SPOTLIGHT SPECIES ON: *JUNIPERUS EXCELSA*, M. BIEB.

Muhammad Shabir Mughal, Assistant Forest Ecologist, Pakistan Forest Institute, Peshawar

Juniperus excelsa, M. Bieb. (Himalayan pencil cedar, Snober, Obust) is a member of family Cupressaceae of Gymnosperms. It is dioecious, medium sized, evergreen tree, bark reddish-brown to grey, vertically fissured, exfoliating in fibrous strips. Leaves of two kinds; one sharp and needle like and the other flat and feather like or scale-like, closely pressed, with a large oblong elliptic glands in the center of the back. Flowers unisexual, the male at the tips of the branches, the female terminating short side branchlets. Flower appears between May and June and fruit berries ripen between September and October in the next year. Fruit 0.8 cm diameter, globose, blue-black and very resinous. Each fruit contains 2-5 seeds (Parker, 1926).

Distribution and Ecology

It has limited geographical distribution. The tree is native of the arid tract of the inner Himalaya. It extends from Pakistan eastwards to Nepal and also found in Afghanistan, Iran and Arabia. It forms extensive wood in mountainous regions (Sheikh, 1993; Troup, 1926).

The biggest chunk of juniper forest in the world occurs in Ziarat, Kalat and Loralai districts of Baluchistan (Khattak, 1963). Locally it is found in the arid regions of Kaghan valley, Chitral, Northern Areas and Kurram valley of N.W.F.P. (Stewart, 1972).

It is xerophytic in nature and grows in the mountainous areas on all types of rocks such as limestone, grey-sandstone, conglomerates and shales at an altitudes from 2500 to 4500 m in the mediterranean type of climate with an average annual rainfall of 210-300 mm falling mainly in the winter and occasionally in summer (Champion et al., 1965). The maximum summer temperature varies from 27°C to 28°C and minimum winter temperature -4°C to -9°C. The soils of juniperus tract area are poorly developed and have shallow profiles due to inadequate rainfall and steep slopes.

Silvicultural characteristics

The tree rarely forms a clean bole, usually branched at the base and lowest branches usually get buried in the soil/debris. It has strongly very well developed spreading root system and is wind firm. It is hardy both drought and frost, enduring very low temperatures. Seedlings are extremely tender and require moderate climate nor severe hot nor severe cold and survive only under shrubs in

natural condition which provide protection from grazing. It requires partial shade during its seedling and early sapling stages, later on full light for optimum growth (Troup, 1921) Some seeds are produced as a rule every year but good seed-years occur at less frequent intervals. An average radial growth rate and increment of the 12 cross-sections was 18 years/cm and 0.008 cm/year (Ahmed et al., 1990). It was generally observed that decay increased progressively with increasing diameter of the tree therefore, a rotational period of 200 years suggested for juniper forests (Zakaullah and Badshah, 1977).

Propagation

It is proposed mainly from seeds under natural conditions and layering has also been reported (Sheikh, 1993). Seed viability is approximately 5 percent (Sheikh, 1984). It has to be sown immediately after collection of the fresh seeds to get good germination percentage. In the nursery beds, the seed keeps on germinating for 2 years, the first germination starts within two months after snowing. Seedling are pricked in polythene bags when 2-5 months old in the nursery beds. Field planting is successful when plants are 2 years old or even more in the nursery (Sheikh and Rafique, 1982). The best time for planting of seedling is March as soon as the snow is off; the ground and the soil can be worked easily. However it can also be planted in August but summer rainfall is not reliable.

Pest and diseases

Wild rats and porcupines do a certain amount of injury to young plants. It is susceptible to bark beetles, especially in a stressed condition (Chaudhry and Rehman, 1979) and is attacked by dwarf mistletoe; *Arceuthobium oxycedri* and fungi; *Pyrofomes demidoffii* (Zakaullah and Badshah, 1977). Dwarf-mistletoe is a destructive parasite and to reduce its incidence through sanitation measures such as pruning and felling of infested trees were recommended (Siddiqui, 1993).

