

A STUDY
BY

HIMALAYAN ACTION RESEARCH CENTRE

AN OIL YEILDING SPECIES FROM CENTRAL HIMALAYA **CHULLU**

NAME : Wild Apricot
Prunus armeniaca.
Chullu/Chulli

HISTORY : Chullu is said to be a native of China and Central Asiatic region, from where it spread to India, Iran, Egypt and Greece by the way of Armenia.

DISTRIBUTION : Wild apricot locally called Chullu is found in abundance in the dry temperate regions of H.P., and Uttarakhand. Found almost naturalized in the north-western himalayas particularly in the valleys of Kashmir, Chenab, and Kulu, Simla and Garhwal hills at altitudes upto 2500m. In district Simla, Chullu is widely spread in Chaupal block, Rampur block, Jubbal block and Rohru block. In Kinnaur except valleys and cold desert, it is found in abundance. In Chamba district it is concentrated in Pangi and Bharmor area and in district Mandi it is in abundance in Chuhar valley.

The distribution of Chullu, the wild apricot in garhwal differs locally. The high concentration areas in Garhwal are Naugaon block, Purola block, Bhatwadi block in district Uttarkashi. Joshimath block, Tharali block, Ukhimath block, Pokhari block, and Dasholi block in Chamoli District. Jakhauli block, Chamba block, and Thathyur block in Tehri District. Khirsu block, Akeshwar block and Dudhatoli in Pauri District. Approximately about 600 villages come under high concentration area of Chullu plantation. About 800 villages have a medium concentration and about 400 villages have a very low concentration of Chullu plantation.

In Kumaon it is found in all the three districts Nainital, Almora, and Pithoragarh. Pithoragarh district has maximum concentration in the region of Kumoan.

MORPHOLOGY : A moderate-sized tree, about 10 m tall, with a reddish bark. Leaves are ovate round-ovate or up-cordate, approximately 5-9cms. Flowers are, pinkish white, borne singly and appearing much in advance of the foliage.

FRUITS : Fruits are round about 5cms, across, hairy when young, but nearly smooth skinned at maturity with a yellow skin overlaid with red, the flesh is yellow or yellowish orange, firm and sweet. Fruit is harvested from May to July. It is highly perishable.

PROPAGATION : The Chullu still grows wild in Central and western Himalayas. The fruits eaten by the cattle, reach the fields with the dung used as manure, where they sprout naturally and are then transplanted and protected by farmers.

Hill farmers also raise the seedlings. The seeds are buried under the earth for three months owing to its hard shells ie. from July to October. In October they are sown in the nurseries, and by January the seedlings appear. The seedlings are ready to be transplanted in December when they are approximately 2ft tall. Chullu can also be propagated through cuttings, the period of planting the cutting is February-March. The wild apricot is self fertile. It starts bearing fruits when it is 4-5 years old and continues to bear well for 30-35 years. The yield of a full-bearing plant varies from 80 -120 kg.

APRICOT FLESH : Apricot is a good source of sugars and vitamin A and contains appreciable amounts of thiamine and iron. Fresh indian apricots yield 86 percent of edible matter which contains

Moisture	85.3 %	Protein	1.0 %
Fat (Ether Extr)	0.3 %	Fiber	1.1 %
Other Carbohydrates	11.6 %	Minerals Matter	0.7 %
Calcium	20.0 mg	Phosphorus	25.0 mg
Iron	2.2 mg	Vitamin A Value	3600 I.U
Thiamine	0.04mg	Riboflavin	0.13mg
Nicotinic Acid	0.6 mg	Ascorbic Acid	6.0 mg
Calories	53/100g		

Ripe fruit pulp contains total solids 12.4- 16.7% insol. solids 2.1- 3.1% acids (as malic acid) 0.7- 2.2% total sugars (as invert sugar) 5.3- 8.6%

Glucose	03.2 - 04.8%
Sucrose	01.4 - 05.4 %
Tanin	0.06 - 0.10 %

UTILIZATION : The cultivated apricot is used as a table fruit in the regions where it is grown. Highly perishable and preserved in a number of ways in U.S.A, South Africa & Iran. They are frozen, candied or made into a paste. In some countries apricot pulp is cooked and thinly spread on cloth and then rolled and dried and it constitutes an important food. A number of products are prepared from apricots. Fruits of wild apricot mixed with those of cultivated types are utilized in H.P. in production of number of products like apricot jam, apricot nectar, and apricot papad. Strained baby foods from pulp is nutritious and a good source of calcium phosphorus and iron. Apricot beverages have low acidity.

The wild apricot locally called Chullu which is unfit for table purpose due to high acids and low sugars . It is not processed for any commercial product at present although studies for preparation of sauces and chutney from this fruit has given quite encouraging results . The major portion of the crop is utilized by the tribals in H.P. for the preparation of distilled alcoholic liquor.

