 Bucerotidae
22 Capitonidae
23 Large green barbet *Megalaima viridis* Boddarti
24 Indian golden-backed threetoed woodpecker *Dryocosmus javensis* (Horsfield)
Table 8 (contd.)

<table>
<thead>
<tr>
<th>St. No.</th>
<th>Family</th>
<th>Sub-family</th>
<th>Common name</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Hirundinidae</td>
<td>Woodpecker</td>
<td>Heartspotted woodpecker</td>
<td>Hemicircus canestriatum</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>Swallow</td>
<td>Hirundo rustica L.</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Oriolidae</td>
<td>Golden oriole</td>
<td>Ortiolus ornatus L.</td>
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</tr>
<tr>
<td>31</td>
<td>Dicruridae</td>
<td>Racket-tailed drongo</td>
<td>Dicrurus paradisus L.</td>
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<tr>
<td>32</td>
<td>Sturnidae</td>
<td>Hill myna</td>
<td>Gracula religiosa L.</td>
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</tr>
<tr>
<td>33</td>
<td>Corvidae</td>
<td>House crow</td>
<td>Corvus splendens</td>
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</tr>
<tr>
<td>34</td>
<td></td>
<td>Tree pie</td>
<td>Ptilorhynchus variegata</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Campephagidae</td>
<td>Scarlet minivet</td>
<td>Pterococcyx rufusus</td>
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</tr>
<tr>
<td>36</td>
<td>Irenidae</td>
<td>Iora</td>
<td>Aegithina tupa L.</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td></td>
<td>Goldmantled</td>
<td>Chloropsis</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>chloropis</td>
<td>cockinchinensis (Gmelin)</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Pycnonotidae</td>
<td>Fairy bluebird</td>
<td>Irena puella (Latham)</td>
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</tr>
<tr>
<td>39</td>
<td></td>
<td>Redvented bulbul</td>
<td>Pycnonotus cafer L.</td>
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<tr>
<td>40</td>
<td></td>
<td>Rubythroated bulbul</td>
<td>Pycnonotus melanotus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gould</td>
<td>melanotus gularis</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td></td>
<td>Greyheaded bulbul</td>
<td>Pycnonotus</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>Yellowbrowed bulbul</td>
<td>Hypsipetes indicus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Jerdon)</td>
<td>(Jerdon)</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Muscicapidae</td>
<td>Timaliinae</td>
<td>Rufous babbler</td>
<td>Turdoides subrubus (Jerdon)</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td></td>
<td>Blackheaded babbler</td>
<td>Rhopocichla arctica</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td></td>
<td>Jungle babbler</td>
<td>Turdoides strigatus (Dumani)</td>
</tr>
<tr>
<td>46</td>
<td>Muscicapinae</td>
<td>Paradise flycatcher</td>
<td>Terrace phoenicurus L.</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td></td>
<td>Redbrested</td>
<td>Muscicapra ruficauda</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>flycatcher</td>
<td>Swainson</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
<td>Verditer flycatcher</td>
<td>Muscicapra thalassina</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Jerdon)</td>
<td>Swainson</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Turdinae</td>
<td>Blue rock thrush</td>
<td>Monticola solitarius L.</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td></td>
<td>Malabar whistling</td>
<td>Myiophonus</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>thrush</td>
<td>horfieldi (Vigors)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wyniard laughing</td>
<td>Garrulax delesserti (Jerdon)</td>
<td></td>
</tr>
</tbody>
</table>

Note: * indicates Western Ghats endemic.

Table 9 Checklist of mammals found in the five Myristica swamps

<table>
<thead>
<tr>
<th>St No</th>
<th>Common name</th>
<th>Scientific name</th>
<th>IUCN status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Common Langur</td>
<td>Semnopithecus entellus</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>2</td>
<td>Langur tailed Macaque</td>
<td>Macaca silenus</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>3</td>
<td>Small Indian Civet</td>
<td>Vivercillia indica</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>4</td>
<td>Grey mongoose</td>
<td>Herpestes indica</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>5</td>
<td>Small Indian Moose</td>
<td>Herpestes javanicus</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>6</td>
<td>Three-striper Palm Squirrel</td>
<td>Funambulus palmarum</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>7</td>
<td>Indian Giant Squirrel</td>
<td>Rana indica</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>8</td>
<td>Common Giant Flying Squirrel</td>
<td>Pteropus pteropus</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>9</td>
<td>Indian Porcupine</td>
<td>Hystris indica</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>10</td>
<td>Indian Pangolin</td>
<td>Manis crassicaudata</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>11</td>
<td>Black-naped Hare</td>
<td>Lepus nigricollis</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>12</td>
<td>Wild Boar</td>
<td>Sus scrofa cristatus</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>13</td>
<td>Indian Spotted Chevrotain or</td>
<td>Tragulus meinini</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>14</td>
<td>Mouse Deer</td>
<td>Cervus unicolor</td>
<td>Lr-lec</td>
</tr>
<tr>
<td>15</td>
<td>The Gaur or Indian Bison</td>
<td>Bos gaurus</td>
<td>VU</td>
</tr>
</tbody>
</table>

Note: * indicates Western Ghats endemic.

About 15 species of mammals are found in these swamps (see Table 9), which include an endemic and endangered primate Lion tailed macaque (Macaca silenus). This species is associated with the relics of the primary forests in Siddapur, having the Myristica swamps and Diptherocapra.

CONCLUSION

In Myristica swamp the perennial streams and its associated flora harbour many of the endemic and endangered fauna of the Western Ghats. The swamp and its immediate surrounding forests have a number of wild fruit bearing trees which include Garcinia, Myristica, Syzygium, Holliganna, members of Lauraceae, Meliaceae, Myrtaceae, etc. which provide food for many wild mammals and birds. Due to high watersheded value and ecological value, it is necessary to conserve and document the biodiversity of these swamps in a proper way.

In the study area most swamps are presumably extinct due to human impacts of various kinds. The swamps are encroached for agricultural lands and areca plantations. The two of the studied swamps are at risk of disappearance due to areca plantations. The pressure is mounting on the last traces of the remaining swamps due to mainly ignorance about the value and evolutionary significance of these ancient patches of forests. Rich biodiversity of swamps along with the evolutionary significance demand the immediate
policy measures to conserve these Myristica swamps—fragile ecosystems in remnant forest patches of Uttara Kannada. Special efforts should be made to locate more of these swamps lying hidden in the recesses of the Western Ghats.

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REFERENCES


