Pak. J. Bot., 46(3): 1137-1144, 2014.

PHYTO-THERAPEUTIC CLAIMS ABOUT EUPHORBEACEOUS PLANTS BELONGING TO PAKISTAN; AN ETHNOMEDICINAL REVIEW

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Abstract

Ethnobotany has attracted many researchers in the modern era in order to find novel and cheaper approaches to alleviate the human sufferings. Since ancient times, plants are used traditionally for cure. In the last few years herbal practices have attained global relevance. Among the different important plant families, the spurge family (Euphorbiaceae) is well known for its therapeutic potential. Different plants are used in folk medicinal practices in different forms to treat several diseases. Plants belonging to Euphorbiaceae are common in Pakistan and used for different purposes. The present communication deals with the different ethnomedicinal uses reported in the peer reviewed articles of the various species present in Pakistan.

Introduction

Over the period of time, different cultures develop their specific customs, rituals and medical practices. Different traditional medical practices (Greeo-Islamic, Chinese, Ayuerdicetc) have been developed in many cultures that pertains to the use of different herbs and their preparations against various diseases. Folk medical practioners (Hakeems or Panjsaars) have deep foundations in Pakistan. "Greeco-Islamic medicines","Yunani Tibb" or "Yunani Dawakhana" are the most commonly used traditional systems in Pakistan (Ahmed *et al*., 2003). Another related system regarding herb administration for diseases and infections is called "Tibb e Nabwi" that represents herbs or natural commodities described by the Holy Prophet (PBUH) to treat various ailments. Plants are rich in such components that can be exploited for beneficial use for example the first anticancer drugs (vincristine and vinblastine) for human were isolated from *Catharanthus roseaus* (Micheal *et al*., 1956). Nearly 80% of the world population is dependant of herbal medicines. Out of the 250,000-500,000 plants estimated in the world; a large proportion of them is unexplored for medicinal potential (Mahesh & Satish, 2008). According to rough estimates there are about 35,000-75,000 medicinal plants that can make a substantial contribution to fulfill the health vacuum (Khalil *et al*., 2013). A major proportion of the world population is dependent on plant based remedies and the worthy information is possessed by the local and tribal population (Shinwari *et al*., 2013; Nadeem *et al*., 2013; Sarwat *et al*., 2012; Gul *et al*., 2012).

Because of variable edaphic, climatic factors and rich biodiversity, Pakistan enjoys a unique position in the developing countries in terms of medicinal plants. The country is blessed with numerous topographical and ecological zones which makes a significant contribution to the rich and fascinating biological diversity (Nisar *et al*., 2011; Hussain *et al*., 2009). Pakistan has about 6000 of flowering plant species out of which 2000 are considered to have therapeutic potential but so far a large proportion of them are not explored for its medicinal values (Shinwari, 1996; Cotton, 1996). Ex-situ and in-situ conservational measures are the need of the hour to prevent further loss of medicinal flora (Shinwari and Gilani, 2003; Shinwari and Qaiser, 2011). The history of the search of medicinal plants is as old as the search of man for obtaining food from plants (Ibrar, 2002). Various forms of herbal preparations are also used in allopathics (Rashid & Arshad, 2002). Over the years, the global market of herbal and aromatic plants has significantly increased and is expected to reach $5 trillion by 2050 (Shinwari, 2010). Plants remain a popular choice for therapies because of little or no side effects and synergy (Gilani & Atta-ur-Rahman, 2005). Due to the changing dynamics of human life style, the indigenous knowledge relevant to using plants as therapeutants has decreased fast (Ismail & Nisar, 2010).

Today, the world faces a dilemma of antibiotic resistant strains (Khalil *et al*., 2014). The major hindrance for herbal therapies is the amalgamation of indigenous knowledge in the modern medical practices because of little or no scientific data available regarding the safety and efficacy of the herbal drugs. It is the need of the hour to document and authenticate the available indigenous knowledge and brought them to modern day scientific principles. The current communication aims to review different ethnomedicinal uses of plants belonging to family Euphorbiaceae in Pakistan (Fig. 1). All the information regarding the species was gathered from Flora of Pakistan (Radcliffe-Smith, 1986).

