

THE CONSERVATION STATUS OF *DERRIS SCANDENS* (ROXB.) BENTH. VAR. *SAHARANPURENSIS* (THOTH.) THOTH. (FABACEAE), A CLIMBER ENDEMIC TO SAHARANPUR, UTTAR PRADESH, INDIA

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Uttar Pradesh is the fifth largest state in India, spread over an area of 2,40,927 km², located between 23°52'N–31°28'N & 77°3'–84°39'E. The western part of Uttar Pradesh includes Saharanpur and Muzaffarnagar, which come under Saharanpur forest division. It lies in the upper Indo-gangetic plain. Saharanpur is located at 29°58'N & 77°33'E. In Uttar Pradesh there are about 2,711 species of Angiosperms belonging to 1,088 genera and 185 families. Here the family Fabaceae is represented by 233 species (Srivastava 2011). According to APG IV (2016) this family includes 19,500 species and 745 genera. The genus *Derris* Lour. includes about 70 species and about 25 species are found in India (Thothathri 1961). In India, *Derris scandens* Benth. flowers during the hot season. It is commonly found in the forests of northern Oudh. It is distributed in central and southern India, extending to Bengal, Assam, the Andaman and Nicobar Islands, Sri Lanka, Burma, southern China and North Australia (Duthie 1903–1929). Endemism manifests itself at various taxonomic levels from variety to higher category. Taxa below the rank

of variety like form, morph and cultivar are not included in IUCN category. *Derris scandens* (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth. (Fabaceae) was described by Thothathri (1970, 1971). It is a large woody climber endemic to Saharanpur (Khanna 2001; Srivastava 2011). There is absolutely no information on the IUCN Red List conservation status, detailed demographic data and population size of *Derris scandens* (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth. except NatureServe's (2009) conservation status assessment for rarity. According to this assessment this taxon is recommended for Nature Serve criteria of critically imperiled [N1] (Malik 2015). So the aim and objective of this study is primarily an analysis of the local population size on the basis of the information of past localities from where the species was collected and to determine the conservation status by applying the IUCN Red List guidelines. Here, I have provided some personal reflections on the conservation status of *Derris scandens* (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth.

Material and Methods: Intensive surveys were made in the entire Saharanpur forest division to locate the species. This taxon was identified by matching it with the specimen kept at BSD, Dehradun (BSD Accession no. 81898). Random sampling methodology (IUCN Standard and petition subcommittee 2011) was adopted for studying the status of the species. IUCN sampling methodology was adopted for determining the area of occupancy. For this purpose, the whole forest division was stratified in grids of 4 km². Within each grid, all the trees were observed for locating



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the individuals of *Derris scandens* (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth. The localities of occurrence and place of endemism were recorded by the global positioning system. The area of occurrence and extent of occurrence were estimated. The IUCN system uses five criteria to determine the threats to a taxon. These criteria are: geographical range size and fragmentation, decline or fluctuation; small population size and fragmentation, decline or fluctuation; very small population or very restricted distribution and quantitative analysis of extinction risk. In this study efforts have been made to assess the population and conservation status of *Derris scandens* var. *saharanpurensis* on the basis of 3.1 version of IUCN Red List (IUCN 2001; Rao et al. 2011, 2012).

Observations: Nomenclature of the plant: *Derris scandens* (Roxb.) Benth. var. *saharanpurensis* (Thoth.) Thoth. In Bull. Bot. Surv. India 13: 164. 1973. *Derris timorensis* (DC.) Pittier var. *saharanpurensis* Thoth. In Bull. Bot. Surv. India 12: 105. 1972.

Characters of the plant: *Branchlets* glabrous, lenticellate. *Leaves* imparipinnate, alternate, 7.5–14.5 cm long, stipulate, leaflets 7–9, mostly oblong, rarely obovate-oblong, opposite, 3.5–7 x 1.5–3 cm, entire, narrow to rounded at base, obtuse to retuse at apex, sub-coriaceous, petiolulate, stipellate, glabrous above, minutely and sparsely puberulous below, lateral nerve 6–8 pairs, rachis glabrous; petiolule glabrous to minutely puberulous, 3–4 mm long; stipule cordate, stipels linear. Inflorescences terminal and axillary racemes, 18–37.5 cm long, rachis puberulous, nodes of the racemes produced into short stalks, each containing a cluster of 2–4 pedicellate flowers; pedicels very slender, minutely puberulous, 9–11 mm long; basal bract at the base of the pedicel, minute, oblong; bracteoles 2, ovate at the base of the calyx-cup. Calyx-cup widely campanulate, mostly entire, rarely faintly toothed, brown silky. Pod indehiscent, oblong, thin, 3.5–4 x 1–1.1 cm, 1–3 seeded, narrowed at the base, acuminate at apex, constricted between seeds, winged on the upper suture, clothed with brown silky hairs, reticulately veined especially against the seeds (Image 1).