APRICOT KERNEL : The wild apricot pits yield 22-38 percent kernels, which may be sweet or bitter depending on the type. Sweet kernals resemble almonds in taste and are used as its substitute in pastes and confectionery and can be added to apricot jams. An analysis of the kernals gave

Water	4.3%	Protein	31.4%
Oil	53.4%	Fiber	4.8%

Ash 2.6%
Sugar as Dextrose 8.1% (direct) & 11.6 % (after conversion)

The fatty oil extracted from the apricot kernels is an important article of commerce. The refined oil is almost colorless and is of agreeable flavor and odour. A sample of light pale-yellow oil obtained from the wild bitter apricot kernels showed the following fatty acid composition :

Myristic acid 1.1%
Palmitic acid 3.5%
Stearic acid 2.0%
Oleic acid 73.4%
Linoleic acid 20.0%

Because kernal oil closely resembles expressed almond oil so it is employed as an adulterant or a substitute for almond oil. French almond oil of commerce is practically pure apricot oil or a mixture with peach kernal oil.

The cake after extraction of oil is utilized as cattle feed, fuel and as fertilizer. It contains :

Nitrogen 6.64%
Phosphoric acid 2.2%
Potash 1.14%

An essential oil that is identical with bitter almond oil is distilled from the cake. Apricot kernels are cheaper and give a higher yield of oil: 0.8 - 1.6 % than bitter almond oil of commerce. The seed cake of the bitter apricot yields 1.6% of the oil.

In Kinnaur wild apricot varieties are collected. Crushing of kernels is reported to be an important industry though exact data of oil production are not available.

The wild apricot is unfit for table purpose due to high acids they are utilized to express an oil used locally for cooking and burning. The Apricot oil is also used as a substitute for almond oil. The cake left after pressing out oil is used as manure or fuel. It is also source of an essential oil identical with that obtained from bitter almond cake. The apricot kernal oil is used for food purposes and in cosmetics and pharmaceutical preparations. It sells at a higher price than most food oils ,but at a lower price than almond oil. It also finds use in medicine for ear ache and other ailments.

TRADITIONAL METHOD OF OIL EXTRACTION

For the extraction of oil the seeds are manually broken to avoid shooting of the seeds, cords made of Bhimal are made into a loop, the seeds are kept inside it and broken manually by small round stones found in the river bed. The kernels extracted thus are dried in the sun. They are then crushed to a fine paste in a mortar, known as the 'Okhali' locally. The paste is then kneaded by dipping hands in warm water under the sun. With this process the paste exudes the oil. This paste is then put in a wooden vessel made specially for the extraction of oil.

The extraction of oil from this paste is comparatively hard and the same paste is

processed two to three times. Even after that the extraction of oil is not complete and a greater percent of oil goes waste. The residual cake is not fit for eating, so it is put in boiling water with a little salt and cooked well, then this can be given to the cattle.

In the recent years power driven oil expellers have been set up near the road sides by some farmers for business. But mostly the farmers nearer the road sides or at close distances of 1 to 3 Km are benefited from them, but in the hills most of the villages are at considerable distances from the roads where the traditional system of oil extraction is the only choice. Even the farmers are close to the roads are also not benefited properly due to the irregularity of the power supply all over the hills. As a result one or two businessmen have established diesel driven oil expellers to meet the shortage in power supply.

The Chullu is used in a number of ways, apart from the oil and chutney and the traditional 'khatai rolls' it is also used to store grass in the season for the months of scarcity. The wood is used for fuel, and the fruits are eaten fresh locally by the people. Even then only 25 percent fruits are used by the villagers, rest goes waste.

PRODUCTION POTENTIAL IN GARHWAL HIMALAYAS :

A detailed survey of Chullu (Apricot tree) was conducted in the villages of the Purola and Naogaon block of the Uttarkashi District.

The Chullu is basically an agroforestry plant in this area. It is grown in all kinds of lands and slopes in the villages. It was observed that out of the 257 villages the chullu has a good concentration in about 200 villages. As far as the agro-climatic condition is concerned it is favorable for chullu in most of the villages.

A door to door survey was conducted in 24 villages of Purola block and 41 villages in the Naogaon Block. There are a total of 2973 families in these 65 villages. There are 778 household who has more than six chullu trees each. This is about 26.20 percent of the total families. In these families, the trees that are yielding fruits are 4936 in number. Another 1595 families have 2-3 chullu trees and tree possessed by these families is around 4000. Rest 600 households have no trees. Apart from the fruit yielding trees there are about 6600 well grown trees in these villages which will start yielding fruits in the coming two years. It means there are approximately 15000 trees in 65 villages. The oil potential of these trees comes around 90 tonnes and pulp availability is around 700 tonnes. If we calculate total oil potential of Purola and Naugaon block, it is approximately 360 tonnes.

