

Nutritional, Medicinal and Economic Potential of Khanor (*Aesculus Indica*) For Socio-Economic Development of Tehsil Thunag of District. Mandi Himachal Pradesh, North West Himalaya.

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*Khanor is a tall, deciduous tree found from 1800 to 3000 m altitude in Tehsil Thunag of Mandi district Himachal Pradesh. Plant is closely intermingled with life style of local people and is excellent source of food, medicine and income for local people. It belongs to botanical family Sapindaceae and also known as Khanot in local dialect. Scientific name of Khanor is Aesculus indica (Colebr. ex Cambess.) and it is commonly known as "Indian Horse Tree". Khanor is a multipurpose tree for the inhabitants of the area and can be used as source of food, fuel, fodder, medicine, wood and other material. Tree is commonly seen growing in wet temperate forests, shady ravines and other shady moist places up to an elevation of 1800-3000 m in Tehsil Thunag. It is native to Himalaya. Local people harvest Khanor from the wild habitat for their local use as a food, medicine, soap and source of materials. Seeds of Khanor are most useful for them. As seeds are best means of regeneration, so these should be harvested, phase wise on rotational basis for ensuring sustainable development. Traditional knowledge of using wild food plant like Khanoris on sharp decline among young generation and further decreasing day by day. This has necessitated initiating studies on indigenous uses of wild plants which are frequently utilized by our ancestors. So present study has been conducted on traditional use, nutritional, medicinal and economic potential of Khanor (*Aesculus indica*) in Tehsil Thunag of District. Mandi of Himachal Pradesh, North West Himalaya.*

Key words: Wild food, Tehsil Thunag, Seek, Khanor, Seed flour, Traditional use.

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I. Introduction

Himalayan forests are the most important source of medicinal plants and with useful species for the local people (Bhatet *et al.*, 2013). The indigenous knowledge and practices of inhabitants revolve around traditional values of resource use. They use plant diversity in various forms *i.e.*, medicine, wild edible/food, fodder, fuel, timber, making agricultural tools and various other purposes (Dhaliwal and Sharma, 1999). *Khanor* is a tall, deciduous, multipurpose tree of Tehsil Thunag used as a source of food, fuel, wood, soap and other material. Traditionally plant is closely intermingled with the life style of local people, but in this present era of modernisation, this knowledge is on sharp decline. Unless efforts are done this knowledge may be lost in near future. In general, a number of studies have been carried out in ethnobotany of useful plants at international level (Duke and Ayensu, 1985; Brown, 1995; Kapoor, 2000), at national level (Chopra *et al.*, 1956; Arora and Pandey, 1996; Khyadeet *et al.*, 2009; Sundriyal and Sundriyal, 2011; Bharadwaj and Seth, 2017) and state level (Parmar and Kaushal, 1982; Sood and Thakur, 2004; Sharma *et al.*, 2013; Tara *et al.*, 2013; Sharma *et al.*, 2017; Kishor *et al.*, 2018), but no such type of study is available for traditional uses of *Khanor* at Tehsil Thunag. So present study has been undertaken in Tehsil Thunag of District. Mandi Himachal Pradesh with main objective:

- 1) To know the habit, habitat, nativity and distribution of *khanor* in Tehsil Thunag.
- 2) To know the morphology of *khanor*.
- 3) To document traditional uses of plant in Tehsil Thunag.
- 4) To assess the medicinal potential of *Khanor* in Tehsil Thunag.
- 5) To know medicinal potential of *Khanor* in Tehsil Thunag.
- 6) To assess economic potential of *Khanor* in Tehsil Thunag.

