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Research Article

Ethnoveterinary plants used by Mising, Tai-Aiton and Santhal community residing nearby Nambor-Doigrung Wildlife Sanctuary of Golaghat, Assam, India

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ABSTRACT

An ethnoveterinary survey was carried out to document the traditional knowledge of medicinal plants in treating domestic animals by three ethnic tribes viz. Mising, Tai-Aiton and Santhal. This paper en-lighten the various processes that are being applied by each community to cure their domestic pets. Interview of informants was conducted using a model questionnaire (Parabia and Reddy, 2002). Specimens were prepared by following standard methodology (Jain & Rao, 1977; Bridson & Forman, 1998). Plants were poisoned in saturated solution of Mercuric chloride dissolved in absolute alcohol (25g in 1000ml Ethyl alcohol) and then mounted in standard herbarium sheets (41 x 28cm). The identification of plants was done by following a number of floristic literatures. A total of 17 plant species were collected and are cited with their Botanical name, Family, Local name, Tribes, Parts used, Diseases, & Mode of preparation and application. Plants with additional new report to ethnoveterinary by the respective tribes are also indicated. This shows a great potential for research as well as discovery of newer drugs. Phytochemical screening of the plants shall further help in denoting the medicinal properties which will validate the traditional knowledge of the tribal communities. The resourceful knowledge of indigenous plants may be lost forever if not properly documented.

Key words: Ethnoveterinary, Golaghat, Mising, Nambor-Doigrung Wildlife Sanctuary, Santhal, Tai-Aiton.

INTRODUCTION

The term Ethnoveterinary is a combination of two words- "Ethno" means race, people or culture and "Veterinary" means medical treatment of animals, particularly domestic animals. Therefore, Ethnoveterinary means the study of traditional knowledge and practices for treating domestic animals suffering from various diseases. The term Ethnoveterinary was first coined by McCorkle in 1986. She mentioned in the article "An introduction to Ethnoveterinary research and development" based on the indigenous knowledge. Ethnoveterinary medicine (EVM) is a holistic comprehension of the indigenous systems of animal health, their interpretation through western medicine and the development of the effective and appropriate technologies (McCorkle, 1986). Mathias-Mundy and McCorkle, 1989 reported that Ethnoveterinary medicine deals with folk beliefs, knowledge, skills, methods and practices pertaining to health care of animals. Herbal medicines are widely used for curing and preventing the animals from various health related ailments/problems. The earliest records of use of ethnomedicine based practices in Ayurveda appear to be nearly over 5000 years old in a Chinese pharmacopoeia (Huxley, 1977). In India, ancient records on traditional herbal practices are found in the Vedas. The use of medicinal plants used in the treatment of man and animals are described in the Rig-Veda (4500-1600 BC). From centuries, man started domestication of animals for fulfilling their various needs, for which the livestock keepers are concerned about their animal's health. In many Indian villages, herbal treatment of domestic animals are a well known practice, as they are easily available, economical and also user friendly. Veterinary medicine in India since 5000 B.C. was documented by Saxena *et al*., 1998. Plants used in Indian ethnoveterinary along with its status are well documented (Jain, 2000; Jain, 2003; Jain & Shrivastava, 1999). Some particular tribal people give treatment to animals only was reported by Dwivedi (1998). A book compiling ethnoveterinary works of India was published by Jain (1999). Prospects of ethnoveterinary medicine was reviewed by Krishna *et al*. (2005). A study on the role of plants as veterinary medicine of Madhya Pradesh was reported by Dwivedi *et al*. (2009). A book on the ethnobotany of Bhil tribes describribing the uses of few ethnoveterinary plants was published by Singh & Jadhav (2011). Herbal medicines found around Gwalior district of Madhya_Pradesh that are used for the treatment of various diseases of goats was documented by Shrivastava *et al*. (2012a). He also worked on the treatment of various diseases of cow in the villages in Gwalior district of Madhya Pradesh (Shrivastava *et al*., 2012b). The ethnobotanical study in relation to veterinary medicine of Uttar Pradesh was reported by Gaur *et al*. (1992). The Traditional herbal veterinary medicine of West Almora district of Uttarakhand, India was documented by Shah *et al*. (2008). The list of plants that are

