

Natural regeneration status of *Terminalia chebula* Retz in Himachal Pradesh

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ABSTRACT

The present study was confined to five natural populations of Harar (*Terminalia chebula* Retz) distributed in three districts of Himachal Pradesh. In every natural population 5 quadrats of 30 x 30 m (900 m²) size were laid down randomly to study the regeneration status along with percentage size class (girth class) occurrence of Harar trees. Most of the individuals in these populations were found to be almost of the same size producing flowers and fruits but no seedlings had been successfully established showing complete absence of natural regeneration of Harar (recruits, un-established or established) within its natural populations. However recruits of Harar were found in some agricultural fields of Jamun Ki Sair and recruits, un-established and established regeneration was found in grassland in the buffer zone of natural population in Rakkar.

Keywords: Buffer zone; germination; natural population; natural regeneration

INTRODUCTION

Terminalia chebula Retz commonly known as Harar having a trade name of chebulic myrobalans belongs to family Combretaceae and is indigenous to India and southeast Asia (Dymock et al 1976). In India it is distributed throughout the greater part except arid zone (Troup 1921). In the Himalayas the tree is found in the outer Himalayas ascending up to 1600 m. In Himachal Pradesh it is distributed between an attitude of 800-1100 m in the districts of Sirmour, Hamirpur, Mandi, Kangra, Bilaspur and Una. *T chebula*

occurs scattered in teak forest, deciduous forest and extends into forests of comparatively dry types. Harar has been traditionally used in Indian system of medicine Ayurveda. It is routinely used as household remedy throughout sub-continent for treating stomach colic of sucking infants and as a laxative for the old. Harar is also useful in apthae, bite trouble, blood pressure, carious teeth, cough, dysentery, diarrhoea, piles, vaginal discharge, ulcers, vomiting, worms and has been held in high esteem in Hindu medicines. Fruit pulp of *T chebula* is used in many of the standard preparations such

as Triphala and Chayvanprash which are used as food supplement. Natural regeneration of Harar is a problem as the nuts that contain seeds are enclosed in horny endocarp and germinate poorly. As the fruit of *T chebula* is a drupe with a hard endocarp it requires a long period of time for the seeds to germinate which is only possible with adequate soil moisture and humus. Studying natural regeneration status within natural populations is an important aspect for commercialization of a species. Keeping in view the socio-economic importance of the species the present investigation was carried out in five natural populations distributed in five districts of Himachal Pradesh.

METHODOLOGY

The present investigation was carried out at five sites namely Jamun Ki Sair, Rakkar, Praur, Ghanu and Bachhwain of Himachal Pradesh having natural populations of *T chebula*. The physical description of natural populations is given in Table 1. To study the regeneration status along with percentage size class (girth class), occurrence of Harar trees in their natural populations was studied in five quadrats of 30 x 30 m (900 m²) size in each natural population covering approximately one per cent area in each population. In addition to areas having natural populations, regeneration study was also carried out in the buffer zone surrounding agriculture land and grasslands due to poor regeneration of

Harar in its natural population. The natural regeneration was measured on the basis of presence and absence of seedlings and saplings of Harar inside and buffer zone of natural population.

RESULTS and DISCUSSION

The life criteria of a species must be measured by its effectiveness in recruiting new individuals into the population of concerned species. The more effective this strategy the longer the population will be able to maintain itself in natural population. One method of measuring this success is to monitor the frequency and abundance of seedling establishment over a period of decades and to record the resultant increase or decrease in population size over time. In many cases the recruitment history of a particular species is reflected by the size distribution of individual within its population. A rapid appraisal of population structure can frequently provide information about whether or not a species is regenerating itself in the natural population. The perusal of data related to percentage girth class distribution of *T chebula* trees in all of the five natural populations reflects final size-class distribution reflecting a species whose regeneration is severely limited for some reason. The girth classes were >40 cm in Jamun Ki Sair, >80 cm in Bachhwain, >20 cm in Rakkar, >40 cm in Praur and >40 cm in Ghanu (Fig 1). Perusal of data (Fig 1) indicates that most of the individuals in

