



ETHNOBOTANICAL AND TAXONOMIC STUDY OF MEMBERS OF IRIDACEAE FAMILY OF KISHTWAR, (JAMMU AND KASHMIR) INDIA

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ABSTRACT

The present study shows that the Jammu and Kashmir state has a great diversity of plants belonging to Iridaceae family with different medicinal properties. The twelve explored plant species have multiple uses which were used in the treatment of different diseases and other conditions with different taxonomic features. All the twelve mentioned plant species were most widely used in various parts of the Jammu and Kashmir and especially in Kishtwar district. Members of the Iridaceae family are used as medicines and other beneficial purposes.

KEYWORDS: Ethnobotany, Iridaceae, Kishtwar, Taxonomy.



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INTRODUCTION

The state of Jammu & Kashmir is known for its rich natural environmental heritage. Since Bernier coined the world of "Cachemir" the paradise of Indies, much has been written about it and botanists have also added to this lore. The valley of Kashmir gifted with blooming lush-green valleys, wild -ranging streams cutting across the mountains, walk -in touching mountains with glistening snow peaks that create a sensation and charm, dense evergreen forests that provide a protective cover to the rarest of the rare species. The plants crowning this globe are so vast and varied that it is impossible to comprehend them unless they are named and grouped into recognizable components. Flora of a particular geographical area provides information about the total number of plant species present in it, their identification, description and distribution etc., In other words, it is a documentary which acts as a platform for the overall progress of botany in any given country Ajaib (2013), Kashmir Valley is gifted with a rich floristic wealth vis-à-vis its typical topography and diverse habitats, hence forming an important region of the Northwest Himalayan phytogeographic zone in India. Ever since, W. Moorcroft's first visit in 1822, many significant contributions have been made to its floristics (Stewart 1972, Blatter 1928-29, Coventry 1923-30, Dhar & Kachroo 1983, Dar 1986, etc.) World-over, an urgent need is being felt for a speedy documentation and better understanding of global biodiversity, which becomes indispensable for the formulation of effective conservation strategies. In this situational matrix, the study of floristic diversity deserves priority as plants act as producers in the ecosystem (Pandey 1995). Presently the destruction of world's

vegetation is continuing at such an alarming pace that about two thirds of the scientifically known plant species are believed to be at the brink of extinction. In view of this threatening scenario, the study of the vegetation wealth present within a region is of wide relevance (Rana Man 2011). Efforts need to be concentrated on documenting the varied patterns and associations of vegetation in different geo-ecological habitats. Such types of studies are possible by on spot observations, in the field. Consequently the information so generated helps in sketching the overall vegetation profile of a particular region (Khan *et al.*, 2004).

MATERIALS AND METHODS

The plants and the Herbarium specimens were critically examined and identified with help of the relevant literature (Hooker 1872-1897). Ethno medicinal information was gathered from experienced persons, local faith healers and traditional medicine practitioners. Voucher specimens have been deposited in department of herbarium Govt Narmada P.G College, Hoshangabad (Barkatullah University, Bhopal. (M. P) for preservation.

RESULTS

The ethnobotanical inventory of study area helps taxonomists and ethnobotanist to better manage plant resources of the J & K state. The over exploitation of the plants, may lead to the destruction of floral wealth of this area, which is one of the important part of Himalayan Biodiversity (Parvaiz *et al.*, 2013).

Table 1

List of 12 plant species which are used as medicine by the local villagers of Kishtwar region Jammu and Kashmir state with botanical name, family, taxonomic study, location, flowering period and their ethnomedicinal importance.

