Folk Herbal Veterinary Medicines of Zilberchay Watershed of East Azerbaijan (Iran)

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ABSTRACT

Background & Aim: Ethnoveterinary medicinal plants of Iran are not scientifically well known, but they have been using traditionally especially in rural areas. This study was carried out to identify the Folk Herbal Veterinary Medicines (FHVM) of ZilberChay watershed in east Azerbaijan province in northwest of Iran.

Experimental: FHVM plants were identified by collecting plant species from the study area and comparing them with previous studies to identify the plant with FHVM value. Overall, 493 plant species that were belong to 243 genera and 59 families were collected. From those, 42 species belong to 37 genera and 23 families were identified as FHVM.

Results: These plants can be used for treatment of different disease and syndromes in livestock, such as internal parasites, mastitis, burns, skin disease, gastrointestinal tract problems, diarrhea, etc. Results showed that most of the FHVM belong to the families including: Fabaceae (14.29%), Asteraceae (14.29%), Apiaceae (7.14%), Poaceae (7.14%), Rosaceae (7.14%), Cupressaceae (4.76%), Lamiaceae (4.76%) and Moraceae (4.76%). Moreover, results showed that chrotypes of identified FHVM belong to IT (Irano-Toranian) with 49.1%, Plur (Plural) with 27.27%, ES (Euro-Siberian) with 18.18 % and M (Mediterranean) regions with 5.45%, respectively. Furthermore, identified FHVM belong to life forms of He (Hemicyryptophytes) with 55%; Ph (Phanerophytes) with 26.19%; Th (Therophytes) with 14.28% and Ch (Chamaephytes) with 4.76%, respectively.

Recommended applications/industries: Identifying FHVM of ZilberChay and their application in treating domestic animals can give us opportunity to increase our knowledge about FHVM and attempt to conserve the area and its plant species.
1. Introduction

Studying of Folk Herbal Veterinary Medicines (FHVM) and traditional methods for health, hygiene and treatment of animal diseases is called Ethnoveterinary (Bahmani et al., 2011). History of the ethnoveterinary refers to the time that humans domesticated the animals. Information of this knowledge, like others is achieved with trial and error (Bahmani et al., 2011). Even in developed countries, veterinary care and animal welfare in rural populations is based on ethnomedical veterinary practices, particularly when access to chemical drugs is difficult or too expensive for the local farmer (Nyanganga et al., 2008). Traditional veterinary knowledge is comprised by a collection of beliefs and practices regarding animal welfare that involves the use of natural resources (plants and animals) and other materials. This knowledge is generally transmitted orally from generation to generation and, as other traditional beliefs, is currently threatened by technological development, sociocultural and environmental changes (McCorkle et al., 1998; Tabuti, 2003). However, within the industrialized and urban society there is an increasing interest in alternative or complementary medicine which, together with other natural therapies, is based on the use of FHVM. Thus, the use of homeopathic and phytotherapeutic remedies in veterinary medicine has gained interest, among other reasons, due to increasing demands on the quality of meat and milk products such as the requirements for producing organic food goods, (Pieroni et al., 2004). FHVM often provides cheaper options than comparable western drugs, and the products are locally available and more easily accessible too (Selvaraju et al., 2011). Based on the facts, there is an interest to identify and increase the application of FHVM in different countries and researchers are identifying and introducing different species of these plants. Some FHVM have been introduced in the studies such as Masika et al. (2000); Takar (2004); Fajimi and Taiwo (2005); Ishiaq et al. (2006); Lans et al. (2006); Guerrera and Lucia (2007); Lans et al. (2007); Pande et al. (2007); Lulekal et al. (2008); Davidović et al. (2011); Khan (2009); Martínez and Luján (2011); Selvaraju et al. (2011); Bahmani et al. (2012); Chakraborty and KantiPal (2012); UL Islam et al. (2012); Manoj et al. (2012); Laudato and Capasso (2013); Adnan et al. (2014); Panda and Dhal (2014); Rajkumari et al. (2014); Verma (2014). Iran’s flora consists of more than 7500 plant species that most of them are classifying as medical plants (Omid Beigi 1993; 1997). Based on these variations in climate condition and plant flora, application of herbal plants were common in Iran for years and nowadays, these plants are applying for different aims according to the culture and faith of people in each area. Based on above, Iranian researchers in their studies have been introduced FHVM of different regions but number of these studies is not adequate to introduce all of them. For example, Bahmani et al. (2010) studied FHVM in treating disease and syndromes in small ruminants in southern areas of Ilam province, west of Iran. They have studied 35 disease and syndrome in small ruminants and 35 FHVM of these areas. This study found that 24 disease and syndrome were treating with identified medicinal plants and 13 disease and syndrome were found without herbal treating. Moreover, they introduced some plants with new remedy effects. Plants such as Phoenix dactylifera: poisons; Triticum aestivum: mastitis; Peganum harmala: Snake bite; Astragalus golicucanthus, Nerium indicum, Amygdalus lycioides and Marsdenia erecta for respiratory signs of Ovis aries larva and their ethnoveterinary effects were introduced for the first time. Malek Mohammadi and Mirzavash Azar (2010) have identified medical utilization and domestication of some wild edible plants in west Azerbaijan. Kouhpayeh et al. (2011) studied the FHVM in Kerman province in south of Iran. They have stated that 42 plants as FHVM value in this region. Touphci (2011) have identified FHVM in Arshad Chamani rangelands of East Azerbaijan. Bahmani et al. (2012) introduced FHVM used by Kurdish owners of Ilam province. Based on their findings, 46 different plant species were identified as beneficial plants in curing 36 animal diseases and syndromes in this area. Chalechale et al. (2013) studied the anthropology and antiparasitic remedies in Kurdish Ethno (veterinary) medicines. They introduced plant species like Andropogon nardus, Artemisia absinthium, Cucurbita verrucosa, Cinchona officinalis, Gossypium herbaceum, Marrubium vulgar and Hippophae rhamnoidesas herbal medicine in Kurdistan province of Iran. However it seems, there is little attempt on the FHVM studies in northwest of Iran, especially in east Azerbaijan and ZilberChay flora. Thus, this study aimed to identify the FHVM of ZilberChay watershed in the east Azerbaijan of Iran to
conserve and revive this treasure and apply them as replacement for veterinary chemical drugs.

