Indigenous curative and prophylactic traditional practices used against haematophagous leeches in Arunachal Pradesh and Sikkim

Joken Bam*, S Rai1, D Bhattacharya, S Maiti, S Islam2, Pallabi Pathak2, A K Bera & S M Deb

*National Research Centre on Yak, Dirang-790 101, West Kameng District, Arunachal Pradesh;
1Veterinary Dispensary Upper Lasso-737 111, Tashiding, West Sikkim District, Sikkim;
2Department of Parasitology, College of Veterinary Sciences, Khanapara-781 022, AAU, Guwahati, Assam

E-mail: jokenbam@gmail.com

Received 15 July 2014, revised 18 May 2015

Leeches are a nuisance to the livestock and human living in the hills of North Eastern parts of India. The people living in this region have learnt to control and manage leeches through various indigenous methods acquired through generations of practice. The present study is an attempt to document the indigenous traditional practices of used by Galo and Monpa tribes of Arunachal Pradesh and Lepcha, Bhutia and Nepalis of Sikkim against blood feeding leeches. The data were collected through an open ended interview schedule to five key informants of each study area. The study has identified a variety of herbal and non-herbal based methods used to control, prevent and kill leeches.

Keywords: Leech, ITK, Repellent, Arunachal Pradesh, Sikkim

IPC Int. Cl.8: A01K, A01N, A61K 36/00

Leeches are blood sucking annelid worms with segmented body. Leeches have three jaws which are armed with numerous teeth that are used to bite the flesh of its host to suck blood. Saliva of leech contains various biomolecules including hirudin that prevents blood clotting thereby maintaining a continuous flow of blood until the parasite is completely engorged. Leeches are broadly classified into aquatic and terrestrial leeches. Some species of leeches have been historically used for medicinal purpose. About 45 species of leeches belonging to 22 genera are found in India1. The states Arunachal Pradesh and Sikkim of India are situated in the eastern part of Himalayas. This region houses a huge flora and fauna biodiversity including a significant number of leech species. The freshwater streams, ponds and paddy fields on the lower altitude to the grasslands and forest of mid altitude are the habitat of leeches2. Leeches are seasonal; those are active in the warmer months of the year and hibernate in the winter months under rocks, woods, logs and forest floor.

Agriculture being main occupation of this region, people depend on forest for their daily livelihood for the want of vegetables, medicinal plants and firewood as well. Therefore, people of this region are having close association with the forest which leaves the opportunity to come in contact with leeches and other biting insects. With the turn of century the tribal people have identified specific plants which are used by several generations against leeches. Besides medicinal plants various household ingredients have also shown hirunicidal activity. So far, scenario of North-eastern region is concern leech infestation is identified as one of the major health issues for mithun3,4, yak and their hybrid5. Although detailed impact of leech on livestock health is yet to be studied, but leeches cause a considerable loss of blood among livestock in hilly region. With rapid development and urbanization the use of chemical based insect repellents in the form of creams, spray and chemical treated socks and clothing are getting popular among young generation of adventurous forest goers but no specific documentation on the traditional practices of leech control in India was made. This study was therefore undertaken to document the indigenous plants and methods used for control of leeches in Sikkim and Arunachal Pradesh.

*Corresponding author
Methodology
The present study was purposively carried out in the eastern Himalayan states of India, i.e., Arunachal Pradesh and Sikkim. West Siang and West Kameng districts of Arunachal Pradesh; and North and West districts of Sikkim were further selected purposively for the present study. One village from each district namely Basar from West Siang, Nyukmadung from West Kameng, Dzongu from North Sikkim and Yuksom from West Sikkim were selected where leech infestation was reported to be hyper endemic. All the four selected villages are the inhabitants of the different indigenous tribe like the Galo in Basar, the Monpa in Nyukmadung, the Lepcha in Dzongu and the Lepcha and Bhutia in Yuksom. These indigenous tribes have their own traditional practices to control the haematophagous leech. Therefore, to document these traditional practices, five key informants from each village were selected by socio-metric method.

Focused group discussions (FGD) on traditional way of controlling of haematophagous leeches were organised in each selected village with the identified five key informants to document the different aspects of traditional leech control mechanisms. An open ended survey questionnaire has also been used during data collection.

Results and discussion
All the herbal and non-herbal based practices used by the locals of Basar, Nyukmadung, Dzongu and Yuksam for leech control are enumerated (Table 1) and descriptions are given below:

Non-herbal package of practices against leeches (Curative)
Common salt is used directly on the leech for killing in the most parts of India. In Sikkim, the locals before entering leech infested forest make a special stick to which salt wrapped in a piece of cloth as a ball is tied. This ball is slightly wetted and carried along in forest and as soon as a leech climbs on a person this ball is touched onto the leech (Fig. 1). By this method the leeches drop down instantly from the body. In a similar manner, Monpas wrap ingcha (salt) in a piece of cotton cloth and carry it with them and touches the leech with it when it climbs on a person. The adults working in agricultural field or forest ignore the leech bite but in children when the bleeding from the site of bite continues for a long time Borongbu (spider web) is collected and applied onto the wound to stop bleeding. Other items used by Monpas to stop bleeding are Thuli (ash) of paper or cotton cloth, Chun (calcium), scrapping of Mongnang (dried animal hide) attached on Shum (case for carrying knife) as a piece of decoration. It is a common practice among Galo tribe of Basar to carry Micco (ash) with them when they go to wet forest. A pinch of ash is applied onto the attached leech to deter and kill leeches.

