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Abdullah Al Mamun

Department of Microbiology,
Faculty of Biological Science and
Technology, Jessore University
of Science and Technology,
Jessore 7408, Bangladesh.

Shanjida Islam Tumpa

Department of Microbiology,
Faculty of Biological Science and
Technology, Jessore University
of Science and Technology,
Jessore 7408, Bangladesh.

Md. Iqbal Hossain

Department of Microbiology,
Faculty of Biological Science and
Technology, Jessore University
of Science and Technology,
Jessore 7408, Bangladesh.

Tasneema Ishika

Department of Microbiology,
Faculty of Biological Science and
Technology, Jessore University
of Science and Technology,
Jessore 7408, Bangladesh.

Correspondence:

Tasneema Ishika

Department of Microbiology,
Faculty of Biological Science and
Technology, Jessore University
of Science and Technology,
Jessore 7408, Bangladesh.

Plant resources used for traditional ethnoveterinary phytotherapy in Jessore District, Bangladesh

Abdullah Al Mamun, Shanjida Islam Tumpa, Md. Iqbal Hossain, Tasneema Ishika

Abstract

Plants comprise the affluent source of therapy of traditional livestock healthcare practices. Ethno-veterinary medicinal practice and skills have developed through time mainly by trial and error and sometimes through deliberate experimentation and innovation. However, scarcity of documentation of farmer's knowledge, attitude and practices can lead the indigenous knowledge lost forever. The objective of this study is to document the knowledge on ethno-veterinary medicine by conducting a survey among the local practitioner in Jessore district, Bangladesh. The majority of the herbs use to treat the ailment belong to Fabaceae but Arecaceae and Zingiberaceae are also the most commonly used family. Mostly used parts are leaf (36%), followed by seeds (23%), fruits (9%), stem (7%), whole plant (5%) etc. As the world is becoming more advanced, a blending of traditional wisdom and modern science could bring better use of medicinal plants to buildup of natural population.

Keywords: Livestock, ethnoveterinary, medicinal plant, phytotherapy, Jessore, Bangladesh.

1. Introduction

Use of plants for treating diverse ailments of domestic animals is an old practice. For centuries, medicinal plants have been used extensively to combat diseases and in many parts of the world are still using for this purpose. The folk's beliefs, traditional knowledge, skills and practices relating to the health of animals are collectively known as ethno-veterinary treatment, which play a vital role in rural areas as chief source of medicine, used to deal with animal health problems^[1,2]. Use of medicinal properties of plants has grown into an art and a science, practiced according to the real life experience, observation, tradition and disease theory of the healer. In ethno-veterinary medicine, there seems to be a range of plants or plant extracts suitable for treating almost each disease of livestock. These herbal preparations, drawing upon centuries of conventional belief and use, are in practice over time by pastoralists and farmers for the treatment of different diseases of livestock^[3]. Literature shows the worldwide interest in herbal products has grown significantly. For instance cattle, horses, sheep, goats and pigs represent about 70% of the animals treated with herbal remedies, followed by poultry (9.1%), dogs (5.3%) and rabbits (4.3%)^[4].

Plants with curative properties enjoy the utmost consideration in indigenous systems of medicine throughout the world. This is especially true in the developing countries, where imported drugs are very expensive and are therefore inaccessible to the vast majority of the population^[5]. The searches for drugs and dietary supplements derived from plants have accelerated in recent years. Pharmacologists, microbiologists, botanists, and natural-products chemists are combing the earth for phytochemicals and leads that it could be developed for treatment of various diseases. Knowledge of the curative properties of specific plants is an accomplished art. This art is still maintained in Bangladesh, especially in rural areas. Bangladesh is endowed with more than 5000 plant species and about 1000 of them are medicinally important^[6].

Ethno-veterinary knowledge is transmitted orally from generation to generation and now in danger of extinction due to loss of cultural heritage and overexploitation. Therefore, documentation and conservation through ethno-veterinary studies is needed before it is lost forever. Thus the knowledge can be preserved, plants can be conserved, sustainably managed and utilized for the control of livestock diseases. The documentation of traditional knowledge on the medicinal uses of plants has provided many vital drugs of modern day^[7].

The aim of this survey is to bring the traditional knowledge on medicinal plants used in the veterinary field to light, to encourage improved methods for the exploitation of natural resources. This paper presents ethno-veterinary medical practices in Jessore District,

Bangladesh with special emphasis on herbal usage in managing livestock diseases.