Botanical name	FAMILY	DISTRIBUTION	Plant Description	Flowering period	Ethno medicinal Importance
<i>Crocus sativus</i> L.	IRIDACEAE A. L. Jussieu (Crocus family)	Cultivated in the 'Karewas' of Kashmir valley. And in Kishtwar district Jammu and Kashmir it is grown in Mandal area.	It is a grass like tuber plants with purple or lilac coloured flower. The flower stalk rises from a bulb, and is a long, white, slender tube; the flower itself being large, leaves radical, linear, dark green above pale green below, enclosed in a membranous sheath. Corms about 3 cm in diameter. Tunic light yellow or yellowish brown, reticulate fibrous. Leaves 9-15, 15-20cm x 2-3mm. Flowers 1 or 2, fragrant. Perianth purple; segments oblanceolate, 4-5cm, apex obtuse. Stamens 2.5cm; anthers yellow, apex slightly curved, pointed. Style 3-branched at apex; branches recurved, deep red, 2.5cm or more. Fertile seeds not produced.	October-December.	The dried stigmas of the plant are traditionally used as medicines extensively to treat various ailments in different ways, as scientifically proved it is used in aphrodisiac, antispasmodic, expectorant, for treatment of stomach ailments, reducing stomach ache and for relieving tension. It is also used to treat sleeplessness and in the treatment of the measles, dysentery, jaundice, cholera etc. Traditionally the powdery form of the plant treats skin diseases like acne. It is also used in weaving industry as a dyeing agent and in the preparation of various perfumes and incense sticks. It is considered as a tonic for heart and nervous system and for smoothing menstruation 2-3. Charaka used the powdered stigmas as one of the drugs in the treatment of cataracts, night blindness and poor vision. Sushruta used it as a blood purifier and to treat skin eruptions internally. It is also used as an antibacterial agent, antiseptic, anti-fungal and antiflatulent traditionally.
<i>Iris reticulata</i> M. Bieb.	IRIDACEAE A. L. Jussieu (Crocus family)	The plant is distributed in Kashmir and in many Dacchan, Marwa, Pucchal, Bongwah area of Kishtwar District.	Plant 7-17cm tall at flowering. Bulb covered by coarsely reticulate-fibrous tunics, sometimes bulbils present at the base. Leaves 1-3	February-May.	Flowers are preferred by the locals for their antiseptic value. Flower paste is applied to infectious eye. A common myth related to this plant is that this plant had originated from the eyes of "Hazrat Zuleikha ^{RA} ". Rhizome paste with common salt is applied against rheumatism

			<p>from each bulb, not longer than flowers, later up to 30 cm long, 1.5-3.0 mm broad, 4 angled in cross section. Aerial stem obsolescent. Flower solitary, spathe up to 9.0 cm long, outer green, enclosing the narrow and inner membranous one. Pedicel up to 4.0 cm. Perianth very variable in colour, pale blue to violet, purple; tube 4-7 cm long, mostly covered by spathe; falls 3.2-5.5 cm long, shaft 2.1-3.8cm long, darker than rests of the flower; standards 3-5.2 cm long, erect oblanceolate. Stamens with filaments 1-2cm; anthers 6-11mm long. Stylar branches 3-5cm long, with lobes 1-1.5cm long, stigma deeply bilobed. Capsule 3.0-5.5cm long, ellipsoid, shortly beaked, more or less at the ground level. Seeds arillate.</p>		
<p><i>Iris aitchisonii</i> (Baker) Boiss.,</p>	<p>IRIDACEAE A. L. Jussieu (Crocus family)</p>	<p>E. Afghanistan, Pakistan, Kashmir.</p>	<p>Bulb tunic papery, dark brown, developed into a neck. Roots fleshy and long, not markedly swollen. Leaves 3-6 well developed at the flowering time, up to 40 cm long, 3-8 mm broad, linear, suberect,</p>	<p>March - April.</p>	<p>It is locally called Snap Buti (Snake Buti) and is used as anti cancerous, diuretic, cathartic and antidote in snake bit. Besides it has also great property of antimicrobial activity like <i>Streptococcus faecalis</i>, <i>Staphylococcus aureus</i>, <i>E.coli</i>, <i>Aspergillus niger</i>, and <i>Aspergillus oryzae</i>.</p>

