

TAXONOMIC STUDY AND MEDICINAL IMPORTANCE OF THREE SPECIES OF THE GENUS *ARTEMISIA* LINN.

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Abstract

Morphological features of three species of *Artemisia* viz. *A. scoparia* Waldst. & Kit., *A. absinthium* Linn. And *A. brevifolia* Wall. Ex DC. For plant size, leaf-shape and size, petiole length, inflorescence type and capitulum, were studied on the herbarium specimens preserved at Herbarium of Quaid-I-Azam University, Islamabad. Medicinal properties and uses of these species were determined by interviewing Hakims and also from the literature. Characters recorded are head and receptacle, number of florets per head were taxonomically important to differentiate these species. It was observed that an important use of *A. absinthium* is as cure against liver diseases.

Introduction

The relationship between man and plants is as old as the history of mankind itself from the time man has started studying plants and animals, as a source of food and remedy for different ailments. Some plants were found useful as food while others showed beneficial effects against various diseases (Said, 1982). The use of plants as a source of medicine was based on the experiences gained through several generations of traditional physicians and herbal practitioners found in different societies. Holy Prophet of Islam (Peace be upon him) also used certain herbs as cure for various diseases.

For centuries, plants with medicinal properties have been utilized successfully in the treatment of ailments of varying degree of severity. The Greek physician, Hippocrates, in 377 BC, said "Let medicine be your food and food your medicine" (Bartram, 1995). Unfortunately many people knowing very little about such useful medicinal plants, that nature has. Therefore, taxonomy of root, stem, bark, leaves, flowers and seed is important to provide convenient method of identification.

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Artemisia Linn. Known as "Worm Wood", is a large genus of herbs with 200 species and belong to family *Asteraceae*. It has strongly scented alternate, entire leaves, and flowers not very distinctly grown in heads. It is reported that 30 species of *Artemisia* are grown naturally in Pakistan. *A.brevifolia* Wall. Ex DC. And *A.scoparia* Waldst. & Kit. Are highly used in herbal medicine. The Margalla hills in Islamabad are rich in medicinal plants but are neglected due to less awareness among locals. Therefore, this area demands extensive ethnobotanical survey regarding medicinal herbs.

Review of Literature

Davis (1975), reported *Artemisia* Linn. as annual or mostly perennial herb with usually erect, much branched stem. Leaves are sessile or petiolate, pinnatisect and the involuere is ovoid or globose with considerable variations in habit, leaf shape and other morphological characters attributable to change of environmental conditions.

Kirtikar and Basu (1975) used *A.brevifolia* Wall. Ex DC. against intermittent fever, jaundice and also as vermifuge. Huang *et al.* (1991) studied a chemical 'scoparone' found in *A.scoparia* Waldst. & Kit, which is useful for the development of better immunosuppressive agent with vasorelaxant actions.

Nin & Magher (1995) reported high variability in *A.absinthium* Linn. in number of branches per plant, growth habit, flowering period, fresh, dry matter field and the plant height due to change of ecological habitat and variations in environmental conditions. Hammond *et al.* (1997) extracted the essential oil from the leaves of *A.absinthium* Linn. which is used in food industry.

Materials and Methods

The taxonomic study on three *Artemisia* spp. was conducted in the Herbarium of Quaid-i-Azam University, Islamabad. The plant specimens were collected in flowering and fruiting stage during field trips. Taxonomic characters including stem, leaf, inflorescence and description of flower were studied with the help of simple microscope. After studying the taxonomic characters, the key to species was prepared for the differentiation of selected species. The specimens were identified and later on deposited as mounted Herbarium sheets at the Quaid-i-Azam University, Islamabad, for further references.

For the medicinal properties and uses, a survey was also conducted in

Rawalpindi and Islamabad area. The method for survey was to interview Hakims. A Questionnaire was devised for Hakims about the method of collection of plants, place of collection, part used and the diseases against which the plants were used.

Results and Discussion

Morphology

Artemisia

Linn., Gen. Pl. ed. 5: 357 (1754); Benth. & Hook., Gen. Pl. 2:435 (1873); Hook. Fil., Fl. Brit. 3: 321 (1875); Cullen in Davis, Fl. Turk. 5: 311 (1975); Podlech in Rech. Fil., Fl. Iran. 158: 159 (1986).

