

***Eria meghasaniensis* (S. Misra) S. Misra, an endemic and endangered orchid of Similipal Biosphere Reserve, Odisha, India**

¹D. Behera, S.S. Jena², B.T. Panda³, H.N. Subudhi⁴ and S.P. Panda*

¹Central National Herbarium, Botanical Survey of India, Kolkata 711 103, West Bengal, India

²AJC Bose Indian Botanic Garden, Botanical Survey of India, Howrah 711103, W.B., India

³Regional Plant Resource Centre, Bhubaneswar 751 015, Odisha, India

⁴P.G. Department of Botany, Utkal University Bhubaneswar 751 004, Odisha, India

⁵National Rice Research Institute, Cuttack 753 006, Odisha, India

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ABSTRACT

In the state of Odisha, 139 species of orchids have been reported, of these 94 species are from Similipal Biosphere Reserve, Odisha, India. The population of the orchid *Eria meghasaniensis* (S. Misra) S. Misra, was located and thoroughly studied from the hills of Meghasani and Kahairiburu of Similipal Biosphere Reserve. It was found that the average height of the plants ranged from 7-15 cm. The light intensity available for each plant habitat was recorded during the month of November and ranged from 8000 to 10000 LUX. The phorophytic plants of *E. meghasaniensis* were *Syzygium nervosum* A.Cunn. ex DC., *Syzygium cumini* (L.) Skeels, *Homalium nepaulense* Benth. and *Careya arborea* Roxb. However, most of the species (more than 80%) was associated with *Syzygium nervosum* A. Cunn. ex DC. While analyzing the populations of *E. meghasaniensis* (S. Misra) S. Misra, it was found that the populations spread over an area of 4 Sq. Km. only with an elevation ranging from 1000 to 1170 meter. There is no suitable mycorrhiza for seed germination. In vitro seed germination should be attempted for conservation of this orchid species.

Key words: Population, *Eriameghasaniensis*, Orchid, Similipal Biosphere Reserve, Conservation

Introduction

In India, more than thousands of orchids are growing at the different natural habitats, out of which 400 species are endemic. In Odisha, 139 species have so far been reported, of these 94 species are collected from orchid hot spot area i.e., Similipal Biosphere Reserve (Misra, 2014). Some of the orchids such as *Tania hookeriana*, *Bulbophyllum guttulatum*, *Pomatocalpadecipiens*, *Phaius tankervilleae* and *Dendrobium regium* are highly rare and population of these species is gradually shrinking from the

state of Odisha. Similipal, the only biosphere reserve for the state of Odisha and 9th biosphere reserve of India included under UNESCO's list of Biosphere Reserve is the store house of both epiphytic and ground orchids (Map 1). Now it is facing serious threats to their survival in the terms of habitat loss, fragmentation of the forest covers, logging of trees etc. The orchid diversity of Similipal biosphere reserve and the ecology of orchids with respect to host specificity and other related aspects are completely lacking except the enumeration of species (Misra, 2004; Behera, 2014). In many rare orchids,

the seed formation is a complex process because of the requirement of specific insect or pollinator for imparting pollination. Moreover, as mentioned earlier the seeds rarely germinate. Because of these, the population growth is mostly due to vegetative propagation and this kind of growth decreases the genetic diversity of the population and species are becoming rare.

Materials and Methods

Data collection

Literature was surveyed for information on *Eria meghasaniensis* orchids species (Misra, 2004, 2007, 2014; Behera, 2014). Frequent field trips were carried out to collect data of *Eria meghasaniensis* from Similipal Biosphere Reserve during the year 2015 to 2018. During the tour, the author collected the data regarding number of plants, ecology, phorophytic species, elevation, geographical position, number of pseudobulb, inflorescence for analysis following Kumar (2007). The author recorded the light intensity of that place to know the habitat.

