Research Article

Taxonomic diversity and ethnobotanical characteristics of the family Lamiaceae of Swat, Khyber Pakhtunkhwa, Pakistan

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Abstract

A total of 35 species belonging to 21 genera of the family Lamiaceae were collected from the research area. The plants were categorized on the basis of their morphological characteristics and ethnobotanical uses. The plants were classified and described in semi-technical language. Bracket keys were constructed to ensure their easy classification and description. *Nepeta* and *Salvia* were found to be the dominant genera each represented by five (5) species. *Mentha* was the next dominant genus with three (3) species followed by *Ajuga*, *Leucas*, *Ocimum*, and *Stachys* each with two (2) species. While a single species was contributed by all the other genera. Ethnobotanically almost all the plants had more than one uses by the locality people. Most of the plants are important ethnomedicinally. Despite various ailments members of the family Lamiaceae collected from the research area are also used for various traditional and religious aspects.

Keywords: Taxonomic; diversity; Lamiaceae; ethnobotanical.

Introduction

The research area, Swat Valley, is located between 34°-31' - 55" and 35° - 53' - 40" north latitudes and 71° - 44' - 40" and 72° - 47' - 15" east longitudes. The climate of the area has been affected by a number of factors. The general topography of the land is undulating cut off by small and big streams. The shape of the valley is a broad "V". The vegetation shows wide variation depending upon the ecological conditions of the area. There are very possible type of vegetation according to the height of different places in the research area and the climatic conditions prevailing there.

A description of the genera and species of the order Labiales was provided [1]. A new species of *Salvia* from Baluchistan and made a complete revision of the family was described [2]. A survey was made on the system of classification of the genus *Salvia* [3]. 11 genera in the alphabetical order from *Ajuga* to *Lallemantia* were studied [4]. Morphology of some representative genera was studied in the tribe Saturejeae (Lamiaceae) [5]. The essential oil yield of Lamiaceae plants in Greece was evaluated [6]. Wood anatomy of Lamiaceae and quantitative and qualitative data on the wood anatomy was formulated [7]. The botanical

characteristics, nomenclature and systematic, ornamental values and other uses of the Genus *Thymus* were investigated [8]. Leaf content of macro and micro element was evaluated for 147 species in the family Lamiaceae [9]. Trudel and Morton [10] studied taxonomy and pollen morphology in the North American Labiatae. Ameluxen and inlert [11] studied filament bundle in *Mentha piperata*. Brenner et al. [12] studied the uses and genetic resources of *Perilla frutescence*. Budansteve and Lobova [13] described fruit surface ultrastructure in 89 *Nepeta* species by scanning electron microscopy. Circella [14] made a comparative account of biology, growth and productivity of the different taxa and ecotypes of the genus *Origanum*. Ramamoorthy and Elliott [15] described the diversity, distribution, endemism and evolution of the Mexican Lamiaceae. Abu-Abu-Asaband Cantino [16] implicated systematically pollen morphology in the sub-families Lamioideae and Pogostemonoideae. Maffie [17] analyzed that leaf was alkan in Lamiaceae and four other families. Ryding [18] studied the pericarp in 11 species of the sub-family Pogostemonoideae. Pace and Piccaglia [19] characterized the essential oil of a wild Italian endemic sage, *Salvia officinalis*. Smitherman et al. [20] described that plants have been used as folk medicine throughout the world. Various studies have been carried out on the ethnobotany of medicinal and other useful plants in different parts of Pakistan [21, 22, 23, 24]. Some medicinal and ethnobotanical studies also have been carried out in the nearby regions of the study site. Shinwari et al. [25, 26] worked on the ethnobotanical studies of Swat. Ali and Qaisar [27] listed the indigenous use of 83 taxa from Chitral district.

Materials and Methods

Several trips were made to the upper and lower Swat for the collection of plants belonging to the family Lamiaceae. Photographs of all the collected plants were taken at the time of collection. The plant

specimens collected were placed in the blotting papers and old newspapers; changed regularly each at 24 hours interval, for the removal of the moisture and subsequently places in the plant presser to avoid any shrinking and wrinkling. The dried plant specimens were treated with Naphthalene powder to keep them protected from any fungal and insect attacks. The dried and preserved specimens were mounted on standard herbarium sheets. Ecological information was noted at the time of the collection of the plants. The mounted specimens were identified on the basis of morphological characteristics of the vegetative and floral parts of the plants with help of flora of Pakistan and some other floras available electronically. All the voucher specimens were submitted to the herbarium of the Department of Botany, Islamia College Peshawar. Data regarding the ethnobotanical characteristics of the plants collected through oral interviews and questionnaires.

Results and Discussion

The plants belonging to family lamiaceae are widely distributed throughout the research area. A total of 35 species belonging to 21 genera of the family Lamiaceae were collected from the research area. *Nepeta* and *Salvia* were found to be the dominant genera each represented by five (5) species. *Mentha* was the next dominant genus with three (3) species followed by *Ajuga*, *Leucas*, *Ocimum*, and *Stachys* each with two (2) species. While a single species was contributed by all the other genera. The plants were categorized on the basis of their morphological characteristics and ethnobotanical uses. The plants were classified and described in semi-technical language. Bracket keys were constructed to ensure their easy classification and description. All the representative genera, species and infra specific categories were described morphologically and their diagnostic features were recorded.

