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RESEARCH ARTICLE

ETHNOVETERINARY SURVEY OF MEDICINAL PLANTS USED BY COMMUNITIES OF RAJAJI TIGER RESERVE, UTTARAKHAND, INDIA

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ABSTRACT

The people residing inside Rajaji Tiger Reserve mainly Gujjars have a great traditional knowledge for curing veterinary ailments. An ethnoveterinary studies on traditional medicinal plants was conducted from 2015-2018 in Rajaji Tiger Reserve, Uttarakhand, India. Information on ethnoveterinary medicinal plants was gathered from communities and Gujjars through informal interviews, questionnaires and discussions. A total 103 medicinal plants species have been used to cure different ailments of livestock. The most common method used for mode of administration was mainly decoction, solution, paste, powder, raw parts, juice and pill. This study was undertaken for importance of traditional knowledge regarding medicinal plants used for curing of different diseases of livestock by the local people and Gujjars residing in the area.

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INTRODUCTION

India is primarily an agricultural country with predominance of rural populations and hence, animals, particularly cattle, play great role in economy and social welfare. Ancient literature like the Vedas, Puranas and Nighantus are replete with references to animal health care. There are Puranas like Ashwapuran, Garudpuran and Hastipuram devoted to animal husbandry (Jain and Srivastava, 2003). In Himalayan region, where modern veterinary health care systems are very poor, the people living in this area have developed their own traditional knowledge for maintaining their livestock health through age old home remedies (Samal *et al.*, 2004). Traditional system of medicine is unique and are often known to few individuals of communities. These systems cure different ailments in livestock by using of various medicinal plants, most of which are endemic and some of them are at the verge of extinction due to over exploitation (Kala, 2005; Phondani *et al.*, 2010). For primary health care treatment of cattle ethnoveterinary medicines are very effective and used in large scale. It has been reported that over centuries people depend on their own localized way of keeping animals healthy by using traditional formula, surgical techniques, husbandry

strategies and magico-religious practices for veterinary health care (McCorkle, 1995). This traditional knowledge developed by the local people mainly livestock holder to treat their sick cattle by utilization of plants, which passes orally from parents to their offspring. This is confined to few persons which need to be documented and applied in the society, as they are cheap, easily available and having no side effect (Shrivastava *et al.*, 2017). Several work done in other countries on ethno veterinary knowledge of plants so far include (Nfi *et al.*, 2001; Pieroni *et al.*, 2004; Confessore *et al.*, 2009; Morekhi *et al.*, 2013). The information available on ethnoveterinary knowledge in India, so far include (Pal DC, 1980; Jain SK, 1999; Jain and Kadel, 2006; Shrivastava *et al.*, 2012; Mishra D, 2013; Galav *et al.*, 2013). The ethno veterinary knowledge in Uttarakhand has been documented by several workers (Gaur *et al.*, 1992; Pande and Joshi, 1999; Tiwari and Pande, 2010; Bhatt *et al.*, 2013; Khadda *et al.*, 2018). However, this area has their old traditional knowledge regarding ethnoveterinary medicine is least documented by workers. Therefore, the present study was taken to document the important plants used to cure livestock diseases by communities of Rajaji Tiger Reserve.

Study area

Present study is confined to Rajaji Tiger Reserve of Uttarakhand which lies between the Shivalik ranges and the Indo-Gangetic plains (Fig.-1).

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The Tiger Reserve spread in area of 1075 sq. km in three districts of Uttarakhand: Haridwar, Dehradun and Pauri Garhwal. It constitutes an important part of terai-arc landscape between Yamuna River in North-West and Sharda River in the South-East. It is located in Northern India at an elevation from 250-1100 above sea level. It has been divided into nine ranges: Ramgarh, Kansrau, Motichur, Gohri, Chilla, Haridwar, Beribera, Dholkhand and Chillawali. Rajaji Tiger Reserve is blessed with a very rich floral diversity and is also storehouse of medicinal plants. Out of the five vegetation types of the Shivalik, four occur in Rajaji, namely: moist Shivalik Sal (*Shorea robusta*), dry Shivalik Sal, northern dry mixed deciduous and Khair (*Acacia catechu*), Sissu (*Dalbergia sissoo*) forest. This zone of Himalaya has dense diversify vegetation which includes large number of trees, herbs, shrubs, climbers and grasses. This area is inhabited by communities like Gujjars, Taungyas, Goths and Chaks. The Gujjars are traditionally trans-nomadic pastoralists who grazed their buffaloes in the forest (Singh and Navneet, 2020).