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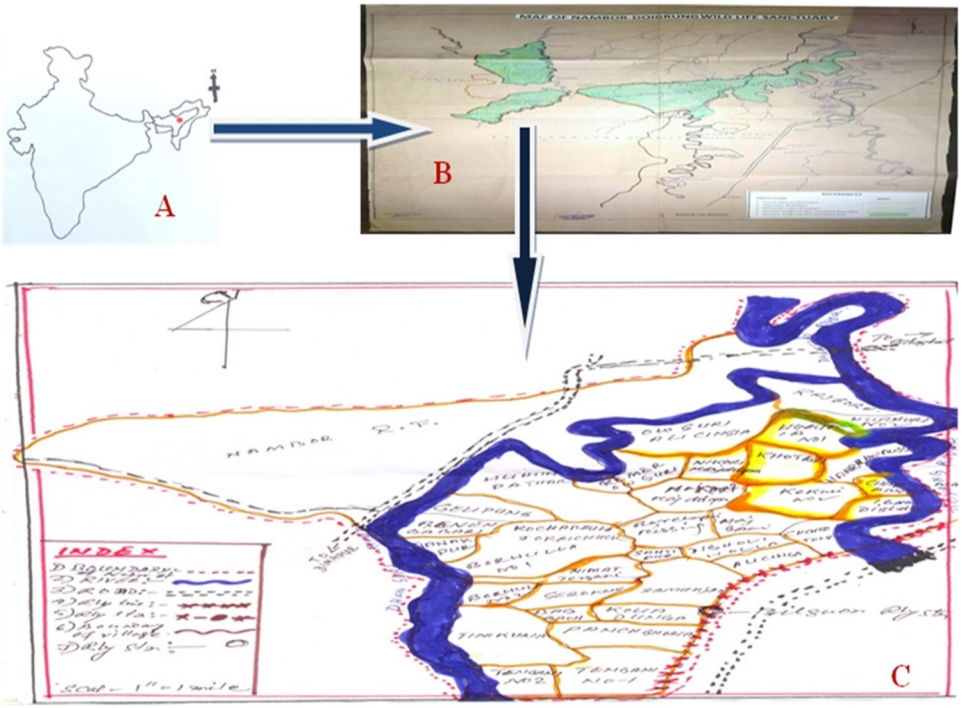

Figure 1. A. Political map of India denoting Golaghat ; B. Nambor-Doigrung Wildlife Sanctuary; C. Location of study site- villages nearby Nambor-Doigrung WLS. (Source: Divisional Forest Office, Golaghat, Assam).

used for ethnoveterinary practices in Warangal district of Andhra Pradesh, India was reported by Reddy *et al*. (1998). He again reported ethnoveterinary medicines used for treating the livestock in Eastern Ghats of Andhra Pradesh, India (Reddy *et al*., 2006). Ethnoveterinary uses of medicinal plants of Lambani community of Chitradurga district of Karnataka, India was reported by Naik *et al*. (2012). The indigenous animal health care practices of Porbandar district of Gujarat, India was reported by Jadeja *et al*. (2006). A list of plants used in traditional medicine by Bhilla tribe of Maharashtra was recorded by Kamble *et al*. (2010). Ethnoveterinary practices of tribal populated areas of Bankura & Medinipur district of West Bengal, India was reported by Ghosh (2002). The ethnoveterinary practices done by the various ethnic groups of Dhemaji district of Assam, India was reported by Sharma & Sapcota (2003). Folk medicine of Lakhimpur district of Assam, India was reported by Kalita & Bora (2008). The ethnoveterinary practices done by Hmar tribe of Cachar district of Assam, India was reported by Nath & Choudhary (2009). A survey on the ethnoveterinary uses of plants by the Halam tribe of Hailakandi district of Southern Assam, India was carried out by Laskar *et al*. (2015). The indigenous traditional herbal medicines used by the local communities for curing various reproductive disorders of the livestock of Kamrup district of Assam, India was reported by Talukdar *et al*. (2015). The ethnoveterinary plants used by the Nepali community of Nagaon and Sonitpur districts of Assam, India was reported by Bharali *et al*. (2015). The present study reveals the documentation of traditional knowledge about the uses of medicinal plants for the treatment of domestic animals by Mising, Tai-aiton and Santhal tribes resding nearby Nambor-Doigrung Wildlife Sanctuary of Golaghat, Assam.