II. Methodology

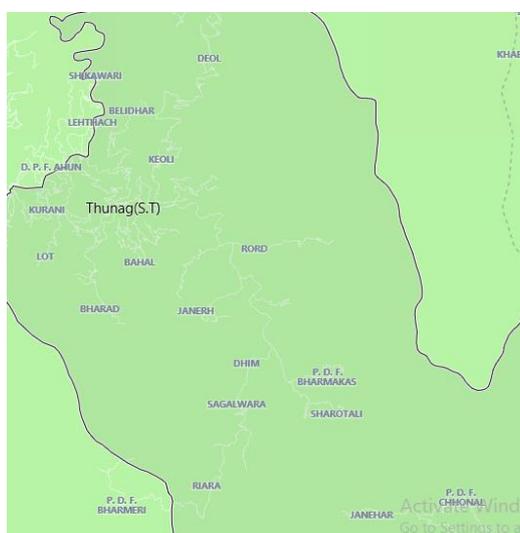
Methods:

Study is based on both primary and secondary data. Survey and sampling were done (Rapid) between m amsl 1490-3359 m in the study area. Information on altitudinal range, habit, habitat (s) and utilization pattern etc. of *Khanor* was gathered. Interviewed knowledgeable persons and Vaidhyas through questionnaire.

Identification of samples was done with the help of local and regional floras (Chowdhary and Wadhwa, 1984; Collett, 1902; Dhaliwal and Sharma, 1999 and P B Singh, 2018.) Plant was analysed for traditional uses of food, fuel, medicinal, aesthetic and religious values.

Study area:

Study area Tehsil Thunag (8° 27' 43.1" N Latitudes and 30° 12' 39.7" E Longitudes) falls in district Mandi of Himachal Pradesh. Altitudinal Range of Thunag is 1490-3359m. and temperature ranges lies between 8°C to 30°C. It covers approximately 313.57 Km² areas, and comprises 22 Panchayats, 171 villages with 10,872 households and 50,308 human populations. Total livestock population is 13,244. Famous Shikari Devi temple and Shikari Devi wild life sanctuary are part of study area. Soil is mainly loamy and forests are deciduous, temperate type. (District Statistical Department, Mandi, H.P.)



Map of study area

III. Result & Discussion

Habit, Habitat, Nativity and Distribution:

Khanor is a tall, deciduous tree found from moderate to high altitude in the Tehsil Thunag Western Himalayas. It is also known as *khanot* in local dialect. Tree belongs to botanical family Sapindaceae. Its scientific name is *Aesculus indica* (Colebr. ex Cambess.) having synonyms *Pavia indica*, *Pawia Indica*. Hook and commonly known as Indian Horse Chestnut. Tree is with a straight trunk having profuse branches in whorls. It is commonly seen growing in wet temperate forests, shady ravines and other shady moist places up to an elevation of 1800-3000 m of Tehsil Thunag. *Khanor* is a cold tolerant tree and succeed well in well-drained soil. It is sometime grown as an ornamental tree for its spreading crown, but it requires a large space. *Khanor* is native to Himalaya.

Morphology of Plant:

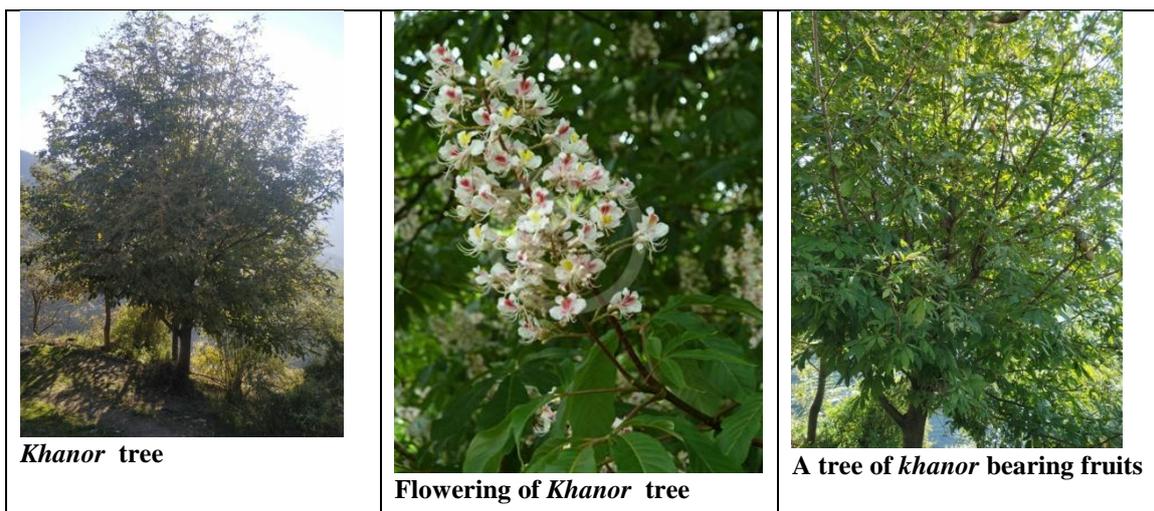
Plant is large, deciduous tree up to 40 m tall, with a dense, spreading crown. The tree shed their leaves during winter and the new growth starts in the last week of March.