MATERIALS AND METHODS

A survey was conducted in different ranges of Rajaji Tiger Reserve during a period of 2015 to 2018. An information was collected regarding ethnoveterinary practices from different categories of people residing there like Gujjars, livestock holders, veterinary practitioners, milkman, and local healers. Many attempts were taken in each ranges for interview and group discussion with local people. Information of plants used in ethnoveterinary medicine was obtain through several meeting with people residing in these areas. Animal owners were interview about the traditional animal health care practices that how they treat their animal like cow, buffalo, goat and hen when they are sick. During each visit information was collected regarding common diseases of livestock, part of plants used, and mode of administration was known.

Ethnoveterinary information was collected by communities using standard proforma designed by Jain and Goel, 1995. The data was gathered to note whether the local people prepare decoction, solution, paste, powder, raw parts, juice and pill from some parts of medicinal plants for the treatment of various livestock diseases. During the field survey in different ranges of Rajaji Tiger Reserve, medicinal plants were collected and herbarium was prepared by standard method. The plants were identified with the help of floras Raizada and Saxena, 1978; Gaur, 1999; Duthie, 1903. The identified medicinal plants were confirmed by consulting the herbaria of Botanical Survey of India, Dehradun and Forest Research Institute, Dehradun.

RESULTS

The Ethnoveterinary practices used by the communities of Rajaji Tiger Reserve are presented in table-1. Which includes botanical name of plant, family, local name, plants part used, name of ailments and mode of administration. In present study a total 103 Ethnoveterinary medicinal plants species belonging to 50 families was recorded (Fig.-2). The most common family reported in study area are Fabaceae (9 species), Euphorbiaceae (6 species), Apiaceae (5 species), Caesalpiniaceae (5 species), Solanaceae (5 species) and Asteraceae (4 species). These medicinal plants were used in the treatment of common 19 ailments such as

Galactagogue, Wounds, Dysentery, Ectoparasite, Eczema, Endoparasite, Mastitis, Foot and Mouth disease, Poisonous bite, Removal of placenta, Blot, Boils, Heat stroke, Bone fracture, Constipation, Fever, Broken horns, Cold and Cough and Haematuria (Fig.-3). It was observed that in most of herbal preparation leaves (40%) was used to cure various veterinary ailments followed by seeds (16%), fruits (10%), bark (10%), stem and rhizome (9%), roots (8%), whole plant (4), bulb (2%) and flower (1%) (Fig.-4). The most common method used for mode of administration was found to be the raw part (33%) followed by paste (26%), decoction (16%), powder (10%), solution (8%), juice (6%) and pill (1%) (Fig.-5).

DISCUSSION

A total 103 medicinal plants have been documented which are used as ethnoveterinary plants by communities of Rajaji Tiger Reserve. The communities living in this area have their own way to treat various diseases of livestock. The common diseases treated by local people are wounds, dysentery, ectoparasite, endoparasite, mastitis, foot and mouth diseases and blot etc. Cattle affected with wounds are usually anxious and easily excited by sudden movements.

During dysentery cattle shows lethargy discharge diarrhoea and decrease milk production. In case of ectoparasite affected cattle shows scaly patches on skin, itching and hair loss are common symptoms. If cattle have infection by endoparasite then loss of appetite, fever and swelling in anal portion is observed. During mastitis udder of cattle swell and become hard, sometime blood come out from mammary gland. Cattle suffering from foot and mouth diseases show symptoms like tongue of animal become reddish with boils on the oral cavity. When some poisonous insect bite the cattle than they show symptom like redness and swelling on affected area. During blot discomfort is seen in cattle kicking feet at the belly and frequent urination.

The most common family was Fabaceae among all 50 families. The most commonly used mode of administration found to be raw part and paste form. In treatment of dysentery *Acacia catechu*, *Euphorbia hirta* and *Murraya koenigii* leaves are given in raw form. Leave paste of *Ageratum conyzoides*, *Annona squamosa*, *Cleome gynandra* and *Solanum nigrum* was used in treatment of wounds. Decoction of *Justicia adhatoda* and *Trachyspermum ammi* is given to cattle in treatment of cold and cough. As in most of cases raw part of plant was given along with fodder but in some home remedies wheat husk, jaggery and chapati is mixed with medicinal plants to remove bitterness of plants, so that cattle can feed easily. The present study revealed that the people living in this area depend on plant based medicine to cure wide range of livestock diseases, because there is no modern veterinary hospital near to them. The plants used by these communities are easily available in forest, hence provide cost free, cheaper, mode of primary treatment as compared to modern allopathy drugs. This traditional ethnoveterinary remedies provide both efficiency as well as safety to cattle.

