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Distribution and ecology of *Drosera burmannii* from Ranchi, Jharkhand

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ABSTRACT

The major parts of the forest of Jharkhand belong to the Tropical Dry Deciduous forest whereas the Chaibasa region of this state confirms the presence of moist tropical deciduous forest mixed with the species of tree, lianas, shrub, and epiphytic parasitic, aromatic and medicinal herbs as well as of insectivorous plants. Drosera burmannii is an annual insectivorous plant popularly known as Sundews. During the floral survey works, D. burmannii is recorded from Ranchi district. The population, morphological variation, ecological characters and threats were observed along with the minerals present in the soil. The anthropogenic activities were also observed. Therefore, population of this naturally growing plants and habitat should need to be conserved before this plant face the day by day global changes.

INTRODUCTION

Ranchi is the capital of Jharkhand State, situated in the Chotanagpur plateau at the Longitude 84°20' to 85°54' east and the Latitude 22° to 23°15' north having an area 5,097 km² inhabited by a number of tribes from time immemorial (Kumari & Kumar 2001). Although a fast growing cosmopolitan city, it has preserved the

culture of its original inhabitants. The tropics of cancer pass through the northern region of town. The soil of the study area comprises of red and laterite type soil. Red colour of red soil is due to the presence of high percentage of iron components. The laterite soil is less fertile because of the presence of iron and manganese oxide in the

soil (Das et al. 2019). Ranchi represents the hilly region of Jharkhand which ranges between 300-629 meters above sea level, so it is the cooler part of the state. The biodiversity of the state is under some threat due to a variety of adverse factors like mining, roads and, rails construction, dams and irrigation schemes, construction of mineral based factories and industries, stone quarrying and unrestricted grazing by free range cattle etc (Lal et al. 2012). The forest of Jharkhand area is mainly consist Tropical Dry Deciduous type mixed with the species of tree, lianas, shrub, and epiphytic parasitic, aromatic and medicinal herbs as well as of Insectivorous plants (Kumar & Saikia 2019). *Drosera* is a cosmopolitan genus of insectivorous plant consists of approximately 200 species (Mishra & Kumar 2020). In India, three species of genus *Drosera* are found viz., *Drosera burmannii*, *Drosera indica* and *Drosera peltata* (Jayaram and Prasad 2006). This carnivorous plant was recorded by Henry Haselfoot Haines in 1921 from Chhotanagpur. Recently, *Drosera burmannii* reported from the Palamau Tiger Reserve, Jharkhand, India (Bakshi et al. 2007). *Drosera burmannii* is an annual insectivorous plant popularly known as Sundews or tropical sundew, distributed widely in China, Japan, Malaya, West Africa and Australia, with their rosette-like leaves covered with sticky glandular hairs and trichomes which trap insects (Nordbakken et al. 2004) and listed under least concern categorized by IUCN is also seen well growing in large number at some area of Ranchi district. Keeping the importance of *Drosera burmannii*, a survey was made to study its ecology and morphological variations along with threats.

MATERIALS AND METHODS

Study area

The *Drosera burmannii* have been sighted on March year 2017 at the Longitude 85°19'15" east and the Latitude 23°15'50" north exact location situated in between the 100 meter wide open area near the outside boundary (Northwest) of Jharkhand Biodiversity Park, Lalkhatanga and outside boundary (Southeast) of Jharkhand Forest Department Nursery situated at Garkhatanga, Ranchi. Author identified this carnivorous plant near the marshy ground and adjoining small paddy field in which ones in year farmer cultivate the rice crop, where the availability of moisture is maintained by underground and running water (only during monsoon season) coming from a Check-dam of about (30 meter x 400 meter) positioned in its eastward direction of about 25 meter far away from plant habitation. The nearby area of insectivorous plant habitat having two very small water pond in which one is in use by local villagers of about 10-15 families. The surrounding area has dominant with Sal forest (Plate 1). For soil nutrient status, 3 sites were selected out of which site- ii represents the soil from insectivorous plant zone and site –i and iii were reveal the status of surrounding area soil health. All the individual plant were counted and collected specimens had been processed to put up on the herbarium sheets as per method proposed by Jain & Rao (1997). The only density (Total no. of individual of a species/Total no. of quadrates studied) of this plant is calculated by the author in 1 meter quadrates.

RESULTS

A total 10 quadrates (1meter x 1meter) were placed in the study area, the diameter of the mature *Drosera* rosette ranged from 1.4 cm. to 2.1 cm, while the diameter of the rosette of juvenile plants was 0.9 cm. to 1.6 cm (Figure 1). As far as the soil nutrient status

has been concern, the paddy field area (study site-ii) was rich in nitrogen in soil, due to somehow agriculture practice or may be enriched by presence of these plant in compare to surrounding area soil status (site-i and site-iii) where the nitrogen availability is negligible (Table 1).