2. Materials and Methods

2.1 Area of survey

Jessore district is the thirteenth largest districts of Bangladesh covers an area of 6,674 km² with 2, 764,547 people. There are eight sub-districts and 1,477 villages within Jessore district. Agriculture is the main occupation and the base of economy. Mixed crop and livestock farming system is the mode of agriculture and cattle are the major livestock kept in the district. The present survey was conducted in three areas of Jessore district, namely Jessore Sadar, Jhumjhumpur and Ambot-tola.

2.2 Data collection and mode of survey

The Rapid Rural Appraisal approach to data collection was used [8]. Ethnoveterinary information was collected using three techniques, namely interviews, observations and guided field walks. The present survey was conducted through interviewing three traditional practitioners in the three areas of Jessore district. The practitioners were all males and mainly farmers and livestock keepers. Moulana Saiyad Nur Mohammad (57) from Jessore Sadar had been practicing for 32 years. On an average, he faces about 35-40 patients per day, which clearly

pointed to his successful practice. Mohammad Abdul Baki from Jhumjhumpur and Amirul Hossain from Ambottola had been practicing for 21 and 12-15 years, respectively. They also had a fruitful practice in their respective villages. All of them were very cooperative in providing the names of medicinal plants that they used for treatment of ailments, methods of formulation and dosages. Interviews were conducted in the Bangla language (spoken by both interviewers and those who were interviewed) with the help of a semi-structured questionnaire. All information including the plant species name, biological forms, habitat, and uses were noted down carefully and cross-checked in evening sessions. They used some local units for measurement such as tola, chotak, poa, ana that were later converted into standard units like gram (gm), milliliter (ml) etc.

3. Results and Discussions

A total of 55 medicinal uses corresponding to 44 plant species with veterinary importance belonging to 32 botanical families are gathered and documented in this research. Table-1 lists the plant species in alphabetical order according to their Latin name. Each plant is presented with its corresponding botanical identity, local name, animal treated and medical applications, indicating the part used, form of preparation and mode of administration.

Table 1: Medicinal plants used in ethnoveterinary medicines in Jessore district, Bangladesh.

Sl. No.	Scientific name	Local vernacular name	Family	Utilized part of the plant	Animals treated	Uses and mode of preparation
01	<i>Abrus precatorius</i> L.	Kuch	Fabaceae	Leaf	Cow, Goat	Swellings* Leaf of <i>Abrus precatorius</i> is pasted and applied externally on affected areas until healings.
02	<i>Acacia catechu</i> (L. f) willd.	Khoyer	Fabaceae	Seed	Cow	Blackwater* About 5 gm of opium (<i>Papaver somniferum</i>), 60 gm powder of chakhri chalk (a kind of soft and white rock), 18 gm powder of dried ginger (<i>Zingiber officinale</i>), 30 ml powder of <i>Acacia catechu</i> seed, 375 ml water and 62 ml wine (spirituous liquor) are mixed altogether and then administered orally until cure.
03	<i>Acalypha indica</i> L.	Muktajhuri	Euphorbiaceae	Leaf	Cow, Goat, Chicken	Wounds* Leaf of <i>Acalypha indica</i> is mixed with common salt and pasted and then applied externally to heal.
04	<i>Achyranthes aspera</i> L.	Aapang	Amaranthaceae	Leaf	Cow, Goat, Chicken	Watering in eyes* Leaf of <i>Achyranthes aspera</i> is grinded with saffron (<i>Crocus sativus</i>) and the filtered juice is used to pour in eyes.
05	<i>Achyranthes paniculata</i>	Apang	Amaranthaceae	Root	Cow	Worm in the wound* The root of <i>Achyranthes paniculata</i> is collected at dawn. Then it is bound to the neck of the cow to remove the worm.
06	<i>Aegle marmelos</i> (L.) Correa	Bel	Rutaceae	Leaf	Cow, Buffalo	Viral fever (tree days fever)* About 100 gm leaf of <i>Aegle marmelos</i> and 50 gm rhizome of <i>Zingiber officinale</i> are boiled in 400 ml of water and when the mixture is about 100 ml, the heat is reduced and after cooling this is mixed with jaggery (molasses prepared from <i>Borassus flabellifer</i>) and administered orally until cure.
07	<i>Allium cepa</i> L.	Peyaj	Amaryllidaceae	Bulb	Cow	Fever of barren cows* About 12 gm onion (<i>Allium cepa</i>), 35 gm leaf of <i>Mimosa pudica</i> , 25 gm pepper (<i>Piper nigrum</i>), 12 gm garlic (<i>Allium sativum</i>) and 6 gm saffron (<i>Crocus sativus</i>) are pasted. The mixture is given orally twice a day until cure.
08	<i>Allium sativum</i> L.	Roshun	Amaryllidaceae	Bulb	Cow	Common sore* Burst of bladder during delivery*