Mising is a tribal community belonging to Mongoloid group- a multitude of people that followed Austro-Asiatic races to India (Singh *et al.,* 1996). The Misings are mostly cultivators. They live in houses made of 'bamboo', known as 'Chang-ghar'. They are skilled persons, expert in Weaving clothes, making furniture, poultry (pig) farm etc. They are also good in their tradition and custom. They prepare 'Rice beer' named as 'Apong' (Traditional drink). They also enjoy festivals and perform rituals. They follow Hinduism, many embraced Vaishnavism, some of them follow Donyi Po:lo (Sun God), and Abu Po:lo (Father Moon). Among the six Indigenous Tai communities of Assam, Tai-Aitons are one of them. 'Tai' is a generic name denoting a great branch of the Mongoloid population of Asia (Sonowal and Barua, 2011). They are Buddhist by religion. The Assamese people commonly term them as Shyams. They speak the Tai Aiton language, which is similar to other Tai languages spoken in Assam. They are scattered in certain villages of Jorhat, Golaghat and Karbi-Anglong districts of Assam. In India, Santhals are the largest Adivasi community. A large population of tea-tribes of Assam are Santhals. They are found in Jharkhand, Bihar, West Bengal, Madhya Pradesh, Assam, Tripura and Orissa. Histories of Santhals are only persisting in the songs and folklore of Santhal tribe itself. The folk songs, dance, music, paintings, etc. express their culture. They are mostly cultivators. They are mostly Hindu, except a few populations follow Christianity. Most of those in Upper Assam are fluent in Assamese and use Sadri as their mother tongue (Fernandes, 2003).

Ethnobotanical knowledge evolves overtime and is therefore always changing and adding new discoveries and methods. So far, very little of the Ethnoveterinary knowledge has been recorded and it is likely to be on the verge of extinction, which needs great attention. Very little work has been done on the ethnobotanical aspects in the Golaghat district. There is no ethnoveterinary work available on the Nambor-Doigrung Wildlife Sanctuary and in the neighbouring areas. This paper thus highlights the ethnoveterinary uses of medicinal plants used by the three ethnic communities respectively.

MATERIALS AND METHODS

Study area

Golaghat district of Assam is situated between 26.00-27.1^0 N lat. and 93.00-94.18^0 E long. The total area of Nambor-Doigrung Wildlife Sanctuary is 9715 hct (as declared on 31st August, 2003). The climate of Golaghat is characterised by fairly high precipitation, moderate to high humidity. In the month of July the average rainfall in Nambor-Doigrung Wildlife Sanctuary reaches its peak to 347 mm. There are 22 tribal populated villages surrounding the Nambor-Doigrung Wildlife Sanctuary viz., Gelipung, Huihing-pathar, Borchapori, Nikorimajdolopa, Awguri-alichinga, Kemeri-awguri, No.1 Kekuri, No.2 Kekuri, Nahorkhona mising gaon, Bengenabari, Sekaimara, No. 1 Borhulla, No. 2 Borhulla, Jokaisuk, Kacharihula, Duboroni shyam gaon, Tengani shyam gaon, Tinikuriya, Chabbisghariya, Pachghariya, Awtengani and Changpul tengani [Figure 1. A, B, C].

