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Short communication

A new Distribution Record and Conservation Plea of Parasitic Angiosperm, *Sapria himalayana* Griffith in Manipur

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Abstract: *Sapria himalayana* Griffith (Rafflesiaceae), a poorly understood root parasitic angiosperm was recorded from the Machi community forest of Tengnoupal district, Manipur at two different spots in the month of October 2020. This paper reports a new distribution record of this endangered species and attempt to reveal the knowledge associated with the local people about this species. In fact, the villagers have no idea about the rarity and conservation status of the species. Due to lack of knowledge and accelerated progress of developmental activities, many sites have been degraded losing number of native species and their habitats. Therefore, it is imperative to recognize the Machi community forest as the valued habitat of *S. himalayana* and needful regulation and supervision should be made by the Forest department involving the local villagers for conservation.

Key words: Parasitic angiosperm, *Sapria himalayana*, Endangered species, Conservation, Machi, Manipur

Introduction

Sapria himalayana Griffith, is an interestingly rare, endangered, and poorly understood holoparasitic angiosperm belonging to Rafflesiaceae family. Angiosperms are the most diverse group of plants that includes parasitic plants. The parasitic plants are found in different habitats across the globe ranging from tropical rain forest to tundra region and they hold important component of vegetation with unique mode of life. There are approximately 4,500 parasitic plant species in the world (Heide-Jørgensen, 2008) wherein parasitic angiosperm contributes about 4000 species (Musselman, 2009; Press and Phoenix, 2005), accounting for 1-2% of 2,58,650 angiosperm species (Raynal-Roques and Paré, 1998; Press *et al*., 1999; Zhang *et al*., 2018). However, there is a very limited study across the countries on diversity of parasitic angiosperms and underlying factors that influence its distribution in different habitats. Such plants specifically *Sapria* Griffith, are restricted in distribution and are confined to virgin forests particularly in humid tropics (Adhikari *et al*., 2003).

Manipur, a state in North-East India, is characterized by dense temperate and tropical forests contributing 90% of the total area. The state is a part of Himalaya and Indo-Burma biodiversity hotspots supporting about 50% of total India's biodiversity (Mao *et al*., 2009). The state harbors over 3,000 species of higher plants having 75 species of endemic plants and 41 primitive flowering plants under 11 families (Singh *et al*., 2000). However, many hilly forests of the state are not fully explored in terms of their floristic assessment but, various developmental activities, encroachment for settlement and resources exploitation are impacting the forest area and its resources to a larger extent before being studied scientifically. Therefore, discovery of any new species or record of new distribution site of any unique species is worthy to

discuss and set additional information in the database of flora and fauna. Such record, in fact, helps in formulation of conservation and management plan of the region and specific forest site.

Sapria Griff. is one among the three genera belonging to the family Rafflesiaceae which are holoparasite on various species of *Tetrastigma* lianas that produces either male or female flowers. *Sapria* is well distinguished from the other two genera by having 10 valvate lobes separated as an outer and an inner series (Tr§n *et al.*, 2018). *Sapria* presently consists of three recognized species: *S. himalayana* Griff., *S. poilanei* Gagnep. and *S. ram* Banziger & B. Hansen (Tr§n *et al.*, 2018; Bänziger, 2000) while the Rafflesia has about 28 species and Rhizanthes has 4 species. The three species of *Sapria* were recorded in sub-tropical regions of mountain forests in the Southeast Asia (Banziger, 1997; Elliott, 1990). In northeastern India, *Sapria himalyana* was first reported from Mishmi Hills in Lohit district (Griffith, 1844; Griffith and McClelland, 1847) and subsequently from Aka Hills in Kameng district (Bor, 1938) of Arunachal Pradesh. It had been categorized under endangered species in Red Data Book of the Botanical Survey of India (Nayar and Sastry, 1987).

The present paper reports the first scientific record of *Sapria himalayana* with photographic evidence in Tengnoupal District of Manipur. A group of Maring tribal community residing at Machi village (Chhokar, 1984). Earlier the species was reported from Koubru hills in Manipur (Deb, 1961) further, there was a newspaper report from Tamenglong district of Manipur in 2018. The aim of this corresponding report is to supervise the ground level conservational practices that can performed by the local people by acknowledging the limited distribution and rarity of species.