						Four seed vessels of <i>Allium sativum</i> are fried in oil of <i>Cocos nucifera</i> . Then the oil is filtered and applied externally to the sore.
09	<i>Aloe vera</i> (L.) Burm. f.	Ghritokumari	Xanthorrhoeaceae	Leaf	Cow	Blackwater* About 30 gm powder of dried ginger (<i>Zingiber officinale</i>), 350 gm salt, 15 gm leaf of <i>Aloe vera</i> , 1 liter hot water, 60 gm sulphur (brimstone) powder and about 125 gm jaggery (molasses prepared from <i>Borassus flabellifer</i>) are mixed altogether and then administered orally until cure.
10	<i>Ananas comosus</i> (L.) Merr.	Anaros	Bromelioideae	Fruit	Cow, Goat	Helminthosis* Equal volume juice of <i>Ananas comosus</i> and young <i>Curcuma longa</i> are mixed and pasted. 240 ml of the mixer are given orally. It is done daily in the morning till cure.
11	<i>Annona reticulata</i> L.	Ata	Annonaceae	Leaf	Cow	Eczema* About 30 gm tender leaf of <i>Annona reticulata</i> and 10 gm of quicklime are mixed altogether and pasted. This is then administered externally to the sore to kill the worm. This is done daily until cure.
12	<i>Azadirachta indica</i> A. juss	Neem	Meliaceae	Leaf	Cow	Worm in wound* Leaves of <i>Azadirachta indica</i> are boiled with water. After cooling the solution is filtered and the scar is washed with the filtrated solution. Carbolic oil is then applied to the wound using a painting brush to kill the worm.
13	<i>Berberis aristata</i> L.	Horidra	Berberidaceae	Root	Goat	Flatulency* Powder of <i>Berberis aristata</i> root, juice of <i>Cynodon dactylon</i> and molasses prepared from juice of <i>Saccharum officinarum</i> are mixed in a ratio of 1: 1: 2. It is given orally until cure.
14	<i>Bombax ceiba</i> L.	Shimul	Malvaceae	Seed	Cow	Rinderpest* The seed of <i>Bombax ceiba</i> is given orally with jiggery (molasses prepared from <i>Borassus flabellifer</i>) before the cocoon of the rinderpest is ripen. About 25, 18 and 10 seeds are administered orally at three to four hour interval in the first day. In the second day, about 15 and 10 seeds are given at ten to twelve hours interval. About 10 seeds are administered orally at a time in the third day.
15	<i>Borassus flabellifer</i> L.	Taal	Arecaceae	Stem juice	Cow	Blackwater* About 125 gm jaggery (molasses prepared from <i>Borassus flabellifer</i>), 30 gm powder of dried ginger (<i>Zingiber officinale</i>), 350 gm salt, 15 gm leaf of <i>Aloe vera</i> , 1 liter hot water and 60 gm sulphur (brimstone) powder are mixed altogether and then administered orally until cure. Viral fever (tree days fever)* About 100 gm leaf of <i>Aegle marmelos</i> and 50 gm rhizome of <i>Zingiber officinale</i> are boiled in 400 ml of water and when the mixture is about 100 ml, the heat is reduced and after cooling this is mixed with jaggery (molasses prepared from <i>Borassus flabellifer</i>) and administered orally until cure.
16	<i>Brassica nigra</i> L.	Sorisha	Brassicaceae	Seed	Cow	Coughing and Sneezing by wisps* Seed oil of <i>Brassica nigra</i> is applied at the cavity between the horns on the head.
17	<i>Butea monosperma</i> (Lam.) Taub.	Polash	Fabaceae	Seed	Cow	Helminthosis* About 20 seeds of <i>Butea monosperma</i> is mixed with <i>Brassica nigra</i> oilcake and then pasted. This is then administered orally once in a day for three days.
18	<i>Calotropis procera</i> (Aiton) W. T. Aiton	Akanda	Asclepiadaceae	Leaf	Cow	Swollen teat in udder* Ghee (clarified butter) mixed with the leaf of <i>Calotropis procera</i> is heated and then applied externally to the teat by hot fomentation until recovery.
19	<i>Cassia fistula</i> L.	Banderlathi, Sonalu	Caesalpinaceae	Bark	Cow, Goat	Fever* About 50 gm stem bark of <i>Cassia fistula</i> is ground with 12 gm pepper (<i>Piper nigrum</i>) and 4 seed vessels of garlic (<i>Allium sativum</i>). The mixture is given orally thrice a day until cure.

