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RESEARCH ARTICLE

EFFECT OF VARIOUS FACTORS WHICH ENDANGER THE SURVIVAL AND MULTIPLICATION OF *LILIUM MACKLINIAE* SEALY, THE STATE FLOWER OF MANIPUR

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ABSTRACT

Lilium mackliniae Sealy or Siroy Lily, belonging to the family Liliaceae grows at an altitude of 2427 m - 2590m ASL, 25° 06' 52.1" N latitude and 094° 26' 52.2" E longitude at Shirui Hills of Manipur has unfortunately become a rare and endangered species in its own natural habitat due to over-exploitation and environmental degradation. A brief study on how the plant growth was affected by various physical factors endangering the plant are studied. The study reveals that the plant grows well in the colder areas with high velocity of wind as compared to the hotter areas with less velocity of wind. Forest fire caused by the villagers every year destroys the seed and the seedlings as it was observed that the *Lilium mackliniae* which grows and survives the forest fire has a long and deeply rooted plant around 10-15 cm underneath the ground and new propagation of seedlings is rarely seen on the open slop. Tourists also adversely affect the survival and reproduction of the plant while walking inside the habitat as they usually stamp on the plant intentionally or unintentionally leading to the destruction of the plant which will ultimately reduce the regeneration of the plant species.

INTRODUCTION

Lilium mackliniae, commonly known as Siroy Lily, belonging to the family Liliaceae, is the State flower of Manipur. It is also known as Kashong Timrawon in the local Tangkhul vernacular was first discovered by a British Botanist named Frank Kingdon-Ward in 1948 and bagged the coveted merit prize of 1948 at Royal Horticultural Society Flower show in London. The plant grows at an altitude of 2427 m - 2590m ASL, 25° 06' 52.1" N latitude and 094° 26' 52.2" E longitude at Shirui Hills in Ukhrul District of Manipur. It was declared the State flower of Manipur on 21 March, 1989 but has unfortunately become a rare and endangered species in India. The Ukhrul district headquarters is situated 83 Kms away from Imphal in the east and Shirui hills where the lily grows is 16 kms away from the Ukhrul district headquarters which is mostly inhabited by the Tangkhul tribe. But a number of biologically rich areas like North-East Region located in the Indo-Burma Biodiversity Hotspot have not been fully explored and studied even though it encompasses a broad range of ecological habitats. As time passes by, these plant genetic resources are getting eroded significantly due to over-exploitation, habitat fragmentation, and environmental degradation. Therefore, in order to protect the plant and help it reproduce efficiently; a report is presented on the various physical factors which affect the survival and the multiplication of this endemic species rendering it endangered in its natural habitat.

The scientific classification:

Kingdom: Plantae
Order: Liliales
Family: Liliaceae
Genus: Lilium
Species: *Lilium mackliniae*

MATERIAL AND METHODS

The study was done at the natural habitat at an elevation of 2427m–2590m above sea level in Shirui hills of Ukhrul district of Manipur, India located under, 25° 06' 52.1" N latitude and 094° 26' 52.2" E longitude. The various physical factors such as climatic, invasive species and anthropogenic activities etc. which affect the plant growth and multiplication were studied.

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RESULTS

Climatic factor

Climate plays an important role in the survival and multiplication of the plant. With increasing altitude, the temperature deceases and on the peak a cold climate with high velocity of wind mostly under the cover of the cloud is experienced. The *Lilium mackliniae* plant grows abundantly there. The plant is hardly spotted in the lower range of the hill where the climate is warmer and humid with lower velocity of wind. This clearly indicates that *Lilium mackliniae* plant is greatly influenced by the temperature. According to the villagers, the place has become much warmer and hotter now as compared to those days when the *Lilium mackliniae* plant was reportedly to be abundant and found growing even on the first peak of the Siroy hill ranges. The plant size of *Lilium mackliniae* has also adversely been affected by the change in the climatic condition which has become comparatively hotter. The plant was reported to be 5ft tall by Kingdon-Ward in 1948 but in 2011, the plant height was recorded to be 1-3 ft (Meitei, 2011). The present field study shows that the plant size has drastically decreased to about 0.262 ft to 0.328 ft only which corrdorates an earlier report of the dwarfing of Siroy Lily by climate (Anonymous, 2013)

Invasive species

The habitat of Shiroy Lily is also threatened by the invasion of 'Machun', a dwarf bamboo species growing abundantly in the Shirui hills (Meitei, 2011). This results in the hampering of the growth and multiplication of the plant and thus it a cause for concern.