Table 1. Ethnoveterinary medicinal plants used by communities of Rajaji Tiger Reserve

SN	Botanical name of plant	Family	Local name	Parts used	Name of Ailments	Mode of administration
1	<i>Abrus precatorius</i> Linn.	Fabaceae	Gunchi	Seeds	Removal of Placenta	Seeds are crushed and mixed with cattle fodder.
2	<i>Acacia catechu</i> (L.f.) Willd.	Mimosaceae	Khair	Leaves	Dysentery	Leaves are given with fodder to cattle.
3	<i>Acacia nilotica</i> (L.) Del.	Mimosaceae	Kikar	Bark	Foot and Mouth disease	Bark is boiled to prepared decoction. Cattle foot and mouth is washed with this decoction.
4	<i>Achyranthes aspera</i> L.	Amaranthaceae	Chirchita	Roots	Ectoparasite	Root is tied around neck of cattle and leave for few days. It is believed that it provide relief from worm infected wounds.
5	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Bael	Fruits	Foot and Mouth disease	Fruit pulp is applied over affected area twice a day.
6	<i>Ageratum conyzoides</i> L.	Asteraceae	Pudina ghas	Leaves	Wounds	Leaves are crushed with raw turmeric to make paste. This paste is applied on affected area.
7	<i>Alangium salviifolium</i> (L.f.) Wangerin	Cornaceae	Akola	Roots	Poisonous bite	Root powder is mixed with mustard oil to make paste. This paste is applied on affected area. It is used specially for insect bite.
8	<i>Albizia lebbek</i> (L.) Benth	Mimosaceae	Siris	Bark	Poisonous bite	Grind its bark and leaves in cow's urine. Apply this paste on affected area. It is used specially for insect bite.
9	<i>Allium cepa</i> L.	Amaryllidaceae	Pyaj	Bulb	Dysentery	The bulb is crushed and mixed with fodder.
10	<i>Allium sativum</i> L.	Amaryllidaceae	Lahsun	Bulb	Endoparasite	The bulb is crushed and mixed with fodder. It is given thrice a day.
11	<i>Aloe barbadensis</i> Mill.	Liliaceae	Aloevera	Stem	Wounds	Its pulp is taken and mixed with little amount of turmeric then apply on affected area.
12	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Chalari	Leaves	Boils	Leaves paste is applied on affected area.
13	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Acanthaceae	Kalmegh	Whole plant	Foot and Mouth disease	Whole plant is given as fodder.
14	<i>Annona squamosa</i> L.	Annonaceae	Sharifa	Leaves	Wounds	Leaves paste is applied on affected area.
15	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guill. & Perr.	Combretaceae	Bakali	Leaves	Galactogogue	Fresh leaves are given as fodder.
16	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Satavar	Roots	Galactogogue	Root is grind and mixed with water. This solution is given to increase lactation.
17	<i>Azadirachta indica</i> A. Juss	Meliaceae	Neem	Leaves	Mastitis	Fresh leaves are boiled in mustard oil. After boiling this oil is strained and applied on affected area.
18	<i>Bauhinia variegata</i> L.	Caesalpiniaceae	Kachnar	Leaves	Boils	Paste prepared from fresh leaves is applied on affected area.
19	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Punerva	Leaves	Fever	Decoction of leaves is given twice a day.
20	<i>Bombax ceiba</i> L.	Malvaceae	Semal	Seeds	Blot	Seeds with cotton is taken and dip in mustard oil. It is given to cattle.
21	<i>Brassica campestris</i> L.	Brassicaceae	Sarso	Seeds	Mastitis	Oil obtained from the seeds is mixed with kapoor and jaggery. This is given to cattle.
22	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	Dard mar	Leaves	Boils	Warm its leaves and tie it on the affected area.
23	<i>Butea monosperma</i> (Lam.) Taub.	Fabaceae	Palash	Seeds	Ectoparasite	Grind its seeds with water. Apply this paste on affected area.
24	<i>Caesalpinia bonduc</i> (L.) Roxb.	Caesalpiniaceae	Katki karanz	Seeds	Fever	Seed powder is mixed along with fodder and given to cattle.
25	<i>Calotropis procera</i> R.Br.	Asclepiadaceae	Aak	Roots	Eczema	Root powder is mixed with curd and applied on affected area.