Annual, biennial or perennial usually aromatic herbs or subshrubs. Stem erect, much branched. Leaves alternate, sessile or petioled, often much dissected or 1-3-pinnatifid, basely petiolate; cauline leaves subsessile or sessile, aromatic. Inflorescence a panicle, spicate or globose raceme, sometimes a dense corymb. Capitula small, heterogamous or homogamous, disciform, broadly campanulate with or without peduncle. Involucre bracts oblong to ovoid or campanulate rarely suborbicular or hemispheric or almost globose. Disc florets hermaphrodite, rarely male, fertile or sterile, corolla regular, tubular-campanulate, 5-toothed. Outer florets female, very rarely sterile, tubular. Receptacle flat, convex or hemispheric. Achenes oblongellipsoid, subovoid, cylindrical or somewhat compressed, smooth or faintly straited, pilose, sometimes prominently ribbed and glabrous. Pappus absent or very rarely represented by a small scarious ring.

Represented by about 4000 species distributed in S. America, Asia, N. America, Canada and New Zealand. In Pakistan genus *Artemisia* is represented by 32 species.

Key to the Species

- 1a. Heads hetrogamous, shortly peduncled, more than 10-flowered; involucre 3-4-seriate; outer phyllaries glabrous to appressed-canescenscent; receptacle conspicuous, hemispherical or convex (2)
- 1b. Heads homogamous, sessile less than 10-flowered; involucre 5-6-seriate; outer phyllaries densely arachnoid-hairy; receptacle very small conical *A. brevifolia*

- 2a. Plants hairy to mostly glabrous, uppermost leaves in the floral region acicular with auricles; receptacle conical, glabrous; florets 10-12 in number; outer phyllaries glabrous, corolla glandular
A.scoparia
- 2b. Plants appressed silky-canescens; uppermost leaves in the floral region 3-fid or entire; receptacle \pm flat, densely white-hairy; florets 20-25 in number; outer phyllaries appressed – canescens; corolla glabrous
A.absinthium

1. *A.scoparia* Waldst. & Kit., Pl. Rar. Hung. 1: 66. T.65 (1802); Bess. In Bull. Soc. Nat. Mosc. 8: 92 (1836); DC., Prodr. 6: 99 (1837); Boiss., Fl. Or. 3: 364. (1875); Hook. Fil., op. Cit. 3: 323 (1881); Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. W. Pak. & Kashm. 719 (1972); Cullen in Davis, Fl. Turk. 5: 322, (1975); Podlech in Rech. Fil., op. Cit. 158: 189 (1986).

Sys.: *A.kohatica* Kaltt, Sitz. Ber Math.-Phys. Cl. Acad. Wiss. München 1878: 91(1978).

A biennial to perennial herb with a thick rootstock stem 40-60 –(80) cm in length, basally woody, branched, slightly hairy to mostly glabrous, brown or dark purple. Radical leaves petioled, pinnatisect. 2.5 cm long, glabrous, upper most leaves in the floral region acicular; petiole of basal leaf 0.7 cm long, whereas, petiole of upper leaf 0.6 cm long, heads heterogamous, sessile in racemose panicles, 10-flowered; receptacle conical, glabrous, involucre glabrous oblong. Florets 10-12; Ray florets 5-6, fertile, tube 1-10 mm in length Disc floret 5-6 functionally staminate, tubular, tube 2-3 mm long, corolla glandular. Ray florets white and Disc florets yellow. Fruit on achene.

2. *A.brevifolia* Wall. Ex DC., Prodr. 6: 103 (1838); R.R. Stewart, op.cit. 715 (1972); Podlech in Rech. Fil., op. Cit. 212 (1986).

Misapplied name: *A.maritima* sensu Hook. Fil., op.cit. 3: 323 (1881) proparte; Kitamura, Pl. W. Pak. & Afghan. 142 (1964); R.R. Stewart, op.cit. 716 (1972) non Linn., Sp. Pl. (1953).

