

Figure 2. Map showing Chitwan–Parsa–Valmiki Landscape and gaur occupied areas in the VTR region.

whereas tiger, leopard and wild dogs are the main predators. Presence of perennial water bodies in the hilly region in northern part makes it a suitable habitat for the gaur. At present, the species is found in two main pockets (Figure 2) namely, Sonha-Pachnad valley in Triveni Forest Block (western part) and Kapan–Acchoh valley in Raghia Forest Block (central part). The species has also been spotted in the adjoining forest blocks. *Shorea robusta*, *Mallotus philippinensis*, *Lagerstroemia parviflora* and *Adina cordifolia*. *Imperata cylindrica*, *Saccharum spontaneum*, *Sclerostachya fusca* and *Themeda* sp. are the abundant grass species in this area.

Observations suggest a population of about 20–25 gaurs in each of these two pockets. A total of nearly 50 gaurs are estimated in the reserve. However, during 1970–1990, a large population was seen by the locals involved in logging operations in this area. Increased commercial forestry activity and planting of non-native tree species such as *Tectona grandis* of commercial importance in the grasslands could be the factors contribut-

ing to reduction in gaur population in the last few decades. The understory vegetation in hilly tracts has been colonized by dwarf Phoenix (*Phoenix humilis*, a type of palm). Secondly, the moist grassy areas along the stream beds have been widely occupied by *Mikania* sp., an exotic vine which overshadows grasses and herbs. Moreover, grazing cattle poses significant threat to the gaur in the reserve, in terms of competition for resources and spread of communicable diseases such as foot and mouth disease, rinder pest and anthrax from domestic livestock. However, there are no records of gaur deaths due to livestock diseases. Extensive poaching of gaur during the mid-90s has been reported by locals. The sun-dried or smoked meat of gaurs has a demand in Nepal. Two incidences of tigers preying on gaurs have been recorded in 2003 and 2011.

In recent years, gaur has reportedly been exterminated from three Indian protected areas, Thattekad Wildlife Sanctuary (Kerala), Bandhavgarh (Madhya Pradesh) and Kanger Valley National Park (now in Chhattisgarh)⁶. The VTR is

the only protected area in the Shiwalik hills–Gangetic Plains landscape harbouring the species, hence demands serious conservation efforts. Strict conservation measures in the reserve in the last 7–8 years have curbed poaching activities, allowing an increase in the gaur population. A study was carried out in specific areas of the Triveni block. Altogether 28 sample plots (100 sq. m) were studied in two gaur-occupied areas based on gaur dung density. The results reveal an increase in the population during 2003 and 2011.

Various measures such as (i) clearing unwanted floral species, (ii) growing native and preferred food species and (iii) restricting cattle grazing and human activity in and around the identified gaur habitats, should be adopted to restore the habitat. There is a need for studies related to population dynamics, seasonal movements and feeding ecology to understand gaur ecology in the reserve, which can enable conservation.

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Relocating *Eremostachys superba* Royle ex Benth. in Himachal Pradesh

Concerns regarding the conservation status of *Eremostachys superba* Royle ex Benth. (family Lamiaceae) in the wild and its possible extermination are serious and justified¹. Losing a species has grave ecological consequences, whereby the

entire web of life is affected². Of the 27 species representing the genera *Eremostachys*, *E. superba* is the only one to be found in India. It occurs in the sub-Himalayan tracts up to an altitude of 1000 m. The plant has a thick rootstock

and a rosette of lyrate leaves that are produced in winter season. It attains a height of more than a metre and when in full bloom, it is very conspicuous (Figure 1). The inflorescence is a spike with yellow, zygomorphic flowers. The root