Methodology

Official and community permissions were taken before conducting the research work. Interview of informants was conducted by using a model questionnaire as suggested by Parabia and Reddy (2002). Specimens are prepared based on the standard methodology (Jain & Rao, 1977; Bridson & Forman, 1998). Plant specimens were poisoned in saturated solution of Mercuric chloride dissolved in absolute alcohol (25g in 1000ml Ethyl alcohol) and then mounted in standard herbarium sheets (41 x 28cm). Print label (8 x 12cm) for noting various informations of the plants was affixed at the bottom right hand corner of the sheet. Finely powdered Naphthalene was spread on the mounted herbarium sheets and then submitted to the Herbarium maintained by Department of Ecology & Environmental Science, Assam University, Silchar, for future reference. The identification of plants were done by following a number of floristic literatures such as Flora of British India Vol. 1-7 (Hooker, 1872-1897); Flora of Assam Vol. 1-4 (Kanjilal *et al*., 1934-1939) & Vol. 5 (Bor, 1940); Flora of India Vol. 1-3 (Sharma *et al*., 1993); Flora of India Vol. 12-13 (Hajra *et al*., 1995) etc. The herbariums were further compared and identified with the preserved herbarium specimens of B.S.I., Shillong.

RESULTS AND DISCUSSION

During the survey, a total of 17 ethnoveterinary plant species belonging to 17 genera and 14 families were recorded (Table 1).

Table 1. Plants used by Mising, Tai-Aiton & Santhal communities for ethnoveterinary purposes

Plant species	Local name with Tribe	Parts used	Disease	Mode of preparation & application
Allium sativum L. (Amaryllidaceae)	Nohoru (S)	Bulb	Hen lice repellent	*Few bulbets are mashed with bark of *Moringa oleifera* Lam., made soluble in water and then spread in hen farm
Cannabis sativa L. (Cannabaceae)	Bhang (M)	Leaves	Cattle loose motion	*Leaves are crushed and then given to cattle to consume
Capsicum frutescens L. (Solanaceae)	Jolokiya (M; T-A) Jhalkiya (S)	Fruit	Cattle tongue fungal infection/ swelling	*Fruits are crushed with leaves of *Ficus racemosa* L. and then applied in tongue
Christella parasitica (L.) Lev. (Thelypteridaceae)	Bihlogoni (S)	Whole plant	Hen lice repellant	*Spread in poultry farms to get relief from hen lice
Curcuma longa L. (Zingiberaceae)	Halodhi (T-A)	Rhizome	Bird flu	*Crushed rhizome juice is poured in hen's mouth and given to consume
Eleusine coracana (L.) Gaertn. (Poaceae)	Bobosabon (T-A)	Whole plant	Bone fracture of hen, duck etc.	Whole plant is smashed and applied in fractures
Erythrina stricta Roxb. (Papilionaceae)	Modar (M)	Young branch	Cattle skin infection	*Young branch (3 inch) is wrapped in cloth or plastic, tied with thread and then tied in cow's neck
Ficus racemosa L. (Moraceae)	Tajjig (M) Dimoru (T-A; S)	Leaves	Cattle tongue fungal infection/ swelling	*Leaves of *Ficus racemosa* L. are crushed with fruits of *Capsicum frutescens* L. and then applied in cattle's tongue

Table 1 continued in next page

Moringa oleifera Lam. (Moringaceae)	Sajina (S)	Bark	Hen lice repellant	*Bark of *Moringa oleifera* Lam. is mashed with few bulbets of *Allium sativum* L., made soluble in water and then spread in hen farm
Nicotiana tabacum L. (Solanaceae)	Dhapat (S)	Leaves	Hen lice repellant	*Leaves are spread in poultry farms
Oroxylum indicum (L.) Benth. ex Kurz. (Bignoniaceae)	Panagka (T-A)	Bark	Cattle urine disorder	*Bark is crushed, made soluble in rice water and then given to cattle when urine flow stops
Polygonum hydropiper L. (Polygonaceae)	Pothorua bihlogoni (T-A; S)	Whole plant	Hen lice repellant	Whole plant is spread in poultry farms
Prunus domestica L. (Rosaceae)	Ahom bogori (T-A)	Leaves	Cattle wound	*Leaves are mashed and applied externally
Rubus moluccanus L. (Rosaceae)	Jotuli poka (M; T-A; S)	Fruit	Cattle tongue fungal infection/ swelling	Raw fruit is rubbed on cattle's tongue
Streblus asper Lour. (Moraceae)	Houra gach (S)	Root	Swine flu	*Roots are crushed, mixed with food and then given to pig to consume
Tagetes patula L. (Asteraceae)	Bakhamsuang (T-A)	Flower	Bird flu	*Flowers are crushed, mixed with food and then given to hen to consume
Vitex negundo L. (Lamiaceae)	Posotiya (S)	Whole plant	Hen lice repellant	*Whole plant is spread in poultry farms

(*)= Additional new report to ethnoveterinary by Mising, Tai-Aiton & Santhal communities;
M= Mising; T-A= Tai-Aiton; S= Santhal.