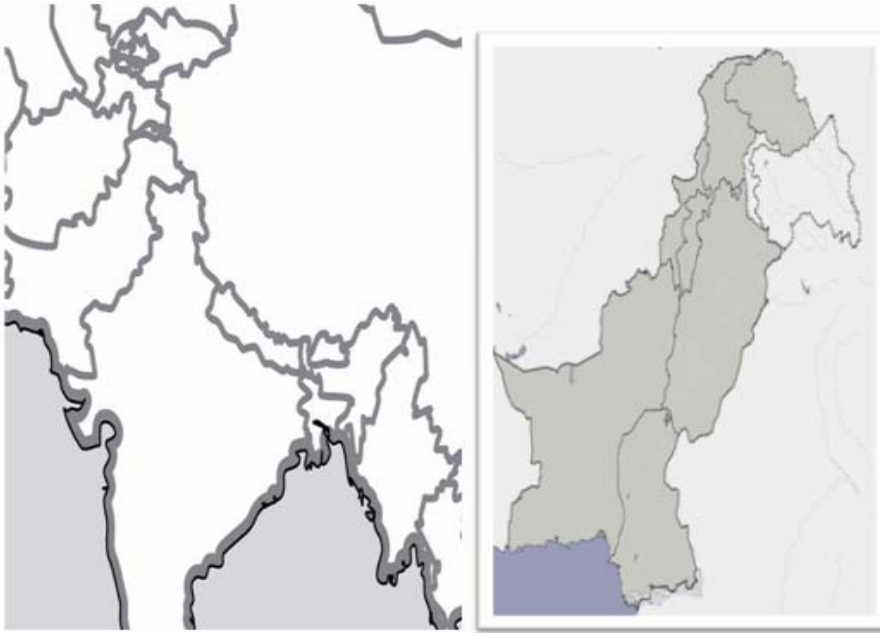
Family Euphorbiaceae

Euphorbiaceae comprises of about 300 genera and about 7950 species out of which 150 are considered medicinally important having cosmopolitan distribution accept for the polar regions (Perveen & Qaiser, 2005; Wiart, 2007). In Pakistan, Euphorbiaceae is distributed in 24 genera in which comprises about 90 species. 11 genera among 24 are non native to Pakistan

(Radcliffe-Smith, 1986). Generally, the medicinal flora of Euphorbiaceae is known for its role in producing more expectoration and anti-inflammatory potential. It is also well known for the promotive role in urination and relives the bowels from costiveness (Wiart, 2007). Euphorbiaceae is also considered as a vast reservoir for cyto-toxic agents and expected to produce antineoplastic compounds in the next thirty years provided if enough work was done (Wiart, 2007). In Pakistan the Euphorbiaceae is presented by *Bridelia, Antidesma, Glochidion, Breynia, Putranjiva, Flueggea, Phyllanthus, Andrachne, Croton, Chrozophora, Aleurites, Vernicia, Codiaeum, Jatropha, Sapium, Excocaria, Manihot, Baliospermum, Ricinus, Dalechampia, Acalypha, Trewia, Mallotus* and *Euphorbia* (Radcliffe-Smith, 1986).

Ethnomedicinal uses

Knowledge about the ethnomedicinal uses was gathered from standard research articles retrieved from Google scholar, Science direct and BioMed central. The ethnomedicinal uses of 65 out of 96 species belonging to Euphorbiaceae with their common names and uses are tabulated in Table 1. The review revealed that Euphorbiaceae is used for medicinal purposes worldwide. Different parts of the plant are used for this purposes summarized in Fig. 2. Mostly we found that plants are used as a whole for treatment i.e., 27.08%. Stem is found to be the least preferred choice (2.08%). A large proportion of the plants were herbs (Fig. 3). All the investigated genera are summarized in Fig. 4.