Management

This is a very important tree for watershed protection throughout most of its range in many areas. It has been harvested for fuel without regeneration. There are numbers of reasons by which regeneration fails that the percentage of filled seeds decrease as the berries mature; large number of seeds were empty because no embryo formed; seeds were eaten by insects and poorly developed soils (water holding capacity ranged from 21 to 41% while the amount of organic matter ranged from 0.37 to 5% only) (Sheikh, 1984; Ahmed et al., 1990). A major efforts is needed to reforest the valuable watershed with this valuable tree and its associates which are indigenous or naturalized to area and comparatively fast growing species like *Fraxinus xanthoxyloides* (Ziarat ash), *Gleditschia tricanthos* (Honey locust), *Pistacia khinjuk* (Pistacio Nut), *Morus alba* (Mulberry), Poplar and *Acer* species. Planting of above said species will not only solve the fodder and fuelwood problem of the inhabitants but also improve the soil and favourable conditions for the juniper regeneration. Grazing, felling of green juniper trees and cultivation of fruit orchards should be stopped/controlled at all costs and local people be encouraged and motivated to grow trees on their own land for fuel and timber purpose (Siddiqui, 1993).

Uses

The wood is moderately hard and fragrant, seasons slowly without any difficulty neither wrapping nor splitting. It is used locally for building and fuel but suitable for pencil-making (Ishaq, 1955). Juniper berries are well known for its oil contents which are used in different pharmaceutical preparations and for flavoring the

gin (oil from fruit is carminative, stimulant and diuretic). It was estimated that 2239.2 tones/annum of juniper berries can be safely collected from the juniper tract (Zaman et al., 1968).

The bark is used for thatching the houses and twigs are used for fencing the agricultural crops.

Research needs

- Permanent control of juniper dwarf mistletoes through silvicultural and biological means.
- Monitoring the status of mistletoe infestation.
- Planting of broad-leaved species in conjunction with juniper species on small scale as an experimental plot for improving the habitat.

REFERENCES

Ahmed, M., Ehsan, E. and Eugene, L.M.W., 1990. Present state of Juniper in Rodhmallazi Forests of Balochistan. Pak. Jour. For. Vol.40(3): 227-236.

Champion, H.G., Seth, S.K. and G.M. Khattak, 1965. Forest Types of Pakistan. Pakistan Forest Institute, Peshawar.

Chaudhry, M.I. and Rehman, W. 1979. Insect pest of Juniper, their parasite and predators. Pak. Jour. For. 29(1): 21-24.

Ishaq, S.M. 1955. Exploitation of Baluchistan Juniper Forests for pencil Industry. Pak.Jour. For. 5(4): 167-175.

Khattak, G.M. 1963. Working Plan for the Juniper Forest of Quetta Civil Division. Govt. Printing Press, W.Pakistan.

Parker, R.N. 1926. A Forest Flora for the Punjab with Hazara and Delhi. Printed by the Superintendent, Govt. printing press, Lahore.

Sheikh, M.I. 1984. Germination trials of juniper seed. Technical Notes (Nos. 1-55). Pakistan Forest Institute, Peshawar.

Sheikh, M.I. 1993. Trees of Pakistan. Winrock International Institute for Agriculture Development, Pictorial Ltd., Islamabad, Pakistan.

Sheikh, M.I. and Rafique, M. 1982. Effect of light, shade and age on survival of transplanted seedlings of *Juniperus excelsa* M. Bieb. Pak. Jour. For. 32 (1): 28-29.

Siddiqui, K.M. 1993. Tour Note of Dr. K.M. Siddiqui, Director General, Pakistan Forest Institute, Peshawar (September, 1-8) on the disease of juniper Forests in Ziarat, Baluchistan (Mimeo).

Stewart, 1972. Flora of West Pakistan. Printed in Fakhri Printing Press, Karachi p.27.

Troup, R.S. 1921. The Silviculture of Indian Trees. Clarendon Press Oxford. Oxford. Vol.III.

Zakaullah and Khial Badshah, 1977. Survey of Juniper Dwarf-Mistletoe in Sasnamana State Forest of Balochistan. Pak. Jour. For. 27 (1): 39-50.

Zaman et al., 1968. Survey of Juniper berries in Baluchistan Forests and prospects for their exploitation. Pak. Jour. For. 18(1): 503-509.