Materials and methods

In the month of October 2020, a field survey was conducted for vegetation analysis in Machi community forest of Manipur. This forest is located at 1443 m amsl (above mean sea level) covering approximately 205 hectares near Machi village (lat. 24°302 30.803 N and long.94°082 29.963 E) of Tengnoupal District (Fig. 1). Surprisingly, during the field survey a fascinating and unusual, magnificent flower blooming on the forest floor was encountered at two different spots. The characteristics features of the encounter flower were systematically studied consulting the relevant literature and it was identified as *Sapria himalayana* Griffith. The survey resulted in documentation of two populations of *Sapria* Griff. at Machi community forest area. Both the populations were examined to determine if they formed a 'cluster' as describes by Bänziger (2000) and

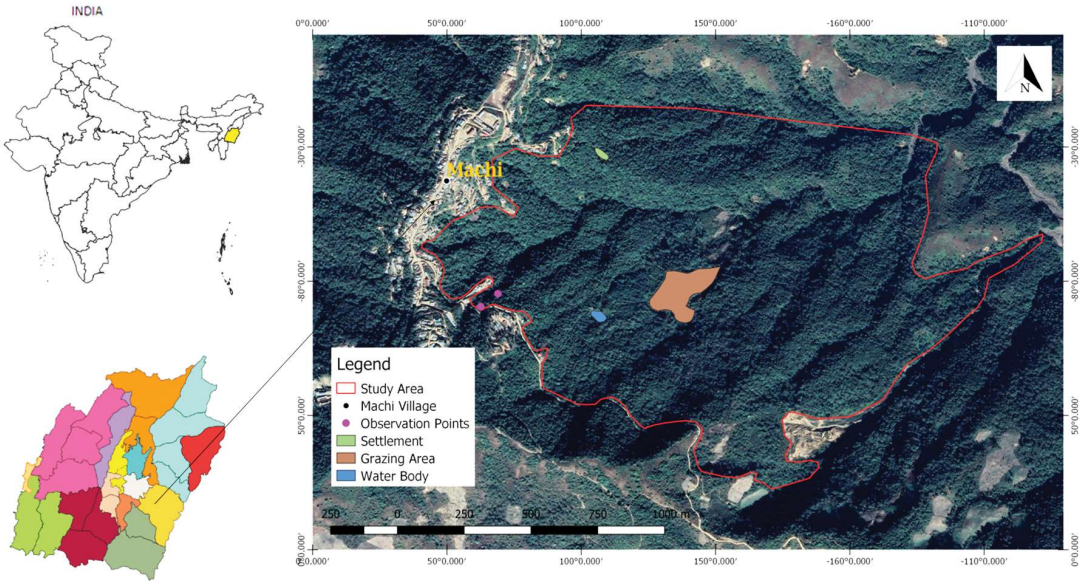

Fig. 1. Showing map of study area Machi community forest of Machi village.

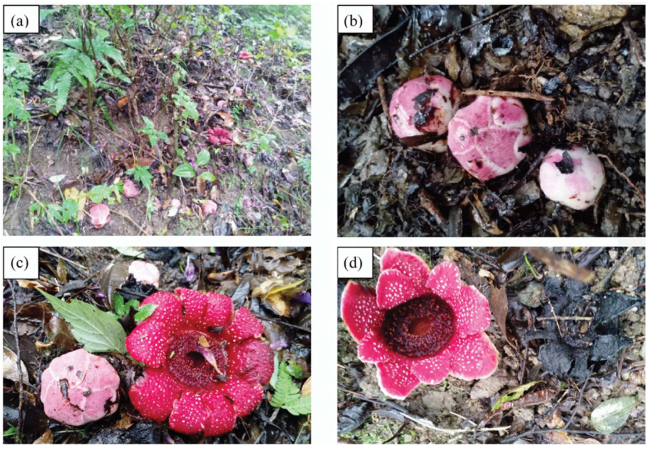

Fig. 2. Showing (a) Natural habitat of *S. himalayana* in the Machi community forest, (b) Flower buds, (c) Female flower with ten bracts and buds, and (d) Colour changes of the flower bracts.

Fig. 3. Host plant of *S. himalayana, Tetrastigma vine* in their natural habitat.

counted the number of individuals examining their microhabitat and measuring the size of the buds and flowers. Observation notes and photographs of different parts of the plant were taken. The host plant of the *Sapria himalayana* was also confirmed with the help of the available literature as well as with the help of local elders who had the prior knowledge of the species.