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26	<i>Cannabis sativa</i> L.	Cannabaceae	Bhang	Leaves	Blot	Fresh leaves are mixed with wheat flour and water to make a dough. Baked chapatis from this dough are given to cattle twice a day.
27	<i>Capsicum annuum</i> L.	Solanaceae	Lalmirch	Fruits	Endoparasite	Fruit powder is mixed with water and given to cattle.
28	<i>Carica papaya</i> L.	Caricaceae	Papita	Stem latex	Eczema	Latex from stem is taken and applied on affected area.
29	<i>Carum carvi</i> L.	Apiaceae	Jeera	Seeds	Galactagogue	Boil cumin seed and carom seed together till water reduce half. This decoction is given to cattle.
30	<i>Cassia fistula</i> L.	Caesalpiniaceae	Amaltas	Fruits	Constipation	Fruit paste is given along with fodder.
31	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Kasaunda	Leaves	Poisonous bite	Paste of leaves is prepared and applied on affected area. It is used specially for insect bite.
32	<i>Centella asiatica</i> (L.) Urbans	Apiaceae	Birmi	Whole plant	Heat stroke	Leaves are grind to make paste. This paste is given along with fodder.
33	<i>Cissus quadrangularis</i> L.	Vitaceae	Harjor	Stem	Bone fracture	Stem is crushed and mixed with water to make solution. This solution is given through drenching tube.
34	<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Nibu	Fruits	Galactagogue	Fruit juice is squeeze in water. This solution is given to cattle when they stop giving milk.
35	<i>Cleome gynandra</i> L.	Cleomaceae	Safed hullhul	Leaves	Wounds	Leaves paste is applied on affected area.
36	<i>Clerodendrum viscosum</i> Ventenat	Verbenaceae	Lochar	Flowers	Ectoparasite	Flowers are crushed to squeeze juice. This juice is applied on affected area.
37	<i>Clitoria ternate</i> L.	Fabaceae	Aprajita	Seeds	Constipation	Seeds are crushed with black salt and mixed with water. This solution is given to cattle.
38	<i>Coccinia grandis</i> (Linn.) Voigt	Cucurbitaceae	Kundaru	Fruits	Poisonous bite	Fruit paste is applied on affected area. It is used specially for scorpion bite.
39	<i>Commelina benghalensis</i> L.	Commelinaceae	Kanchara	Leaves	Wounds	Leaves paste is applied on affected area.
40	<i>Cordia dichotoma</i> G.Forst.	Boraginaceae	Lasora	Bark	Ectoparasite	Bark is tied around neck of cattle and leave for few days.
41	<i>Coriandrum sativum</i> L.	Apiaceae	Dhaniya	Seeds	Dysentery	Make decoction of its seeds along with ginger. Give this decoction twice a day.
42	<i>Curcuma longa</i> L.	Zingiberaceae	Haldi	Rhizome	Broken horns	Haldi power is mixed with mustard oil to make a paste, little amount of salt is also added. This paste is applied on affected area.
43	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Aakash bel	Stem	Removal of Placenta	Stem is given as fodder to cattle twice a day after delivery.
44	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Doob	Leaves	Galactagogue	Leaves are given as fodder to increase production of milk. This is the excellent fodder for cattle.
45	<i>Cyperus rotundus</i> L.	Cyperaceae	Motha	Leaves	Galactagogue	Leaves are given as fodder and also leaves paste is applied on udder of cattle. It stimulate milk production.
46	<i>Dalbergia sissoo</i> Roxb.	Fabaceae	Shisam	Leaves	Mastitis	Decoction of leaves is used to rinse the udder of cows and buffalos.
47	<i>Datura metel</i> L.	Solanaceae	Dhatura	Seeds	Endoparasite	Two to three seeds are mixed with fodder and given twice a day.
48	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae	Bhringraj	Leaves	Foot and Mouth disease	Leaves are crushed to make paste. This paste is applied on affected area.
49	<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	Amla	Fruits	Dysentery	Take powder of its dried fruits and mixed in water. Give this solution to cattle twice a day.
50	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Doodhi	Whole plant	Dysentery	Whole plant is given with cattle fodder.