Figure 2. Ethnoveterinary plants used by Mising, Tai-aiton & Santhal community (I) *Christella parasitica* (L.) Lev. (II) *Erythrina stricta* Roxb. (III) *Ficus racemosa* L. (IV) *Oroxylum indicum* L. Kurz (V) *Streblus asper* Lour. (VI) *Tagetes patula* L.

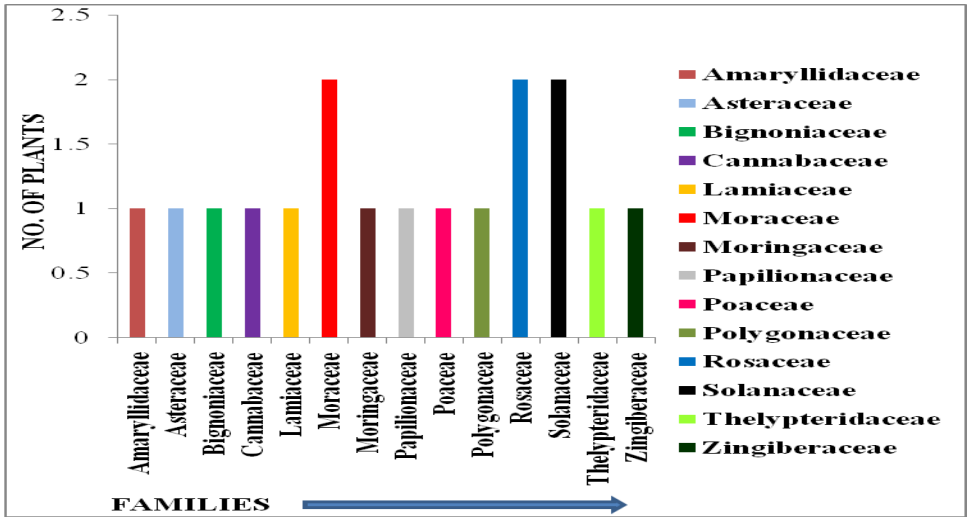

Figure 3. Dominant families with number of plant species

Three Families viz., Moraceae, Rosaceae and Solanaceae were found to be having highest of all with 2 plant species each; along with the rest 11 families each with single plant species (Figure 3).

From the diversity of various plant parts, "Whole plant" and "Leaves" is found to be highly used in medicinal purposes for curing domestic animals, followed by bark, fruit etc. (Figure 4).

