

DOCUMENTATION OF ENDEMIC PLANT SPECIES OF BALOCHISTAN
AND PHYTOCHEMICAL SCREENING OF *SERIPHIDIUM QUETTENSE*
(PODLECH) LING

Fozia Aman¹, Tahira Bibi², Shazia Irfan³, Nelofer Jamil⁴, Hina Ali Ahmed⁵, Shaista Ajum⁶,
Farah Naz Channa⁷

^{1,2,3}Department of Botany, Sardar Bahadur Khan Women's University, Quetta

⁴Department of Environmental Sciences, Sardar Bahadur Khan Women's University, Quetta

⁵Department of Zoology, Sardar Bahadur Khan Women's University, Quetta, Pakistan

⁶Department of Botany, University of Balochistan, Quetta

⁷Department of Biotechnology, Sardar Bahadur Khan Women's University Quetta

¹kakar_rules@yahoo.com, ²tahira_botany@yahoo.com, ³irfanshazia16@gmail.com,

⁴nelofer.sbkwu@gmail.com, ⁵hina29_zoo@yahoo.com, ⁶shaista.alizai@yahoo.com, ⁷farah.naz@sbkwu.edu.pk

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Corresponding Author: *

Tahira Bibi

Abstract

Seriphidium quettense (Podlech) Ling, Bull. belongs to the family Asteraceae and is endemic to Quetta, Balochistan, In the present the endemic flowering plants of Pakistan was enlisted with a special focus on the endemic species of Balochistan. *Seriphidium quettense*, an endemic medicinal plant of Quetta, Balochistan, was qualitatively evaluated for its secondary metabolites like alkaloids, steroids, terpenoids, flavonoids, tanins, saponins, phlobatanins and cardiac glycosides. A total of 170 flowering plant species were found to be endemic to Pakistan which belonged to 95 genera and 29 families. The search revealed that there are at least 21 endemic flowering plants in Balochistan belonging to 16 genera and 12 families. The phytochemical screening of *S. quettense* proved that alkaloids, terpenoids, flavonoids, tanins, saponins, phlobatanins and cardiac glycosides were present in the aerial parts of the plant while steroids were absent. The re-documentation of the endemic flora and their threatened status according to ICUN rules is suggested for the province of Balochistan. Biological activities and detailed phytochemical screening of the endemic plants of Balochistan is also suggested in order to discover new and novel drugs.

INTRODUCTION

Being restricted to a particular region, the endemic plants always face the danger of extinction thus need special attention for conservation (Behera et al., 2005). Forest fires, urbanization, industrialization, over grazing, desalinization and unconscious exploitation of natural resources are considered as the main factors involved in the

extinctions of threatened species. For the conservation of endangered species survey of endemic plants is of utmost importance because most of these are endangered species.

99% of endemic plants of Turkey were declared as threatened (Bulut & Yilma, 2010). Similarly, all the endemic plants of north east Turkey were endangered to variable degree (Altan, 2001).

Borokni et. al., (2010) also tried divert the attention of conservation scientist towards the endangered species of Nigeria.

Dhar & Samant (1993) also reported that most of the endemic plants of Himalayas deserved special attention for conservation due to their endangered status. A large number of endemic species of India were under the threat (Irwin & Narasimhan, 2011).

Endemic species of Pakistan are facing threats of extinction due to unlawful anthropogenic activities. Moreover recent disasters like earthquake 2005 and sever unprecedented floods in 2008-2010 and particularly apparently endless war against terrorism and extremism have resulted in loss of natural habitats for the whole flora of the country in general and endemic species in particular.

In Pakistan 80% of endemic plants are restricted to northern and western areas, specially affected by the so called war on terror. In situations like persisting in Pakistan, the greater loss is faced by endemic species as they are restricted to an area of usually small size. It is therefore very crucial to conserve the threatened species specially the endemic plants of the country.

Unfortunately very little work has been done on the status of endangered species of Balochistan. Balochistan is the largest province of Pakistan by area. So enlisting the endemic species of Balochistan will be of great importance in respect of conservation of endemic species.