A basally woody subshrub, with many erect, strait, upto 60 cm tall, densely arachnoid, greyish-hairy, greenish brown, rarely reddish branches. Radical and lower leaves with 10-20 mm long petioles, lamina orbicular in outline, much divided, 1-1.5 \times 1.5-2 cm; uppermost leaves sessile to subsessile undivided. Heads homogamous, 1-2 mm in diam, sessile, less than 10-flowered, remote or contiguous. Involucre 5-6-serate; outer phyllaries densely arachnoid hairy; receptacle very small, conical, glabrous. Fruit an achene, without pappus.

3. *A. absinthium* Linn., Sp. Pl. 848 (1753); Hook. Fil., op. Cit. 3: 328 (1881); Stewart, op. Cit. 714 (1972); Podlech in Rec. fil., op. Cit. 158: 182. T. 167 (1986).

A perennial aromatic plant with erect flowering stem. Stem 30-90 cm long, woody below, cylindrical, minutely glandular punctate. Lower leaves petiolate, petiole ca. 10 cm long, lamina broadly ovate, 8-15 × 4-7 cm, 2-3-pinnatisect into linear – oblong segments. Upper & middle leaves subsessile uppermost leaves in the floral region subsessile, 3-fid or entire. Heads heterogamous, short peduncled. Involucre 3-4 seriate, outermost phyllaries linear, green appressed-canescens. Receptacle ± flat, densely white hairy. Florets numerous, yellow; ray florets female, 20-25, fertile; disc florets many, bisexual, fertile. Corolla glabrous. Achenes ± oblong, cylindrical.

The 3-species of genus *Artemisia* that is *A. absinthium*, *A. brevifolia* and *A. scoparia* showed similarities to one another. But these species were differentiated mostly on the basis of their leaves. Leaves of *A. absinthium* were petiolate, tripinnate, leaves of *A. brevifolia* were bipinnate, upper leaves sessile, lower leaves petiolate and leaves of *A. scoparia* were subsessile, pinnatisect and upper leaves were acicular that is thread like/or needle like. Systematic study provides valid and distinguishing characters which can be made use for further differentiation of the species.

A survey was conducted by interviewing the Hakims in Rawalpindi and Islamabad. A total of 15 Hakims were questioned throughout the survey. During the survey, information on vernacular names, area of collection and medicinal uses of these species were collected. Table 1 showed that the 3 species were used in herbal medicine for the treatment of various diseases like Hepatitis, Jaundice, Diabetes, different types of fevers, Intestinal parasitic diseases etc.

From the survey results it is concluded that *A. absinthium* is more used in herbal medicine whereas *A. brevifolia* and *A. scoparia* are less used due to less awareness about the properties of these species. The survey reveals that, these species are collected throughout the year and these species sprout in March and April.

Table 1. Medicinal properties and uses of selected species (Ahmad & Rahman, 1989).

Name of spp.	Vernacular name	Area of collection	Part use	Use against diseases
<i>Artemisia absinthium</i> Linn.	Afsantin	Hazara, Abbottabad, Swat, Parachinar, Northern areas, Azad Kashmir, Bagh, etc.	Leaves and flowers were used. Leaves contain active santonin, whereas flowers contain essential oil Afsanteen. Tablets, safoof (porlver) and syrup were manufactured from these parts.	Mostly used against liver diseases, Hepatitis, a, b, c, blood purification, jaundice, diabetes, skin, diseases, allergy, Brain tonic scabies and tetanus etc.
<i>Artemisia brevifolia</i> Wall. Ex DC.	Afsantin-u-Bahr	High altitude, (7000-14000 ft), Baluchistan, Hazara, Chitral, Swat, Baltistan, Kashmir etc.	Whole plant used	Swollen joints, Dyspepsia, pain due to bite of venomous reptiles scorpion and intestinal parasites
<i>Artemisia scoparia</i> Waldst. & Kit.	Dona john	Sind, Baluchistan, Islamabad, Pothwar, Peshawar, Swat, Gilgit, Baltistan.	Whole plant used	Different types of fever, Bronchitis, Cough, Jaundice Diuretic, Purgative, Earache etc.

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