Plants used as fish toxins in Garhwal region of Uttarakhand Himalaya

KS Negi* & KS Kanwal
Environment Department, Tehri Hydro Development Corporation Ltd, Rishikesh, Uttarakhand
E-mail: drkamalsnegi@gmail.com

Received 7 April 2008; revised 12 August 2008

Garhwal Himalaya is known for its rich bio-resources and ethnocultural diversity. Ethnobiological survey was conducted in different hilly districts of Uttarakhand which reveals their Indigenous Traditional Knowledge (ITK) in fish capture. Fishing is one of the important sources of animal protein for the people of hilly region. In the study, a total of 13 plants, which are significantly used as fish toxicant by local people in the aquatic resources of the Garhwal region have been listed. Plant’s characteristic feature, vernacular name, family, distribution, parts used and other ethnobotanical uses have been also described.

Keywords: Fish diversity, Garhwal, Aquatic resources, Fish toxin, Traditional fish folk, Uttarakhand

IPC Int. Cl.: A61K36/00 A01K79/00

Garhwal region is one of the distinct division of Uttarakhand Himalaya. Geographically, Garhwal has almost central position in the long Himalayan sweep, which lies between the latitude 29° 26' to 31° 28' N and longitude 77° 49' to 80° 06' E. It has an area of about 30,090 sq km, spreading 220 km in East-west and 235 km in North-south, the whole region constitutes about 7.01% of the entire Indian Himalaya. Most of the holy rivers of India owe their origin to the snow peaks of Chamoli and Uttarkashi districts of Garhwal region. Besides the snow-fed rivers, there are many spring origin streams, rivers and hundreds of rivulets are present in the region. These aquatic resources harbour diverse ichthyofauna belonging to 64 fish species in different hilly and Terai-Bhabar zone of Garhwal Himalaya. Fish constitutes an important, cheap and rich source of high quality animal protein for the people living in the hills of Garhwal division. Traps and nets are an important tools used for capture fishes from rivers and streams but use of various plants as fish poisons is also very old practice in the history of human kind.

Plants species with ichthyotoxic properties that are frequently used in the whole region have subsequently been less studied. Hence, the communication gives the detailed information of various plants, which are used as fish toxicants by the people in Garhwal region of Uttarakhand Himalaya.

Methodology
Extensive and frequent field surveys were conducted in different villages of Garhwal region of Uttarakhand state. Information on plants used as fish poison and other beneficial uses were collected by field observation and discussion with people of the hilly areas and local tribal communities of Terai Bhbar zone. The general information related to vernacular names of plants in different region and plant parts used have been provided by elder and knowledgeable people. Plants were identified taxonomically by referring at HNB Garhwal University, Srinagar-Garhwal and ICFRE Dehradun. Extensive literature search was also conducted to verify the name of plants and their use in fish poisoning.

Result & discussion
Local people used various conventional methods to catch fishes for their domestic consumption and protein diet requirement. Various types of plant products such as leaves of khinna (Sapium insigne), rambans (Agave americana), stem bark of jamun (Syzygium cumini), latex of surai (Euphorbia royleana), leaves and bark of akhrot (Juglans regia), bark of agali (Acacia pennata), fruits of chilla

*Corresponding author
(Casearia elliptica) and maindul (Catunaregam spinosa), pounded seeds and stem bark of Zanthoxylum armatum and oil cake of mahwa (Madhuca longifolia), etc. are used to catch various size of fishes from the aquatic resources of Garhwal region (Table 1). These plant products are first well crushed and grinded nearby the aquatic system. The pest is used as a fish poison in stagnant or semi-stagnant pools, slow flowing streams and rivers for fish catch; it is mostly applied during the morning or evening hours. Sometimes, streams would be partly blocked to slow down the water flow for concentrate the power of poison without being washed away or diluted by a strong current. The active ingredients are released by mashing the appropriate plant parts. A variety of chemicals found in these plants will stun fish when it passes through the gills or in some cases ingested. The fishes come to the surface and exhibit abnormal behaviors due to may be nervous breakdown and lack of dissolved oxygen. The fainted fishes are collected by the fisherman or local people using simple cloth, cast net and put into the basket.