			<p>rather flaccid, glabrous, margin not conspicuously white. Stem up to 36 cm in height, nodes and internodes visible.</p> <p>Inflorescence 1-3 flowered.</p> <p>Bracts 5-6 cm long.</p> <p>Perianth 5-6 cm in diameter, yellow or violet or sometimes yellow and brown; falls 3.5-5.5 cm long; claw 2-3.5 cm long.</p> <p>Standard reflexed 1.2-2.5 cm long, hypanthial tube 2.5-3.5 cm long.</p> <p>Stamens with filaments 0.5-1.2 cm, anthers 1.1-2.0 cm. Style branches 3.4-4.4 cm long, lobes upto 1-1.3 cm long, acute; stigma emarginate, crenate. Fruit sessile, 3.7-5.7 cm long, linear-oblong, glabrous, tip acute, pointed, longitudinally running veins, 3 veins more prominent.</p> <p>Seeds 2.5-3.5 mm long, 1.5-2.0 mm broad, ovate with a beak, dark brown, warty, aril absent.</p>		
<i>Iris decora</i> Wall.,	IRIDACEAE A. L. Jussieu (Crocus family)	Jammu and Kashmir, Himachal Pradesh, Meghalaya, Punjab, Sikkim, Uttar Pradesh, Pakistan, China. (No specimens in KASH).	<p>Roots swollen tuber-like, white fleshy as well as fibrous roots attached to flat rhizome, densely covered by remains of old leaves. Leaves 10-45 cm long, 2-5 mm wide, strongly ribbed.</p>	May-July.	Rt. Liquid for constipation.

			<p>Peduncle (stem) 10-30 cm tall often branched. Bracts slender, acuminate, keeled, generally 2-flowered. Pedicel upto 2.5 cm long. Flower 4.0-5.0 cm long in diameter, pale bluish-lavender to deep reddish purple. blade broadly lanceolate; shaft with deeper reddish purple veins and a central ridge which is brownish yellow at base, yellowish to pale mauvish-white on blade; standards narrowly lanceolate, bent outwards and downwards like falls; tube 2.5-6.0 cm long. Filaments white slightly violet tinged, anthers cream coloured, violet-tinged at the base. Ovary 3-sided, each side slightly concave. Styles broadly lobed, pale-violet, toothed at edges, crest triangular erect, exceeding falls and standard, whitish or yellowish orange at tips, stigma deeply bilobed. Capsule 2.5-3.5cm long, trigonal, grooved at sides, tip pointed. Seeds dark brown small,</p>		
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			round, aril as large or larger than seed.		
<i>Iris kashmiriana</i> Hook. f., Fl. Brit.	IRIDACEAE A. L. Jussieu (Crocus family)	Endemic to Kashmir.	Rhizome thick and stout. Leaves 4-6; up to 60 cm, 3.0-4.5 cm broad, straight, glaucous. Peduncle (stem) 50-70 (120) cm tall, with 1-2 branches, each branch 2-3 flowered. Bract and bracteoles 7-11 cm. Pedicel 1.0 cm. Perianth white often with some blue marking and yellow-green veins; tube 2.2-2.5 cm long; falls 6.5-9.5 cm, obovate, rounded or cuneate narrowed into a short yellow claw which has a dense, narrow white or yellow beard of long hairs along the centre; standards 6.5-9, obovate to oblong-elliptic, with a short yellowish claw. Filament 1.3-1.8 cm long, white; anther 1.5 cm, long. Stylar branches lobed 1.8, entire, upturned; stigma entire. Capsule rarely formed, stipulate, stipe ca. 4-5mm, c.3mm thick, woody; fruit ca. 3.0-4.3cm long, ca. 2.2cm broad, walls thick and woody. Seeds globular, wrinkled, red-brown.	May.	The plant is most commonly grown on grave yards. The local people believed the plant as rodent repellent. The dried rhizome are grind into powder and is mixed with oil to make paste and the paste is applied externally on joints pain, and is applied on the portion having inflammatory skin disease and wounds for desired results. A mixture of rhizome powder water and jiggery is made into semi solid balls (Gullah) which are given as tonic to cattle's against general body weakness.
<i>Iris</i>	IRIDACEAE A. L.		Rhizome	April-May.	The dried roots of <i>Iris germanica</i> contain essential