Results and Discussion

Eria meghasaniensis (S. Misra) S. Misra is an endemic and threatened sympodial orchid naturally occurring in Similipal Biosphere Reserve of Odisha. Its distribution is mainly restricted to Meghasani and Khairiburu hills of the protected areas (core area) of the Similipal Biosphere Reserve. This species is unique being the presence of a globose spike having flowers with bilobulate labellum and placed in *Eria* section *Pinalia* Lindl. Although the species has been described in 1988 and has been located by many subsequent workers in last three decades but it has never been reported outside of its type locality.

It has been observed that 138 number of individuals were found in 14 sites within four sq.km. area in the evergreen forest patches of core zone of the Similipal Biosphere Reserve. Most of these plants were found growing on *Syzygium nervosum* A. Cunn. ex DC. The flowers were somewhat cleistogamous and thus fruit set is a natural phenomenon. But despite of successful fruit set (Fig. 1), very few seedlings were observed in the type locality during the study. This may be due to non-availability of suitable mycorrhizal association for seed ger-

mination or any other climatic factor associated to it. Maturity of seeds and their viability could also be an issue for reduced seedling development. The light intensity available for each plant was recorded during the month of November and was from 8000 to 10000 LUX. We have identified the host plants and it is observed that the *Eria meghasaniensis* plants were mostly associated with five phorophytic plants namely *Syzygiumner-vosum* A.Cunn. ex DC., *Syzygiumcumini* (L.) Skeels, *Homaliumnepaulense* Benth. and *Careyaarborea* Roxb., however, the association are not found to be host specific.

This species occurs in the core zone of a protected area and therefore, there is no record of anthropogenic exploitation for this species, still its population

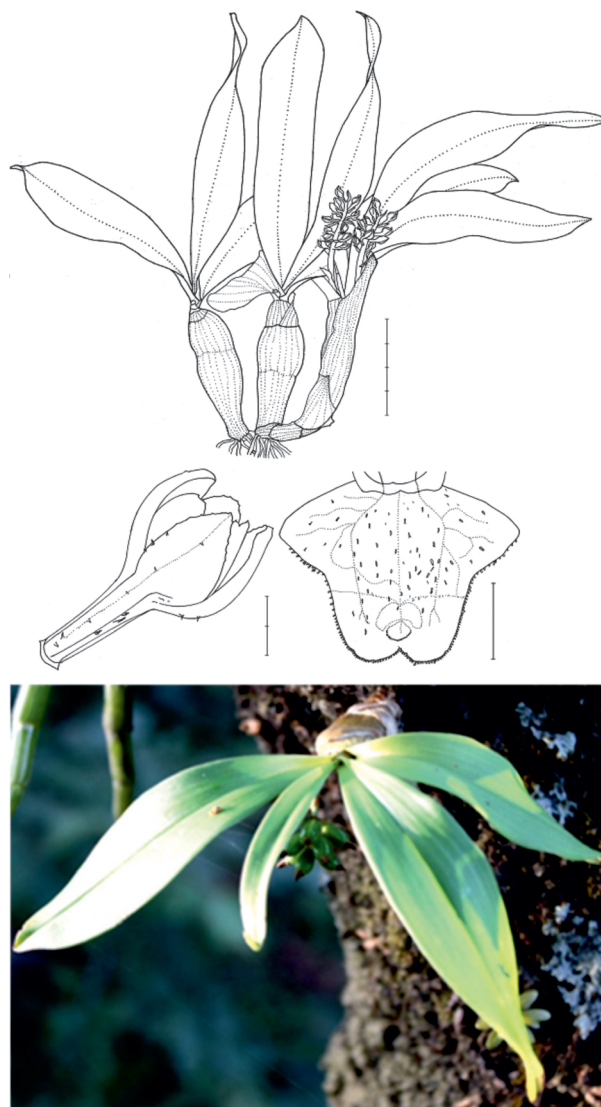


Fig. 1. *Eriameghasaniensis*(S. Misra) S. Misra

is under severe threat of declination. Its habitat experiences high summer temperature and heat wave. Being a sympodial orchid, this species has effective vegetative mode of propagation through new shoot developing from the matured pseudobulbs annually. But during the present study it has been observed that, these vegetative new growths have been infected with some pests (Fig. 2) and aggregation of many small pseudobulbs were found detached from the host plants (phorophytes) due to unknown reasons.