Varietal characteristics: *Derris scandens* var. *saharanpurensis* differs from its type species *Derris scandens* in the more slender and longer pedicels and thin pods which are slightly constricted between the seeds (Thothathri 1970, 1971).

Type specimen: 1305/87 (LE), Botanical Garden, Saharanpur, 1895, E. Kleigen.

Ethnobotanical and economic importance: Its roots contain rotenone, a strong insecticide and flavonol



Image 1. *Derris scandens* (Roxb.) Benth. var. *saharanpurensis*

scadenin, nallanin used as fish poison. Its bark yields a coarse fiber. This endemic climber is used for the treatment of osteoarthritis, arthritis, joint diseases, musculoskeletal diseases, rheumatic aches, muscle tension, myalgia, numbness, helps to improve arterial blood flow, antitussive, diuretic, antidiarrhoeal, fatigue and anti-inflammatory activity. Thus the plant is of great importance nationally for the development of various drugs for the general populace. The root of this climber is used in India to increase milk secretion after childbirth; it is crushed with or without water and the juice is given orally. The stem is used as a diuretic, laxative, emmenagogue, expectorant and to treat common cold and backache.

Floristic structure and species association: This woody climber prefers to grow in closed places in association with medium and large sized trees. In the study area, it is found associated with trees like *Putranjiva roxburghii*, *Bauhinia variegata*, *Barringtonia acutangula*, *Holoptelea integrifolia*, *Mallotus philippensis*, *Ficus mysorensis*, *Ficus benjamina*, *Lagerstroemia parviflora*, *Pongamia glabra*, *Swietenia mahagoni* and *Pithecellobium dulce*.

Conservation assessment: During a survey of 10 years it has been found that the current population trend of this taxon is decreasing and declining. One young plant had been cut down in 2013. During exhaustive survey only one specific habitat of this taxon was identified in this study. It is distributed naturally in

the botanical garden in Saharanpur.

Out of the 900 grids laid in Saharanpur district, this taxon was located in one grid present in Saharanpur Botanical Garden. Here I found only nine mature plants and one sapling. Nine individuals were found in flowering and fruiting stage. The field survey finding indicates that EOO (m²) = 275, AOO (m²) =150, Number of subpopulation=1, Habitat status - it is declining due to anthropogenic pressure (Fig. 1).

Out of the five IUCN criteria used for assessing the threatened status, this taxon qualifies for the following criteria:

Criterion B: Since this has very narrow endemic zone of distribution, it has very high restricted extent of occurrence (EOO; B1) and area of occupancy (AOO; B2).

Criterion B1: The EOO of this taxon has been estimated to be 275m². Since this taxon was found only in one single location (sub criterion a) and it has been

observed and inferred that there is a continuous decline in the number of individuals (sub criterion b), in terms of area, extent and quality of habitats (iii) and number of mature individual (v). Thus this taxon comes under critically endangered category because its geographical range is <100km² and it satisfies the sub criteria a b (iii and v).

Criterion B2: Since the AOO of this taxon is 150m² and it is <10km², this taxon qualifies for the critically endangered category under sub criterion a b (v) and c (iv).

Criterion C: Very small population size and continuing decline in the number of mature individuals. Only nine mature individuals have been observed. So it qualifies for the sub criterion a (i).