Anthropogenic activities

Forest fire

The forest fire has a great influence - both negatively and positively, upon the growth and propagation of plants in general and the *Lilium mackliniae* in particular. It is observed that *Lilium mackliniae* which grows and survives the forest fire has a long and deeply rooted plant around 10-15 cm underneath the ground. New propagation of seedlings is rarely seen on the open slop because the seeds are burnt out during the forest fire. Therefore forest fire has also greatly reduced the plant density as it kill the plant, seeds and seedlings. The forest fire alters the habitat which results in the negative effect on the growth and survival of *L. mackliniae*.

Tourist

The tourists who throng the Sirui hills in thousands every year during the flowering season of the *L. mackliniae* have also adversely affected the survival and reproduction of the plant. Tourists, while walking inside the habitat, usually stamp on the plant intentionally or unintentionally leading to the destruction of the plant. They usually dump wastes and plastics and pollute the environment threatening the sustenance of the species. They also randomly pluck and uproot the flowers thereby adversely affecting the reproduction of the plant which will ultimately reduce in the propagation of the plant.

DISCUSSION

Climate has affected both plants and animals drastically. Bera *et al*., 2011 reported the change of climate in the Dzuku valley which has a similar climatic condition and vegetation with that of Shirui hills. Meitei, 2011 also reported that the plant was found in the third peak of the hill but in the present study plants are found mainly only at the seventh peak of the hill near the cross. The plant was reported to be 5 ft tall by Kingdon-Ward in 1948. Meitei, 2011 has also reported the height to be 1-3 ft but at present, the average height of the plant is only 0.262-0.328 and maximum height upto 0.984. This report support the earlier paper published in the Sangai Express (a local daily in Manipur) on the dwarfness of the plant (Anonymous, 2013).

This dwarfness is greatly attributed to the climatic change as the plants are much abundant in the higher altitude where it experiences a much colder environment with high speed of wind and mostly under the cover of cloud. But in the lower altitudes, where it experiences much hotter, humid and less speed of wind, the plants are less frequent. On the other hand, the local people burn down the forest in order to increase the humus of the soil so that the *Lilium mackliniae* can flourish. The local people also presume that the fire helps to maintain the invasive species and the growth of the lily species. Many workers also supported the above view (Hessl and Spachman, 1995; Safford and Harrison, 2004; DeBano *et al*, 1998).

However, on the contrary, it has been noticed during this study that, forest fire has a negative impact on *Lilium mackliniae* by adversely affecting the climatic factors and the dispersal of the species by burning down the seeds and the fragile seedlings thereby decreasing the population and retarding the growth. Mao and Gogoi, 2013 also reported that forest fire and colonization by the dwarf bamboo threatened the *Lilium mackliniae*. Mcmaster, 2010 described the effect of fire on the landscape after the fire. Thus, fire has both positive and the negative impact on the growth and survival of the plant. Tourists also add to the problem in decreasing the plant population. Every year tourists throng the Shirui hills in large numbers just to visit the beautiful *Lilium mackliniae*. The tourist trample on or pluck off the plants which lead to considerable decrease in the plant number and also affect the reproductive cycle of the plant which will ultimately reduce the population of the species in the natural habitat.

It is concluded that climate and forest fire has adversely affected the growth and survival of the species. The population of the species has decreased as the seeds are burnt during the fire. The plant height has also reduced each year due to the climate. Tourists also add in the complication of the matter by indirectly affecting in the plant conservation. Therefore, there is an urgent need of the public as well as the Government authorities to understand the prevailing situation which is hampering the survival of the State flower and to take up

conservative measures at the earliest. Otherwise, the *Lilium mackliniae* will vanish from its natural habit and the State flower will remain only as a namesake.

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