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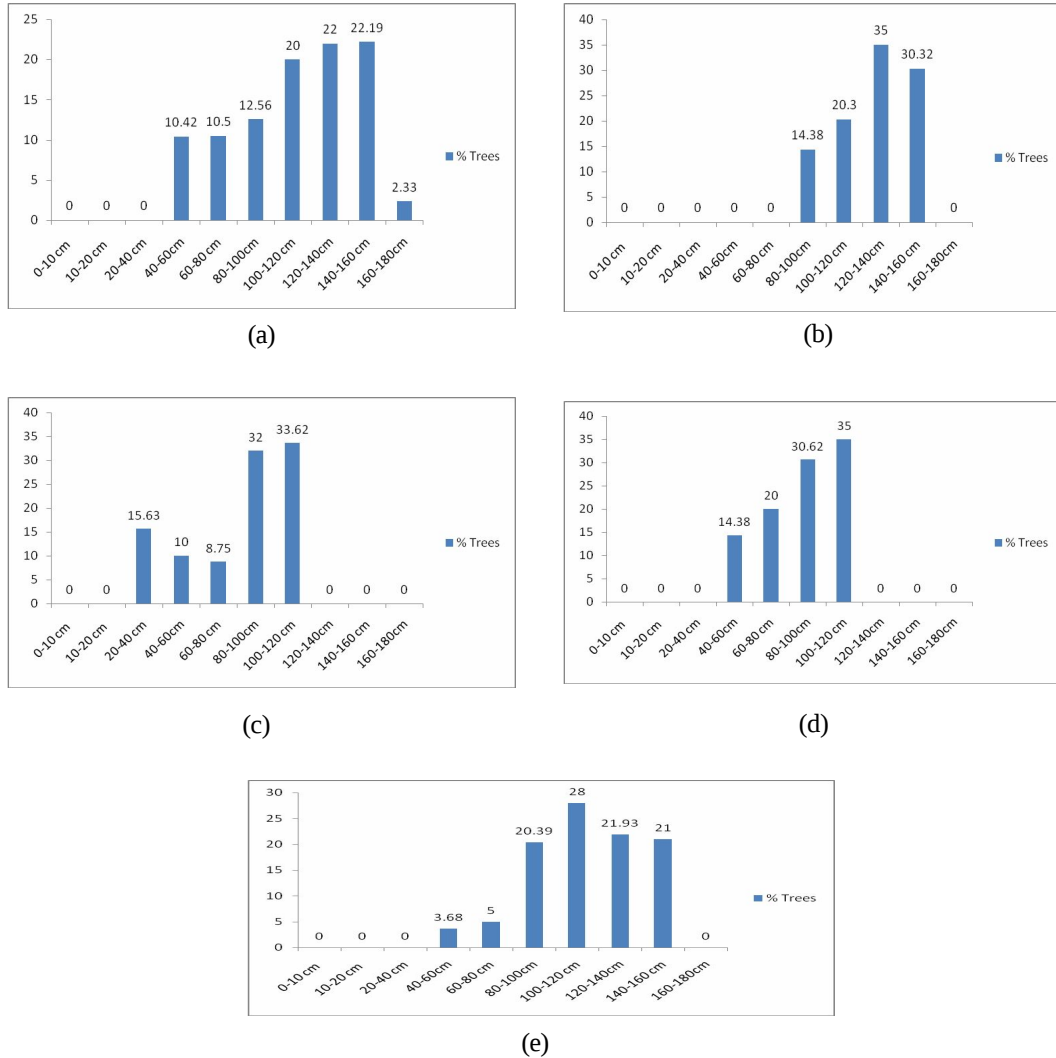


Fig 1. Girth class distribution of Harar trees at a) Jamun Ki Sair, b) Bachhwain, c) Rakkar, d) Praur, e) Ghanu

Table 1. Physical description of sites (populations)

Population	District	Population code	Altitude (m)	Latitude (N)	Longitude (E)
Jamun Ki Sair	Sirmour	JKS	1050	30° 41' 733"	77° 10' 611"
Praur	Kangra	PRR	995	32° 05' 089"	76° 27' 223"
Bachhwain	Kangra	BCW	948	32° 00' 959"	76° 26' 783"
Rakkar	Kangra	RKR	715	31° 46' 679"	76° 14' 303"
Ghanu	Una	GHN	590	31° 48' 486"	75° 57' 354"



Plate 1. Seedlings of *Terminalia chebula* in agricultural field at Jamun Ki Sair



Plate 2. Established regeneration of *Terminalia chebula* in grassland at Rakkar

these populations were of almost the same size producing flowers and fruits but no seedlings had been successfully established showing complete absence of natural regeneration of Harar (recruits, un-established or established) within its natural populations. However recruits of Harar were found in some agricultural fields of Jamun Ki Sair and recruits, un-established

and established regeneration was found in grassland in the buffer zone of natural population in Rakkar (Plates 1 & 2). The reasons for poor regeneration of Harar in natural regeneration were found to be having hard seed coat, the species being a strong light demander, complete burning of seedlings due to forest fires during summer and intensive removal of fruits for sale in

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the local markets. These results are supported by the findings of Talwar and Bhatnagar (2014), Singh et al (2003) and Chauhan et al (2010) who also reported absence of natural regeneration of Harar in its natural populations. The presence of seedlings of Harar in agriculture field at Jamun Ki Sair was due to cow dung applied in the field as manure because domestic animals also act as agents of digestion and dispersion of the seeds while grassland in the buffer zone of natural population at Rakkar was found to be frequently used as resting place by shepherds for their livestock which lead to dispersion of seed in the grassland. In addition to this grassland was having southern aspect and not having any tree cover which helped seedlings of Harar to establish easily as it is a strong light demander.

CONCLUSION

Complete absence of natural regeneration of Harar in its natural population confirms the urgency of propagation of the species with the help of artificial techniques, reduction of destructive harvesting methods such as hacking tree

branches and lopping pressure, establishment of community-based pulp extraction enterprises near the forest ecosystem to help in returning back the seeds to the ecosystem enabling greater chances of regeneration by extracting the pulp and reusing the seeds for regeneration.

REFERENCES

- Chauhan DS, Singh B, Chauhan S, Dhanai CS and Todaria NP 2010. Regeneration and plant diversity of natural and planted Sal (*Shorea robusta* Gaertn F) forests in the Terai- Bhabhar of Sohagibarwa Wildlife Sanctuary, India. *Journal of American Science* **6(3)**: 32-45.
- Dymock W, Warden CJH and Hopper D 1976. *Pharmacographica indica*: a history of the principal drugs of vegetable origin met within British India. Bishen Singh Mahendra Pal Singh, Dehradun, Uttarakhand, India, pp 1-5.
- Singh DRR, Dhir KK, Vij SP, Nayyar H and Singh Kamaljit 2003. Study of genetic improvement technique of *Terminalia chebula* Retz- an important multipurpose tree species of India. *Indian Forester* **129(2)**: 154-168.
- Talwar S and Bhatnagar AK 2014. Pollination biology of *Terminalia chebula* Retz in Delhi and western Ghats. *The International Journal of Plant Reproductive Biology* **6(2)**: 181-194.
- Troup RS 1921. *Silviculture of Indian Trees*. International Book Depot. Dehradun. Uttarakhand, India, 1195p.

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