Pakistan

Location:South Asia

Area: 803940 km^2

Land area: 778720 km^2

Latitudes: 24^{o}N and 37^{o}N

Longitudes: 61^{o}E and 75^{o}E

(http://www.psa-ude.com/pakistan.html)

(http://www.psa-ude.com/pakistan.html)

Fig. 1. Focus area (Maps source Google images).

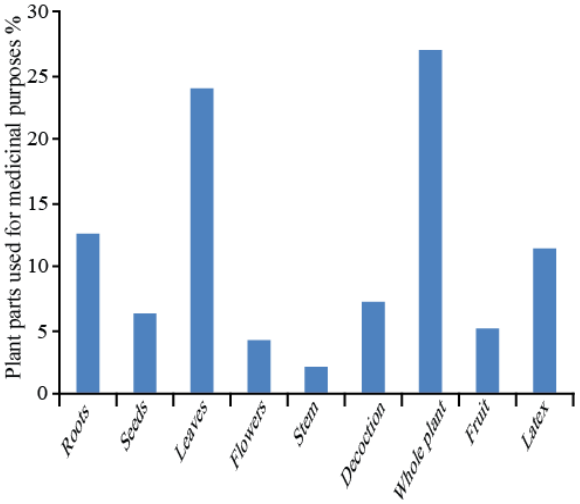


Fig. 2. Different Parts of the plant used for medicinal purposes.

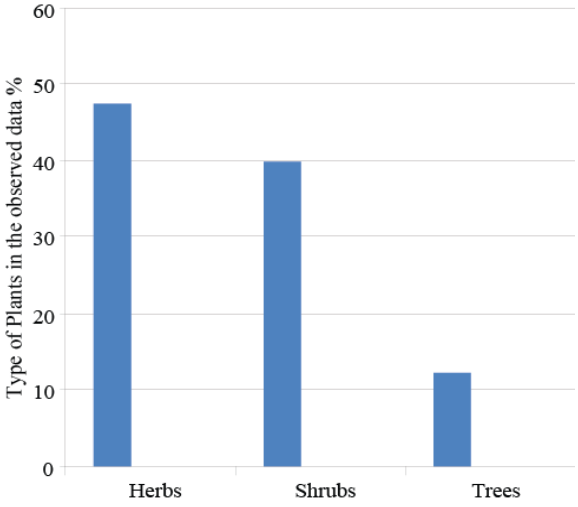


Fig. 3. Euphorbeaceous herbs are mostly used for treatment.

Table 1. Ethnomedicinal claims about 65 species of Euphorbiaceae belonging to Pakistan.

