

DIVERSITY AND UTILIZATION OF GYMNOSPERMS IN SWAT-KOHISTAN HINDUKUSH RANGE, PAKISTAN

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ABSTRACT

Diversity and utilization of nine Gymnosperm species belonging to four families occurring wild in Swat-Kohistan have been described. Each plant is followed by local name, distribution range, short taxonomic description, part used and local uses.

Key Words: Diversity, Utilization, Gymnosperms, Swat-Kohistan.

INTRODUCTION

Swat lies between 34°, 34' to 35°, 55' North latitude and 72°, 08' to 72°, 50' East longitudes. The entire area covers about 5337 sq. km. The area comprises of gorges and tributaries opening in to the Swat River. The altitude varies from Thana (1000 m) to Mankial (5800 m) having high Plant Biodiversity (Anonymous, 1998). Agriculture is the main occupation of the people of the Swat Kohistan; however sheep, goats, and other animals are also kept as source of income.

Though considerable work has been done on the taxonomic (Stewart, 1972; Beg and Khan, 1977; Nasir and Ali, 1970-1989; Ali and Nasir, 1989-1991) and Ethnobotanical studies of various aspects of the Plant Biodiversity (Hussain *et al.*, 1995; Ahmad, 1996; Khan, 1996; Gul *et al.*, 1999; Shinwari and Gilani, 2000; Khan, 2001; Shinwari *et al.*, 2000 a; Shinwari *et al.*, 2000 b; Muhammad *et al.*, 2003; Thomas and Shengji, 2003; Shinwari *et al.*, 2003; Din *et al.*, 2003; Iqbal *et al.*, 2004; Hussain *et al.*, 2006; Ullah *et al.*, 2009;) but most of their works are confined to taxa of angiosperms only. The locals rely upon the species of gymnosperms which have remained unexplored. The gymnospermic flora of the area is under severe stress of cutting therefore, the present study was initiated to fill this academic gap and to aware local people about the sustainable utilization of the Plant Natural Resources of the area.

MATERIALS AND METHODS

Field studies were arranged from May to September 2005; specimens were collected, documented, preserved and identified with the help of literature (Nasir and Ali, 1970-1989; Stewart, R. R. 1972; Ali and Nasir, 1989-1991; Polunin, O. and A. Stainton, 1990; Nasir and Rafique, 1995). Ethnobotanical information were collected from the local people and Hakeems regarding local name, part used and local uses about the Gymnosperm of the area. Voucher specimens were deposited in the Peshawar University Herbarium (PUP).

RESULTS AND DISCUSSION

Nine Gymnospermic species belonging to four families viz. Cupressaceae, Ephedraceae, Pinaceae and Taxaceae were reported from the area as per following details.

KEY TO THE MEMBERS OF FAMILY CUPRESSACEAE

- +Leaves 4-7 mm long; ovate-lanceolate, not jointed at the base. Fruit 1-seeded -----1. *J. comminus*
- Leaves 5-15 mm long, lanceolate jointed at the base; Fruit 2-3-seeded -----2. *J. squamata*

1. *Juniperus comminus* L.

Local name: Awbeer

Distribution: Alpine and Arctic Europe and Asia, N. Africa, N. America. Forms dense patches near the tree limit and up to 4200 m.

Dioecious, shrubby decumbent plant. Branches dense. Leaves in whorls of threes, 8-12 x 2-4 mm, subulate, pungent, jointed at the base, ± curved to sub erect. Male cones axillary, c. 8 mm long; female cones solitary, 20 mm long, scales 3. Fruit subglobose, bluish-black, 8-12 mm broad. Seeds 2-3, ovoid.

Uses: Wood is fuel, leaves are used as incense; bark is used for local liquor.

2. *Juniperus squamata* Buch-Ham. ex D. Don

Local name: Awbeer

Distribution: E. Afghanistan, Chitral eastward to W. Nepal, N. Burma, Middle and W. China.

Dioecious bushy, semiprostrate plant. Leaves decurrent, in whorls of 3, ovate-lanceolate, pungent, 4-7 mm long, concave. Male and female cones terminal at the end of short lateral branchlets. Fruit ovoid, brown to purple-black, 8-10 mm long, glabrous, 1-seeded.