Leaves are glabrous, opposite, long- stalked, digitately compound; leaflets 5-9, oblong- lanceolate, long pointed, toothed, 15-25 cm long; petiole 10-15 cm long.

Flowers are yellowish- white, red- streaked, irregular, in large thyrsoid cyme- bearing terminal panicles. Petals 4, 1.5 - 2 cm long. Stamens 7, longer than petals.

Capsules are rough, 2.5 to 4.5 cm long, brown, ovoid, containing 1-3 large, globose, dark- brown seeds.

Seed is large shining black from outside, and lime white from inside, 3.5 cm in diameter.



Traditional Uses:

Khanor is a multipurpose tree for the inhabitants and traditionally used as a food, fuel, fodder, medicine, wood and other material.

Edible Potential:

Seeds are dried and ground into flour by local people, they call this flour *tattwakhar*. People mainly eat *khanor* seed flour to harness its nutritive and medicinal values. Due to saponin content in seeds they can be poisonous, so should be properly washed, dried and cooked before use. Flour can be made into *chapattis* or mixed with wheat flour to prepare chapattis. A sweet dish *Halwa* can be prepared from seed flour. Its bitterness is removed by soaking it in water for about 12 hours. The bitter components get dissolved in water and are removed when the water is decanted. The *halwa* prepared from the flour is taken as *phalahar* during fasts. *Halwa* can also be made by mixing *khanor* seed flour with sooji or wheat flour for better taste. *Seek* is also prepared from starch extract of *khanor* seed in some parts of Thunag. Its processing and preparation resemble *Sirra* another traditional dish of North India

HALWA:

Ingredient:

Khanor seed flour, 200 g; Sooji, 50 g or wheat flour, 50 g; vegetable oil or clarified butter, 250g; sugar, 200; walnut seed, 20 g, dry coconut powder, 50g; raisins and other grated dry fruits, 25g.

Method:

Put 250 g ghee (clarified butter) in a pan and roast *khanor* seed flour and Sooji well. Add to it water three times more of roasted flour, keep on stirring it and add sugar, cook till water get absorb. Add to it coconut powder and grated dry fruits. Now *HALWA* is ready to serve.

Seek:

Ingredient:

Seek, 200 g; vegetable oil or clarified butter, 250g; sugar, 200.

Method:

Soak seek in water for 2-3 hour and mix well with sugar. In hot oil cook it for 20 to 30 minutes. Now seek is ready to serve.

		
<p>Harvested <i>Khanor</i> Capsules</p>	<p>Seeds of <i>Khanor</i></p>	<p>Dried <i>Khanorseed</i> ground into flour for cooking</p>
		
<p><i>Chapatti</i> made up of <i>khanor</i> seed flour</p>	<p><i>HALWA</i> made up of <i>Khanor</i> seed flour</p>	<p><i>Seek</i> of <i>khanor</i></p>

Food Value:

The seeds which constitute the edible portion of the fruit contain 50.5% moisture. The total sugars content is 5.58%, whereas the reducing and non-reducing sugars are 4.59% and 0.94% respectively. The proteins and minerals contents are 0.358 and 1.934% respectively. Phosphorus, 0.124; potassium, 0.733; calcium, 0.0495; magnesium, 0.042 and iron, 0.00484% respectively (Parmar and Kaushal, 1982).