S. No.	Botanical name	Folk name	Habit	Part used									Ethnomedicinal uses	Literature cited
				R	Se	L	F	St	D	W	Fr	La		
1.	*Ricinus communis*	Aarand	Shrub	+	+	+	-	-	-	-	-	-	Liver disorders, Hypoglycemic, Laxative, Contraceptive, warts, cold tumours, Anodyne, digestive, blood purifier, tonic, cough and colds, Antioxidant, Anti-inflammatory, obesity	Kirtikar & Basu, 1991; Dhar *et al*., 1998; Cappaso *et al*., 1994; Kadri *et al*., 2011; Zarai *et al*., 2012, Mahmood *et al*., 2013
2.	*Mallotus Philippensis*	Kamila	Tree	-	-	-	-	+	-	-	-	-	Hydrocele, Stomachache, demulcent, aphrodisiac, Laxative, astringent, Diuretic, laxative, expectorant, purgative, typhoid, meningitis,	Shah & Khan, 2006; Zabihullah *et al*., 2006; Manandhar, 2000
3.	*Sapium sebiferum*	Vilayiti shishtum	Tree	-	-	+	-	-	-	-	-	-	Diuretic, antihelminthic, antidote,	Ferris & Zheng, 1999
4.	*Phyllanthus fraternus*	Tamalaki	Herb	+	-	-	-	-	+	-	-	-	Anemia, Burns, Burning sensations, Cough, chronic pyrexia, Dysmenorrhoea, Diarrhoea, Gonorrhoea, Fever, joint inflammation, Leucorrhoea, Menoschesis, astringent, diuretic	Khan & Khan, 2004; Kumaran *et al*., 2007
5.	*Phyllanthus acidus*	Harpharauri	Shrub	-	-	-	-	-	-	+	-	-	Purgative, Hypertesnsion, Respiratory infections, Hepatoprotective, psoriasis, antidibetic, antinociceptive, cough, asthema, bronchitis, poulticing, soles, cathartic, laxative, uriticaria, sciatica, rheumatism, gonorrhea, skin disorders	Lemmens *et al*., 1999; Sausa *et al*., 2007; Lee *et al*., 2006; Burkill *et al*., 2002; Banik *et al*., 20 I 0; Catapan *et al*., 2000; Caius *et al*., 2003; Prasad D, 1986; Morton *et al*., 1987
6.	*Phyllanthus emblica*	Amla	Tree	-	-	-	-	-	-	+	+	-	Cold, cough, Jaundice, anti-inflammation, antidibetic, hypolipidemic, hepatoprotective, antiulcerative, gastroprotective, antioxidative, erectile dysfunction, loss of hair, irritation in urination	Mirunalini & Krishnaveni, 2010; Rahmathullah *et al*., 2009; Hassan *et al*., 2010
7.	*Phyllanthus reticulates*	Patt pairoon	Shrub	-	-	+	-	-	-	-	-	-	Swelling of limbs, Chicken pox, Small pox, syphilis, asthma, diarrhoea, bleeding of gums	Hassan *et al*., 2010; Kumar *et al*., 2008
8.	*Phyllanthus rotundifloius*		Herb	-	-	-	-	-	-	+	-	-	Hepatoprotective	Sharma *et al*., 2011
9.	*Phyllanthus amarus*	Jangli amla	Herb	-	-	-	-	-	-	+	-	-	Anemia, diarrhoea, astringent, conjunctivitis, cough, deobstruent, dropsy, diabetes, asthma, diuretic, dysentery, fevers, eye disorders, galactagogue, bronchitis, hepatitis, genitourinary disorders, gonorrhea, jaundice, leucorrhea, mammay abcesses, antiseptic ete	Patel *et al*., 2011; Kumaran *et al*., 2007
10.	*Phyllanthus urinaria*	Bhumi amla	Herb	-	-	-	-	-	-	+	-	-	Diuretic, hepatitis, diabetes, abdominal pain, and kidney disease, antioxidant, cardioprotective	Kumaran *et al*., 2007; Chularojmontri *et al*., 2005
11.	*Phyllanthus virigatus*		Herb	-	-	+	-	-	-	+	-	-	Jaundice, Stomachache, antiseptic, antiinflammatory	Ayyanar & Ignachimuto, 2005; Kumar & Chatuyedi, 2010
12.	*Phyllanthus maderaspatensis*		Herb	-	-	+	-	-	-	+	-	-	Jaundice, antidiabetic, wounds healing and burns	Kumar & Chatuyedi, 2010
13.	*Phyllanthus parvifolious*		Shrub	-	+	-	-	-	-	-	-	-	Pregnancies and Deliveries	Shreshta & Joshi, 1993
14.	*Chrozophora tinctoria*	Neeli booti	Herb	+	-	+	-	-	-	-	-	-	Chest burning and stomachic, warts, emetic, cathartic, fever and cough	Qureshi *et al*., 2011; Dastagir *et al*., 2012
15.	*Chrozophora pilcata*		Herb	+	-	+	-	-	-	-	-	-	Asthma, depurative, purgative, Leprosy	Patil *et al*., 2008; Mossa *et al*., 1987

Table 1. (Cont'd.).