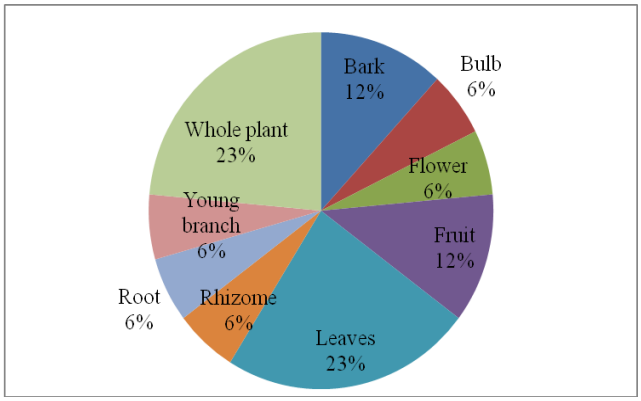

Figure 4. Percentage of plant parts used in ethnoveterinary purposes

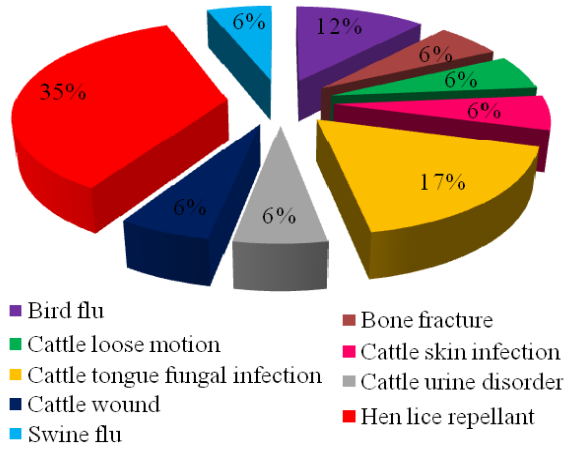

Figure 5. Percentage of plant species used in treating various diseases

From the diversity of various diseases, "Hen lice" is found to be highly cured by the medicinal plants followed by "Cattle tongue fungal infection/ swelling", "Bird flu" etc. (Figure 5).

Many ethnoveterinary works done earlier shows some resemblance in case of names of some plants but they vary in case of their disease type and mode of applications. Likewise, Ethnoveterinary practices used by Halam tribe of Hailakandi district of Southern Assam as reported by Laskar *et al.* (2015) showed that root juice of *Moringa oleifera* Lam. is given orally against worms in goats, root juice of *Oroxylum indicum* (L.) Vent. is given orally to cure fever and cough in cattles, crushed leaf paste of *Tagetes patula* L. is applied in cuts and wounds of cattles. Bharali *et al.* (2015) reported ethnoveterinary practices used by Nepali community of Nagaon & Sonitpur districts of Assam which reveals that bulb juice of *Allium sativum* L. mixed with rhizome of *Zingiber officinale* is given in sickness and indigestion; bulb paste mixed with mustard oil is applied on cattle nipple infection. Leaf juice of *Cannabis sativa* L. is given in indigestion and dysentery of cow and goat. Rhizome paste of *Curcuma longa* L. is applied in naval infection of calf; foot and mouth disease of cow; nipple infection of lactating cow. Bark juice of *Erythrina stricta* Roxb. is sprayed in cowshed; leaf paste used as preventive measure before infection. Crushed root of *Moringa oleifera* L. is applied on wounds; also kill worms. Fruit and bark paste of *Oroxylum indicum* (L.) Kurz on cuts and wounds. Crushed leaf of *Nicotiana tabacum* L. applied against ectoparasite; cuts and wounds. An ethnoveterinary survey done by Khatoon *et al.* (2013) on Kom tribe of Manipur reveals the uses and applications of *Capsicum annum*, *Coriandrum sativum*, *Nicotiana tabacum*, *Urtica dioica* etc.

CONCLUSION

There is no ethnoveterinary work available on the Nambor-Doigrung Wildlife Sanctuary and in the neighbouring areas. From the present study, it has been observed that the 3 tribes have immense knowledge on action of the medicinal plants and use the plants for curing various types of animal diseases.

The tribes preserve the information of wild plants that are being used by them as herbal remedy. They follow their own system of disease diagnosis and prepare herbal medicines in indigenous way. Their knowledge of preparing medicines for domestic animals is gathered from their ancestors. They try to conserve the resources for their future generation. The preparation of herbal medicines are of low cost and possess no side effects. This shows a great potential for research as well as discovery of newer drugs. Phytochemical screening of the plants shall further help in denoting the medicinal properties which will validate the traditional knowledge of the tribal communities. There is an urgent need to conserve and save those medicinal plants for domestic animal health care. The resourceful knowledge of the indigenous plants may be lost forever if not properly documented. For this, the local people need to raise their voice against the forest destruction. In order to conserve the traditional knowledge of the tribal communities, it is high time to document and identify those medicinal plants otherwise they may become extinct.

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REFERENCES

Bharali, R., Dutta, B.K. and Gogoi, P. 2015. Studies on the ethno-veterinary plants used by the Nepali community of Nagaon and Sonitpur districts of Assam, India. *Pleione*. 9(1): 26-39.

Bor, N.L. 1940. Flora of Assam, Vol. V (Gramineae), Shillong: Govt. of Assam. pp. 480

Bridson, D. and Forman, L. 1998. The herbarium handbook (3rd ed), Great Britain: Royal

Botanic Gardens, Kew. Pp: 334.