Determination of active compounds of medicinal plants is very important in phytochemical research and with respect to their potential pharmaceuticals (Pascual et al., 2002). The qualitative determination of secondary metabolites like alkaloids, saponins, steroids terpenoids, phlobatannins, flavonoids, tannins and cardiac glycosides etc. is very essential for the identification of active principals in the medicinal plants.

Seriphidium quettense (Podlech) Ling, Bull. Vern. Sperah Tarkha (Pashto), [syn; *Artemisia quettensis* (Podlech)] belongs to the family Asteraceae and is endemic to Quetta, Balochistan, found in Spin Karez and Urak areas in the North East of Quetta city. It is used as traditional medicine for stomach-ache (Ghafoor, 2002) and vomiting and fever (Durrani et al., 2003).



Seriphidium quettense (Podlech) Ling

MATERIAL AND METHODS

A comprehensive review of the relevant literature and herbaria was conducted. Some areas of Quetta and Ziarat were visited for observation and overview of plant diversity.

Plant collection and identification

The collected plants were identified with the help of flora of Pakistan. *Seriphidium quettense* was collected from Urak near Quetta city for phytochemical screening. The plant sample was shade dried and ground to powder.

Phytochemical Screening

1. **ALKALOIDS:** A small quantity of plant sample was treated with few drops of Mayer's reagent. A reddish brown or orange precipitate indicated the presence of alkaloids.

2. **SAPONINS:** 2g sample was boiled in 20 ml H₂O. Three drops of olive oil was added to the

filtrate and shook vigorously, then observed for the formation of emulsion.

3. **STEROIDS:** One ml of concentrated H₂SO₄ was added to one ml of the plant extract. Red colour indicated the presence of steroids.

4. **TERPENOIDS:** Five ml of the plant extract was mixed in 2 ml of chloroform, and 3 ml of concentrated H₂SO₄ was added carefully. A reddish brown colouration indicated presence of terpenoids.

5. **PHLOBAPHENES:** The aqueous extract of the plant was boiled with 1% aqueous hydrochloric acid was taken as evidence for the presence of phlobaphenes.

6. **FLAVONOIDS:** A small quantity of plant sample was heated with 10 ml of ethyl acetate for 3 minutes. 4 ml of the filtrate was shaken with 1 ml of dilute ammonia solution. Yellow colouration indicates a positive test for flavonoids.

7. **CARDIAC GLYCOSIDES:** Five ml of the plant extract was treated with 2 ml of glacial acetic acid containing one drop of ferric chloride solution. Then added 1 ml of concentrated sulphuric acid. A brown ring of the interface indicates the presence of cardiac glycosides.

8. **TANINS:** About 0.5% of the powdered sample was boiled in 20 ml of water and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or blue black colouration.

RESULTS

List of endemic plants of Balochistan and their respective families are given in table 1 & fig. 1.

Twelve plant families have 22 endemic representatives in Balochistan. The families with endemic representatives are Asteraceae (2 species), Boraginaceae (2 species), Brassicaceae (1 species), Convolvulaceae (2 species), Juncaceae (1 species), Pandanaceae (1 species), Papilionaceae (6 species), Poaceae (1 specie), Umbelliferae (1 species), Vitaceae (2 species), Violaceae (1 species) and Zygophyllaceae (2 species).

The phytochemical screening revealed that alkaloids, terpenoids, flavonoids, tanins, saponins, phlobatanins and cardiac glycosides were present in the test sample while steroids were absent (Table 2)

Table 1. Endemic plants of Balochistan.