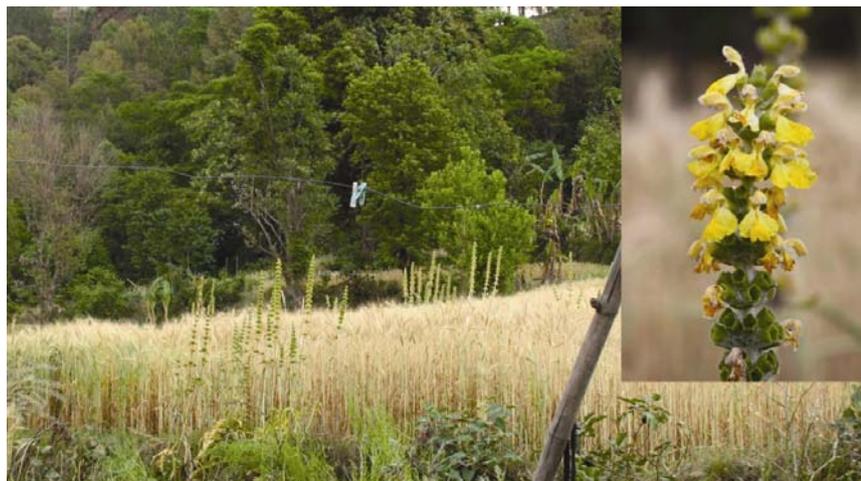


Figure 1. *Eremostachys superba* along the farm bunds. Inset: Beautiful inflorescence of *E. superba*.

of the plant is used locally for medicinal purposes and also given to lactating cattle³. The possible reasons for its limited distribution and scarce population are available in terms of pollination ecology, reproduction and bottlenecks⁴⁻⁶.

Although the plant had been mentioned in the flora of Jammu and Kashmir (J&K)⁷ and Himachal Pradesh (HP)⁸, relocation of the species was not reported until 2001 (ref. 3). Consequently, most of the observations on *E. superba* were from its type locality (Mohand near Dehradun, border of newly formed Uttarakhand (UK) and Uttar Pradesh (UP))¹. The alarming fluctuation in its population at this site led to renewed interest for its search in other western Himalaya states from where it was earlier known. During 2001 to 2007, this plant was found growing well in five localities^{3,9} of J&K. However, the plant could not be relocated from HP. This is probably one of the reasons why assessment of genetic diversity in *E. superba* has focused mainly on its population from Mohand and J&K⁹. This motivated us to search for *E. superba* in HP. Consequently, we observed the plant growing in two localities, one each in Kangra (near Khudiyan) and Una (near Gujrada) districts. The species is now being reported from HP after a gap of nearly 72 years. In Kangra district, the plant occurs alongside human habitations and grows profusely on farm bunds in the area (Figure 1) as

has also been reported from J&K³. Nearly 500 plants in an area of ~5 ha were found here. The people, especially the elderly, when interviewed, reported its presence in the area for the last 70–80 years. They say that as the plant does not encroach upon their land and at the same time looks beautiful, there is no reason to uproot it. We, therefore, are of the opinion that this is the same population that has been earlier reported from Kangra⁸. Whereas for the Mohand population, the collection locality was very clearly specified in the labels, ‘as near culvert no 136/12’, lack of such details for HP and J&K may have limited its recollection and repeat observations. The species was also found to occur in Una District (HP). This population occurs in wild and is represented by 22 individuals growing on sandy soils. The population is restricted to an area of nearly 400 sq. m, where the dominant taxa include *Pinus roxburghii*, *Mallotus philippensis*, *Colebrookea oppositifolia*, *Murraya koenigii*, *Lantana camara*, *Carissa opaca*, *Woodfordia fruticosa*, *Eupatorium adenophorum*, *Asparagus adscendens*, etc.

Data on *E. superba* is now available from a total of 8 localities of which the maximum is from J&K (5 localities), followed by HP (2 localities) and the border area of UK/UP (1 locality). The maximum population is also found in J&K (total individuals ~1252)⁹ followed by HP (~522) and then UK (~18)⁹. As has

been proposed⁹, with the discovery of the long missing central population and a new locality from HP, it is quite possible that *E. superba* once occupied the sub-Himalayan tracts of western Himalaya. In recent years, heavy loss of its population may have occurred due to many reasons (the inherent characteristics of the plant, habitat destruction^{4,5}, exploitation by humans for medicinal purposes³ and quite possibly invasive species (we saw *Lantana camara* and *Eupatorium adenophorum* dominating the landscape at Una)) and the plants in these 8 localities appear to be remnants of an erstwhile large population. Further surveys to document the conservation status and identify new localities harbouring the species are required.

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ACKNOWLEDGEMENTS. We thank the Director CSIR-IHBT for encouragement and facilities. We also thank R. D. Singh and members of the herbarium for valuable comments and the local people for sharing their information.

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