Ethnomedicinal Knowledge for Management of Leeches in Assam

Werina Ingtipi, Ni-et Teronpi, and Robindra Teron*
Department of Life Science and Bioinformatics, Assam University, Diphu Campus, Karbi Anglong, Diphu-782 462, India
*E-mail: robin.teron@gmail.com

ABSTRACT
Leech infestation is a common health problem in Assam that affects people of all ages, sexes and even livestock. Ethnomedicinal practice for management of leech infestations among ethnic groups in Assam is discussed. Data collection included ethnobotanical methods of group discussions and semi-structured interview. A total of 13 medicinal plants and 08 non-plant products are used by ethnic groups for management of leech infestation. Plants like Mikania scandens and Chromolaena odorata while among non-plant sources common salt and kerosene are the most extensively used ethnomedicines against leech infestation. In rare cases of intraperitoneal leech bites, Cucumis sativus or raw duck blood is taken to expel the leech. Ethnobotanical studies followed by chemical evaluation of locally used anti-leech plants can provide valuable clues about the bioactive compounds and prioritise species for further pharmacological investigation.

Keywords: Ethnomedicine, leech management, leech infestation, ethnic groups, anti-leech plants

1. INTRODUCTION
Leech infestation is a common health problem in Assam, Northeast India that affects people of all ages and even livestock. Diverse habitats such as swamps, water bodies, marshes, agricultural fields and forests support luxuriant growth of leeches among other biota. Hirudinia is dominant aquatic species while terrestrial forms are represented by species of Haemadipsa. Leeches mostly gets attached to the exterior or exposed parts of the body but leech infestation has also been reported frequently from body cavities1. Primary complications associated with leech infestation include bites, haemoptysis and haematemesis leading to anemia. Secondary infections of the bites cause swelling and itching in the infected area and high fever. Very often bleeding becomes uncontrollable due to anti-coagulant hirudin released by these sanguivores and worst when they are endoparasitic. Often people gather fear psychosis for these blood sucking annelids while working in agricultural fields, walking along forest paths and collection of forest resources. Tribal groups in Assam use plants and other products to manage leech infestations, either to repel or kill the annelids or to cure the secondary infection that arises due to leech bites. Management of leech infestations sometimes involves magico-religious practices in which the healer uses charms and incantations. Herbal approach to manage leech infestation could be a viable option as it is non-toxic to environment. In the present communication, ethnomedicinal knowledge of different ethnic groups of Assam for management of leech infestations is discussed.

2. MATERIALS AND METHODS
2.1 Study Area
Assam state (24°44′-27°45′N to 98°41′-96°02′E; area: 79,000 sq km) in Northeast India is considered as the meeting ground of diverse cultures including Karbi, Dimasa, Bodo, Chakma, Naga (Rengma), Deori, Mising, Rabha, Koch rajbongshi, Kuki, Hmar, etc. It is bounded by six of the other seven sister states of the region (Fig. 1). Forest type varies from semi-evergreen to evergreen forest with mixed crop
composition including bamboo, canes and orchids. The people are mainly agriculturists with farmers practicing wet cultivation in plains and jhum in the hills.

2.2 Data Collection and Analysis
Ethnobotanical field work was conducted during 2012–2014 among the ethnic groups of Assam. Consent of informants was obtained and information was collected following ethnobotanical methods of group discussion and semi-structured interview12-13. Checklist of anti-leech plants was prepared after conducting group discussion. Semi-structured interview was conducted with 148 informants (Karbi: 31; Rengma: 5; Garo: 9; Nepali: 5; Kuki: 35; Koch Rajbongshi: 3; Bodo: 27; Mising: 3; Mizo: 7; Hmar: 1; Meitei: 3 and Dimasa: 19). The questionnaires included key issues like
(i) complaints of leech infestation in an area,
(ii) potential habitats of leeches,
(iv) complications caused by leech infestation,
(v) ethnomedicines for managing leech infestation, and
(vi) precaution measures to avoid leeches.

The local names of plants, parts used, application and mode of action disclosed by informants were recorded in the field diary. We accompanied informants into leech-infested habitats and personally observed the leeches and responses to the application of ethnomedicines. Medicinal plants were collected with the help of key informants and identified with local floras14-16.

3. RESULT AND DISCUSSION
Leech infestation is a common health problem in both the plains and hill areas of Assam. Two different approaches for management of leeches have been observed. First, removal of leeches from the body of the victim and second, management of wounds, which in most cases, is seen to be associated with different types of secondary infections. The removal of leeches is generally seen to be carried out either by mechanical means or by the application of various substances with known anti-leech properties. The second approach is accomplished by further medicinal examination and application of biomedicines. The most common complication of leech infestation is non-coagulation of blood (Fig. 2) and proper management of the wound is key to prevention of secondary infections. A total of thirteen anti-leech plants have been recorded among different ethnic groups of Assam (Table 1) while as many as eight non-plant products are also used for management of leeches (Table 2). Besides, wood ash and charcoal of almost all plants are used as source of remedy for management of leech infestation. Study on anti-leech medicinal plants has received comparatively less attention from researchers and therefore there is a need to enhance ethnobotanical studies among unexplored cultures before it is too late.
enumerated as follows.