2. Materials and Methods

2.1. Study area

ZilberChay watershed with 261437 ha is located in 45°04′.44″ to 55°33′.55″ E and latitude of 38°18′.09″ to 37°40′.57″ N in East Azerbaijan, Iran. Elevation of this area varies between 937 to 3207 m. Average precipitation in northern and southern slopes varies from 123 to 787 mm. In ZilberChay watershed July is the hottest month of year with the average temperature of 24 °C and coldest month is December with the average temperature of -4 °C. Due to this climate variation verity of plant species are growing in this area (Ghorbani et al., 2013).

2.2. Data collection and Identification

Plants were collected by considering the affective ecological factors in plants distribution such as elevation, slope, aspect, temperature, precipitation, soil, etc. Mainly, two west-east elevation profiles from low elevation to the highest and 6 north-south profile were applied for collecting plants. Information of each plant (date of collection, number, ecological condition and elevation, etc) was recorded. Samples were transferred to the lab and all collected species were identified using reference flora, such as: Flora Iranica (Rechinger, 1963-1998), Iraq (Townsend and Guest, 1966-1985), Palestine (Zohary, 1966-1972), Turkey (Davis, 1965-1988), East (Boissier, 1867-1888), Soviet union (Komarov, 1934-1954), Iran (Assadi et al., 1988-2013), Colored flora of Iran (Ghahreman, 1979-1992), Iranian Astragalus (Maassoumi, 1986-2005), Cromophites of Iran (Ghahreman, 1996), plants of Iran (Mobayen, 1975-1996). Scientific names of species were assigned using International Plant Name Index (IPNI, 2013). For determining life forms, Raunchier (1934)’s classification method was applied. Published article and references, such as Takhtajan (1986), Ghorbani et al. (2013), Sokhanvar et al. (2013), etc. were used for determining chorology of the identified FHVM species.

3. Results & Discussion

In this study, for identifying FHVM species at ZilberChay watershed, initially 493 plant species that were belong to 243 genera and 59 families were collected. Although there is high disturbance on the watershed, this area is rich from flora of FHVM species perspective. However, because of the lack of references in identifying FHVM species we were unable to record all ethnoveterinary species. Identified FHVM species are presented in Table 1. As can be seen from Table, 42 FHVM species were identified, which were belonging to 23 plant families and 37 genera.

![Fig 1. Number of ethnoveterinary medical species families in ZilberChay watershed.](image1)

![Fig 2. Comparison of chrotypes among ethnoveterinary medical species in ZilberChay watershed.](image2)
used as powder, past, decoction or even mixture of two or more. Moreover, different parts of species such as leaves, flower, roots, bark, fruits, seeds, mucilage, aerial part, bulb and whole plant can be used in the cure of each disease.