Medicinal Potential:

Khanor as medicine is especially used for the complaints of veins, such as phlebitis, haemorrhoids, vari-cose veins; in ulcers; to prevent thrombosis; in some cases of colic. Oil from the seeds is externally applied in rheumatism. The hydrosycoumarin glycoside aesculin from the bark of the branch absorbs ultra-violet rays and is an ingredient for suntan oil (Purohit *et al.*, 2009). The fruits are given to horse suffering from colic. They are used to cure rheumatism, but for this purpose the oil is extracted from the seeds are preferred.

The nuts are used in the case of piles and obstinate constipation. An extract of leaves has been found to be useful in whooping-cough (Kirtikar and Basu, 1935).

Other uses:

Khanor seeds are good soap substitute for locals. People usually chop seed into small pieces and boil in water. This water is then used for washing the hairs, body and clothes etc. *Khanor* seed flour is also given to milch animal and considered good for enhancing milk yield. Seeds are good soap substitute for locals. People usually cut seed into small pieces and boil in water. This water is then used for washing the hairs, body and clothes etc. *Khanor* seeds used to be a great source of entertainment for kids in hills. They used to make a plough of *khanor* seeds and wood for playing. This plough is symbol of farmers plow drawn by bullock for ploughing the agricultural land. Children call this plough *HALDHNU BOLDHNU* in their local dialect.

 <p>A plough <i>HALDHNU BOLDHNU</i> of <i>khanor</i> seeds and wood prepared by kids for playing .</p>	 <p>Professionally build <i>HALDHNU BOLDHNU</i> of <i>khanor</i> seeds and wood for small kids.</p>	 <p>Kids playing with <i>HALDHNU BOLDHNU</i></p>
 <p>Beehives made up of <i>Khanor</i> wood</p>	 <p>Idol of God “Vishnu” in a temple made up of <i>Khnaor</i> wood along with wood of <i>Morus alba</i>, <i>Cedrus deodara</i>, <i>Juglans regia</i>.</p>	

Economic Potential:

Wood of tree known to have commercial value and used to construct household items, agricultural tools, water- troughs, packing- cases and tea boxes etc. It is also utilized to prepare decorative article. *khanor* wood along with wood of *Morus alba*, *Cedrus deodara* and *Juglans regia*, is used for making God idol for temples and is good source of earning for local people. Idols are usually sold at the cost of Rs 30,000 to 1, 00,000 depending upon size and quality. *Seed* of *Khanor* seed is a good source of income for local people of hills. It is sold at the cost of Rs 500/kg in many parts of Western Himalaya. Professionally build *HALDHNU BOLDHNU* can be offered for sale in local fair.

 <p>Beehives made up of <i>Khanor</i> wood</p>	 <p>Idol of God “Vishnu” in a temple made up of <i>Khnaor</i> wood along with wood of <i>Morus alba</i>, <i>Cedrus deodara</i>, <i>Juglans regia</i>.</p>
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IV. Conclusion:

It has been observed that the traditional knowledge of using wild food plants is on sharp decline. Unless efforts are made to educate the younger generations about their tremendous use and importance, this knowledge may be lost in the near future. Documented medicinal uses of *Khanor* are tremendous but very less practised by inhabitant at present. They only use this plant medicinally to treat hydrophobia. Awareness is also needed for sustainable use and harvesting of highly valued seeds of this plant.

V. Recommendation:

1. *Khanor* can be planted in large scale along roadside for enhancing scenic beauty of mountain region.
2. *Khanor* is a multipurpose tree of the inhabitants of study area and is exploited unsustainably. So, awareness for its sustainable harvesting of useful plant parts is also needed among the inhabitants of this area.

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