S. No	SPECIES	FAMILY	Distribution
1.	<i>Allium baluchistanicum</i> Wendelbo	Alliaceae	Balochistan, Zarghon, camble
2.	<i>Ampelopsis vitifolia</i> sub sp. <i>vitifolia</i> Planch.	Vitaceae	Quetta, Balochistan
3.	<i>Astragalus afghanus</i> Boiss.	Papilionaceae	Chitral, Balochistan
4.	<i>Astragalus brahuicus</i> Boiss.	Papilionaceae	Balochistan
5.	<i>Astragalus khalifatensis</i> Ali	Papilionaceae	Balochistan
6.	<i>Astragalus nicharensis</i> Bunge	Papilionaceae	Balochistan
7.	<i>Berchemia pakistanica</i> Browicz	Juncaceae	Pakistan, Ziarat & North Waziristan

8.	<i>Blepharis sindica</i> Stocks	Pandanaceae	Southern Pak (Sind & Balochistan)
9.	<i>Caragana brachyantha</i> Rech. f.	Papilionaceae	Balochistan
10.	<i>Caragana ulicina</i> Stocks	Papilionaceae	Balochistan& N.W.F.P
11.	<i>Colutea armata</i> Hemsley & Lace	Papilionaceae	Balochistan
12.	<i>Convolvulus cephalopodus</i> Boiss	Convolvulaceae	Iran & S.W Balochistan
13.	<i>Danthoniopsis stocksii</i> (Boiss.) C.E. Hubbard	Poaceae	Sind & Baluchistan
14.	<i>Heliotropium ulophyllum</i> Rech. F.	Boraginaceae	Balochistan
15.	<i>Heliotropium baluchistanicum</i> Kazmi	Boraginaceae	Balochistan
16.	<i>Lycium makranicum</i> Schoenbeck-Temesy	Violaceae	Balochistan
17.	<i>Pimpinella llaranunculifolia</i> Boiss.	Umbelliferae	This rare endemic species has not been re-collected in Balochistan.
18.	<i>Seriphidium quettense</i> (Podlech) Ling	Asteraceae	Balochistan
19.	<i>Tetracme stocksii</i> Boiss.	Brassicaceae	Pakistan&balochistan
20.	<i>Vincetoxicum stocksii</i> Ali & Khatoon	Vitaceae	Balochistan

21.	<i>Xylanthemum macropodum</i> (Hemsl. & Lace) K. Bremer & Humphr	Asteraceae	Balochistan
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Fig. 1. Graph showing endemic flora of Balochistan

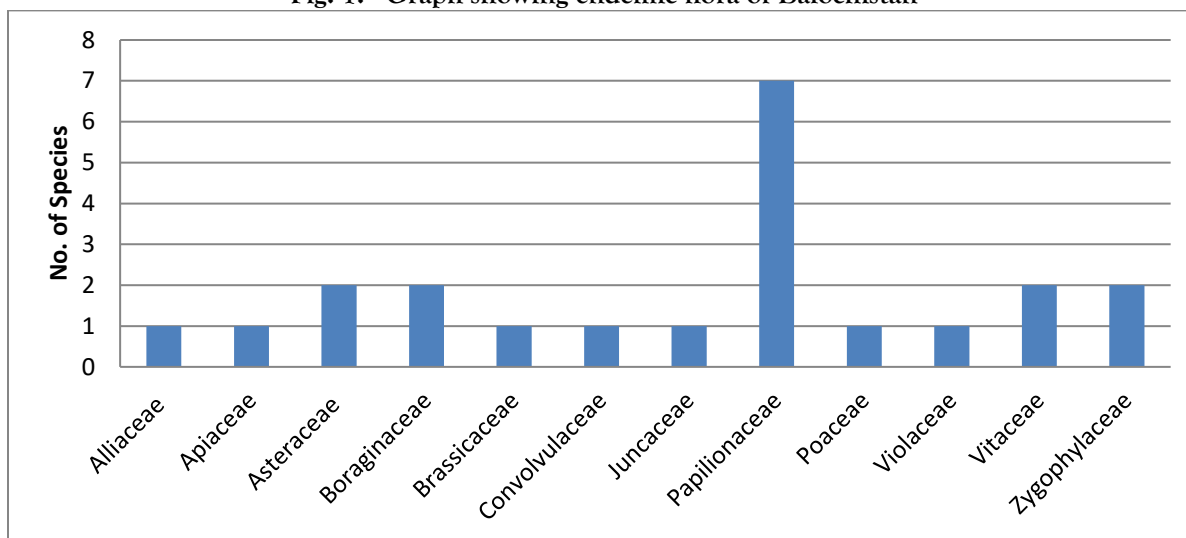


Table 2. Qualitative determination of secondary metabolites in *Seriphidium quettense*

