



# **In-Situ conservation of *Abscondita* sp. (close perplexa) program - Policies and perspectives for Kalsubai Harishchandragad wildlife sanctuary in Maharashtra, India.**

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## **Abstract**

Some threats to fireflies namely *Abscondita* sp. (close perplexa) exist in Kalsubai Harishchandragad wildlife sanctuary have been reported. Biomagnification possibilities, introduction of foreign species and disappearing of local canopy, terrace farming with chemicalization, illegal entry of tourists during mating behavior and light pollution of vehicles, changing climatic conditions are key concerns associated to population decline of reported firefly species during the field work. For *Abscondita* species some in-situ conservation measures and policy perspectives have been discussed in this paper.

**Key Words-** *Abscondita* species, In-situ conservation, population decline

## **Introduction -**

Bhandardara dam is located on Pravara river. Bhandardara is well known destination for trekking and recreational tourism activity among the Sahayadri mountain ranges of Maharashtra. The area is also known for famous peak namely “Kalsubai”, which is highest in Maharashtra. Ratangad, Harishchandra fort, Kalsubai are the very famous spots for trekking and tourism. This protected area gives a birth to incredible biological resources due to perennial availability of water. Fireflies’ festival is one of miraculous gift to this region.

## **Habitat and forest range in Kalsubai Harishchandragad wildlife sanctuary, Ahmednagar District-**

The forest cover change towards western to eastern region with change in rainfall. Total

forest cover of district is 1905 Sq. km in the district which is only 11% of total geographical area of district. The reported forest type is southern tropical dry deciduous forest. Some pockets representing spurs and valleys sheltered in mostly in Akole, Sangamner, Parner and Rahuri blocks of district. Of the total forest area 96% (1835 Sq.Km) area is reserve forest, 1.35% (26 Sq.Km) forest area is under protected forest, 2% (44 Sq.Km) forest area is unclassified forest and 2% (345 Sq.Km) forest area is under revenue department ( Ahmednagar district DSR Report, Page 33). Maximum forest cover i.e 28 % of Ahmednagar district lies in Akole block, which representing global hotspot of namely Western Ghat.

Eco-sensitive Zone around Kalsubai Harishchandragad Wildlife Sanctuary, Maharashtra Kalsubai Harishchandragad

Wildlife Sanctuary is situated in Akole and Rajur Tehsils (Blocks) of Ahmadnagar district and shares boundary with Igatpuri Taluka of Nashik district, Shahpur and Murbad Talukas of Thane district and Junanr Taluka of Pune district in the State of Maharashtra. The Wildlife Sanctuary is located within Western Ghats and is one of the biological hotspots of Western Ghats. It is spread over an area of 361.71 sq km. The forests in 8 the region consist of tropical semi-evergreen forests. It is home to rich variety of wildlife comprising of Leopard, Giant Squirrel, Wild Boar, Blacknaped Hare, Wild Cat, Hyeana, and about 130 species of avi-fauna. The area is also rich in 93 reptilian species, 21 types of mammals, and 130 types of birds. Many of these species are endemic. The region is the origin of Rivers Pravera and Mula which join the Godavari.

The sanctuary area spreads from Kalasubai to Harischandragad in Akole Tehsil of Ahmednagar district. The area is part of Sahyadri hill ranges. The Kalsubai sanctuary is challenge to trekkers as it is most rugged, hilly area and difficult to get accessibility. Kalasubai is the highest (1646 m) peak of Western Ghats in Maharashtra. It is also a paradise for nature lovers. The vegetation type is southern moist mixed deciduous. The part of Sahyadri that is close to West Coast is semi evergreen forest and semi deciduous shrub savanna. The main indigenous tree species that are seen in this area are *Hirda, Jambhul, Chandawa, Bahava, Kumbhal, Gulchavi, Kudal, Siras, Kharvel, Karap, Avali, Aashind, Lokhandi, Beheda* and character worth noticing. *Species that are undergrowth are Mandar, Kadipatta, Ghaneri, Chilhar, Parjambhual, Karvi, Karwand, Ber, Dhaiti, and Rametha.* There are large patches of grasslands mostly of *Marvel, Dongari, Pawanya, Ber,*

*Surad, Harali* etc. Bamboo is available in this region, but rarely. In the faunal species wide variety of mammals, reptiles, and birds. The mammals found here are *Leopard, Jungle cat, Palm civet, Mongoose, Hyena, Wolf, Jackal, Fox, Wild Boar, Barking Deer, Sambar, Hare, and Bats* etc. The most attractive animals are Indian Giant Squirrel and Porcupine. The reptiles found in this sanctuary are *Monitor Lizard, Fan-Throated Lizard, Turtles, and many species of snakes.* Among the birds are the common hill and grass land birds. One can also spot water birds such as *White Necked Storks, Black Ibis, Herons, Egrets, Cormorants, Water hen's, etc.*