**Colocasia esculenta** (L.) Schott: Petioles are crushed and the sap is applied on the wound. This application heals the wound and repels leeches from further infestation.

**Chromolaena odorata** (L.) R.M. King & H. Rob.: Leaves are pounded and the paste is applied dermally on the wound for quick healing. However, further infection would require medical treatment.

**Mikania scandens** (L.) Willd.: Application is similar with that of **Chromolaena odorata**. **Gossypium arboreum** L.: Cotton ashes are applied on the wound. This results in quick healing and prevents from further secondary infection.

**Areca catechu** L.: The masticatory extract of betel quid is applied dermally on the wound for quick healing. **Piper betel** L.: Similar with that of **Areca catechu** L.

**Nicotiana tabacum** L.: Dried leaves are powdered and sprinkled where the leech has attached itself strongly on the skin. This detaches the leech from the body and paralyses it. This application, although, does not help in healing the wound yet, it kills the leech with further application. During field study, our informants removed the terrestrial leech attached to his feet and placed on his palm; he then added some crushed dried tobacco leaves. We observed the leech struggled due to the effect of tobacco and became paralysed in about a minute. **N. tabacum** L. is the most commonly used anti-leech plant among the cultural groups studied.

**Nicotiana plumbaginifolia** Viv. (Fig. 5): Similar with **Nicotiana tabacum** L. Use of this plant is restricted to the Karbi ethnic group only.

**Cucumis sativus** L.: It is used in cases of endoparasitic leech infestation. Either tender leaves or the whole fruit is

### Table 1. Medicinal plants used for management of leeches by ethnic groups of Assam

<table>
<thead>
<tr>
<th>Plants [Family]</th>
<th>Cultural groups</th>
<th>Parts used</th>
<th>Mode of action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nicotiana tabacum</strong> L. [Solanaceae]</td>
<td>Bodo, Karbi, Dimasa, Manipuri and Mizo</td>
<td>Leaves</td>
<td>Repellant and killing agent</td>
</tr>
<tr>
<td><strong>Nicotiana plumbaginifolia</strong> Viv. [Solanaceae]</td>
<td>Karbi</td>
<td>Leaves</td>
<td>Repellant and killing agent</td>
</tr>
<tr>
<td><strong>Citrus sp.</strong> [Rutaceae]</td>
<td>Karbi</td>
<td>Leaves</td>
<td>Repellant</td>
</tr>
<tr>
<td><strong>Cucumis sativus</strong> L. [Cucurbitaceae]</td>
<td>Karbi</td>
<td>Fruits and Peels</td>
<td>Repellant and killing agent (intraperitoneal leeches)</td>
</tr>
<tr>
<td><strong>Scoparia dulcis</strong> L. [Plantaginaceae]</td>
<td>Mizo</td>
<td>Leaves</td>
<td>Wound management</td>
</tr>
<tr>
<td><strong>Alternanthera brasiiana</strong> (L.) Kuntze [Amaranthaceae]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gossypium arboreum</strong> L. [Malvaceae]</td>
<td>Kuki</td>
<td>Ash</td>
<td>Repellant</td>
</tr>
<tr>
<td><strong>Chromolaena odorata</strong> (L.) R.M. King &amp; H.Rob. [Compositae]</td>
<td>Kuki, Karbi, Hmar, Garo, Dimasa and Bodo</td>
<td>Leaves</td>
<td>Wound management</td>
</tr>
<tr>
<td><strong>Mikania scandens</strong> (L.) Willd. [Compositae]</td>
<td>Karbi, Kuki, Hmar, Bodo, Dimasa, Mizo and Garo</td>
<td>Leaves</td>
<td>Wound management</td>
</tr>
<tr>
<td><strong>Zingiber officinale</strong> Rosc. [Zingiberaceae]</td>
<td>Rengma Naga</td>
<td>Rhizomes</td>
<td>Repellant</td>
</tr>
<tr>
<td><strong>Colocasia esculenta</strong> (L.) Schott [Araceae]</td>
<td>Ahom, Mising, Bodo and Koch Rajbongshi</td>
<td>Petiole</td>
<td>Repellant and wound management</td>
</tr>
<tr>
<td><strong>Areca catechu</strong> L. [Areaceae]</td>
<td>Karbi, Mising and Bodo</td>
<td>Masticated betel quid</td>
<td>Repellant</td>
</tr>
<tr>
<td><strong>Piper betel</strong> L. [Piperaceae]</td>
<td>Karbi, Mising and Bodo</td>
<td>Masticated betel quid</td>
<td>Repellant</td>
</tr>
</tbody>
</table>

**Nicotiana tabacum** L.: Dried leaves are powdered and sprinkled where the leech has attached itself strongly on the skin. This detaches the leech from the body and paralyses it. This application, although, does not help in healing the wound yet, it kills the leech with further application. During field study, our informants removed the terrestrial leech attached to his feet and placed on his palm; he then added some crushed dried tobacco leaves. We observed the leech struggled due to the effect of tobacco and became paralysed in about a minute. **N. tabacum** L. is the most commonly used anti-leech plant among the cultural groups studied.

