OAKS IN PAKISTAN - A REVIEW

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ABSTRACT

Literature has been reviewed and compiled the scattered informations. There are over 400 species of Oaks which are distributed in the moist and dry temperate forests of the world. Six species namely *Quercus baloot, Q. dilatata, Q. glauca, Q. incana, Q. rubra and Q. semicarpifolia* are found in temperate and sub-tropical forests of Pakistan. The key character, brief description, distribution, ecology and uses of these species are discussed.

INTRODUCTION

The oaks are extremely slow growing, crocked trees, once occurred over large area in Pakistan but they have been universally destroyed, by felling and lopping, to provide timber and fuelwood and to create cultivated land and whatever remains today occurs as a low scrub and only provide fuel and forage. Oak species are important both economically and silviculturally: provide a watershed cover over the steep mountainous slopes and a habitat for big game, black mush room, some medicinal plants and as a nurse to conifers seedlings with which these are frequently associated. Dry oak forests were found to indicate mediterranean climate as elsewhere in the world, however, they comprise of two sub-types in Pakistan: pure dry oak forests with true mediterranean climate and the dry oak-chir ecotonal forest with transitional mediterranean climate (Beg and Khan, 1980).

The Oaks (*Quercus* spp.) are the members of family Fagaceae. There are over *400 species* which are distributed in America, temperate Europe, Asia, sub-tropical Africa, Australia and other part of the world. In Pakistan six species namely *Q. baloot, Q.dilatata, Q.glauca, Q.incana, Q.rubra* and *Q.semecarpifolia* occur wild in nature in moist and dry temperate forests (Champion et al, 1965). Among these species *Q. rubra* is planted and has been naturalized, however, it is not common (Stewart,1972 and Yasin,1976).

The **Oaks** are monoecious, evergreen or deciduous trees, rarely shrubs. Leaves are alternate, usually toothed or lobed, stipulate. Male flowers in pendulous catkins, solitary or in cluster, bracts small, perianth campanulate or cupular, 3-6 lobed or partite; stamens usually 6 pistiloide sometimes present, usually 0. female flowers with an involucre of small scales, solitary or in cluster of 3 on erect or axillary in few flowered spikes. Ovary 3-5 locular; styles usually 3 or as many as the loculi. Fruit (acorn) is, partially enclosed in a cupule formed by the accrescent and hardened involucral scales; seed frequently solitary, rarely more. The size of fruit varies considerably on the same tree.

The wood of all the indigenous oak is brownish, very hard, with distinct pale coloured sapwood and very indistinct annual rings. The medullary rays are of two types, some very fine and other very broad, the latter causing a silver-grain which can be seen on radical sections. The wood, raps and shrinks in seasoning and is very rarely used as timber except for ploughs, but is the favorite wood for firewood and charcoal (Gamble,1902).

The specimens available in the herbarium were studied thoroughly and also

reviewed the literature and set a key for identification. In addition to this, brief description, distribution, ecology and uses of each species is given below:

KEY CHARACTERS

1. + Leaves pinnatifid or partite, auricled at the base. **1 .*Q. rubra***
   - Leaves entire or spiny-toothed, not auricled at the base. **2**

2. + Bracts 3-4 mm long. Styles sub-capitate. The accrescent scales of the cupule in annular rings. **2.*Q. glauca***
   - Bracts less than 2.5 mm long. Styles linear or clavate. The cupule of imbricate scales. **3**

3. + Lower leaf surface rusty-tomentose. Acorn sub globose, the cupule covering only of its base. **3.*Q. semecarpifolia***
   - Lower leaf surface whitish-tomentose to glabrescent and pale green. Acorn ovoid or oblong, the cupule covering 1/3 to 2/3 of it. **4**

4. + Leaves always coarsely toothed. Upper leaf surfaces dark green and spiny,lower white-tomentose. **4.*Q. incana***
   - Leaves entire to spiny toothed, upper surface green, lower pale to whitish-tomentose, becoming glabrescent. **5**

5. + Small tree or shrub. Young shoots and under surfaces of leaves stellate pubescent. Anthers hairy. Acorn more or less cylindric. **5.*Q. baloot***
   - A medium to large sized tree. Young shoots and under surfaces of leaves glabrescent. Anthers glabrous. Acorn more or less ovoid. **6.*Q. dilatata***

Name: *Quercus baloot* Griff.
Syn.: *Quercus ilex* Auch.
Eng. name: Holm Oak
Vern.: Brech

Description

A small medium sized (2-12m tall), monoecious, gregarious, evergreen tree.It flowers between April and May and fruiting period is 12 to 18 months after pollination.

Distribution

It is native of India, Pakistan and Afghanistan, distributed from Syria westward to Atlantic. In Pakistan it is found in the Himalayas and Hindukush mountains specially Kurram, Dir, Chitral, Swat, Nanga Parbat, Tirah etc (Parker,1918; Stewart, 1972 and Yasin,1976).

Ecology

Tree grows on dry, stony and arid soils. It requires a precipitation of 200 to 1000 mm/year or more. It prefers a sub-humid, semi-arid temperate mediterranean climate with a temperature range of -20 to 35° C at an elevation between 1500 and 3000 m. It coppices well and is attacked by powdery mildew and leafy mistletoe. The tree is well suited for planting in watershed areas to help erosion control.

Uses

The bark is used for tanning purposes. The stored leaves when shed the spines are used as winter fodder. The heartwood is red or reddish-brown and very durable having specific gravity 0.94. It is well polished and largely used for tool handling agricultural implements. It yields good fuelwood and charcoal (Calorific value 5100 Kcal/Kg) (Sheikh,1992). The branches are used for fencing purposes.