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51	<i>Euphorbia nerifolia</i> L.	Euphorbiaceae	Nagfani	Stem latex	Boils	Latex is used on boils which was developed due to hard eruption on the skin.
52	<i>Ficus benghalensis</i> L.	Moraceae	Baragad	Roots	Dysentery	The prop roots are mixed with cattle fodder.
53	<i>Ficus racemosa</i> L.	Moraceae	Rumal	Bark	Dysentery	Bark is boil in water along with tea. This decoction is given twice a day.
54	<i>Ficus religiosa</i> L.	Moraceae	Peepal	Bark	Eczema	Burn its bark to form ash, mixed coconut oil in it. Applied this paste on affected area.
55	<i>Foeniculum vulgare</i> Mill.	Apiaceae	Sauf	Seeds	Galactagogue	Boil its seeds in water with jaggery. This solution is given to increase milk production.
56	<i>Grewia hirsuta</i> Vahl	Malvaceae	Gursakri	Roots	Removal of Placenta	Root decoction is given to cattle for removal of placenta
57	<i>Grewia oppositifolia</i> Roxb.	Malvaceae	Bhimal	Leaves	Galactagogue	Fresh leaves are given as fodder to increase milk production.
58	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Gurhal	Leaves	Haematuria	Decoction of leaves is given to cattle through drenching tube twice a day.
59	<i>Holarrhena antidysenterica</i> (Roth.) DC.	Apocynaceae	Kura	Bark	Poisonous bite	Fresh bark is crushed to make paste and applied on affected area. It is used specially for scorpion bite.
60	<i>Holoptelea integrifolia</i> (Roxb.) Planch.	Ulmaceae	Kanju papri	Leaves	Eczema	Leaves paste is applied externally.
61	<i>Hordeum vulgare</i> L.	Poaceae	Bajara	Seeds	Galactagogue	Bajara seeds, rice and wheat flour are boiled in water. Prepared product is given with fodder.
62	<i>Justicia adhatoda</i> L.	Acanthaceae	Adusa	Leaves	Cold and Cough	Decoction of leaves is given to cattle.
63	<i>Lantana camara</i> L.	Verbenaceae	Lalten ghas	Leaves	Ectoparasite	Dried leaves powder is sprinkled on affected area. It provide relief from fleas, lice and tics
64	<i>Lawsonia inermis</i> L.	Lythraceae	Mehndi	Leaves	Wounds	Prepare decoction of its leaves. Rinse the wound with this decoction twice a day.
65	<i>Lens culinaris</i> Medik.	Fabaceae	Masoor	Seeds	Foot and Mouth disease	Masoor dal is prepared. It is given to cattle with fodder.
66	<i>Litsea glutinosa</i> (Lour.) C.B.Robins.	Lauraceae	Maida	Bark	Bone fracture	Bark is boiled to make paste. This paste is applied around fractured bone.
67	<i>Madhuca indica</i> J.F.Gmel.	Sapotaceae	Mahuwa	Fruits	Removal of Placenta	Fruits are given along with jaggery and carum seeds with fodder.
68	<i>Mallotus philippensis</i> (Lam.) Muell. Arg.	Euphorbiaceae	Kamila	Seeds	Endoparasite	Seeds are crushed and mixed with water. This solution is given to cattle.
69	<i>Mangifera indica</i> L.	Anacardiaceae	Aam	Fruits	Heat stroke	Unripe mango is roasted on fire. Take its pulp and mixed in water with black salt. This solution is given to cattle.
70	<i>Melia azedarach</i> L.	Meliaceae	Bakain	Bark	Endoparasite	Decoction of bark is given twice a day.
71	<i>Mentha piperita</i> L.	Lamiaceae	Pudina	Leaves	Dysentery	Fresh leaves are mixed with cattle fodder.
72	<i>Millettia extensa</i> (Benth.) Baker	Fabaceae	Gauj	Stem	Ectoparasite	Stem is crushed and its juice is applied on affected area. It provide relief from fleas, lice and tics.
73	<i>Mimosa pudica</i> L.	Mimosaceae	Chhuimui	Leaves	Wounds	Leaves paste is applied on affected area.
74	<i>Moringa oleifera</i> Lam.	Moringaceae	Sahjan	Bark	Mastitis	Bark is crushed and given with chapati to cattle twice a day.
75	<i>Morus alba</i> L.	Moraceae	Shahtoot	Leaves	Mastitis	Leaves paste is applied on affected area.
76	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Meethe neem	Leaves	Dysentery	Fresh leaves are mixed with cattle fodder.
77	<i>Nicotiana tabacum</i> L.	Solanaceae	Tambaku	Leaves	Wounds	Its dried leaves are grind with water to make paste. This paste is mixed with alum and applied externally.
78	<i>Ocimum basilicum</i> L.	Lamiaceae	Tulsi	Leaves	Mastitis	Decoction of leaves is given twice a day.
79	<i>Oryza sativa</i> L.	Poaceae	Chawal	Leaves	Galactagogue	Rice straw is given as fodder.
80	<i>Ougeinia oojienensis</i> (Roxb.) Hochr.	Fabaceae	Sandan	Bark	Eczema	The bark powder is applied on affected area.
81	<i>Prunus persica</i> (L.) Betsch.	Rosaceae	Aadu	Leaves	Endoparasite	Decoction of leaves is given twice a day.
82	<i>Raphanus sativus</i> L.	Brassicaceae	Mooli	Roots	Dysentery	The raw mooli is taken and cut into pieces. This is mixed with cattle fodder.
83	<i>Ricinus communis</i> L.	Euphorbiaceae	Arand	Seeds	Blot	Small amount of seeds are given along with fodder once in a day.
84	<i>Sesamum indicum</i> L.	Pedaliaceae	Til	Seeds	Broken horns	Seed oil is mixed with turmeric and warm it. This mixture is applied on broken horn.
85	<i>Solanum nigrum</i> L.	Solanaceae	Makoya	Leaves	Wounds	Leaves paste is applied on wounds and ulcer.
86	<i>Solanum surattense</i> Burm.f.	Solanaceae	Bhatkattiya	Roots	Ectoparasite	Root is tied around cattle tail, for two to three days and believed not to see it until cure.
87	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun	Leaves	Galactagogue	Fresh leaves are given as fodder.
88	<i>Tagetes erecta</i> L.	Asteraceae	Genda	Whole plant	Wounds	Juice of whole plant is applied on affected area.
89	<i>Tamarindus indica</i> L.	Caesalpiniaceae	Imili	Fruits	Heat stroke	Ripe fruit is mixed with jaggery in cold water. This solution is given to cattle during summer.
90	<i>Tectona grandis</i> L.f.	Lamiaceae	Sagaun	Leaves	Eczema	Grind its leaves with neem and turmeric. This paste is applied on affected area.