Dwivedi, S., Dwivedi, A. & Gupta, P. 2009. Role of plants as veterinary medicine from Madhya Pradesh, India: A status survey. *Journal of Pharmacy Research*. 2 (4): 688- 690.

Dwivedi, S.K. 1998. Overview of ethnoveterinary practices in India, P.I. In: Dwivedi, S.K. (Ed.) Techniques for scientific validation and evaluation of ethnoveterinary practices in India, Bareilly, pp. 1-5.

Fernandes, W. 2003. Assam Adivasis: Identity issues and liberation. *Vidyajyoti Journal of Theological Reflection*, Delhi.

Gaur, R.D., Bhatt, K.C. & Tiwari, J.K. 1992. An ethnobotanical study of Uttar Pradesh Himalaya in relation to veterinary medicines. *J. Indian Bot. Soc.* 72: 139-144.

Ghosh, A. 2002. Ethnoveterinary medicines from the tribal areas of Bankura and Medinipur districts, West Bengal. *Indian Journal of Traditional Knowledge*. 1 (1): 93-95.

Hajra, P.K., Rao, R.R., Sing, D.K. and Uniyal, B.P. 1995. Flora of India, Vol. 12 & 13 (edt.), Botanical Survey of India, Howrah, India.

Hooker, J.D. 1872-1897. Flora of British India, Vols. 1-7. L. Reeve & Co Ltd, Ashford, Kent.

Huxley, A. 1977. Foreword, In: A history of herbal plants. Angus and Robertson Publishers, 1st edition, Fisher street, London.

Jadeja, B.A., Odedra, N.K., Solanki, K.M. & Baraiya, N.M. 2006. Indigenous animal healthcare practices in district Porbandar, Gujarat. *Indian Journal of Traditional Knowledge*. 5 (2): 253-258.

Jain, S.K. 1999. Dictionary of ethnoveterinary plants of India. Deep publications, New Delhi.

Jain, S.K. 2000. Plants in Indian ethnoveterinary medicine: Status and Prospects. *Indian Journal of Veterinary Medicine*. 20: 1-11.

Jain, S.K. 2003. Ethnoveterinary recipes in India: A botanical analysis. *Ethnobotany*. 15: 23-33.

Jain, S.K. and Rao, R.R. 1977. A Handbook of field and herbarium methods. Today & Tomorrow's Printers and Publishers, New Delhi.

Jain, S.K. & Srivastava, S. 1999. Dictionary of Ethnoveterinary plants of India. Deep Publications, New Delhi.

Kalita, D. & Bora, R.L. 2008. Some folk medicines from Lakhimpur district, Assam. *Indian Journal of Traditional Knowledge*. 7 (3): 414-416.

Kamble, S.Y., Paul, S.R., Sawant, S., Pawar, S.G. & Singh, E.A. 2010. Studies on plants used in traditional medicine by Bhilla tribe of Maharashtra. *Indian Journal of Traditional Knowledge*. 9 (3): 591-598.

Kanjilal, U.N., Kanjilal, P.C., Das, A. and Purkayastha, C. 1934. Flora of Assam, Vol. I, Assam Govt. Press, Shillong.

Kanjilal, U.N., Kanjilal, P.C. and Das, A. 1936. Flora of Assam, Vol. II, Assam Govt. Press, Shillong.

Kanjilal, U.N., Kanjilal, P.C., Das, A. and De, R.N. 1938. Flora of Assam, Vol. III, Assam Govt. Press, Shillong.

Kanjilal, U.N., Kanjilal, P.C., Das, A. and De, R.N. 1939. Flora of Assam, Vol. IV, Assam Govt. Press, Shillong.

Khatoon, R., Das, A.K., Singh, P.K. and Dutta, B.K. 2013. Ethno veterinary plants used by Kom tribe of Manipur, India. Bioresource and Traditional Knowledge of North East India, pp. 303-306.

Krishna, L., Swarup, D. & Patra, R.C. 2005. An overview of prospects of Ethnoveterinary medicine in India. *Indian Journal of Animal Sciences*. 75: 1481-1491.