20	<i>Cassia tora</i> L.	Teraj	Caesalpinaceae	Seed	Cow, Goat	Skin diseases* About 10 seeds of <i>Cassia tora</i> are pasted with 250 ml water. It is applied topically to cure.
21	<i>Cinnamomum camphora</i> (L.) J.Presl.	Korpur	Lauraceae	Gum	Cow	Sore in hoof* About 1 gm <i>Cinnamomum camphora</i> is mixed with 10 ml oil of turpentine and applied externally at hoof twice a day until cure. Cough, inflammation of tonsils and increase in body temperature* Ghee (clarified butter), camphor (<i>Cinnamomum camphora</i>) and <i>Urena lobata</i> are crushed together in equal amounts and applied externally to the neck until cure.
22	<i>Citrus aurantiifolia</i> (christm.) swingle	Kagoji lebu	Rutaceae	Leaf	Cow	Helminthosis* Leaves of <i>Citrus aurantiifolia</i> are macerated with tobacco pipe water and pasted. Then it is mixed with 60 gm salt and more tobacco pipe water and taken in a stone vessel. It is then filtered. 250 ml of this preparation is given daily for 3-4 days.
23	<i>Cocos nucifera</i> L.	Narikel	Arecaceae	Fruit	Cow	Burnt sore* About 20 ml oil of <i>Cocos nucifera</i> is mixed with same amount of water of lime (Calcium carbonate) and then applied externally to the burnt place (s) with a clean cloth or cotton. The cotton is bound to the burnt place (s) until cure. Sore in hoof* Equal volume <i>Cocos nucifera</i> oil and <i>Cinnamomum camphora</i> are mixed and applied to the infected area until cure.
24	<i>Corchorus capsularis</i> L.	Paat	Malvaceae	Seed	Cow	Worm in the scar* The seed of the <i>Corchorus capsularis</i> is pasted and applied to the wound where worm attacks.
25	<i>Coriandrum sativum</i> L.	Dhonia	Apiaceae	Seed	Cow	Catarrh, cold and heatstroke* About 12 gm seed of <i>Coriandrum sativum</i> , 5 gm <i>Linum usitatissimum</i> , 50 gm <i>Plantago ovata</i> husk, 50 gm leaf of <i>Cursia fistula</i> and 12 gm of black salt are pasted altogether and then it is inserted into the clod of rice pulp and administered orally to the infected animal. Twice in a day for 2 days is effective.
26	<i>Curcuma longa</i> L.	Holud	Zingiberaceae	Rhizome	Cow	Flatulency* About 62 gm green dried rhizome of <i>Curcuma longa</i> is powdered and mixed with molasses of <i>Saccharum officinarum</i> . This is then administered orally. Laxity of tooth* Grinded powder of <i>Curcuma longa</i> is applied to the root of loosed tooth and then a small amount of cotton soaked in <i>Brassica napus</i> oil is applied to that root. The mouth of the cow has to be closed for 2 hours.
27	<i>Cynodon dactylon</i> (L.) Pers.	Durba, Dublo	Poaceae	Whole plant, top of stem	Goat	Flatulency* Juice of <i>Cynodon dactylon</i> , powder of <i>Berberis aristata</i> root and molasses prepared from juice of <i>Saccharum officinarum</i> are mixed in a ratio of 1: 1: 2. It is given orally until cure.
28	<i>Datura metel</i> L.	Dhutura	Solanaceae	Leaf	Cow, Buffalo	Mastitis* About 20 gm dried <i>Azadirachta indica</i> and same amount of <i>Datura metel</i> leaf are pasted and heated moderately. It is then poulticed to the teat and the udder. This reduces the swelling within 10-12 hours.
29	<i>Dillenia indica</i> L.	Chalta	Dilleniaceae	Leaf	Cow	Diarrhea* Leaf of <i>Dillenia indica</i> is given orally to stop the evacuation of the bowel causing diarrhea. This is given until cure.
30	<i>Lagenaria siceraria</i> (Molina) Standl.	Lau	Cucurbitaceae	Fruit	Cow	Galactischia* Fruit of <i>Lagenaria siceraria</i> is cut into small pieces and boiled with water. It is then cooled and fed to the cow twice a day for 5-7 days.
31	<i>Lawsonia alba</i> L.	Mehedi	Lythraceae	Leaf	Cow	Swelling in shoulder, neck* Leaf of <i>Lawsonia alba</i> is pasted and heated. This is then applied to the swollen neck and inflated