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91	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Sharpunkha	Leaves	Ectoparasite	Dried leaves powder is applied externally. It provide relief from fleas, lice and tics.
92	<i>Terminalia belliricia</i> (Gaertn.) Roxb.	Combretaceae	Baheda	Fruits	Constipation	Fruit powder is mixed with half liter of water and given to cattle.
93	<i>Tinospora cordifolia</i> (Willd.) Hook. f. & Thoms.	Menispermaceae	Giloye	Stem	Heat stroke	Prepare decoction of its stem. This decoction is given to cattle.
94	<i>Trachyspermum ammi</i> (L.) Sprague	Apiaceae	Ajwain	Seeds	Cold and Cough	Ajwain, methi, ginger and jaggery are mixed and boiled in water to prepare decoction. This decoction is given orally twice a day.
95	<i>Trewia nudiflora</i> L.	Euphorbiaceae	Gutel	Leaves	Galactogogue	Fresh green leaves are given as fodder.
96	<i>Tridax procumbens</i> L.	Asteraceae	Pardeshi	Leaves	Cuts and wounds	Fresh leaves juice is applied on affected area.
97	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Methi	Seeds	Removal of Placenta	Seeds of methi and seeds of sauf are boiled in water along with jaggery. This decoction is given twice a day.
98	<i>Triticum aestivum</i> L.	Poaceae	Gehu	Seeds	Galactogogue	Seeds are boiled in water and given with fodder.
99	<i>Urtica dioica</i> L.	Urticaceae	Bichhu ghas	Leaves	Galactogogue	Leaves are dried to make powder. This powder is given along with cattle fodder.
100	<i>Vanda testacea</i> (Lindl.) Rchb.f.	Orchidaceae	Perasara	Leaves	Bone Fracture	Leaves paste is applied on fractured area.
101	<i>Vitex negundo</i> L.	Verbenaceae	Mala	Leaves	Fever	Leaves are crushed with ginger, red chilly, onion and jaggery. All are mixed together to make pills. It is given with chapatis twice a day.
102	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Adarak	Rhizome	Blot	Stem is crushed and mixed with cumin then given with fodder.
103	<i>Ziziphus mauritiana</i> Lamk.	Rhamnaceae	Ber	Leaves	Wounds	Leaves paste is applied on affected area.