<i>germanica</i> L.	Jussieu (Crocus family)	Kashmir (Keller, Pulwama); recorded from most parts of the world, though not known in the wild.	thick; plant 60-120 cm tall. Leaves 30-40 cm long, 2.0-4.5cm broad, ensiform, glaucous. Peduncle (stem) up to 100 cm long, up to 3 branches with 4-5 flowers. Bract and bracteoles up to 5 cm long, scarious in upper half, often purplish. Perianth lavender, violet or bluish with brownish veins in lower parts; tube 2-2.5 cm; tapels obovate-cuneate at base; beard white or pale blue; standard upto 4-5 cm, obovate or elliptic with a narrow claw at the base. Filament ca. 1.8 cm long, pale-purple, anther white, subequal. Pedicel short, ovary ca. 1.6 cm long, style branches upto1.5 cm, lobes obtuse 1-1.5cm. Capsule 3-5cm, ellipsoid, rare. Seeds pyriform, wrinkled, acute.		oil that has fragrance of violets. The dried roots are used in toothpastes and cosmetics.
<i>Iris hookeriana</i> ; Hook. f.	IRIDACEAE A. L. Jussieu (Crocus family)	Kashmir; (Sonamarg, Gulmarg, Baltal, Sarbal, Ledwas, Khillenmar g, Khan mountain, Harwan, Pulwama, Gurais, Chorwan), India, Pakistan and Afghanista n.	Roots slender, fleshy. Rhizome slender, knobably. Leaves up to 40.0 (2cm. Peduncle (stem) 5-15 (-30) cm. Bracts 4.5-7 cm long, 2-flowered; pedicel very short. Flowers blue-purple, with blotches;	June-July.	The oil extracted from <i>Iris hookeriana</i> is used in perfumery, and it is rich source of ascorbic acid. Its roots are used to treat frozen feet. It is also grown in grave yards as rodent repellent.

			<p>tube 1.2-3.0 cm long; falls 5-6.5 cm long, c. 2.0 cm broad; haft cuneate, blade oblong, beard white, tips coloured. Standard 5.0 cm, shaft canaliculate, blade oblong. Filaments blue, as long as creamy anthers. Ovary ca. 1.2-1.3 cm long, trigonal, style sharply keeled, crest triangular; stigma with serrated edge. Capsule 5-6 cm long, broadly elliptic, terminating into a conspicuous beak with dried flower parts; stipe 2.0-2.5cm; dehiscence longitudinal. Seeds pyriform, red, aril yellowish.</p>		
<p><i>Iris kumaonensis</i> Wall. ex Royle,</p>	<p>IRIDACEAE A. L. Jussieu (Crocus family)</p>	<p>Ladakh (Zojila pass), Pakistan.</p>	<p>Roots fleshy. Rhizome knobbly leaves up to 45 cm long, 2-10 mm broad, linear. Peduncle (stem) usually short. Bracts 2-3 acuminate, sheathing base of hypanthial tube; pedicel up to 1.5cm long. Flower 4-5 cm in diameter, lilac purple with darker blotches; hypanthial tube 5.0-7.5 cm; falls 4.5 cm long, 2.5 cm broad, haft cuneate; beard of dense white hairs tipped with yellow or orange; standards ca. 4 (1.5 cm obovate; filaments</p>	<p>May-June.</p>	<p>The plants are used against fever and in urine complain.</p>