**Nicotiana plumbaginifolia** Viv. (Fig. 5): Similar with **Nicotiana tabacum** L. Use of this plant is restricted to the Karbi ethnic group only.

**Cucumis sativus** L.: It is used in cases of endoparasitic leech infestation. Either tender leaves or the whole fruit is

---

Figure 4. Terrestrial leech (**Haemadipsa** sp.)

Figure 5. Plant of **N. plumbaginifolia**.
consumed which kills and discharges the leech out of the body.

*Citrus* sp.: Rinds of *Citrus* fruits are scattered in the surroundings as repellants, particularly for terrestrial leeches. The rind extract helps in detaching the leech from the body.

*Alternanthera brasiliiana* (L.) Kuntze: Leaves are crushed and the extract is applied on the wound caused by leech bites. This clogs blood and helps in wound healing.

*Scoparia dulcis* L.: Similar with that of *Alternanthera brasiliiana*. It further controls any secondary infection.

*Zingiber officinale* Rosc.: The extract of the rhizomes work as repellant for the leeches.

### 3.2 Anti-leech Ethnomedicines from other Sources

Eight products other than plants (Table 2) are also used to manage leech infestation: repellent (six), killing agent (one) and for management of wounds (two). Common salt is the most extensively used non-plant ethnomedicine for killing and repelling both aquatic and terrestrial leeches.

*Kerosene:* When people happen to visit leech infested habitats, they rub kerosene oil over the exposed parts of fore and hind limbs; the odor is said to repel the leeches. It further restricts the hold of the leeches onto the person's body.

*Salt:* Use of common salt is the most widespread practice observed in almost all the tribal communities. Salt is applied to remove both (a) aquatic and (b) terrestrial leeches from the body and very effective in killing these annelids (Fig. 6). People working in agricultural fields often carry salt container where they put leeches that have been removed from the body. Leeches die within a few seconds (approx. one minute).

*Saliva:* This forms the handiest resource to remove aquatic leech from the body. The application of saliva helps in detaching the leech with ease. During the study, we applied our own saliva on the leech that got attached to our feet and observed the organism retracted its proboscis and searched for new location to bite. Probably the lubricating nature of saliva releases hold of the leech but bioassay study will be able to identify the bioactive component responsible for this effect.

*Lime:* Application and effect are similar with that of *Areca catechu*.

*Alkali solution:* People working in area infested with aquatic leech often carry locally prepared alkali solution in a vessel. When a leech gets attached to a person, the solution is sprinkled which releases hold of the leech and then removed with ease. It is placed in the vessel so that the leech does not escape back to the environment. This practice has been observed among the Karbis during paddy plantation.

*Duck blood:* Though rare, in cases of intraperitoneal leech infestation (through rectum or the vagina) fresh duck blood is given orally and within moments the leech gets discharged through urine. The victim is then taken to a nearby hospital for further medication. Such practice has been reported among the Karbi ethnic group only.

*Wood ash:* Wood ash of any plant is applied on the wound caused by leech bites. It is said to enhance blood clotting and heals the wound. Though this material does not kill the leech yet it helps as a repellant.

*Charcoal:* Burnt wood charcoal is applied to heal the wound caused by leech bites.

### 4. CONCLUSION

Though leech therapy has been used for various ailments like circulatory disorders and cardiovascular diseases, leech infestation is the source of health problems for both human and livestock. Many anti-helminthic and anti-parasitic drugs have been used against various types of leech infestation but these compounds can have obvious adverse effects on environment. Ethnobotanical based studies can provide a sustainable remedy for management of leech infestation. Chemical evaluation of locally used medicinal plants can provide valuable clues about the bioactive compounds for further pharmacological investigation. However, agricultural expansion and urbanisation are destroying potential habitats of both...
terrestrial and aquatics leeches and this trend may result in decline of local pharmacopoeia of indigenous people. This calls for urgent documentation of ethnomedicinal knowledge of different cultures around the world.

ACKNOWLEDGEMENT

Authors are thankful to all the informants for their participation and sharing their knowledge. Authors also extend their gratitude to the Institutional Biotech Hub, funded by Department of Biotechnology, Govt. of India for infrastructural support.

Conflict of Interest: None

REFERENCES