S. No.	Botanical name	Folk name	Habit	Part used									Ethnomedicinal uses	Literature cited
				R	Se	L	F	St	D	W	Fr	La		
16.	*Chrozophora oblongifolia*		Shrub	-	-	-	-	-	-	+	-	-	antimicrobial, emetic, cathertic, hypoglycemic properties	Batanouny, 1999
17.	*Euphorbia caducifolia*	Kheer wall	Shrub	-	-	+	-	-	+	-	-	+	Abortifacient, eye infection, antidote for rabies	Jain *et al.*, 2004; Qasim *et al.*, 2010; Sanctuary, 2010
18..	*Euphorbia neriifolia*		Shrub	-	-	-	-	-	-	+	-	+	Abortive, anti-inflammatory, asthma, bronchitis, purgative, diuretic and expectorant, piles, skin infections, gastric problems	Jain *et al.*, 2004; Jain *et al.*, 2006; Singh *et al.*, 2010
19.	*Euphorbia hirta*	Dhuudhli	Herb	-	-	-	-	-	-	+	-	+	antiasthmatic, febrifuge, narcotic, bronchitis, colic, dysentery, worms, coughing, asthma, swellings, boils, antineoplastic	Yusuf *et al.*, 1994; Kumar & Bhagat, 2012; Mahmood *et al.*, 2013
20.	*Euphorbia peplus*	Duudh booti	Herb	-	-	-	-	-	-	+	-	+	Diuretic, expectorant, laxative, warts, skin problems	Al-Bakri & Afifi, 2007; Benítez *et al.*, 2010; Kumar & Bhagat, 2012
21.	*Euphorbia heliscopia*	Chathri Dhoodak	Herb	-	-	-	-	-	-	+	-	+	Antiseptic, Skin infections, Anthelmintic, cathartic, rheumatism, neuralgia, eruptions, cholera	Ch *et al.*, 2013; Mossa *et al.*, 1987;
22.	*Euphorbia royleana*	Daanda thor	Shrub	-	-	-	-	-	-	-	-	+	Antileukemia, antihelmenthic and cathartic	Kumar & Bhagat, 2012
23.	*Euphorbia pulcherrima*	Lal Patha	Shrub	-	-	+	-	-	-	-	-	-	Cut injuries, antitumour,	Uddin *et al.*, 2012; Whelan & Ryan, 2003
24.	*Euphorbia milii*		Shrub	-	-	-	-	-	-	+	-	-	Hepatitis, abdominal edema	Schall *et al.*, 1992;
25.	*Euphorbia wallichii*	Shangla	Herb	+	-	-	-	-	+	-	-	-	skin disease, edema, exanthema, ,cutaneous anthrax, laxative	Ul-Haq *et al.*, 2012
26.	*Euphorbia prostrata*	Prewatka	Herb	-	-	-	-	-	-	+	-	-	Leucorrhoea	Venkata & Venkata, 2005
27.	*Euphorbia indica*	Choti dhudli	Herb	+	-	+	-	-	-	-	-	-	Diarrhea, dysentery, leucorrhoea, skin diseases	Singh *et al.*, 2010
28.	*Euphorbia serpens*		Herb	-	-	-	-	-	-	+	-	-	Eye and skin diseases, diuretic, diarrhoea, tumour, laxative, diuretic, kidney & gall-stones	Ruffa *et al.*, 2004
29.	*Euphorbia granulata*		Herb	-	-	-	-	-	-	+	-	+	anthelmintic, diuretic, purgative. Milky latex is used as purgative	M. Al-Shanwani, 1996
30.	*Euphorbia dracunculoides*		Herb	-	-	-	-	-	-	-	+	-	Warts, Skin diseases	Mossa *et al.*, 1987
31.	*Euphorbia nivula*		Tree	-	-	-	-	-	-	-	-	+	Cuts, pain in joints, antidote for bites	Jain, 1991
32.	*Euphorbia tirucalli*		Shrub	-	-	-	-	-	-	-	-	+	Diseases of skin, Warts, fish poison	Kumar & Chaturvedi, 2010
33.	*Euphorbia thymifolia*		Herb	-	+	+	-	-	-	+	-	-	Pain of joints, anti-inflammatory, dislocation, antidote, astringent, ring worms, laxative	Kumar & Chaturvedi, 2010
34.	*Euphorbia prolifera*		Herb	-	-	-	-	-	-	-	+	-	Dog bites	Kumari *et al.*, 2009
35.	*Euphorbia hypericifolia*		Herb	-	-	+	-	-	-	+	-	-	colic, diarrhea, dysentery, astringent, antidysentric, antileucorrhoeic, menorrhagia	Kumar & Intekhab, 2013
36.	*Euphorbia clarkeana*		Herb	-	-	-	-	-	-	+	-	-	Spermatorrhoea, mouth blister	Adsul *et al.*, 2013
37.	*Euphorbia cyathophora*		Herb	-	-	-	-	-	-	+	-	-	Galactagogue	Adsul *et al.*, 2013
38.	*Euphorbia falcata*		Herb	-	-	-	-	-	-	-	-	+	Eczema, fungal infections	Altundag & Ozturk, 2011