			<p>blue, anthers lavender; style c. 3.0 (0.5cm, crest small, triangular, crenate, stigma entire, crenate, capsule 2.0-2.5 cm, almost sessile at ground level; tapering to a pointed tip, dehiscence longitudinal. Seeds pyriform, brown red, arillate, aril cream coloured.</p>		
<p><i>Iris milesii</i> Hook. f.</p>	<p>IRIDACEAE A. L. Jussieu (Crocus family)</p>	<p>Kashmir (Aish Muqam, Pulwama); Pakistan, Afghanistan, China. (No specimens in KASH).</p>	<p>Roots fleshy. Rhizomes thick, fleshy, greenish, annular scars left by earlier year's growth prominent. Rhizome bears a terminal leafy flowering stem and two lateral non-flowering leafy stems. The lateral stems become active shoots for next year's growth thus the old and the new rhizomes result in a series of dichotomies. Basal leaves 30-60 cm long, 3-7 cm wide, ribs prominent, pale-green. Branched flowering stems 30-90 cm tall, bearing shorter leaves than the sterile shoots. Bracts (in fruits) ca. 2.5cm. Flower ca. 6-10 cm in diameter, pinkish-violet with darker spots. Falls with fringed yellow crest. Capsule stipitate, stipe 2.8-3.0</p>	<p>May-July.</p>	<p>The locals of the Jammu and Kashmir dried the Roots and then grinded to make powdery form which is mixed with lukewarm water or milk as is used domestic remedy to cure fever, cough and chest pain. Paste is mixed with ghee and is applied on wound to avoid infection and stimulate healing.</p>

			cm long, ovoid-cylindrical, ca. 3.1-3.3cm long. Seed black, pyriform.		
<i>Iris crocea</i> Jacquem. ex R.C.	IRIDACEAE A. L. Jussieu (Crocus family)	Kashmir (Vishunag, Mudegaum, Pir Panjal, Harwan, etc.); Pakistan, China, Bhutan.	Plant up to 1.5m in height. Leaves 60-90 (1.5-2.5 cm, ensiform. Inflorescence : terminal cluster at the tip and 3 lateral clusters on short erect branches. Flowers 12-18cm in diameter, deep golden yellow. Blade of the falls 4.5-5.0cm (2-2.5cm; oblong, tapered, crimped at margin, narrowing to 3-3.5cm long haft. Standards 7.5cm long, oblanceolate, waved at edges, style 3.8cm; crest deltoid. Capsule 3.8-4.0 cm long, oblong, 6-angled, beaked.	June.	Crushed rhizome of this <i>Iris crocea</i> is applied for relief from rheumatic pain.
<i>Iris lactea</i> Pallas	IRIDACEAE A. L. Jussieu (Crocus family)	Kashmir (Pampore), Pakistan and Afghanistan, China, Tibet, Central Asia and Korea.	Roots not swollen. Rhizome branched, covered with purplish brown remains of older leaves. Leaves up to 45.0 cm long, 3.0-5.0 mm wide, straight, ribbed. Peduncle 5-50 cm, 1-3 flowered. Bracts several, outer 5-7.5 cm, enclosing the inner membranous ones. Pedicel 2.0-9.0 cm. Flowers 4.0-6.0 cm in diameter, creamy white, pale mauve or	May - August.	Roots are reputed to have medicinal properties. Leaves are used as fodder and for thatching, matting and basket work. Flowers contain anthocyanin pigment (Kirtikar & Basu, Ind. Med. Pl. 4: 2460 1991; Ambasta et al., Usef. Pl. Ind. 294. 1986).