Criterion D: This taxon has a very small population size and the total number of mature individuals are nine (<50 mature individual), so this taxon falls under

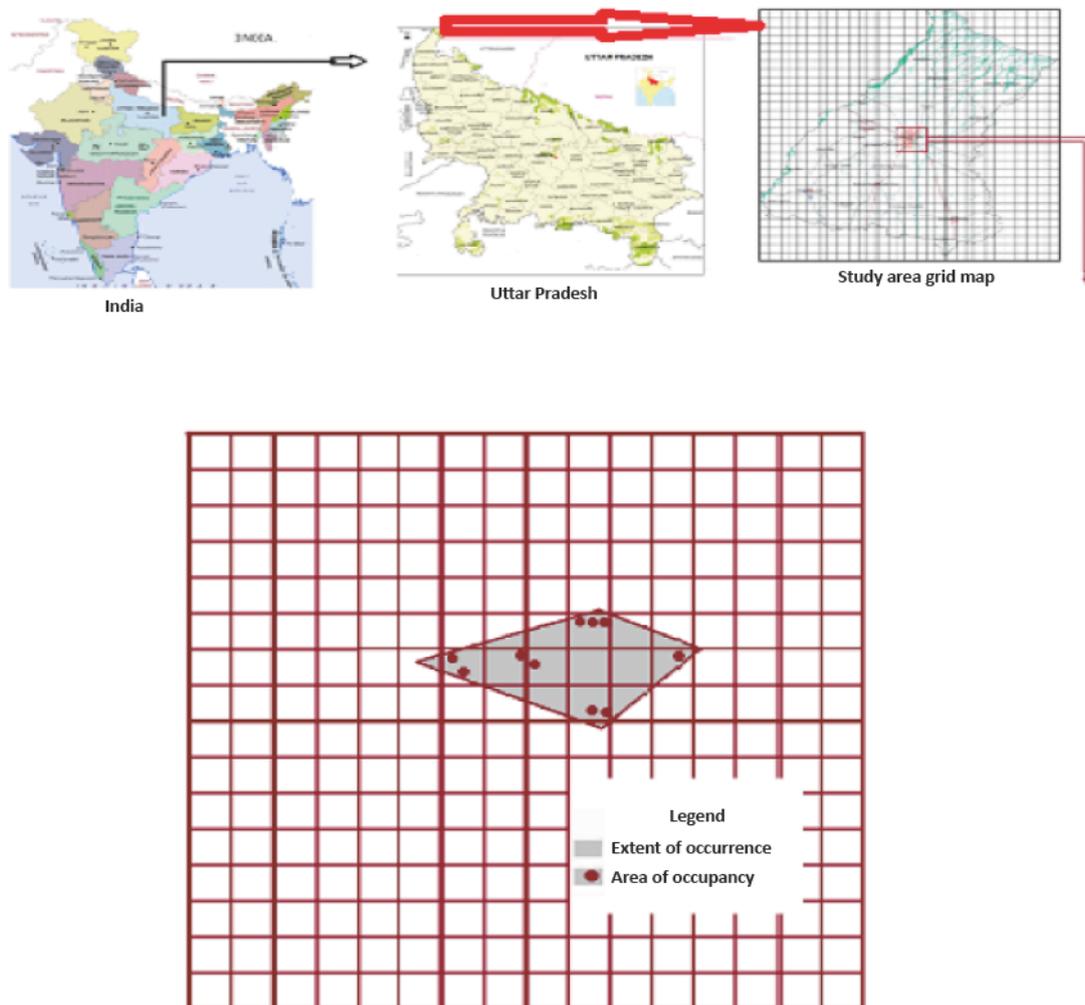


Figure 1. Minimum convex polygon of *Derris scandens* (Roxb.) Benth. var. *saharanpurensis*

critically endangered category.

Thus, on the basis of field observations this taxon is recommended for the IUCN criteria of critically endangered. The hierarchical alphanumeric numbering system of criteria and sub criteria for this taxon according to version 3.1 IUCN (2001) is CR B1ab(iii,v)+2ab(iii,v)+2c(iv); C2a(i); D. In this way this taxon appears to be in serious danger.

Conclusion: This variety has a very narrow endemic zone of distribution in Western Uttar Pradesh including Saharanpur forest division. This variety has very little dispersal and it has evolved some morphological features that are different from its type species *Derris scandens*. It is declining and it needs to be monitored. The probability of colonization of this variety is almost stable and it is facing an imminent danger of extinction. Till now there is no effort to increase the number of individuals for this species. Immediate efforts must be made to ensure its survival by protecting its population in its type locality by in situ conservation strategies. Besides, tissue culture studies may be used for its propagation and reintroduction of this woody climber in other localities of similar ecological conditions.

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