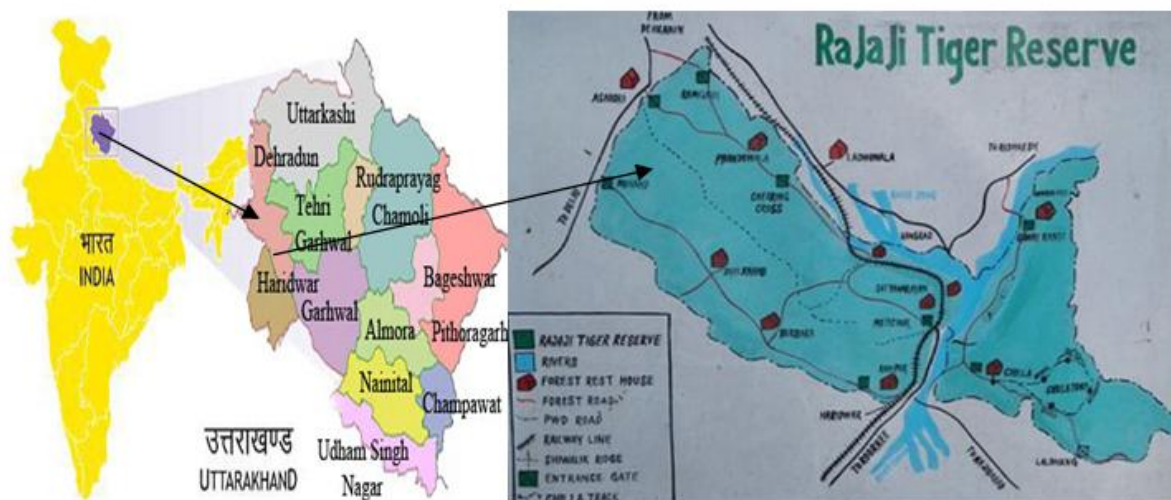


Fig. 1 - Map showing location of study area

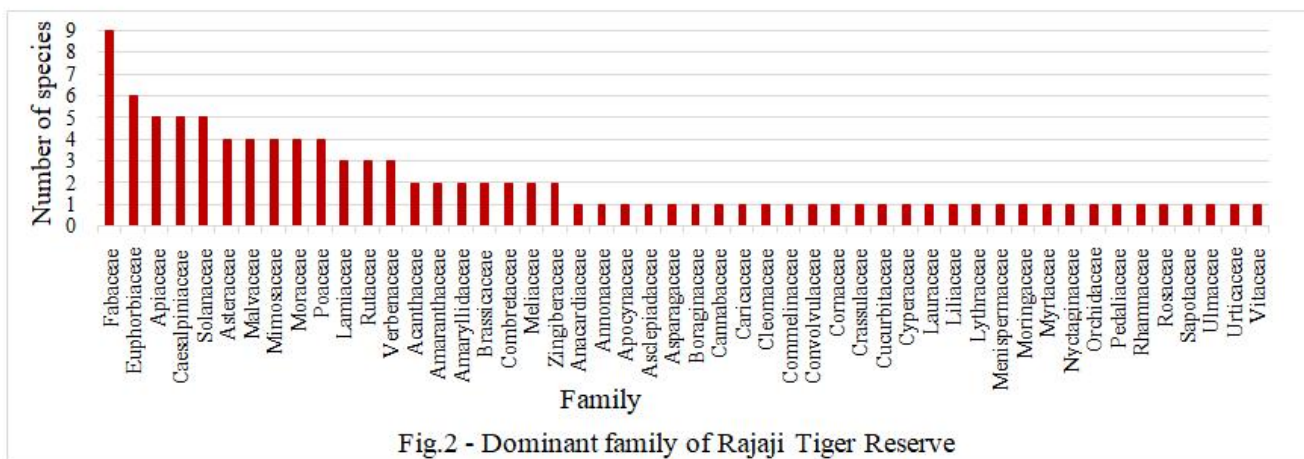
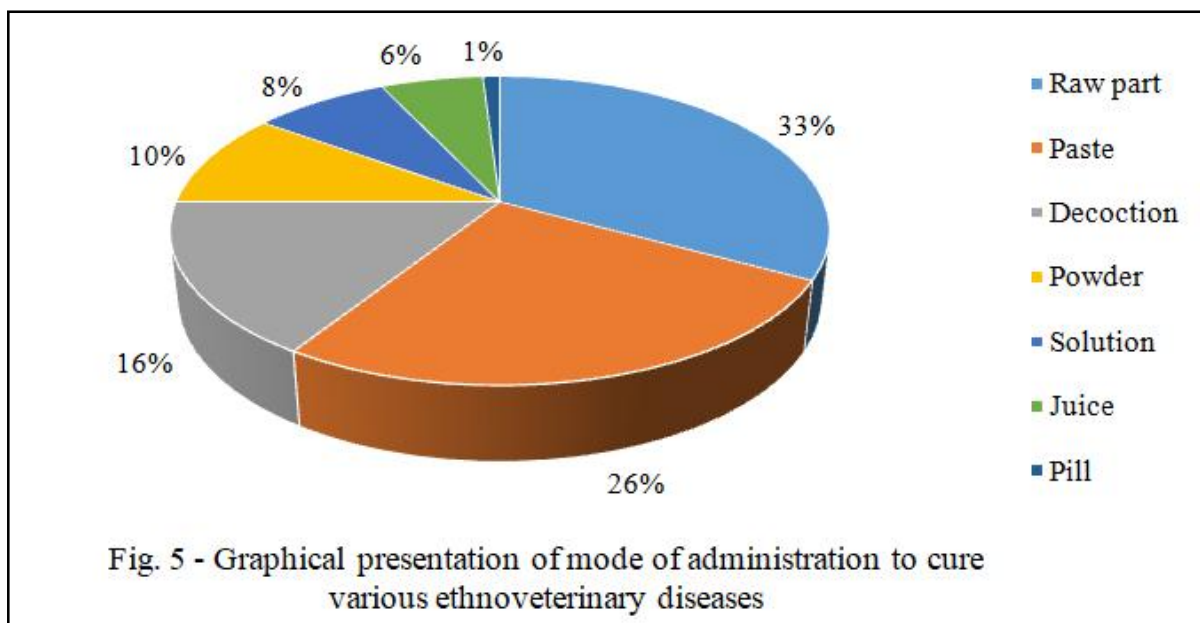
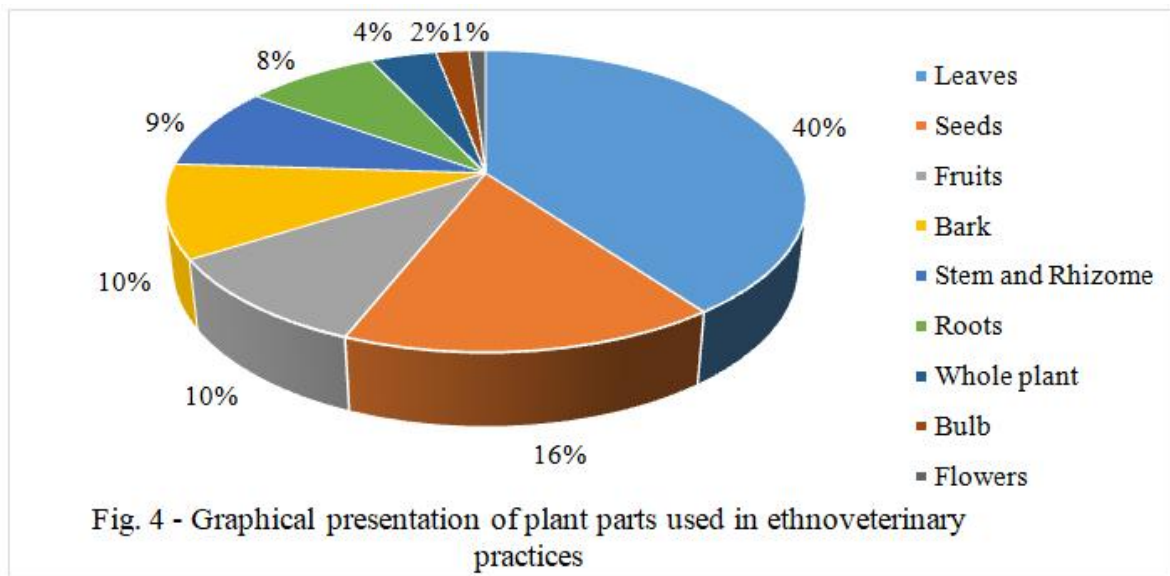
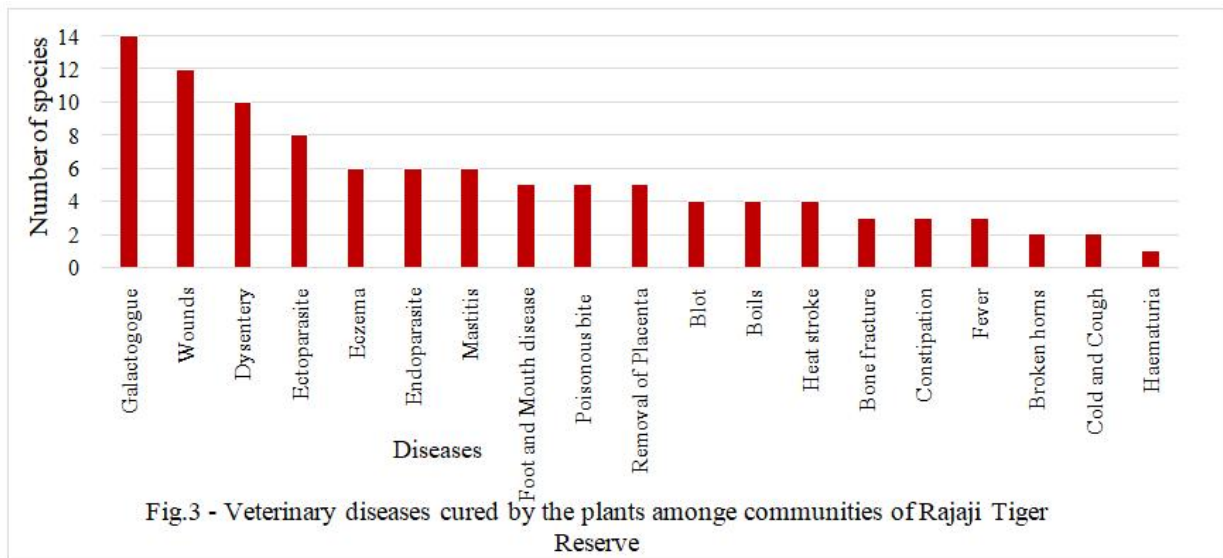


Fig.2 - Dominant family of Rajaji Tiger Reserve



Conclusion

The present study shows that communities living inside Rajaji Tiger Reserve has very good knowledge about traditional ethnoveterinary medicine for curing common diseases of their livestock. The local people and Gujjars have their own knowledge about the utilization of plants which passes from parents to their offspring. Today due to change in life style of these communities, their indigenous knowledge is depleting very fast. Hence there is urgent need to record their traditional ethnoveterinary knowledge about the use of medicinal plants before it gets lost in near future. These valuable ethnoveterinary knowledge can be starting point for discovery of new drugs which can be used in animal health care and for further studies. A large number of medicinal plants are used by these communities due to this there is depletion of biological resources, over exploitation of these medicinal plants should be stopped by creating awareness among people to cultivate more plants. The government should develop ethnoveterinary as an additional subject in colleges. Through workshop, seminars, training awareness among local people for ethnoveterinary system should be developed.

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