			<p>bluish purple or pale violet blue. Tube 2.0-3.0 mm. Falls 4.5-5.5 cm with claw, slightly longer than obovate blade; standards erect, oblanceolate. Filaments and anthers 1.2 cm long, style c. 3 cm long, lobes c. 7 mm long, stigma small, triangular. Capsule 2.5-7.0 cm long (including the beak), with 6 ribs at regular intervals; breadth and beak length variable. Seeds c. 5 mm in diameter, round smooth, dark brown</p>		
<p><i>Iris ensata</i> Thunberg</p>	<p>IRIDACEAE A. L. Jussieu (Crocus family)</p>	<p>Kashmir (Pulwama, Harwan, Pampore, Kunzer, Tangmarg, Ganderbal), Ladakh (Leh, Kargil, Nubra, Hemis, Khalsi), Pakistan, Afghanistan, Tibet, China and Myanmar.</p>	<p>Leaves electing 30-60 cm long, 5-12 mm wide. Scapes 40-100 cm tall, bracteoles green 5-8 cm long. Flowers pedicelets 3-5 cm long inside bracteoles, purple 10 cm across, outer perianth 3-4 cm wide with yellow lines at center, inner perianths electing 4 cm high, flowering in June to August. Fruits 2.5-3 cm long. Perennial plants. Rhizomes creeping, thick. Leaves linear, 30-80 cm x 5-12 mm, midvein distinct on both surfaces, apex acuminate. Flowering stems 25-</p>	<p>June-July.</p>	<p>The roots are supposed to be Dietary food supplements containing natural cyclooxygenase inhibitors and methods for inhibiting pain and inflammation.</p>

			100 cm, solid, 1-3- leaved; spathes 3, lanceolate, unequal, 4.5- 7.5 x 0.8-1.2 cm, leathery, 2-flowered, veins distinct, raised, basal spathe shorter, apex usually acute, apical spathe longer, apex usually obtuse. Flowers dark reddish purple, 9- 10cm in diameter. Pedicel 1.5- 3.5cm. Perianth tube 1.5-2cm; outer segments obovate, mottled yellow at center, 7-8.5 x 3-3.5cm; inner segments erect, narrowly lanceolate, ca. 5cm x 5- 6mm. Stamens ca. 3.5cm; anthers purple. Ovary cylindrical, 1.5-2cm x ca. 3mm. Style branches purple, ca. 5cm x 7- 10mm. Capsule ellipsoid, 4.5- 5.5 x 1.5- 1.8cm, 6- ribbed, apex shortly beaked. Seeds maroon- brown, semi orbicular, flat.	
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DISCUSSION

Predominantly, a tropical family Iridaceae has some representatives in the extra tropical regions as well. The family comprises of about 92 genera and about 1800 species throughout the world (Bhargava 2011). *Iris*, *Crocus* is the family representatives in the Kashmir. *Iris* is represented by 9 species, of which 5 are temperate alpiners. *Iris* is wide

spread in Europe, Afghanistan, Central Asia, Siberia, Mongolia, and Korea. The family name is based on the genus *Iris*. (Kandemir 2011). The genus *Iris* dates from 1753, when it was coined by the Swedish botanist, Carl Linnaeus. Its name derives from the Greek Goddess, Iris, who carried messages from Olympus to earth along a rainbow,

whose colours were seen by Linnaeus in the multi-hued petals of many of the species. Members of Iridaceae family occur in a great variety of habitats. The genus has eastern extension in China and Eastern Himalaya with *Iris hookeriana* and *I. kashmiriana* are endemic to North Western Pakistan and Kashmir, (Lone 2013). Genus *Crocus* in our area is represented by single cultivated species, (Trak *et al.*, 2013). The investigation of 12 plant species belonging to crocus and Iridaceae family, gives some valuable information which is used enormously by locals mainly by residents of far-flung area of Kishtwar district. Of the twelve mentioned plant species belong to Iridaceae family. Most of the plant species are wild. Plants and their extracts have immense potential for the management and treatment of various diseases. The phytomedicinal property for curing various diseases are not only cheap and affordable but are also purportedly safe, as they are used traditionally from the ancient time. There is no conservation programme for the valuable source of medicinal flora. The traditional systems of medicine were used in health care by many countries of the world. For a long time, the knowledge of traditional systems of medicine was confined to the local communities only. It is only during the recent years that much of the traditional knowledge associated with the health care system has been documented and subject to scientific verification through ethnobotanical studies coupled with medicinal investigations. These studies, in fact, have led to the discoveries the wonders that the plants of a single family, i.e. Iridaceae are very much important as per their taxonomic and ethnobotanical use is concerned. Although ethnobotanical studies have been carried out in many countries, including India, there are many geographical areas where rich traditional knowledge associated with ancient cultures is not yet documented. Jammu and Kashmir State (India) of Himalayas is one