Figure 3. Comparison of life forms number among ethnoveterinary medical species in ZilberChay watershed.

Figure 4. Most common treated disease and syndromes with ethnoveterinary species in ZilberChay watershed.

Number of chrotypes among the studied FHVM are compared presented in Fig. 2. These chrotypes included IT (Irano-Toranian) with 49.1 %, Plur (More than 2 chrotypes) with 27.27 %, ES (Euro-Siberian) with 18.18 %M (Mediterranean) with 5.45 %. According to the table, the most common chrotype among the ZilberChay watershed FHVM are belong to Irano-Toranian chrotype.

Comparison of different life forms (i.e. He= Hemicryptophytes with 55%; Ph= Phanerophytes with 26.19 %; Th= Therophytes with 14.28 % and Ch= Chamaephytes with 4.76 %) among the studied plant species of ZilberChay watershed are given in Fig. 3. This figure represents that the most common life form among the FHVM of this area is hemicryptophytes.

Additionally, Fig. 4 shows the most common disease and animal health problems which have been treating with identified FHVM species in the study area. According to the results, endoparasites with 24 percent and skin disease with 16 percent are the most common treated disease by identified FHVM species and the less treated disease with medicinal plants are fever and diarrhea. These FHVM species are distributed on 900 to 3200m asl elevation.

Some of the identified ethnoveterinary species from the study area have already been reported in other studies. For example, Lautado and Capasso (2013) in ethnoveterinary study of useful plants in animal therapy showed that latex of *Achille amillefolium* is useful for fever treatment. Kouhpayeh et al. (2011) in the study of ethnoveterinary plants in Kerman province of Iran have reported that therapeutic potential of *Achille awilhelmii* can cure wounds. Chalechale et al. (2013) found that *Amygdalus lycioides* which is growing in Kurdistan province of Iran can be mixed and grounded with the bark of brinjl (egg-plant) in vinegar and used as paste during 10 days to treat ulcerative lesions of leishmaniasis. Khan (2009) has reported that decoction of leaves and thorns of *Cichorium intybus* is used in impaction in cattle, sheep, goats and camels. Pande et al. (2007) and Ul Islam et al. (2012) have demonstrated the application of *Cynodon dactylon* to treat mastitis, gastric troubles, internal injury, food poisoning, wounds and as tonic, antiseptic and analgesic. Kouhpayeh et al. (2011) have also found that the leaves of *Gundelia tournefortii* is using against scabies in sheep and goat by local people of Kerman province in Iran. Laudat and Capasso (2013) and Lans et al. (2007) respectively reported *Morus alba* and *Salix alba* as ethnoveterinary plants in mastitis. Some of herbal plants are being used by local people for curing indigestion like *Punica granatum* and *Triticum aestivum* in the study of Pande et al. (2007). Some plants are useful for treating mineral elements deficiencies like *Urtica dioica* for treating zinc deficiencies and *Medicago sativus* in selenium deficiency (Lans et al., 2007).
**Table 1.** List of ethnoveterinary species of ZilberChay watershed in northwest of Iran. IT= Irano-Toranian; M= Mediterranean; Plur= More than 2 chorotypes; ES= Euro-Siberian; Th= Therophytes; He= Hemicryptophytes; Ch= Chamaephytes; Ph= Phanerophytes.