Uses: Fresh and wet wood is used as fuel. Also used as in bile, as anti-tension, anti-depression, anti-frustration, blood purifier and as mental tonic in human beings.

FAMILY EPHEDRACEAE

Ephedra gerardiana Wall. ex Stapf

Local name: Someni and Asmany Booty

Distribution: Afghanistan, Chitral, eastward to W. Nepal, Bhutan, S. W. China.

Plant shrubby, tufted, dense, 20-120 cm tall. Branchlets green, ascending, striate and smooth. Male strobilus solitary or in cluster of 2-3. Flowers 4-8; bracts obtuse, connate. Staminal column exerted; anthers 5-8. Females strobili solitary. Bracts 2-3-pairs, strobillus 1 mm long, straight. Berry 7-8 mm long, ±ovoid, red.

Uses: Root ash is applied on injuries and wounds. Shoot decoction is used as expectorant and febrifuge.

KEY TO GENERA OF THE FAMILY PINACEAE

1. + Leaves born solitary on long shoots; short shoots absent -----2
- Leaves born in whorl on long or short shoots -----3
2. + Leaves linear-flattened; cone erect; sporangia open by transverse slit -----1. *Abies*
- Leaves needle like; cone pendulous; sporangia open by longitudinal slits -----3. *Picea*
3. + Leaves short, needle like, spiral, fascicled on dwarf ones; cone erect; male cone solitary on dwarf branches -----2. *Cedrus*
- Leaves scale like on long shoots; short shoots with acicular leaves; male cone clustered at the base of young dwarf shoots -----4. *Pinus*

1. *Abies pindrow* Royle

Local name: Achar

Distribution: E. Afghanistan, Himalayas eastward to W. Nepal. Common and gregarious in the Himalayas up to 3100 m.

Trees up to 30 cm tall or more, with a narrow pyramidal shape. Bark fissured, light grey to brown. Leaves spiral, 2-4 cm long, axillary, ellipsoid, reddish-green; microsporophyll with 2 linear sporangia; microspores winged. Female cones 8-12 cm long, solitary or in pairs, narrowly oblong, violet purple; megasporophyll obovate, 2 cm long. Seeds 1-1.2 cm long; wing twice as long as the seed.

Uses: Wood is used for planking, ceiling and flooring, packing, cases, shingles and water troughs, furniture of inferior quality and various other articles of common use. Small branches are used as fuel wood, fresh leaves are ground and mixed with equal quantity of honey and given to patients 1 teaspoonful twice a day for curing cold and cough. Twigs and leaves are fed to cattle and also laid on floor for beddings. Bark and leaves contains tannins and used as tea substitute by nomads.

2. *Cedrus deodara* (Roxb. ex Lamb) G. Don

Local name: Diyar

Distribution: Afghanistan, Kurram eastward to Kashmir and W. Nepal. Commonly gregarious at altitude from 2000-3000 m.

Trees up to 30 m long with spreading horizontal branches; branchlets drooping. Leaves acicular. 2.5 cm long 3-sided. Male cones solitary at the tips of dwarf shoots, erect, cylindrical, purplish at maturity, 2.5-4.5 (-7) cm long; microsporophyll spirally arranged, each with 2 oblong sporangia; microspores not winged. Female cones solitary, erect, terminal at the end of shoots; young cones greenish, mature cones brown, barrel-shaped, 7-12 x 5-9 cm; sporophyll fan shaped, deciduous, leaving a central woody axis. Seeds obovate, 4-6 mm (excluding wing) with a large light wing.

Used: Reddish brown oil extracted from its heartwood is applied locally for treating piles, ulcers, skins disorders and rheumatic pains. Rubbed on body to repel insects, ticks and mites. Up to three drops of the oil locally called 'Ranzarran' with in a glass of water as cooling agent and blood purifier. 50 ml is given orally once a day for 3-4 days against dysentery and fever. Wood is most durable and is valuable timber for construction. It is used for bridge construction, beams, posts, door and window frames and shingles etc.

3. *Picea smithiana* (Wallich) Boiss.

Local name: Magazay

Distribution: Afghanistan, Himalayas eastward to C. Nepal. Common from 2500-3300.