Wildlife Sanctuaries are the protected areas in which human interference are not allowed. These areas are completely free from the any kind of human renovation. Hunting and other related activities are also not allowed in these reserves. (Rajendra S. Pawar, 2017)

**The salient features of Eco Sensitive Zone (ESZ) are as follows: As Sanctioned by Government of India (GoI).**

Area of Protected Area (PA): 361.71 sq km, Proposed ESZ area: 300.72 sq. kms, Proposed Extent : 1.6 km to 4.0 km. It was informed that the water body has not been included as part of the proposal as a dam exits in the vicinity and the water body is also used for commercial purposes. The State Government representatives informed that a road passes through the WLS and vehicular movement even during night time may be included under regulated category. It was clarified that this activity has been included under 'Regulated Category' in the draft notification. The Committee after deliberations recommended finalizing the draft notification. (**Meeting held on 30th May 2016 Ministry of Environment,**

*Forest & Climate Change, Indira Parayavaran Bhawan, New Delhi, under the Chairpersonship of Dr. Amita Prasad, Additional Secretary.)*

### **Environmental associations of Bhandardara Dam and Kalsubai-Harishchandra WLS.**

Fortunately the waterbody in vicinity with Bhandardara dam backwater, environmentally it may be called artificial lotic (standing) ecosystem. The pleasant environment throughout year, abundant availability of oxygen, maintained levels of relative humidity (air moisture), greater variety of flora and fauna and associated balanced food chains / food webs are the key features of Kalsubai –Harishchandra WLS.

### **The Fire-flies festival –**

The villages in association with Bhandardara dam namely Purushwadi,

Ratanwadi Ghatghar, Udawane, Panjre, Murshhet, Mutkhel, Koltembhe Bhandardara, Chichondi, Bari Shivar are the recognized village in the name of fireflies festival. A very scanty literature and research work is available about such miraculous festival usually fall at fag end of May month lasting towards mid of June month every year. A millions of fireflies generated during these days.

### **Coexistence of Fireflies with plant species –**

The abundance of fireflies has been observed in the following sequence. The lightening

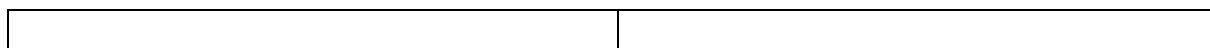
**Bondra – Hirda - Satada – Jambhul – Amba – Bichkut –Kurpa ( Local names of plants)**

*(Note – This sequence is noted during the field work of 01 June to 02 June 2021)*

SN	Marathi (local Name of Species)	English Name	Botanical Name	Family	Abundance of fireflies as per field observation (from 1 to 5. i.e. Minimum to Maximum)*
01	Bondra	Queen Crape Myrtle	Lagerstroemia speciosa (L.) Pers.	Lythraceae	5
02	Hirda	Myrobalan	Terminalia Chebula		4
03	Satada / Ain	Indian Laruel	Terminalia elliptica	Combretaceae	5
04	Jambhul	Java pulm / Indian blackberry	Syzygium cumini	Myrtaceae	3
05	Amba	Mango	Mangifera indica	Anacardiaceae.	3
06	Bichkut / Bahava	Golden shower tree	Cassia Fistula	Fabaceae	2
07	Kurpa	Soapbeery	Lepisanthes tetraphylla	Sapindaceae	2

(Note- \*Values based on field observation)

### **Photo Plate No. 2 -**





**Bondra** (*Lagerstroemia speciosa* (L.) Pers.)



**Hirda** (*Terminalia Chebula*)



**Ain, Satada** (*Terminalia elliptica*)



**Jambhul** (*Syzygium cumini*)



**Kurpa-** (*Lepisanthes tetraphylla*)



**Bhava/ Bichkut** (*Cassia Fistula*)

### Fireflies – Life Cycle and Occurrence

*Abscondita* species( Photo-plate No1.) is the commonly observed firefly in the Bhandardara region of Maharashtra. Fireflies usually lives in diverse habitats

across the part of globe. The mating cycle of the most of fireflies occurs during the monsoon i.e rainy season. The fireflies observed across the part of globe from states of America to Europe to Asia. The



firefly population is exist typically in safest places such as waterlogged lands, marshes, riverbanks, adjoining places of dam water, with little human interference. The life cycle of every firefly species is differ from