Results

Sapria himalayana Griffith (Rafflesiaceae), a narrowly host-specific root parasitic angiosperm (Fig. 2) which was listed under endangered species in the Red Data Book of the Botanical Survey of India (Griffith, 1982) was observed in the forest floor of Machi village. The spectacular pinkish-red colour buds directly emerging from the host root of *Tetrastigma* vine (Fig. 3) was like the masterpiece in the habitats. The buds appear just above the ground and the flower remains erect and unbranched. Buds are globose with pink and white bracts while open bloom flower comprises of 10 bright red colour bracts covered with sulphur-yellow dots. Bud size were measured using ruler and found in the range of 4 to 8 cm while flowers size ranges from 15 to 20 cm diameter across. It was observed that the flower blooms for 2 to 3 days and colour of the bracts becomes dark which subsequently decomposes slowly. It has an unpleasant odour but have no evidence of attracting pollinating agents in their vicinity. *S. himalayana* is most likely to be annual, budding and flowering occurs during winter usually from October to December. The host plants are generally lianas, like *Vitis* and *Tetrastigma* vines that belong to the grape family Vitaceae. It was found to be confined in small patches and buds emerges only from the secondary roots of host plant *Tetrastigma* vine. Hence the patches of buds and flowers observed were till nearly 4m away from the host plant. The habitat area was moist, humid and covered with litters which form a specific microclimatic condition suitable for the species.

The species was sighted in two spots in cluster at Machi community forest area. Nearly sixty buds, ten widely open flowers, few mid open flowers and dead flowers were recorded from these two spots. This community forest area is a primary forest dominated by *Cinnamomum sp.* and other associated species like *Juglans sp., Pyrus pashia, Schima wallichi,* etc. Field survey was extended in nearby surroundings area to explore, if any another localised area of this species. But no other population of this species was observed in nearby localities. However, an extensive field survey is needed to corroborate any other patches of *S. himalayana* in this forest area.

Discussion

The geographical distribution of this hardly understood taxon *S. himalayana* is highly restricted and reported mainly from the North-eastern region of India, southwest China, Vietnam and Thailand (Banziger, 1997). A distribution record was also reported from Mizoram, northeast India (Pandey *et al.*, 2013). In Manipur, the first distribution report of *Sapria himalayana*

was from Koubru hills in Senapati district (Deb, 1961) and another recent report was from Tamenglong district in 2018 (a news report from Sangai Express). The present paper represents the first distribution record from Machi, Tengnoupal district, Manipur. Unfortunately, due to the lack of knowledge and induced human activities, considerable areas of natural habitats of Machi community forest are nearly exploited before being studied and documented in terms of their biodiversity status and potential values. This Machi community forest is being encroached gradually by villagers for agricultural purposes. Such factors may lead to the degradation of the natural habitat of *Sapria* Griffith. Through informal interview with the local people, it has been recorded that local people does not have any knowledge about the importance and utility of this holoparasitic plant. Moreover, they have no idea about the rarity and conservation status of the species and its habitats. Villagers of Machi village informed that earlier the species was seen in several areas of the village forest, but it is now restricted in some localized areas. Whenever, people sighted this rare structure, they tend to pluck it out of curiosity without hesitation. Anthropogenic activities like encroachment of forest for the expansion of village area and new village settlement as well as shifting cultivation have severely damaged the host plant *Tetrastigma* vine and changed the mosaic of the natural habitat of the rare *S. himalayana.* Although, it is not clear whether the elimination of this species affects the overall stability of the ecosystem (Arunachalam *et al*., 2004) but it is very much clear that loss of any species will draws several undesirable effects in the community. It is also recommended that special attention for *in situ* conservation of the species should be given due to its limited distribution, biological curiosity, genetic rarity and its host specificity in parasitism (Adhikari *et al*., 2003).

Therefore, it is very essential to give awareness for conservation of these natural sites (Machi community forest), also to impart education about the value of this root parasitic angiosperm and its host plant to the local people. If no regulation and supervision, in near future this particular species may lose as they have no record of potential value to provide food, drugs and other useful commodities (Norton, 1988) for the people. In fact, it is imperative to recognize the Machi community forest as the valued habitat of *S.himalayana*. Further, Forest department should take a lead to formulate an appropriate conservation strategy involving villager's and their participation for the conservation of this species and its natural habitat.

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