<table>
<thead>
<tr>
<th>No.</th>
<th>Family &amp; Scientific name</th>
<th>Elevation</th>
<th>Chrotype</th>
<th>Life forms</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Amaranthaceae</td>
<td>2000-3000</td>
<td>IT</td>
<td>Th</td>
<td>Emollient</td>
</tr>
<tr>
<td>1.</td>
<td><em>Amaranthus viridis</em> L.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Apiaceae</td>
<td>2000-3200</td>
<td>IT</td>
<td>He</td>
<td>Ectoparasites, Digestive &amp; Gastric troubles, Skin diseases, Fever, Dehydration, Mouth infection</td>
</tr>
<tr>
<td>2</td>
<td><em>Carum carvi</em> L.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Daucus carota L.</td>
<td>900-2000</td>
<td>IT</td>
<td>He</td>
<td>Endoparasites</td>
</tr>
<tr>
<td>4</td>
<td><em>Prangosferulacea</em> (L.) Lindley.</td>
<td>900-2200</td>
<td>IT, M</td>
<td>He</td>
<td>Treatment of thick and louse (Ruminants)</td>
</tr>
<tr>
<td>2.</td>
<td>Asteraceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><em>Achillea millefolium</em> L.</td>
<td>1500-2000</td>
<td>Plur</td>
<td>He</td>
<td>Fever, Mastitis, Wounds, Sternal abscess</td>
</tr>
<tr>
<td>6</td>
<td><em>Achillea wilhelmsii</em> C.Koch</td>
<td>1500-3200</td>
<td>Plur</td>
<td>Ch</td>
<td>Wound relief in cattle, sheep and camel</td>
</tr>
<tr>
<td>7</td>
<td><em>Achillea lappita</em> L.</td>
<td>900-2000</td>
<td>IT, ES</td>
<td>He</td>
<td>Mastitis</td>
</tr>
<tr>
<td>8</td>
<td><em>Cichorium intybus</em> L.</td>
<td>900-2000</td>
<td>Plur</td>
<td>He</td>
<td>Endoparasites</td>
</tr>
<tr>
<td>9</td>
<td><em>Gundelia tournefortii</em> L.</td>
<td>1500-2000</td>
<td>IT,M</td>
<td>He</td>
<td>Scabies in sheep &amp; goat</td>
</tr>
<tr>
<td>10</td>
<td><em>Taraxacum officinale</em> Webber.</td>
<td>1500-2500</td>
<td>IT</td>
<td>He</td>
<td>Gastrointestinal diseases</td>
</tr>
<tr>
<td>3.</td>
<td>Brassicaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td><em>Sisymbrium officinale</em> L.</td>
<td>900-2500</td>
<td>IT</td>
<td>Th</td>
<td>Febrifuge, Expectorant</td>
</tr>
<tr>
<td>4.</td>
<td>Convolvulaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><em>Convolvulus arvensis</em> L.</td>
<td>1000-2000</td>
<td>Plur</td>
<td>He</td>
<td>Purgative</td>
</tr>
<tr>
<td>5.</td>
<td>Cupressaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td><em>Juniperus communis</em> L.</td>
<td>1500-3200</td>
<td>Plur</td>
<td>Ph</td>
<td>Skin diseases, Ectoparasites, Endoparasites, Liver fluke</td>
</tr>
<tr>
<td>14</td>
<td><em>Juniperus excels</em> M. B.</td>
<td>1500-3200</td>
<td>IT</td>
<td>Ph</td>
<td>Topical pain of motion organs in camel</td>
</tr>
<tr>
<td>6.</td>
<td>Elaeagnaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td><em>Hipophaerahamnoides</em> L.</td>
<td>900-1500</td>
<td>IT</td>
<td>Ph</td>
<td>Gastrointestinal endoparasites</td>
</tr>
<tr>
<td>7.</td>
<td>Fabaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td><em>Alhagi camelorum</em> Fisch.</td>
<td>900-2500</td>
<td>IT</td>
<td>He</td>
<td>Impaction in cattle, sheep, goats and camels</td>
</tr>
<tr>
<td>17</td>
<td><em>Glycyrrhiza glabra</em> L.</td>
<td>900-2000</td>
<td>IT, ES</td>
<td>He</td>
<td>Reducing pain and swell in strains bruise, Stomach swell in horse</td>
</tr>
<tr>
<td>18</td>
<td><em>Lotus corniculatus</em> L.</td>
<td>900-2000</td>
<td>M, IT</td>
<td>Th</td>
<td>Endoparasites</td>
</tr>
<tr>
<td>19</td>
<td><em>Medicago sativa</em> L.</td>
<td>900-2000</td>
<td>Plur</td>
<td>He</td>
<td>Growth and enhancing camel and weak &amp; young sheep, Selenium deficiency, Nutrition after calving</td>
</tr>
<tr>
<td>20</td>
<td><em>Melilotus officinalis</em> (L.) Desr.</td>
<td>900-2000</td>
<td>Plur</td>
<td>He</td>
<td>Increase the milk production in ruminants</td>
</tr>
<tr>
<td>21</td>
<td><em>Trifolium repens</em> L.</td>
<td>1200-2300</td>
<td>ES, IT</td>
<td>He</td>
<td>Nervous disease</td>
</tr>
<tr>
<td>8.</td>
<td>Hypericaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td><em>Hypericum perforatum</em> L.</td>
<td>1500-3200</td>
<td>Plur</td>
<td>Ch</td>
<td>Wounds, Proud flesh</td>
</tr>
<tr>
<td>9.</td>
<td>Juglandaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td><em>Juglance regia</em> L.</td>
<td>900-2000</td>
<td>ES, IT</td>
<td>Ph</td>
<td>Rape leaf and fruit for worm excretion</td>
</tr>
<tr>
<td>10.</td>
<td>Lamiaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td><em>Menta longifolia</em> L.</td>
<td>1500-2500</td>
<td>Plur</td>
<td>He</td>
<td>As (stomachic) and (febrifuge) Commonly</td>
</tr>
<tr>
<td>11.</td>
<td>Lincée</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td><em>Prunella vulgaris</em> L.</td>
<td>900-2000</td>
<td>Plur</td>
<td>He</td>
<td>Wounds</td>
</tr>
<tr>
<td>12.</td>
<td>Malvaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
27 Malva neglecta Wallr. 900-1500 IT, ES  He  Digestive problem, For food poisoning, As fodder, But excess amount cause loose motion