Table 1. (Cont'd.).

S. No.	Botanical name	Folk name	Habit	Part used									Ethnomedicinal uses	Literature cited
				R	Se	L	F	St	D	W	Fr	La		
39.	*Jatropha curcas*		Shrub	-	-	-	-	-	-	-	-	+	Boils and Pimples	Adsul *et al*., 2013
40.	*Jatropha gossypifolia*		Shrub	+	+	-	-	-	+	-	-	-	Rheumatism, abdominal inflammation, purgative and emetic, gum disease, tooth-ache	Adsul *et al*., 2013
41.	*Jatropha integerrima*		Shrub	-	-	+	-	-	-	-	-	-	Purgative	Sabandar *et al*., 2013
42.	*Putranjiva roxburghii*		Tree	-	-	+	-	-	-	-	-	-	Fevers caused by viruses	Kumar & Chaturvedi, 2010
43.	*Acalypha indica*		Herb	-	-	+	+	-	-	-	-	-	Skin infections and wounds, anodyne, bronchitis, cathartic, diuretic, emetic, expectorant, hypnotic and purgative	Ayyanar & Ignacimuthu, 2009
44.	*Acalypha ciliata*		Herb	-	-	-	-	-	+	-	-	-	Bronchitis, pneumonia, asthma, skin disease	Jain *et al*., 2009
45.	*Acalypha hispida*		Shrub	-	-	-	+	-	-	-	-	-	Diarrhea, laxative	Mishra, 2008
46.	*Acalypha brachystachya*		Herb	-	-	-	-	-	-	+	-	-	Skin diseases and eczema	Lai *et al*., 2004
47.	*Acalypha wilkesiana*		Shrub	-	-	+	-	-	-	-	-	-	Hyper tension, diabetes	Ikewuchi *et al*., 2011
48.	*Baliospermum montanum*		Herb	+	+	-	-	-	+	-	-	-	Asthma, bleeding cut , haemorrhage, prevents suppuration, jaundice, leucoderma, pains, wound, anaemia, piles, itching,	Mali & Wadekar, 2008
49.	*Excocaria cochinchinensis*		Shrub	-	-	+	-	-	-	-	-	-	Wounds	Lai *et al*., 2004
50.	*Trewia nudiflora*		Tree	-	-	-	-	-	-	-	+	-	Sores	Molik *et al*., 2010
51.	*Bridelia retusa*		Shrub	-	-	+	-	-	-	-	-	-	Wounds, Hypertensive	Ayyanar & Ignacimuthu, 2005
52.	*Bridelia verrucosa*		Shrub	+	-	-	-	-	-	+	-	-	Anthelmintic, astringent	Anjum *et al*., 2011
53.	*Antidesma acidum*		Shrub	-	-	+	-	-	-	-	-	-	Wound healing	Kala, 2005
54.	*Glochidion velutinum*		Tree	-	-	-	-	+	-	-	-	-	Dislocated bones	Manadhar, 1998
55.	*Berynia vitis-idaea*		Shrub	+	-	+	-	-	-	-	-	-	Mouth wash, tonsils	Jothi *et al*., 2008
56.	*Berynia cernua*		Shrub	-	-	-	-	-	-	+	-	-	Boils, swollen legs, dysentry	Khan & Omoloso, 2008
57.	*Fluggea virosa*		shrub	+	-	-	-	-	-	-	-	-	Epilepsy and convulsions, Contraceptive Pneumonia, antidote	Pedersen *et al*., 2009; Maroyi, 2011
58.	*Fluggea leucopyrus*		Shrub	-	-	+	-	-	-	-	-	-	Promote healing, Myiasis treatment, bleeding, antidote, vermifuge, urinary diseases, stomach ache	Muthu *et al*., 2014
59.	*Andrachne cordifolia*		Shrub	-	-	+	+	-	-	-	-	-	Vermifuge	Hamayun *et al*., 2007
60.	*Andrachne telephioides*		Herb	-	-	+	-	-	+	-	-	-	Acne	Tetik *et al*., 2013
61.	*Andrachne aspera*	Rumtotia	Herb	+	-	-	-	-	-	-	-	-	Eye problems	Ahmed *et al*., 2007
62.	*Croton bonolandianus*		Herb	-	-	-	-	-	-	+	-	-	Astringent	Molik *et al*., 2010
63.	*Aleurites moluccana*		Tree	-	-	+	-	-	-	-	+	-	Fever, gonorrhea, inflammation, head ache,	Pedrosa *et al*., 2002
64.	*Codiiaeum variegatum*		Shrub	-	-	-	-	-	-	+	-	-	Head stroke	Molik *et al*., 2010
65.	*Manihot esculenta*		Herb	-	-	-	-	-	-	+	-	-	Diabetes	Aiyeloja & Bello, 2006