DISCUSSION

The existing plant population was seen only in small patches due to effect of various environmental factors such as the less area with good soil moisture, temperature rise and delayed monsoons, invasive species, sites undulation and dead rocks in surroundings somehow influence nutritional intake and seed production and also the dispersal. The plant density was found higher in site (ii) due to the availability of enough moisture due to underground water and nutrition that favors growth of plant. The study area only receive underground water that keep moisture on its ground level

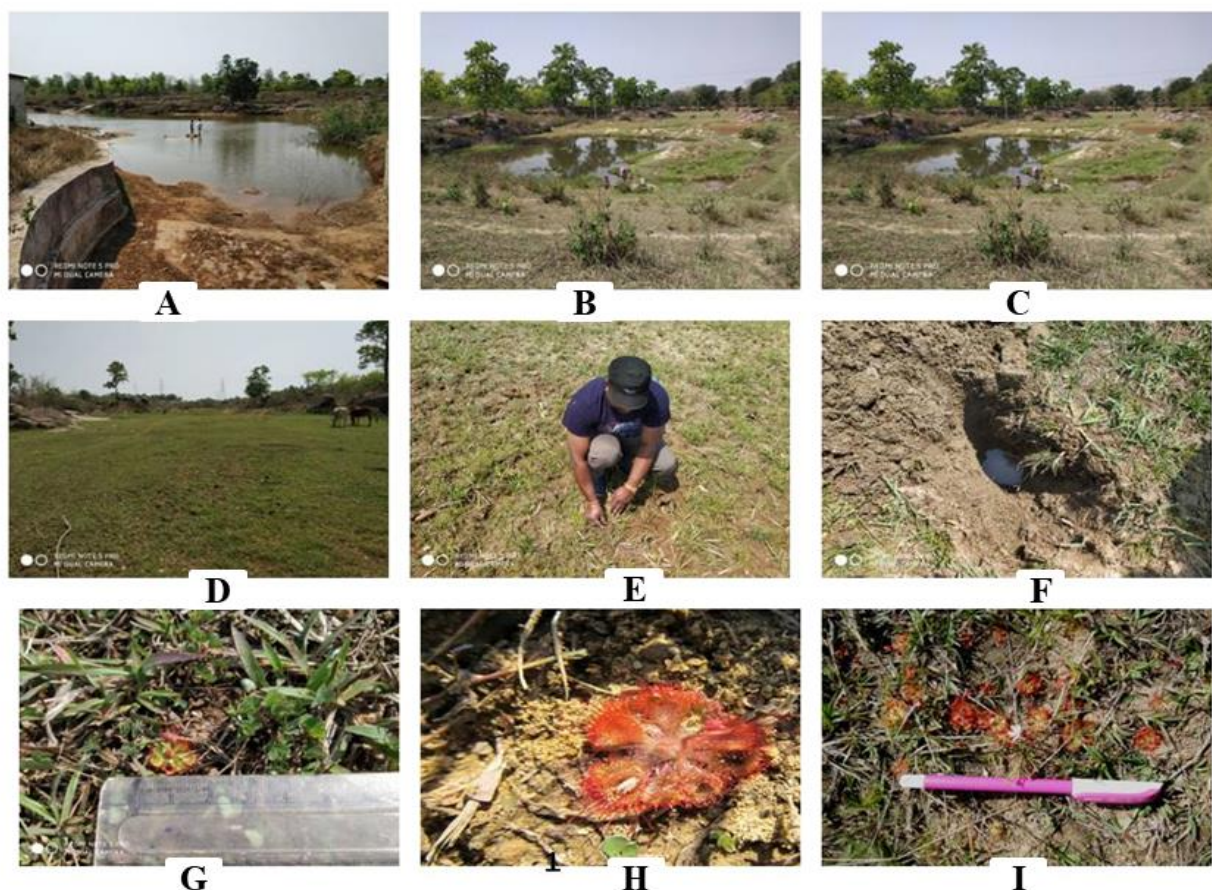
at the study period and help these plant to complete their life cycle in the month of hot summer of April . Majumdar et al. (2011) in Tripura region found the diameter of the mature *Drosera* rosette had ranged from 1.3 to 2.8 cm, while for juvenile plants rosette diameter was 1.1 to 2.1 cm and for seedlings 0.3 to 1.1 cm showing approximately mature plant diameter here approximately similar in this region too.

CONCLUSION

Sites are subject to persistent anthropogenic disturbance like grazing, soil removal, thatch collection, annual weeding growth like *Eupatorium* and *Lantana* spp., use of agrochemicals, habitat destruction during fishing, are the primary threats to persistence and survival of the species. Therefore, population of this naturally growing plants and habitat should need to be conserved before this plant face the day by day global changes.



Figure 1: Vegetative parts of *Drosera burmannii*

Plate 1: Field studies on *Drosera burmannii*Table 1: Soil nutrient status of habitat of *Drosera burmannii*

Macronutrient elements			
Soil parameters	Site -i	Site-ii	Site-iii
Nitrogen	Negligible	0.14	Negligible
Phosphorus	0.025	0.5	0.047
Potassium	1.02%	2.51%	3.15%
Micronutrient elements			
Soil parameters	Site -i	Site-ii	Site-iii
Iron	5.39	0.01	3.99
Manganese	0.11	0.05	0.09
Zinc	0.015	0.017	0.014
Copper	0.007	0.01	0.006
Nickel	0.005	0.0032	0.004
Trace elements			
Soil parameters	Site -i	Site-ii	Site-iii
Aluminum	Negligible	Negligible	Negligible
Bismuth	0.002	0.005	0.0034
Cadmium	0.0001	0.00012	0.00015
Chromium	0.015	0.037	0.023
Cobalt	0.0028	0.0019	0.0022
Lead	0.004	3.71	0.004
Lithium	0.004	0.004	0.004
Silver	0.0006	0.003	0.004

Strontium	0.011	0.019	0.014
Boron	0.15	0.11	0.082
Beryllium	10.01	6.25	7.64
Antimony	0.0003	0.0005	0.0002
Arsenic	0.002	0.0011	0.0014
Selenium	Negligible	Negligible	Negligible
Mercury	Negligible	Negligible	Negligible
Note- All macro and micronutrient values of soil per kg calculated here as % by mass			

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