Tall tree up to 30 m or more. Bark grayish-brown. Branches drooping. Leaves 2.5-4 cm long. Male cones axillary, solitary, 2-2.5 cm long. Microsporophyll with 2 linear sporangia. Young female cones erect reddish-green, mature ones pendulous, dark brown, ellipsoid, 10-15 x 2.5-5 cm. Bract scales membranous. Seeds 5-6 mm long, dark grey, wing twice as long as seed.

Uses: Strong branches and wood are used for building of houses and huts. Dried wood is used as fuel. Young shoots are used for beddings. Oleoresin is applied locally on the cracks of heels and also on wounds. Bark is used for roofing of huts. The leaves are also used for packing fruits.

KEY TO THE SPECIES OF GENUS *PINUS*

+ Leaves in the fascicles of 3 -----1. *P. gerardiana*
-Leaves in the fascicles of 5 -----2. *P. wallichiana*

1. *Pinus gerardiana* Wall. ex Lamb.

Local name: Nakhtar

Distribution: the Himalayas from Chitral eastward to Bhutan, Sikkam. Common from 600-1800 m.

Trees up to 18m tall spreading at top and with irregular branches. Bark silvery-grey, thin. Leaves in clusters of 3, stiff, acicular, 6-12 cm; sporophylls woody, apex with recurved beak. Seeds about 20 mm long, ± cylindrical, with a shot wing.

Uses: The seeds are edible and commonly call "Chalghoza." Juice is extracted from the fresh leaves and bark by grinding, mixed with water and taken twice a day before meal for toothache, sore throat and lung-infections. Dried powder of the leaves and bark is taken with water for diarrhea. Decoction of the leaves is taken for scabies. Wood is resinous and heavy. It is used in buildings, huts, for making boxes and also as firewood. The resinous pieces of the wood locally called 'Lithkay or Shontay' are used for lighting. The dried leaves are used for thatching of mud houses and also for packing. Resin extracted from the wood is applied on cracked heels. Its resin is locally called 'Jaula' is a stimulant used for ulcer, snakebites, scorpion stings and skin disease. The carbon collected from burning of the resinous wood is mixed with few drops of mustered oil to make black paste called 'kajal'. This is used by young girl to make their eyes attractive. Dried cones are used as firewood. Living in a hut built in a pine forest for few months is believed to cure tuberculosis.

2. *Pinus wallichiana* A. B. Jackson

Local name: Nakhtar

Distribution: Afghanistan, Chitral eastward to W. Nepal. Common and gregarious in the Himalaya from 1800-3500 m.

Trees up to 30 m tall. Bark grey, scaly. Branches whorled. Leaves acicular, in clusters of 5, 10 to 20 cm tall, bluish to grey-green. Male cone 1-1.5 cm long, in dense clusters. Female cones 2-3 at the tips of branches, 15-30 cm

long, elongated, dropping, \pm woody; megasporophyll broadly obovate, tip not beaked. Wing 2-3 times as long as the seed.

Uses: Oleoresin is applied locally on the cracked heels. Resin is mixed with butter and eaten before meal as anthelmintic; some people also crush the young shoots, mix it with butter and use it externally for etching. The yellow dye made from decoction of its bark is used to dye wool. The leaves when ground with soil forms a paste, this is locally applied to treat internal injuries of cattle. Wood is light and preferred for construction purposes and furniture. Cones are used as firewood and for interior decoration.

FAMILY TAXACEAE

Taxus wallichiana Zucc.

Local name: Banerya

Distribution: Afghanistan, N. W. India, Burma, Indonesia and Philippines. Common in the Himalayas from 1800-3000 m.

Diocious tree 6-18 m tall. Branches spreading, irregular; bark reddish-brown, scaly. Leaves spirally disposed, linear, 2-4 cm long, upper surface green, shiny. Staminate cones solitary, globose, axillary on the underside of the branches. Sporophyll 6-10 in number, peltate, each with 5-8 pendent sporangia; microspores not winged. Female cones solitary, axillary, green, with 3 pairs of scales, decussate. Seed olive-green, when young (ovule) partially surrounded by a red fleshy aril.

Uses: A fine furniture wood, berries are edible. Powdered bark is used as tea substitute. Fruit is used as sedative and antiseptic. Also used as emmenagogue and antispasmodic. The hard, reddish wood is used for making grain ponders called 'Sota'. It is used for retentions of walls, doorframes, boxes, handles of tools, ploughs and beams. Leaves are used as fodder.

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