13. Moraceae

28 Morus alba L. 900-1500 ES, IT  Ph  Leaves are used as fodder. In excess amount cause loose motion. It is also laxative and tonic, mastitis

29 Morus nigra L. 900-1500 IT  Ph  The leaves are used as fodder for sheep, goats and cows. These are also tonic and laxative

14. Plantaginaceae

Plantago major L. 900-2000 IT  He  Hits or Inflammations

15. Poaceae

31 Cynodon dactylon (L.) Pers. 900-2500 Plur  He  As fodder for veterinaries. As tonic, antiseptic and analgesic, wounds for blood clouting, relieving pain mastitis, gastric troubles, internal injury, sprains, bone fracture, food poisoning, sunstroke, broken horn, clotting of blood

32 Hordeum vulgar L. 900-2000 IT  Th  Anemia, Post calving care, Itching, Haematuria, Strength, Density, Skin disease, Heat stroke, Cough, Regulate fertility, Lactation

33 Triticum aestivum Lamk. 900-1200 IT  Th  Bloat in goats, Skin infection, Stomachache, Indigestion, Anemia, Throat infection, Ricket, Remove serility, scabies, Tympay, Gas problem of goat

16. Punicaceae

Punica granatum L. 1200-2200 IT, ES  Ph  Diarrhea, fever, Dehydration, Indigestion, Gastric troubles, Tonic, Internal parasite, Burn, Paralysis, Flatulence, Tympay

17. Rhamnaceae

Rhamnus virgata Roxb. 2000-3000 IT  Ph  Swelling

18. Rosaceae

36 Amygdalus lycioides Spach. 1500-2500 IT  Ph  Ulcerative lesions of leishmaniasis

37 Rosa canina L. 900-2500 IT, ES  Ph  Inflammation

38 Sanguisorba minor Scop. 1500-3200 IT, ES  He  Joint troubles in camel

19. Salicaceae

Salix alba L. 900-1500 ES, IT  Ph  Eye disease, Diarrhea, Scours, Mastitis, Pain, Unknown illness

20. Solanaceae

Datura stramonium L. 900-1500 Plur  Th  Burns, Infected wounds, Parasite in cattle & sheep

21. Ulmaceae

Urtica dioica L. 900-3200 Plur  He  Endoparasites, Diarrhea, Pre-show protection, Zinc deficiency

22. Zygophyllaceae

Peganum harmala L. 900-1700 Plur  He  Snake bite(in all species)
Some of the identified ethnoveterinary plants are good against parasites. Species such as Carum carvi and Juniperus communis for Ectoparasites, Cichorium intybus, Daucus carota, Punica granatum and Urticadioica in treating endoparasites and Hippophae rhamnoides using for gastrointestinal endoparasites (Lans et al., 2007; Kouhpayeh et al., 2011; Chalechale et al., 2013; Lautado and Capasso, 2013). Moreover, in different studies some of the ethnoveterinary plants are reported for applying in specific disease, syndromes or problems. Plants such as Peganum harmala for snake bite (Bahmani et al., 2012); Trifolium repens for nervous disease (Pande et al., 2012); Salix alba for eye disease (Martínez and Luján, 2011); Gundelia tournefortii for scabies in sheep and goat (Kouhpayeh et al., 2011); Juniperus communis for skin diseases (Lautado and Capasso, 2013).

4. Conclusion

Forty two ethnoveterinary plant species with their medical effects were identified in ZilberChay watershed as the results of this study. Traditional knowledge of medical plants varies according to the culture and faith of different tribes all around the world, but because of the lack of previous studies, most of the ethnoveterinary plants are still unknown. Thus, there is a need to widespread study of ethnoveterinary medical plants and documentation of traditional knowledge of using them in treating domestic animals for conservation of medicinal flora and regional biodiversity that is particularly threatened around the world especially in Iran and east Azerbaijan.

5. References


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