such area where livelihoods of communities are based upon plant resources and unique plant culture. The present studies on "Ethnobotanical and Taxonomic Study of Members of Iridaceae Family of Kishtwar Jammu and Kashmir (India)" was, therefore, undertaken with the objectives: (i) to document the traditional knowledge associated with the plant resources, (ii) to carry out an economic evaluation of the plant resources traditionally used, (iii) to assess the conservation status of plant species used, and (iv) to access the taxonomic study of the plant species. In short, efforts were made by the author to explore the plants belonging to the Iridaceae family.

CONCLUSION

Of the ethnobotanical information of medicinal plant in study area, it was noted that different plant species of the Iridaceae family are used to cure different ailments in different ways. Each plant of the Iridaceae family has its importance at its own place. Efforts need to be made to conserve the plants of the Iridaceae family and need to pay attention to aware the people for the potential of medicinal plants to cure various diseases and to protect them to become endangered or extinct. If we do not do the efforts to preserve them, we will lose them forever.

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REFERENCES

- Blatter, E. Beautiful Flowers of Kashmir, John Balc, Danielsson, London. 2 Vol. (1928-29).
- Coventry, B.O., Wild Flowers of Kashmir, Raithby, Lawrence, London. Series 1-3 (1923-30).

3. M.A. Khan., Dar G.H., R.C. Bhagat. Biodiversity of Kashmir Himalaya. Valley Book House, Srinagar, Kashmir (2004).
4. Dhar, U. & P. Kachroo.. Alpine Flora of Kashmir Himalaya. Scientific Publishers Jodhpur, India (1983).
5. Pandey, A.K., Jun Wen., J., Dogra, V. V. CBS Publishers and Distributors, New Delhi. Hooker, J.D.. The Flora of British India, L., Reeve, London (1872 – 1897).
6. Khan, Z. S., Khuroo, A.A., Dar, G. H., Naqshi, A.R., Vegetational profile along varied spatial habitats in Uri, Kashmir Himalaya. In Plant Taxonomy: Advances and Relevance (eds. A.K. Pandey, Jun Wen & J. V. V. Dogra) CBS Publishers and Distributors, New Delhi (2004).
7. Stewart, R.R. An Annotated Catalogue of the Vascular Plants of West Pakistan & Kashmir. (E. Nasir & S.I. Ali eds.) Karachi (1972).
8. Bhargava, V. Medicinal uses and pharmacological properties of *Crocus sativus* linn (saffron). International Journal of Pharmacy and Pharmaceutical Sciences, 3: 22-26(2011)
9. Kandemir, N., celiki, Surucu, A, Ecological response of some *iris* l. taxa (Iridaceae) in turkey, Bangladesh J. Bot. 40(2): 177-184 (2011).
10. Lone, A., P., Bhardwaj, A. Ethnomedicinal uses of certain locally available plants of Bandipura district of Jammu and Kashmir India Int. Jour Med. Arom. Plants, vol. 3:477-485 (2013).
11. Trak, T., Ayub, H., Upadhayay., R. Inventorization of ethnosacred plants of Kishtwar District, World journal of pharmaceutical research, 3: 295-310 (2013).
12. Ajaib, M., Khan, Z., Abbasi, M., Raiz T. Antimicrobial screening of *Iris aitchisonii* (Baker) Boiss. Biologia (Pakistan) 59: 51-52 (2013).
13. Rana, M. S., Samant, S. S. Diversity, Indigenous uses and conservation status of medicinal plants in Manali wild. Indian Journal Of Traditional Knowledge 10:439-459 (2011).