HARC has also conducted random survey all over the Garhwal Himalayas. There are rich areas spread all over, having tremendous potential for Chullu oil extraction. According to our observation, the total potential of Chullu oil is not less than 1000 tonnes in Garhwal Himalayas, even when there are no direct cash benefit programmes. But because it fulfills many of the necessities of the villagers it dominates the other tree species around the village in these areas.

SOME PROBLEMS :

The production capacity of each tree varies widely from tree to tree. The reason for this wide diversity is the negligence of the tree and random distribution of the trees. The average yield of the Chullu tree is taken as 20 to 40 Kg of seeds per tree.

Although the total yield is much higher but due to lack of proper collection and less requirement a great quantity of the seeds goes waste. All these problems will be solved once people start getting returns.

Decortication of nut is the most difficult task. In the Garhwal region the seeds are soaked overnight and then split the other day with stones, soaking the seeds makes the seed covers soft.

The National Institute of Oil Technology has developed a decorticator for Chullu nut with the assistance from NOVOD Board. Decortication speed of this machine is 150 kg an hour as compared to 8 kg a day by a person.

Since 1993 Himalayan Action Research Centre, Dehradun (HARC) has started its oil programme in Yamuna Valley

TRENDS IN RECENT PAST :

In recent years, the chullu has enjoyed wide plantation due to many reasons. The different river valley projects launched in the Uttarakhand have laid emphasis on the watershed management of the river valley. Under these projects govt. made a policy that 20 percent of the plantation on the civil/soyam lands will be of wild fruit varieties .

For example, in the Yamuna valley, the Forest Department has an annual capacity of Chullu seedlings nearly one lakh and they are planting it every year. A young energetic forest officer, with all his efforts is carrying the task ahead but even then the results are not satisfactory. It is not that people are not interested in long term ecological development projects, but their priorities differ. The long term projects can survive only when they fulfill the basic needs and support income generation of the local people, they must promote environmentally sustainable resource development and contribute to an effective eco-system management and environmental protection.

Since 1993 Himalayan Action Research Centre, Dehradun (HARC), has started its Chullu collection as well as plantation programme in Upper Yamuna valley. A complete oil processing unit is also established at Naugaon. At present this unit is processing only 4000 litres of oil in one season which will be increased to minimum 10000 litre in coming two years.

Oil seed industry of agro-forestry origin can play multidimensional role in the development of the Himalaya.

- 1. If the effort, which has been made for the production of oil is successful, then atleast 30 percent of private culturable waste lands which amounts to about 64,000 hectares, and is suitable for the growth of these species can be used by the farmers for growth of such species. With the waste lands growing and the dwindling agricultural resources, if this effort is sincerely carried out, it can become a major financial support to the farmers.*
- 2. Multipurpose forestry management recognizing NTFP production as an objective, efficient and effective approach to sustainable mountain environmental management can be demonstrated.*

3. *The forest based industries that promote environmentally sustainable resources development and use only annual fruits will contribute to effective eco-system management and environmental protection.*
4. *In the long run, the problems of common property resource management can be resolved through confidence building mechanisms which will shift the responsibility from the forest department to user groups, thereby initiating a socially sustainable development process.*
5. *Local level knowhow and exchange of experience and knowledge of agro-forestry will significantly increase.*
6. *Local level organizational capacities for institution building will be developed with long lasting impacts in community organization and local level resource management.*
7. *These wild species can be a boon to the marginal farmers living in the remote areas. Though the fruits are highly perishable and farmers in the remote cannot sell them but unlike the other fruits where the whole fruit goes waste, the seeds can be collected for their precious oil. Where the flesh production in the other fruits is more, the seed production in these species is comparatively very high. And as the seeds can be kept for a long period of time without being damaged, the farmers can sell or use them at their convenience.*
8. *As these species are native to these areas they need no experiments for their adaptability and acceptability.*
9. *Surprisingly a number of attempts are being made with the help of foreign aids to cultivate exotic oil species like Olive in the Himalayan region, to which people are least responsive, where on the other hand we have a number of native species which just need the right tapping.*
10. *If the effort made is carried out sincerely, there is reason why it should fail. Where on one hand we would be saving considerable sums of money in the afforestation schemes, on the other the farmers in these areas can improve their economic conditions and the country can earn a considerable amount of money by exports.*

Chullu is an ideal tree both from ecological and financial point of view for the villagers in Utrakhkand because it can be grown with least efforts, giving rise to a sustainable system and also improving the financial status of the villagers with a wide range of products from its yield.