Name: *Quercus dilatata* Lindl.
English name: The Holy Oak
Vern.: Barungi, Moru

Description

A large (24-30 m tall), monoecious, gregarious, evergreen tree. It flowers between April and May and fruits between May to October, a year after pollination.

Distribution

The tree is native to India, Pakistan, Afghanistan and Nepal. In Pakistan, it is found in the Himalayas specially in Dir, Chitral, Swat, Hazara, Tirah, Kurram Agency, Murree Hills and Azad Kashmir; Poonch (Stewart, 1972 and Yasin, 1976).

Ecology

It grows on deep , rich moist, well drained soils and prefers moist shady sites. It requires a precipitation of 500 to 1200 mm/year or more. Prefers humid to sub-humid, cool- cold temperate climate with a temperature ranging from -20°C to 35°C, at an elevation between 1600 to 2900 M. It coppices well, young shoots are heavily browsed and tree attacked by leafy mistletoe (Troup, 1921). In order to maintain diversity of tree species, attempts must be made to ensure its regeneration with conifer species as it is important component of conifers.

Uses

The leaves and young shoots are extensively used as fodder for sheep and goats and seeds can be used as poultry and livestock feed (Watt,1891; Gul and Khan, 1979). The heartwood is reddish-grey (specific gravity 0.95) with darker streaks, very hard and seasons well. It is very elastic, easily worked, wraps and used in building and agricultural implements and extensively used in manufacturing of charcoal (calorific value 4900 Kcal/Kg).

Name: *Quercus glauca* Thunb.
Syn.: *Q. annulata* Sm.
Vern.: Barin, Banni.

Description

A medium sized (5-20 m tall), monoecious, evergreen tree. It flowers between March and April and fruit ripens between July to August (Parker,1918).

Distribution

It is native to India, Pakistan, Afghanistan, Nepal, Bhutan, China and Japan (Sheikh,1992). In Pakistan it is found in Dadar, Garhi Habibullah, Murree, Kashmir; Poonch.

Ecology

The least common of our oaks, is sometime found in moist temperate climate with freezing temperature in winter. It requires a precipitation of 900 mm/year with an elevation range between 700 to 2000 m. It is managed for fuelwood but branches are lopped for fuel and fodder.

Uses

The wood is grey or grayish-brown, very strong and durable, handsomely mottled and polishes well and oftenly used in the construction of bridges, for making door-posts, window-frames, rafter etc. Its wood is also used for fuelwood, and leaves for fodder.

Name: *Quercus incana* Roxb.
Syn.: *Q.leucotrichophora* A.
English name: White Oak
Vern.: Rien

Description

A medium sized (18-24 m tall), monoecious, gregarious, evergreen tree with rounded crown. It flowers and fruits between April-May and November-January respectively (Yasin,1976).

Distribution

It is native of India, Pakistan, Nepal and

Upper Burma. In Pakistan, it is found frequently in Himalayas mountains specially Dir, Swat: Madian, Hazara, Murree hills and Kashmir; Poonch.

Ecology

The species is light demander but at seedling stage requires shade. Tree grows on a variety of geological formations including shale, gneiss, mica-schist, quartzite, limestone and deep rich moist, well drained soils and prefers moist shady sites. It requires a precipitation of 1000 to 2300 mm/year (Parker, 1918 and Troup, 1921). It prefers humid to sub-humid moist temperate climate with a temperature range -10 to 30° C on an elevation ranging from 1000 to 2400 m. Tree coppices well and shoots may be heavily browsed and is commonly attacked by leafy mistletoe. It is associated with Deodar and Rhododendron species. It has proved very useful nurse to the *Deodar* seedlings specially on hot slopes.

Uses

The bark yields reddish-brown colouring matter which is extensively employed for dyes and tanning purposes. The fruits posess medicinal values, and are given as diuretic and gonorrhoea and also as an astringent in indigestion, diarrhoea and in asthma. The leaves are extensively lopped for fodder. The acorns are greedily eaten by monkeys which account to some extent for the sparse natural reproduction of the trees in spite of profuse seedling. The heartwood is very hard, reddish-brown in colour, difficult to season and generally used for agricultural implements, fuelwood and charcoal.

Name: *Quercus rubra* L.
Syn.: *Q. pedunculata* Ehrh.
English name: English Oak

Description

A variable tree in size, in shape and in the degree of incision of the leaves. It flowers between April-May and fruit ripens between July-August.

Distribution

The species is native to temperate and S. Europe, Turkey and N. Iran and cultivated in N. America.

Ecology

In Pakistan this oak has been planted at various places on the hills such as Quetta, Parachinar, Murree hills etc up to 2200 m. It requires a deep soils and grows well on areas of light snowfall. The species regenerate naturally.

Uses

The bark is used in leather industry for tannin purpose. The wood is durable and is used fuelwood and construction purposes.

Name: *Quercus semecarpifolia* Sm.
English name: Brown oak
Vern.: Binjar

Description

A large (25 to 30 m tall) monoecious, gregarious, evergreen tree. It flowers between May-June and fruit ripens between July and August.

Distribution

The species is native to India, Pakistan,

Afghanistan and Nepal.

Ecology

It grows in pure stands or in association with conifers on well drained soils of moist temperate climate with an annual rainfall of 1000 mm and freezing temperature, on an elevation ranging between 2500 to 3800 m. It coppices well, reproduces readily from seed, forms almost pure forests or associates with conifers. The wood is said to be liable the attacks of insects. The species is heavily lopped for fodder and fuelwood, as a result it is gradually disappearing form its natural habitat (Troup,1921).

Uses

The leaves are used as fodder and stored in winter for the same purpose. Heartwood is grayish often with a reddish tinge, commonly used in the house building, door-frames and agricultural implements. It is a good firewood and an excellent source of charcoal.

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