#### Photo plate No.1



**Dead Specimens of Abscondita collected from electrified rooms during the field work.**

#### The role of Bhandardara Vernal pool and natural vegetation in development of Fireflies-

The Dam was constructed in British era i.e in 1903 under the guidance of English Engineer Arthur hill. The construction of dam was constructed in the year 1926. The Governor of that Mr. Lislle Wellesley inaugurated the dam on 10<sup>th</sup> December 1926. The dam is recognized in honor of Mr. Wilson and reservoir is named after as Arthur lake. The dam was built on Pravara river and this vernal pool leads to boost the firefly population simultaneously. Bhandardara dam backwater ( standing water) levels dropped at alarming rate during the time of summer leads to complete dry. In the backwater of Bhandardara dam at some places lowlands are partially and fully vegetated which coexists with adjoining permanent natural vegetation. As the water level dropdown the concern area became free of fishes and the suitable habitat is formed with some

one another. Usually some species may live for two or more years. The life of fireflies shrinking after larval stage. Scientists believe that Abscondita species may live for seven-eight months.

semiaquatic species like frogs, different crabs, turtles etc.

#### Fireflies prey predator relationships-

The studies associated to prey predator relationship of fireflies are scattered and research scholars aren't sure about herbivores and carnivores pattern of firefly's species. Usually larvae of study species in Bhandardara region is namely Abscondita species, which is living off some small insects, snails exist within muddy and waterlogged areas. The wet areas are preferable to fireflies. As mentioned in the Photo-plate No.2, the local natural vegetation in Bhandardara dam regions in its full blossom. The Bondra, Hirda, Satada plants blooms with flower. Specifically Bondra (Taman) and Satada (Ain) is mostly attracting plants to firefly's. The sequence of firefly's dominance is followed by plants namely Jambhul, Mango, Kurpa, Bichkut etc. Usually it is also reported in some study area's that, some firefly species fed on pollen grains, local grass species *Marvel*,

*Dongari, Pawanya, Ber, Surad, Harali etc.* Fireflies are strictly nocturnal in habit, hence they creep on grasses during day and in the night specifically after sunset they fly high into branches of trees to signal their mates. ( [www.firefly.org](http://www.firefly.org)). A very scanty literature is available about dependent food chain of firefly's in the sequence of trophic levels changing from herbivores to carnivores.

### **Constraints and policy perspectives for management of firefly *Abscondita* sps in Bhandardara region**

1. Ecotourism activity began during the months of June to till end of December put huge pressure of human interference in Kalsubai-Harishchandra WLS contrary to legal provisions made for Wildlife Protection Act 1972. Most of the tourist attracted by tourism agencies with striking awesomeness of Kalsubai-Harishchandra WLS.
2. Tourists are wonder in the Kalsubai-Harishchandra WLS up-to late night on day to day basis and throw the lights with torches over the trees with fireflies for photography purpose.
3. Even a little verbal communication and moving appearance in dark light also disrupts the successful mating behavior of fireflies and.
4. Fireflies are the only insect category which disturb with light pollution. To avoid this the strict ban on tourism activity is required during the fag end of May to Mid of June. There should not be permission to single tourist to enter in such areas.
5. The local villager's activity is permitted up-to evening. The mobilization of vehicles is need to restrict during night hours.
6. Street lights are not permitted during the May to Mid of June.
7. The Low intensity lighting in the red end of the spectrum is less disruptive, such lighting measure should be promoted for safety of villagers.
8. The In-situ conservation programs is the need of day. The protection of eggs and hatching in captive environment may be remedy to decline population of fireflies.
9. During fireflies festival villagers told that, in the remote area of Ratanwadi village on an average one vehicle pass at an interval of 30 seconds. Villagers reported the traffic jams also in remote area. The lakhs of tourist visit to various spots during monsoon.
10. The backwater areas are sown by farmers during the sliding of water levels from dams. The chemical pesticides and fertilizers leads to changing properties of soil near to marshy and waterlogged area, which is not favorable for growth of firefly.
11. The terrace farming in this area at peak level. For that clearing of canopy is most viable method preferred by local farmers. Decline of canopy in lowland and upland areas is serious concern witnessed during the field assessment.
12. The plants at the top of list about favor for mating behavior of fireflies are least valuable in the opinion of local residents. This mentality vanishing the canopy at an alarming rate. The lack of knowledge about ecological role is key constraint reported during field work.

### **Conclusion –**

The perspective plan of *Abscondita* firefly species is composed with in-situ conservation method. In situ method come up with idea of protection of vernal pools

and waterlogged land from interference of human activities. The counselling sessions for the farmers will be conducted to promote organic farming. The chemicals from agriculture constantly leaching to dam water may be responsible for changing water qualities of water and vernal pools. The upland areas of the sanctuary will be covered with water harvesting structures to arrest the rainwater and these structures may play the role of vernal pools for laying the eggs for firefly females. The afforestation activity will be carried out with consultation with local communities.

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