Fig. 2. Affected *Eria meghasaniensis* (S. Misra) S. Misra by insect and natural calamity; a & b. plant infected by insect; c & d: plant detached from phorophyte

Due to the narrow distribution range, small population size and all other associated threats, this species assessed as 'Critically Endangered' and needs immediate attention for conservation. For this purpose, a long-term population monitoring programme along with identification of ecological drivers threatening this species must be identified on priority. In-vitro propagation and reintroduction can also be served as an important tool for conservation of this endemic species.

Taxonomic Treatment

Eria meghasaniensis (S. Misra) S. Misra in J. Orchid Soc. India 3(1, 2): 69. 1989; S. Misra, Orchid. Orissa: 398. 2004. *Eriabilobulata* Seidenf. ssp. *meghasaniensis* S. Misra in J. Orchid Soc. India. 2(1, 2): 49, t. 1, 2. 1988.

Small tufted, pseudobulbous epiphytes, 12-16 cm tall, stem covered with progressively larger sheaths; old pseudobulbs clavate-fusiform, compressed face

to back, 2-3 noded. Leaves 2-4 on top the stem, elliptic-lanceolate, acuminate, 75-135x15-30 mm, narrowed below to an articulate sheathing base; base rusty brown-dotted. Inflorescence subterminal from behind the leaf-base, 1-3 per plant; peduncle c. 20 mm long, greenish white; rachis c. 95 mm, with 10-16 flowers. Bracts slightly longer than the pedicel and ovary, c. 5x2.5 mm. Flowers c. 5 mm long, perianth not wide-opening, unequal, mucronate, sparingly dotted with linear glands. Sepals off-white; the dorsal truncately ovate, apical edge narrowly involute; laterals obliquely ovate-lanceolate. Petals white, oblong-ovate, not much oblique. Lip included in the lateral sepals, erect, \pm parallel to the column, sessile; 3-lobed; lateral lobes erect, ovate-triangular, pale yellow; terminal lobe bright yellow, scabrous, ovate-truncate, shortly bilobulate with rounded tips, with an orbicular to elliptic warted patch slightly above the notch of the lobules.

This species is characterized by a fusiform flattened stem; short subterminal flowering spike, with a few not well-opening off-white flowers.

Flowering: September- early October; flowers last for about a week.