						shoulder. This is done daily till cure.
32	<i>Linum usitatissimum</i> L.	Tishi	Linaceae	Seed	Cow, Goat	Spasmodic fit or convulsion* About 500 ml oil of <i>Linum usitatissimum</i> seed and 28 ml oil of turpentine are mixed and given orally at the very beginning of the symptoms. Galactischia* About 500 gm of <i>Linum usitatissimum</i> oilcake and 100 gm jaggery are mixed and administered orally for seven days. Flatulency* 300 ml oil obtained from <i>Linum usitatissimum</i> seed is mixed with 400 ml turpentine oil. It is given orally 2-3 times at 2 hour interval
33	<i>Luffa acutangula</i> (L.) Roxb.	Jhingge	Cucurbitaceae	Seed	Cow	Helminthosis* About 12 seeds of <i>Luffa acutangula</i> is mixed with oilcake of <i>Brassica nigra</i> and then pasted. This is then administered orally for 2-3 days to cure.
34	<i>Mimosa pudica</i> L.	Lojjaboti	Mimosaceae	Leaf	Cow	Fever of barren cows* About 35 gm leaf of <i>Mimosa pudica</i> , 25 gm pepper (<i>Piper nigrum</i>), 12 gm onion (<i>Allium cepa</i>), 12 gm garlic (<i>Allium sativum</i>) and 6 gm saffron (<i>Crocus sativus</i>) are pasted. The mixture is given orally twice a day until cure.
35	<i>Musa sapientum</i> L.	Kola	Musaceae	Whole plant	Cow	Burnt sore* The rotten orts of <i>Musa sapientum</i> is pasted and applied to the burnt place (s) immediately after burning to alleviate the pain.
36	<i>Neolamarckia cadamba</i> (Roxb.)	Kodom	Rubiaceae	Leaf	Cow	Abdominal Pain* About 125 gm juice of <i>Neolamarckia cadamba</i> leaf is mixed with molasses of <i>Saccharum officinalum</i> . It is then administered orally. Flatulency* About 125 gm juice of <i>Neolamarckia cadamba</i> leaf is given orally at a time.
37	<i>Nicotiana tabacum</i> L.	Tamak	Solanaceae	Leaf	Cow	Eczema* About 58 gm leaf of <i>Nicotiana tabacum</i> is soaked in 150 ml cold water for overnight. The water is filtered in the following day with a thin cloth and the separated water is boiled to make concentrated solution. After cooling the solution is mixed with 30 ml oil of <i>Brassica napus</i> and applied externally to the sore daily at night until cure. Common sore* Powder of conch-shell and powder of <i>Nicotiana tabacum</i> leaf are mixed with oil obtained from seeds of <i>Brassica campestris</i> . It is applied to the infected area (s) 3-4 times till cure. Or, 1 handful leaf of <i>Nicotiana tabacum</i> is boiled with water. This is then filtered and the filtered solution is mixed with oil obtained from seeds of <i>Brassica campestris</i> . The mixture is applied to the infected area (s) till cure.
38	<i>Oxalis corniculata</i> L.	Amrul	Oxalidaceae	Leaf	Buffalo	Abdominal pain* About 12 gm leaf of <i>Oxalis corniculata</i> is pasted and mixed with 90 ml molasses prepared from juice of <i>Saccharum officinarum</i> and juice of <i>Neolamarckia cadamba</i> leaf. It is given orally.
39	<i>Piper nigrum</i> L.	Gol morich	Piperaceae	Fruit	Cow	Fever with cough* About 60 gm of dried and grinded ginger (<i>Zingiber officinale</i>), 60 gm jowan (fruit of an undefined plant, possibly <i>Carum captinum</i>), 72 gm <i>Piper nigrum</i> are mixed with 60 gm salt and administered orally with gruel of rice. This is done twice a day for 1 week.
40	<i>Saccharum officinarum</i> L.	Aakh	Poaceae	Stem	Cow	Pox* In the early stage of pox young <i>Curcuma longa</i> mixed with molasses prepared from juice of <i>Saccharum officinarum</i> is given orally.
41	<i>Sesamum indicum</i> L.	Til	Pedaliaceae	Seed	Cow, Buffalo	Urinary disease* (local term-'Meho', generally denotes urinary problems arising from endocrinological disorders) Oil obtained from <i>Sesamum indicum</i> seed, root juice