S. No.	Name of Metabolite	Status Presence (+), Absence (-)
1.	Alkaloids	+
2.	Saponins	+
3.	Steroids	-
4.	Terpenoids	+
5.	Phlobatannins	+
6.	Flavonoids	+
7.	Tannins	+
8.	Cardiac glycosides	+

DISCUSSION

The flora of Pakistan is especially well-off due to the country different climatic, and soil situations and several ecological areas. Pakistan has about 6000 species of flowering plants which are represented by Pteridophytes (23), Gymnosperms (40), Monocots (576), Dicots (128) and Grasses (4492) (Nasir & Ali 1971-1991).

Out of 170 species 22 are endemic to Balochistan. In Pakistan almost 80% of the endemic plants are restricted to the mountains of western and

northern areas, affected by war on terror (Shanwari & Shinwari 2010).

Balochistan is the largest province of Pakistan by area. It contributes about 43% of the land of Pakistan. This vast area is divided into different ecological zones and is therefore rich in biodiversity. In the present study, the search of flora revealed that there are 22 endemic flowering plants in Balochistan belonging to 12 families viz; Asteraceae (02), Boraginaceae (02), Brassicaceae (01), Convolvulaceae (01), Juncaceae (01), Acanthaceae (01), Papilionaceae (07), Poaceae (01)

Apiaceae (01), Violaceae (01), Vitaceae (02) and Zygophyllaceae (02).

Endemic plants always remain under pressure and face the threat of extinction because these plants usually inhabit isolated geographical areas and therefore any change in environment like drought, higher fluctuation in temperature than usual, overgrazing, deforestation, urbanization and/or industrialization can cause serious damage and threat to their survival. Threats are posed to the endemic species due to their narrow habitat, lower viability, lower number of seed per fruit and lower dispersal rate (Chithra & Nair, 1999; Abeli, 2010). All the endemic plants, especially narrow endemics, are more vulnerable and are prone to extinction due to the anthropogenic interferences (Rossi et al., 2009; Abeli, 2010). IUCN, 2004 reported that 170 out of 200 endemic plants of Nigeria were facing the threat of extinction. Dhar & Samant (1993) have also warned about the threats faced by the endemic plant and stressed upon the conservative measures of these plants. Shinwari & Shinwari (2010) have expressed concern on the decline in the number native flora and fauna in Pakistan. Irwin & Narasimhan, (2011) have focused on the need of threat assessment posed to the endemic plants. It is clear from the above discussion that the endemic species are always under threat therefore needed to be conserved. Unfortunately, the flora of Balochistan has not been thoroughly assessed for its endemism. First, it needs to be documented and its endemic status be determined. Secondly, the threatened status of endemic plants of Balochistan needs to be assessed.

Bioactive compounds of plants (secondary metabolites) provide protection to plant, animals and human beings. Medicinal plants are rich in therapeutic agents (Chopra et al., 1992) which can be used as drugs and utilized in the synthesis of modern drugs (Akinmoladun et al., 2007). In the present study all the tested metabolites such as like alkaloids, saponins, terpenoids, phlobatannins, flavonoids, tannins and cardiac glycosides were found to be present in the aerial parts of *Seriphidium quettense* except steroids. This indicates that *S. quettense* has potential quality to

be used as drug and valuable modern drug(s) can be synthesized from the active metabolites of this plant. However, the quantitative evaluation of the active compounds and different biological activities will be useful tools to isolate the specific active principal.

CONCLUSION

The present study shows that about 400 plants are endemic to Pakistan which belong to 29 plant families. Out of which 21 are found in Balochistan belonging to 12 families. The phytochemical screening of endemic medicinal plant (*Seriphidium quettense*) was done and it is concluded that the extract of the aerial parts varied and all the constituents were present except steroids.

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