The poison has a narcotic and debilitating action on the fish, without killing them. The sporin

<table>
<thead>
<tr>
<th>Plant name / Local name</th>
<th>Family</th>
<th>Ethnobotanical uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia pennata (L.) Willd</td>
<td>Mimosaceae</td>
<td>Bark used as antidote to snake bite, used as detergent. Wood used as fuel; flowers as source of bee-forage.</td>
</tr>
<tr>
<td>Agali, Rigad, Aila, Shembi</td>
<td></td>
<td>Cream coloured wood made into pots and vessels; fruits given to cattle and goats; seed flour mixed with wheat flour during famine; seed paste and oil applied in rheumatic pain; flowers useful in apiculture as bee-forage.</td>
</tr>
<tr>
<td>Aesculus indica (Colebr. ex Cambess)</td>
<td>Hippocastanaceae</td>
<td>Plant used as biological-fence; leaf fiber used for several wicker works; leaf paste as poultice; plant use to check land slide and soil erosion.</td>
</tr>
<tr>
<td>Agave Americana L.</td>
<td>Agavaceae</td>
<td>Wood as a low - grade fuel; leaf paste used to check bleeding of wounds.</td>
</tr>
<tr>
<td>Casearia elliptica Willd</td>
<td>Flacourtiaceae</td>
<td>Fruits used to wash woolen clothes. Bark and fruits used in dyspepsia, asthma, cough and as anthelmintic.</td>
</tr>
<tr>
<td>Chilla, Chillak, Chihlak</td>
<td></td>
<td>Fruits edible and also provide oil; wood is excellent for furniture, carved work, gun - stocks, and veneers; bark used as a dye and as medicine; rind of fruits used for drying and tanning. Leaves mixed with stored - grains as fungicide and insecticide.</td>
</tr>
<tr>
<td>Catunaregam spinosa (Thumb.) Tirvengadum, Maindul, Mainfal, Madanfal</td>
<td>Rubiaceae</td>
<td>Plant used as biological-fence; leaf fiber used for several wicker works; leaf paste as poultice; plant use to check land slide and soil erosion.</td>
</tr>
<tr>
<td>Euphorbia royleana Boissier.</td>
<td>Euphorbiaceae</td>
<td>Fruits used to wash woolen clothes. Bark and fruits used in dyspepsia, asthma, cough and as anthelmintic.</td>
</tr>
<tr>
<td>Sulla, Surai, Schund</td>
<td></td>
<td>Fruits used to wash woolen clothes. Bark and fruits used in dyspepsia, asthma, cough and as anthelmintic.</td>
</tr>
<tr>
<td>Juglans regia L.</td>
<td>Juglandaceae</td>
<td>Wood used as fuel; young leaves poisonous to cattle; seed paste applied on wounds and boils.</td>
</tr>
<tr>
<td>Akhrot, Akhror, Akshor</td>
<td></td>
<td>Wood used as fuel; young leaves poisonous to cattle; seed paste applied on wounds and boils.</td>
</tr>
<tr>
<td>Lyonia ovalifolia. (Wallich) Drude</td>
<td>Ericaceae</td>
<td>Wood used as fuel; young leaves poisonous to cattle; seed paste applied on wounds and boils.</td>
</tr>
<tr>
<td>Anyar, Aiyar</td>
<td>Sapotaceae</td>
<td>Wood for various constructions; flowers and fruits edible, afresh or made into several preparations; useful in apiculture as bee-forage; seeds yield an oil, used for candle and soap manufacturing; flowers often used in local beverages.</td>
</tr>
<tr>
<td>Madhuca longifolia (Koenig)</td>
<td></td>
<td>Fruits edible and also provide oil; wood is excellent for furniture, carved work, gun - stocks, and veneers; bark used as a dye and as medicine; rind of fruits used for drying and tanning. Leaves mixed with stored - grains as fungicide and insecticide.</td>
</tr>
<tr>
<td>Mac Bride</td>
<td></td>
<td>Wood for various constructions; flowers and fruits edible, afresh or made into several preparations; useful in apiculture as bee-forage; seeds yield an oil, used for candle and soap manufacturing; flowers often used in local beverages.</td>