						of <i>Asparagus racemosus</i> and juice of <i>Berberis aristata</i> are mixed in a ratio of 3: 2: 2 for buffalo and 2: 1: 1 for cow. It is then administered orally once a day for 4-5 days.
42	<i>Spondias mombin</i> L.	Amra	Anacardiaceae	Bark	Cow	Snake bite* About 50 gm of bark of <i>Spondias mombin</i> is administered orally for cure.
43	<i>Swertia chirata</i> (Wall.) C. B. Clarke	Chirota	Gentianaceae	Stem	Cow	Contagious fever containing sore* About 15 gm saltpeter (potassium nitrate) is mixed with 90 gm molasses. 30 gm dried stem of <i>Swertia chirata</i> is grinded and mixed with the ingredients. Then the mixture is given orally with 500 ml water. Blackwater (Blood in urine)* About 15 gm dried ginger (<i>Zingiber officinale</i>), 15 gm dried and grinded jowan (fruit of an undefined plant, possibly <i>Carum captimum</i>) and 15 gm dried and grinded black pepper (<i>Piper nigrum</i>) is mixed with 15 gm dried and grinded <i>Swertia chirata</i> . This is given orally with 4 gm molasses and hot gruel of rice.
44	<i>Zingiber officinale</i> Roscoe.	Ada	Zingiberaceae	Rhizome	Cow	Treatment of poison* About 18 gm dried ginger (<i>Zingiber officinale</i>) is grinded and mixed with 250 ml oil of <i>Linum usitatissimum</i> and 125 gm gunpowder. This mixture is administered orally with 500 ml gruel of rice. This treatment is fruitful for small amount of poisoning. Fever with cough* About 60 gm of dried and grinded ginger (<i>Zingiber officinale</i>), 60 gm jowan (fruit of an undefined plant, possibly <i>Carum captimum</i>), 72 gm <i>Piper nigrum</i> are mixed with 60 gm salt and administered orally with gruel of rice. This is done twice a day for 1 week.

As can be seen from Table-1, Fabaceae (3) is the species rich family and also the most representative in the medicinal flora of the Pirojpur District, Bangladesh [9]; Plateau State, Nigeria [10]; Northcoastal Districts of Andhra Pradesh, India [11]. But

Arecaceae and Zingiberaceae are also the most commonly used family, followed by Amaryllidaceae (3), Fabaceae (3), Linaceae (3) and Solanaceae (3) (Figure 1).