Fruiting: October - March

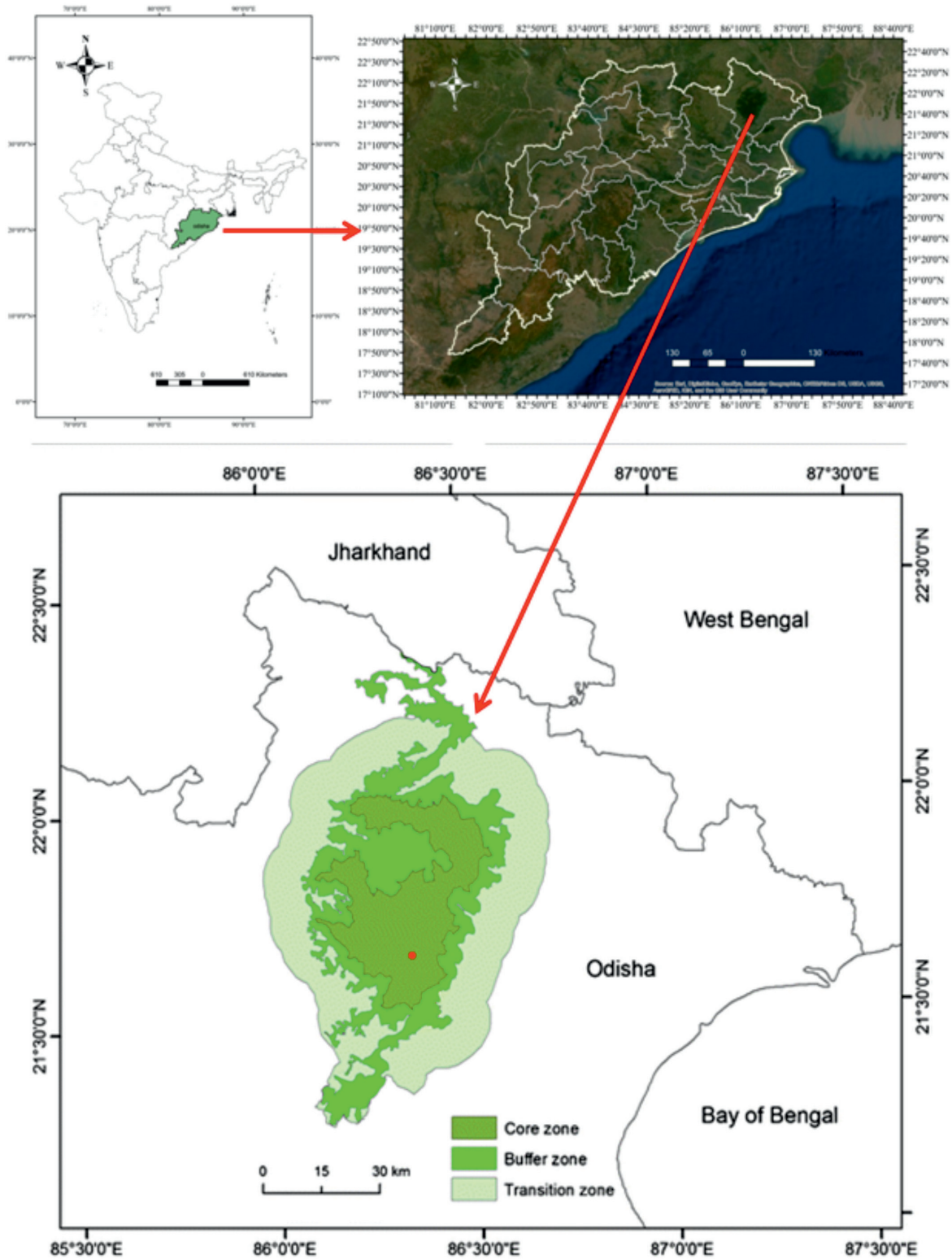
Habitat: In semi-evergreen moist montane forest, at about 1100 m, on folds of hill slope, epiphytic on moss-covered tree trunks at low heights, in somewhat exposed situations.

Field notes: New foliar shoot appears in April - May and develops fully by middle of August. Floral shoot appears in the last week of August; flowers appear all at a time.

Locality: INDIA (Odisha; Similipal, Meghasani hill, nearing the peak; Khairiburu hill, nearing the peak).

Status: Endemic; Critically Endangered

On analyzing the populations of the *Eria meghasaniensis* it is found that the populations spread over an area of 4 sq. km. It started from the Khairiburu Hills to Meghasani Hills of Similipal Biosphere Reserve. Altogether 14 numbers of populations were located in the recent study and the maximum numbers of individuals were recorded on growing at the population number 6 (Table 1). It is also found that majority of the plants are growing on *Syzygium-cerasoides* and seems to be the most suitable host for *Eria meghasaniensis*. In most of the populations, inflorescence bearing capsules has been noticed. It seems that the pollination is of cleistogamous type as all the flowers produced seed bearing capsules. Out of the total number of populations analysed, only one



Map 1: Study area: a. India map highlight Odisha state; b. Odisha state; c. Simlipal Biosphere Reserve and its adjoining areas (red dot showing the 14 population area)

Table 1. Population structure of *Eriameghasaniensis* in Similipal Biosphere Reserve