</tr>
<tr>
<td>Mahwa, Madhuca</td>
<td></td>
<td>Wood for various constructions; flowers and fruits edible, afresh or made into several preparations; useful in apiculture as bee-forage; seeds yield an oil, used for candle and soap manufacturing; flowers often used in local beverages.</td>
</tr>
<tr>
<td>Sapindus mukorossi Gaertner</td>
<td></td>
<td>Wood for various constructions; flowers and fruits edible, afresh or made into several preparations; useful in apiculture as bee-forage; seeds yield an oil, used for candle and soap manufacturing; flowers often used in local beverages.</td>
</tr>
<tr>
<td>Reetha, Arishthak, Phenila</td>
<td></td>
<td>Wood for various constructions; flowers and fruits edible, afresh or made into several preparations; useful in apiculture as bee-forage; seeds yield an oil, used for candle and soap manufacturing; flowers often used in local beverages.</td>
</tr>
<tr>
<td>Sapium insigne (Royle) Benth ex Trimen</td>
<td>Euphorbiaceae</td>
<td>Wood used for making floats, cases, drums, toys, matchboxes; latex regarded as poisonous, causes blisters.</td>
</tr>
<tr>
<td>Kinna, Khindra, Khinni, Khirni Syzygium cumini (L.) Skeels</td>
<td>Myrtaceae</td>
<td>Wood used for construction and various other purposes; bark for dyeing and tanning. Ripe fruits edible. Fruits kernel and bark supposed to be good against diabetes.</td>
</tr>
<tr>
<td>Jamun, Phalend, Kala Jamun, Jambu</td>
<td></td>
<td>Leaves and fruits chewed for mouth wash and tooth care. Flowers of bee-forage in apiary.</td>
</tr>
<tr>
<td>Zanthoxylum armatum DC Timroo, Tejbal, Timbur, Andhaka, Tumbak</td>
<td>Rutaceae</td>
<td>Wood used for making floats, cases, drums, toys, matchboxes; latex regarded as poisonous, causes blisters.</td>
</tr>
</tbody>
</table>
produces foam when entering in the water and it paralyzes the fish. At the beginning all fishes are paralyzed, but those that are in deep pools and those that have not been picked up by fishermen were revived. Plant extract also alters the physico-chemical properties of the water bodies, which ultimately cause decline of small fishes in the stream and rivers. The toxicant released from the paste or slurry of these plants not only affects the fishes but also damage the stream biota like periphyton and macrobenthos. Incalculable loss of juveniles and small fishes occurs, as a result of poisoning of streams. Poison flow down stream over a long distance killing all fry and fingerlings of fish. A variety of plants having fish poisoning properties has been known for centuries, especially in South America and Asia. Many have been employed directly to collect wild fish from ponds and streams for the table. In Guyana, fishermen pound the root of *Lonchocarpus* for poison of small fish in a stream. Similarly, various plants used as ichthyotoxic plant in Garhwal Himalaya.

### Conclusion

The plant toxins have an impact on the target resource and may affect also non-target species of streams and rivers. Many of them also have an impact on the wider aquatic environment. Incalculable loss of juvenile and small fishes occurs, as a result of poisoning of streams. Poison flow downstream over a long distance killing all fry and fingerlings of fishes. Therefore, use of plant extract and other poisoning should be strictly banned in the strams, rivers and other aquatic resources of Uttarakhand Himalaya. Provision against public nuisance in the Indian Penal Court, Criminal Court and Local Acts by which legal powers are conferred upon State Fishery Officials.

### References