Legend: R (Roots), Se (Seeds), L (Leaves), F (Flower), St (Stem). D (Decoction), W (Whole plant), Fr (Fruit), L (Latex)

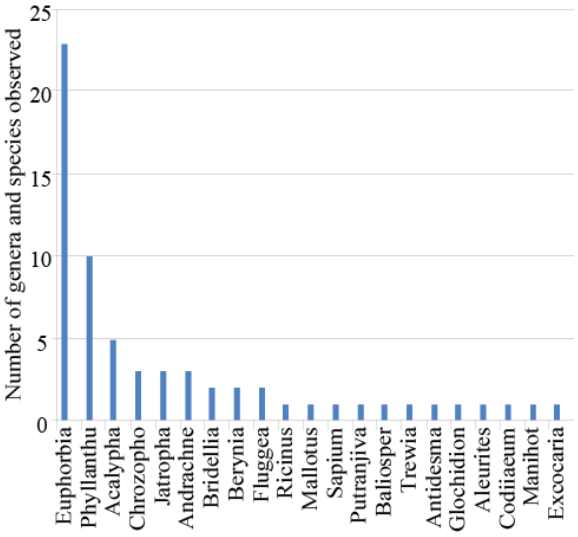


Fig. 4. Overall genera observed in the current study.

Conclusion

People belonging to the ancient civilization possessed great knowledge about the numerous uses of different plants. They used plants for fodder, shelter, fuel and as a source of curing ailments (96). In the past, mostly the ethnobotanical research was confined to expert botanists, rarely anthropologists and physicians but the trend has changed a lot because of the potential of Ethnobotany to alleviate poverty levels by introducing cheaper therapeutants (97).

Conservational strategies should be undertaken regarding the Euphorbiaceae family in Pakistan. As listed in the Table 1, many of the species belonging to the family are medicinally important and can be a subject of research for the scientists.

Ethnomedicinal uses of the family Euphorbiaceae are reported from across the world but only few reports are available from Pakistan. It is important to document the indigenous knowledge relevant to Euphorbiaceae from Pakistan.

Acknowledgment

The authors are very thankful to his lab fellows batch fellows, Mr. Imran Khan and Mr. Shahab Saqib for their kind and selfless support and valuable suggestions.

Competing interests

The authors declare that they have no competing interests.

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(Received for publication 12 August 2013)