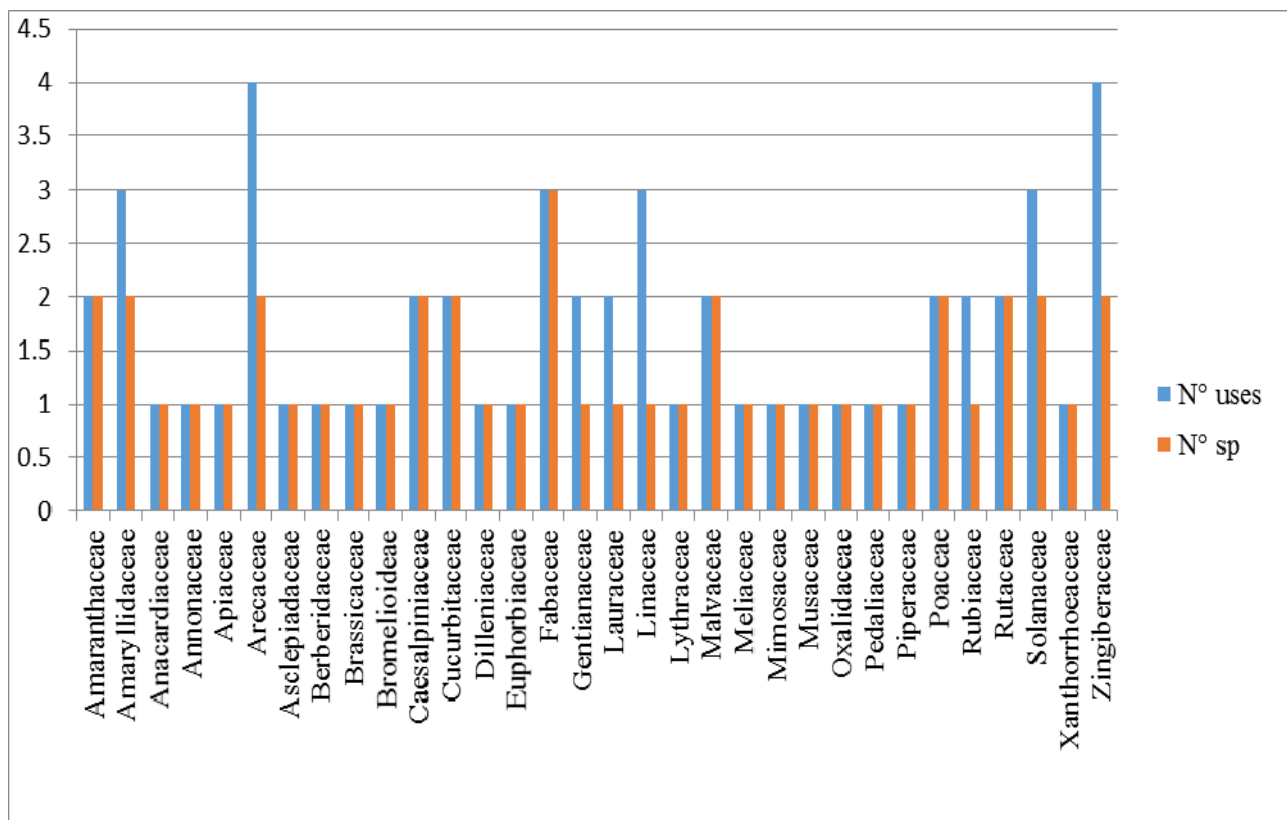


Fig 1: Botanical families with the most number of uses and species cited for veterinary medicine. (Families represented have N°uses/N°sp. values greater than 1).

Most remedies documented in this study are based on a combination of different plants that improve the cure rates, which was strengthened by the previous report of Bonet and Valles (2007) [12]. For instance, treatment of fever of barren cows involves five plant species, viz. *Mimosa pudica*, *Piper nigrum*, *Allium cepa*, *Allium sativum* and *Crocus sativus*. The same plant parts from each plant are not always used. Treatments with combinations of plants are also notable in Pirojpur District, Bangladesh [9], Tanzania [13], Jalaun district of Uttar Pradesh, India [14]. Variation in the effects of various plants was attributed to the qualitative and quantitative differences in biochemical constituents of the plants like phenols, polyphenols, tannins, terpenoids, essential oils, alkaloids, flavonoids, lectins and polypeptides [15].

The study reveals that the most frequently used plant is *Zingiber officinale*. It has variety of applications both directly and indirectly with other plant materials. The practitioners use a specific term 'Suth' for the dried variety of ginger (rhizome of *Zingiber officinale*). With *Acacia catechu* and *Aloe vera* 'Suth' is separately used for treating blackwater (bleeding during urination). *Piper nigrum* and *Linum usitatissimum* are used in combination with ginger for treating fever with cough and poisoning respectively. Rhizome of *Zingiber officinale*

along with *Aegle marmelos* is used for treating viral fever.

It is observed that the forms of illness that encountered most often are different type of wounds, pains and worms, such as helminthosis, abdominal pain, swellings, common sore, sore in hoof, burnt sore, worm in wounds etc. Of the recorded medicinal plant species 18 are used for this purpose. Other diseases treated include various fever, cough and cold, blackwater, galactischia, spasmodic fit, pox, treatment of poison and various gastrointestinal disorders like flatulency, diarrhea etc.