Laskar, K.A., Das, A.K. and Dutta, B.K. 2015. Plants used in ethno-veterinary medicine by Halam tribe settled in Hailakandi district of Southern Assam, India. *International Journal of Current Research*. 7(3): 13136-13140.

Mathias-Mundy, E. and McCorkle, C.M. 1989. Ethnoveterinary medicine: An annotated bibliography. Bibliographies in technology and social

change, No. 6, Technology and social change programme, IOWA State University, Ames, IOWA 50011 USA.

McCorkle, C.M. 1986. An introduction to ethnoveterinary research and development. *Journal of Ethnobiology*. 6 (1): 129-149.

Naik, R., Venugopalan, V., Kumaravelayutham, P. & Krishnamurthy, Y.L. 2012. Ethnoveterinary uses of medicinal plants among the Lambani community in Chitradurga district, Karnataka, India. *Asian Pacific Journal of Tropical Biomedicine*. 2: 470-476.

Nath, M. & Choudhury, M.D. 2009. Ethnoveterinary practices by Hmar tribes in Cachar district, Assam. *Ethnobotany*. 21: 61-65.

Parabia, M.P. and Reddy, M.N. 2002. Protocol for ethnomedicinal studies in ethnobotany. Avishkar Publishers, Distributors 807, Vyar Building in India, Chaura Rasta, Jaipur, India, pp. 383-393.

Reddy, K.N., Bhanja, M.R. & Raju, V.S. 1998. Plants used in ethnoveterinary practices in

Warangal district, Andhra Pradesh, India. *Ethnobotany*. 10: 75-84. Deep Publishers, New Delhi.

Reddy, K.N., Subbaraju, G.V., Reddy, C.S. & Raju, V.S. 2006. Ethnoveterinary medicine for treating livestock in Eastern ghats of Andhra Pradesh. *Indian Journal of Traditional Knowledge*. 5 (3): 368-372.

Saxena, M.J., Pandey, S.K., Madan, P. & Chhabra, M.B. 1998. Ethnoveterinary practices: Need for clinical validation. In Dwivedi, S.K. (Ed.), 83.

Shah, R., Pande, P.C. & Tiwari, L. 2008. Traditional veterinary herbal medicines of western part of Almora district, Uttarakhand Himalaya. *Indian J. Traditional Knowledge*. 7 (2): 355-359.

Sharma, B.D., Balakrishnan, N.P., Rao, R.R. and Hajra, P.K. 1993. Flora of India, Vol. I-III (edt.) (Ranunculaceae-Barclayaceae), B.S.I., Calcutta.

Sharma, U.K. & Sapcota, D. 2003. Studies on some ethnoveterinary practices on Dhemaji district of Assam. *Journal of Natural Remedies*. 3: 73-77.

Shrivastava, S., Jain, A.K. & Mathur, R. 2012a. Documentation of herbal medicines used in treatment of diseases of goats (*Cypris communis*) in and around Gwalior (MP). *Indian Journal of Natural Products and Resources*. 3 (2): 278-280.

Shrivastava, S., Mathur, R. & Jain, A.K. 2012b. Study of herbal recipes used in the treatment of various ailments of cow (*Bos indicus*) in villages of Gwalior district. *Life Sciences Leaflets*. 5: 41-46.

Singh, J., Bhuyan, T.C. and Ahmed, A. 1996. Ethnobotanical studies on the Mising tribes of Assam with special reference to food and medicinal plants. *Journal Economic Taxonomy Botany*. 12: 350-356.

Singh, V.P. & Jadhav, D. 2011. Ethnobotany of Bhil tribe- A case study among the Bhils of Ratlam district (Madhya Pradesh), Jodhpur, Scientific Publishers.

Sonowal, R. and Barua, I. 2011. Ethnomedical practices among the Tai-Khamyangs of Assam, India. *Ethno-Medicine*. *5* (1): 41-50.

Talukdar, D.J., Shyam, J., Talukdar, P., Ahmed, K. & Gogoi, R. 2015. Documentation of traditional herbal medicines for reproductive disorders of livestock in Kamrup district of Assam. *International Journal of Agricultural Science and Research*. 5 (6): 221-228.