Ethnobotanically almost all the plants had more than one uses by the locality people. Most of the plants are important ethnomedicinally. Despite various ailments members of the family Lamiaceae collected from the research area are also used for various traditional and religious aspects. The plants have diverse uses in a number of therapeutic classes of disorders. Most of the

plants recorded are used in gastric and stomach disorders. The current study provides recipes for all the plants reported for the family Lamiaceae from the research area. These recipes are mostly in accordance with [28, 29, 30]. All the information related to ethnomedicinal uses of the plants belonging to the family Lamiaceae were recorded in a comprehensive table (Table 1).

Table 1. Representative members of the family Lamiaceae with their ethnobotanical uses

S. No.	Genus	Botanical Name	Part Used	Ethnomedicinal Uses
1.	<i>Ajuga</i> L.	1. <i>Ajuga integrifolia</i> Buch.-Ham.	Leaves and stems	Paste of wounds and tumors
		2. <i>Ajuga parviflora</i> Benth.	Leaves	Respiratory disorders
2.	<i>Clinopodium</i> L.	3. <i>Clinopodium debile</i> (Bunge) Kuntze	Whole Plant	Forage and healing wounds
3.	<i>Hyssopus</i> L.	4. <i>Hyssopus officinalis</i> L.	Flowers, leaves and essential oil	Expectorant and antiviral activities
4.	<i>Isodon</i> (Schrader ex Benth.) Spach	5. <i>Isodon rugosus</i> (Wall. ex Benth.) Codd	Whole Plant	Antipyretic and an anti-diarrheal
5.	<i>Lamium</i> L.	6. <i>Lamium album</i> L.	Leaves and young stems	Trauma, fracture, paralysis, hypertension and uterine hemorrhage.
6.	<i>Leucas</i> R. Br.	7. <i>Leucascephalotes</i> (Roth) Spreng.	Whole Plant	Antioxidant, analgesic and anti-inflammatory
		8. <i>Leucas nutans</i> (Roth) Spreng.	Whole Plant	cough, cold, diarrhea, and inflammatory skin
7.	<i>Marrubium</i> L.	9. <i>Marrubium anisodon</i> K. Koch	Aerial Parts	Essential oil, Antioxidant
8.	<i>Mentha</i> L.	10. <i>Mentha longifolia</i> (L.) L.	Roots	Carminative and anti-vomiting
		11. <i>Mentha spicata</i> L.	Leaves	Salad and Making tea for treating vomiting
		12. <i>Mentha royleana</i> Wall. ex Benth.	Leaves	Antioxidant activity, Antioxidant activity
9.	<i>Micromeria</i> Benth.	13. <i>Micromeria biflora</i> (Buch.-Ham. ex D. Don) Benth.	Dried flowers and leaves	Antimicrobial, used as a tea, flavouring in lentil soups
10.	<i>Nepeta</i> L.	14. <i>Nepeta erecta</i> (Royle ex Benth.) Benth.	Leaves	laxative
		15. <i>Nepeta floccosa</i> Benth.	Leaves and flowers	Reduce fats, temperature and to stop hair fall.

		16. <i>Nepeta kokanica</i> Regel	Leaves and flowers	anthelmintic, emetic, digestive
		17. <i>Nepeta laevigata</i> (D.Don) Hand.-Mazz.	seeds	Dysentery
		18. <i>Nepeta podostachys</i> subsp. <i>paulsenii</i> (Briq.) A.L.Budantzev	Aerial parts	Fever, aromatic
11.	<i>Ocimum</i> L.	19. <i>Ocimum basilicum</i> L.	Leaves and inflorescence	Fragrance, to avoid mosquitoes and devils effects
		20. <i>Ocimum americanum</i> L.	Leaves and stems	Dysentery bacteria
12.	<i>Origanum</i> L.	21. <i>Origanum vulgare</i> L.	Extracted oils	Dysentery bacteria
13.	<i>Rydingia</i> Scheen & V.A. Albert	22. <i>Rydingia limbata</i> (Benth.) Scheen & V.A. Albert	Leaves	Wounds, gum diseases
14.	<i>Phlomis</i> L.	23. <i>Phlomoides bracteosa</i> (Royle ex Benth.) Kamelin & Makhm.	Aerial parts	Forage
15.	<i>Plectranthus</i> L'Hér.	24. <i>Plectranthus barbatus</i> Andrews	Leaves and flowers	Leaves in tea and used against cough and cold. Flowers are used against toothache and as laxative.
16.	<i>Prunella</i> L.	25. <i>Prunella vulgaris</i> L.	Leaves	Applied directly to a fresh wound
17.	<i>Salvia</i> L.	26. <i>Salvia aegyptiaca</i> L.	Whole Plant	dizziness, trembling, diarrhea and piles
		27. <i>Salvia mukerjeei</i> Bennet & Raizada	Leaves	Antiseptic and cleansing agent
		28. <i>Salvia moorcroftiana</i> Wall. Ex Benth.	Roots	Colds and coughs
		29. <i>Salvia nubicola</i> Wall. ex Sweet	Aerial parts	Making pastes used as emulsion
		30. <i>Salvia plebeian</i> R.Br.	Whole plant	astringent, diuretic and vermifuge
18.	<i>Scutellaria</i> L.	31. <i>Scutellaria edelbergii</i> Rech.f.	Root	Diarrhea, and inflammation.

Authors' contributions

Designed by: I Ahmad. Data collected by: I Ahmad & S Wali. Data analysis: I Ahmad, A Begum, S Jan & S Wali. Written by: I Ahmad & S Wali.

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