Popula- tion No.	Geographic Location	Ele.In (M)	Name of Phorophyte	No. of Plant / Phorophytes	Mean no. of Pseudobulb	Leaf / Plant	No of Inflo. /Plant
1	N - 21°37'50.8" E - 86°20'0.27"	1020	<i>Careyaarborea</i>	3	9	1-2	0-1
2	N - 21°37'50.0" E - 86°20'60"	1030	<i>Syzygiumcerasoides</i>	4	13	1-5	0-4
3	N - 21°38'04.6" E - 86°20'0.26"	1080	<i>Syzygiumcerasoides</i>	3	7	1-4	0-1
4	N - 21°37'54" E - 86°20'20.2"	1080	<i>Careyaarborea</i>	3	7	2-3	1
			<i>Syzygiumcerasoides</i>	2	5	0-1	0
			<i>Syzygiumcerasoides</i>	3	2	1	0
5	N - 21°37'02.5" E - 86°20'30.6"	1148	<i>Syzygiumcerasoides</i>	6	9	1-3	0-1
			<i>Syzygiumcerasoides</i>	18	9	0-5	0-3
6	N - 21°37'58.7" E - 86°20'33.0"	1158	<i>Syzygiumcerasoides</i>	2	3	1	0
			<i>Syzygiumcerasoides</i>	8	6	1-2	0-2
			<i>Syzygiumcerasoides</i>	8	4	1-3	0-2
			<i>Syzygiumcerasoides</i>	7	4	1-3	0-1
			<i>Syzygiumcerasoides</i>	7	6	0-2	0-1
7	N - 21°38'59.9" E - 86°20'48.1"	1147	<i>Syzygiumcerasoides</i>	5	6	1-2	0
8	N - 21°38'13.3" E - 86°21'19.5"	1114	<i>Syzygiumcumini</i>	3	3	1	0
			<i>Syzygiumcumini</i>	1	3	1-2	1
			<i>Homaliumnepalense</i>	6	3	1	0-1
			<i>Melia dubia</i>	2	2	1-3	0
9	N - 21°38'14.4" E - 86°21'35.5"	1090	<i>Syzygiumcerasoides</i>	3	5	1-2	0-3
10	N - 21°38'13.1" E - 86°21'16.3"	1131	<i>Syzygiumcumini</i>	5	5	1	0-1
			<i>Syzygiumcerasoides</i>	1	4	1-2	1
			<i>Syzygiumcerasoides</i>	7	4	1-3	0-1
			<i>Careyaarborea</i>	4	5	2-3	0-1
11	N - 21°38'14.7" E - 86°21'12.7"	1117	<i>Syzygiumcumini</i>	2	7	1-3	0
12	N - 21°38'56.9" E - 86°21'38.2"	1144	<i>Syzygiumcerasoides</i>	10	4	1-4	0
13	N - 21°38'57.6" E - 86°21'35.7"	1171	<i>Syzygiumcerasoides</i>	4	5	1-5	0-3
14	N - 21°38'58.7" E - 86°21'34.1"	1163	<i>Syzygiumcerasoides</i>	11	5	1-4	0-4
			<i>Syzygiumcerasoides</i>	3	12	2-4	1-3

seedling was observed in the seed germination process.

Conclusion

In the current study, the total number of *Eria meghasaniensis* plants and its population was well studied. The authors documented both phorophytic plants and the ecological parameters which show that the plants are phorophyte specific in its locality. The major threat is due to its less seed germination in the natural habitat and the natural death of the orchids. This above criteriocreates these plants more rare and endangered day by day. It is also try to understand the biology properly like flowering time, vase life of flowers, pollination methods, seed development process for these orchids to know its cause of rarity. Pollinator identification is also an important aspect

for conservation of orchid species. The fungal and insect association of all the populations should be characterized in order to identify the possible dependency of the orchid on these organisms for natural germination. There are many ways to study the conservation aspects of this group of plant, but the important as well as immediate step need to be taken is to propagate and reintroduce the orchids in their natural habitats. Germination of such orchids is not possible under natural conditions as the seeds do not have stored food (endosperm) in their seeds. Moreover, for conservation purpose, in vitro propagation and reintroduce in the natural mother habitat of *E. meghasaniensis* may increase its population.

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