Most of these medicines are given orally (60%), such as drinks and inhalations while some were applied externally either in washes, compresses, holding plant parts or by friction (40%). In this present survey, whole plants (5%) as well as some of the aerial parts of plants (95%), like leaf, stem, root, bark, fruit, bulb and seed are used for treatment. The plant parts mostly used in veterinary herbal preparations are leaves (36%) followed by seeds (23%), fruits (9%), stem (7%) whole plant (5%) for curing different ailments of livestock (Figure-2). Various scientific reports confirmed leaves are the most harvested plant part of remedy preparation and oral is the major route of application of traditional medicine in the treatment of both human and livestock diseases [10, 16-18].

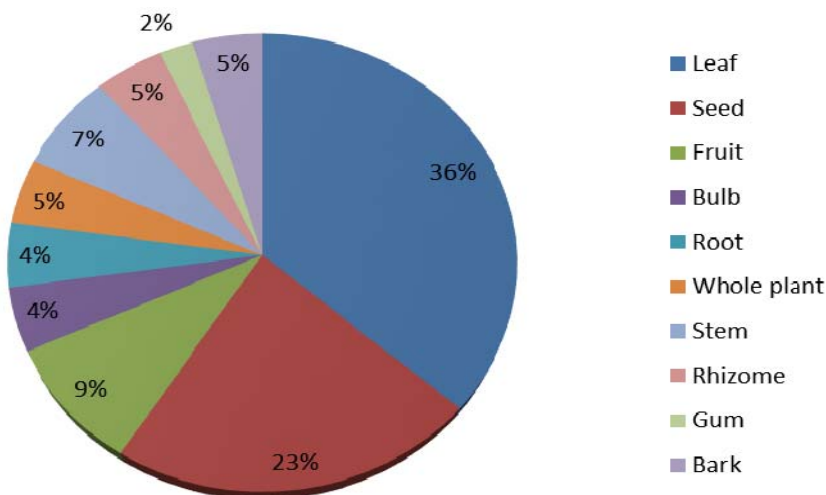


Fig 2: Percentage distribution of medicinal plant parts used in the management of livestock diseases.

Sometimes vehicles and some other-than-plant materials also have significant role; e.g. for the treatment of catarrh, cold and heatstroke, mixture prepared from *Coriandrum sativum* (seed), *Cursia fistula* (leaf), *Plantago ovat* (husk), *Linum usitatissimum* (gum) are inserted into the clod of rice pulp and administered orally. The use of rice pulp does not appear to have any clinical significance; it is merely used as a vehicle or carrier. Black salt is also added to the mixture, presumably to make the formulation more palatable. Existing scientific reports validate the use of enhancers such as honey, cow/goat's milk, ghee, salt, boiled rice and butter milk to in folk medicine that in turn improve the palatability and medicinal property of certain remedies [18, 19]. In the present survey the commonly used enhancers are water, jaggery, wine, gruel of rice, clarified butter (ghee), molasses, vegetable oil, common and black salt. Besides, some other-than-plant materials, e.g. chakhri chalk (a kind of soft and white rock), sulphur (brimstone), quicklime, carbolic oil, lime (calcium carbonate), conch-shell are used for the treatment and control of livestock diseases in the study area. In some areas wheat flour, sugars were also reported to be used [20]. It has been reported that the use of such carriers may dilute or reduce the relative potency of the drug [21]. The

dosages of administration are often varied with the parts of the plants used and the mode of preparation. However, most of the preparations are administered once or twice a day for 3 to 5 days, or keep treating until the animal recovers. Full recovery is confirmed when the animals restart normal feeding and activities.

A similar complexity and knowledge of the prophylactic effect of plants is displayed in different areas, although the number of plants used and the preparations may be different. In this present survey *Calotropis procera* leaf is used for the treatment of swelling and it was also reported by Pragada *et al.* (2012) [22], who documented its use in treating inflammation; the usage of *Zingiber officinale* along with the other plant materials for treating fever with cough was supported by the earlier report of its use in treating cough, cold and fever [23]. But sometimes ailments treated by the same plant may vary in different region, like *Curcuma longa* is reported for treating flatulency and laxity of tooth in this study, has been used for controlling mastitis in Pakistan [20].

The observed diversified uses of plant species even between the practitioners of two areas in close proximity to each other represents the unexplored dimension of this knowledge

throughout the country and highlights the importance of documenting this knowledge and attitude in the greater interest of mankind. It is possible that all plant species used by the livestock raising farmers may not prove suitable for treating the specific ailment that they are used for. But obviously the diversity of plant species used will provide a rich data-base and proper scientific studies on the efficacy of a particular plant may lead to the discovery of new infection fighting strategy.

4. References

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