Table 1—Indigenous traditional practices followed against leeches in Arunachal Pradesh and Sikkim

<table>
<thead>
<tr>
<th>Name of items/plants used</th>
<th>Local name (G: Galo, L: Lepcha, B: Bhutia, N: Nepali, M: Monpa)</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ageratum conyzoides L. Asteraceae</td>
<td>Eww Namya (G)</td>
<td>To stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Animal hide</td>
<td>Mongnang (M)</td>
<td>To stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Artemesia vulgaris L. Asteraceae</td>
<td>Titey pati (N), Khanpa or Khanme (M)</td>
<td>Leaves used as leech repellent</td>
</tr>
<tr>
<td>Ash</td>
<td>Micco (G), Purasor (L), Ghachew (B), Kharani (N), Thuli (M)</td>
<td>To deter and kill leech</td>
</tr>
<tr>
<td>Bamboo</td>
<td>Vv (G), Shi (M)</td>
<td>Scrappings are used to stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>Tano (G), Chun (M)</td>
<td>To kill leech and to stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Chromolaena odorata L. Asteraceae</td>
<td>Daglin (G)</td>
<td>To stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Common salt</td>
<td>Alo (G), Vom (L), Cha (B), Nun (N), Ingcha (M), Tampu (M)</td>
<td>To deter and kill leech</td>
</tr>
<tr>
<td>Nicotiana tabacum L. Solanaceae</td>
<td>Damv (G), Tongku (L), Tanku (B), Surti (N),</td>
<td>Leech repellent</td>
</tr>
<tr>
<td>Solanum viarum Dunal Solanaceae</td>
<td>Khebyong chang (B), Boksikara (N)</td>
<td>Leech repellent</td>
</tr>
<tr>
<td>Spider web</td>
<td>Borongbu (M)</td>
<td>To stop bleeding from leech bite site</td>
</tr>
<tr>
<td>Zanthoxylum armatum DC. Rutaceae</td>
<td>Kunda (L), Nangri (B), Timur or Timmur (N), Khagi (M)</td>
<td>Leech repellent</td>
</tr>
</tbody>
</table>

(G: Galo, L: Lepcha, B: Bhutia, N: Nepali, M: Monpa)
Plants used as leech repellent (Prophylactic)

A total of seven plant species used as leech repellents were identified (Figs. 2-6). All the plants are enumerated with their botanical name, family, local name and method of application.

*Artemesia vulgaris* L. (Asteraceae), *Tittey pati* (Nepali) and *Khanpa, Khamne* (Monpa), the leaves are crushed and juice is applied on legs by locals of Sikkim and *Monpas* of Arunachal Pradesh. *Tittey pati* is also used as anti-leech agent by *Limboo* tribe in Sikkim. Dried leaves are also mixed with other leaves of other plants in *Dhoop* to repel mosquitoes.

*Nicotiana tabacum* L. (Solanaceae), *Dumv* (Galo), *Tongku* (Lepcha), *Tanku* (Bhutia), *Surti* (Nepali), *Tampu* (Monpa), tobacco is used either directly with water to kill leeches or in combination with other ingredients. The saliva after chewing tobacco is also applied to remove leech from the body. The paper used to wrap the *bidi* is pasted on the bite wound by Galo people to stop bleeding. Many forests of Sikkim are heavily infested with leeches. *Lepcha, Bhutia* and *Nepalis* of Sikkim used a special solution for leech control in human as well as animals. The solution is prepared by soaking tobacco, crushed seeds of *Zanthoxylum*, ash and salt in water. This solution is applied on legs before entering forest for grazing their animals and collecting grasses and fodders. The people of Dzongu, North Sikkim carry this solution along when they go for 3 hrs long track across the jungle to visit one of the most sacred monasteries in Sikkim, the Thulong Monastery for protection against leeches on the way.

*Solanum viarum* Dunal (Solanaceae), *Khebyong* (Lepcha), *Boksikara* (Nepali), the raw ripe fruits are crushed and applied on hands and legs by the cardamom plantation workers of Sikkim to prevent themselves from leech bite. Other species of *Solanum* are also reported to be used by other communities in India like *S. virginianum* and *S. surattensis* by Gujjars of Uttarakhand for treatment of nasal hirudiniais in livestock. Similarly *Kani* people of Tamil Nadu apply a mixture of fruit powder of *S. erianthus* and tobacco on their legs to protect from leech bite.

*Zanthoxylum armatum* DC. (Rutaceae), *Kundu* (Lepcha), *Nangri* (Bhutia), *Timur* or *Timmur* (Nepali), *Khagi* (Monpa), it is consumed as such with meal or in the form of *chutney* with other ingredients. Monpa people consume plenty of *khagi* at night when they plan to enter into forest the next day to keep them protected from ticks in the forest. The dried fruit is crushed into powder and rubbed onto the legs to act as anti-leech agent in Sikkim or also used in combination with tobacco and ash. Apart from seeds the leaves of *Z. acanthopodium* DC. (*Bhokey timmur*) and *Z. alatum* Roxb. (*Bhaley timmur*) are also crushed and rubbed on the body to act as anti-leech agent by Limboo tribe of Sikkim. The persistence of leech repellent activity of essential oil of *Z. armatum* on cloth was evaluated in comparison to chemical repellents N,N-diethyl phenyl acetamide (DEPA), N,N-diethyl-m-toluamide (DEET), 3 acetyl 2 (2-6-dimethyl-5-heptenyl) oxazolidine (Citronyl), dimethyl phthalate (DMP) and N-benzoyl piperidine (NBP).
against land leeches of Assam\textsuperscript{11}. Essential oil of \textit{Z. armatum} showed comparable result with citronyl and better than DMP and NBP though DEPA and DEET was found to be the best.

**Plants used to stop bleeding from the site of leech bite (Curative)**

\textit{Ageratum conyzoides} L. (Asteraceae), \textit{Eww Namya} (Galo), it is a common alien weed widely distributed from tropic, sub-tropic to temperate region upto 3000 m above msl in Arunachal Pradesh\textsuperscript{10} and found in abundance in most Galo village. The plant has a typical smell and bears white colour flower. The leaves are crushed between two palms and juice is applied at the site of leech bite to stop bleeding. This plant is also used to stop bleeding and rapid wound healing by \textit{Apatani}\textsuperscript{12} and \textit{Bangni}\textsuperscript{13} tribes of Arunachal Pradesh.

\textit{Chromolaena odorata} L. (Asteraceae), \textit{Daglin} (Galo), Galo people crush the leaves of this plant and apply at the site of leech bite to stop bleeding. \textit{Jarawa} tribe of Andaman and Nicobar Islands also use this plant for leech bite\textsuperscript{14}.

\textit{Bambuseae}, the stem of the bamboo is scrapped with knife to remove the greenish powdery portion which comes out like a powder. It is then applied to stop bleeding. It stops the bleeding instantly and also acts as an antiseptic and prevents any infection. Like \textit{Galo} and \textit{Monpa}, young tribal women of Tripura also uses Bamboo scrapings to stop bleeding when bitten by leech, mosquitoes, spiders or other insects\textsuperscript{15}.

**Significance of the study to farmers and recommendations for further studies**

With traditional knowledge and wisdom acquired from generation to generation, highlanders of North-East region have developed effective mechanisms to control haematophagous leeches which are organic and nature friendly. These practices are often cheap, safe, log time tested, based on locally available resources and proved their efficacy against haematophagous leeches. Therefore, these practices are the strongest alternative to the modern medicines/drugs. Most of the time modern medicines are not available in the remote corners of the North-East region of the country, then, these traditional practices are only in vogue to control the haematophagous leeches. Increasing leech infestation is one of the major concerns for the livestock rearers of the North-East region. The present study may help farmers to overcome the concern of leech infestation.

Ethno-botanical as well as effective traditional practices yet to be tapped and has a tremendous potential on the economic well being of the resource poor rural communities. Some of the recommendations for better utilization of these practices are as follows:

(i) Concern regarding efficacy, quality, safety and dose standardisation remains. Therefore, it is an urgent need to evaluate the pharmacodynamics of these practices.

(ii) Misuse of these traditional practices are quite common due to lack of awareness of local communities. Hence, it is very important to save and conserve these valuable floras from mishandling and destruction.

(iii) A farmer participatory research has to be designed for their further documentation and validation.

**Conclusion**

Till today most of the leech control and prevention approaches are plant based. The present study enumerated the indigenous knowledge practiced by people of Arunachal Pradesh and Sikkim against leeches. Further research is required at a larger scale to find out the list of practices followed by different communities in the leach infested hilly regions of the country and to evaluate the actual efficacy of these plants so as to develop an eco-friendly herbal leech repellent for both human and the livestock.

**Acknowledgment**

Authors are thankful to Dr Bomchak Riba, Tagam Bam, Dorjee, Sang Chomu and Tsering Khandu for their inputs and all the key informants of Basar, Nyukmadung, North and West Sikkim for their valuable information. The authors are grateful to the Dean, Faculty of Veterinary Sciences, AAU, Khanapara for logistic support.

**References**

BAM et al.: CURATIVE AND PROPHYLACTIC TRADITIONAL PRACTICES AGAINST LEECHES

14 Sharief MU, Plants folk medicine of Negrito tribes of Bay Islands, Indian J Tradit Knowle, 6(3) (2007) 468-476.