

Environmental changes effect the biomass production in some conifers

Geetika Sirhindi

Department of Botany, Punjabi University, Patiala-147 002. INDIA

kumarp@pbi.ernet.in

Conifers are the major body of the forest cover all over the world. They are all woody and mostly evergreen, and consist of 41 genera and approximately 400 species of trees and shrubs, widely distributed in the temperate, subtropical and tropical regions of both hemispheres. Conifers are capable of growing under a wide range of conditions. Many can tolerate moisture stress and, therefore are able to survive in semi-arid and arid regions. Others are capable of growing on barren or nutrient poor soils or in extremely cold climates. Some species have co-evolved with naturally occurring wildfires and can co-exist with these catastrophic disturbances. And, most important, many conifers are capable of producing both wood and non-wood products, which are of great benefit to human society.

The chief economic product of this family is wood, and in this respect the group occupies a unique position, which is out of all proportion to its size botanically. Several factors contribute to this situation. Coniferous trees are frequently gregarious and often cover wide tracts with almost pure stands or stands of relatively few species. These forests attain their maximum size and area in the temperate zones where to date industry, with its many demands for wood, has attained its greatest impetus; in fact has been the ready accessibility of these coniferous forests and their exploitation on a large scale which has been responsible in no small measure for the rapid march of civilization in recent times.

Scarcely second in importance to timber production, at least in many instances, are the intangible contributions which the trees of coniferous group make in terms of relaxation, health and aesthetics. The stately beauty and dignity of the conifers has resulted likewise in their use for large-scale scenic effects. Coniferous wood exhibit a wide variation in physical and chemical properties but a surprisingly limited range in structure; in fact, so uniform is the structure of these timbers that their identification as to species is often very difficult or quite impossible.

In India the Conifers are represented by at least 21 native species, distributed in 10 genera. Most of these are Himalayan and of relatively little importance in comparasion to the tremendous number of hardwood species which are available in greater quantity. In addition to the above a number of exotic conifers are cultivated for ornament, among which *Thuja orientalis*, Linn., *Cryptomeria japonica*, Don, *Cunninghamii sinensis*, R. Br., *Araucaria excelsa*, R. Br., and *A. cunninghamii*, Ait., deserve special mention. One native conifer of Himalayan region is genus *Juniperus*. The genus *Juniperus* is important as furnishing the true pencil cedar wood of commerce, and a number of species and various varieties of the dwarf forms are extensively cultivated as ornamental shrubs.

The objective of the present paper is to provide the information regarding the role of conifers, specially emphasized on *Thuja orientalis*, Linn., an exotic species and *Juniperus* species (*J. chinensis*, *J. prostrata*, *J. variegata*) some of which are native to the Himalayan region, as good biomass resources. Present research was done in the year 1997-1999 during that we investigate that how total biomass production fluctuate in these conifers while facing different seasonal variations as they grow outside the forest in Botanical Gardens, at Punjabi University, Patiala. As for any species to survive and flourish well outside the forest, the species should have better *survival capacity* under hazardous conditions of temperature; good *production capacity* to full fill

the energy requirements of the species and thirdly it should have good *reproduction capacity* to reproduce its healthy young ones.

All the four coniferous species taken for investigation show very active growth in the autumn season, which fall from August and go up to October when winter comes. Our data showed that *T. orientalis* which is an exotic species show maximum biomass production in mid summer in the month of May when environmental temperature goes as high as 45°C second highest from the total biomass production during autumn season. In winter and spring season the production of biomass remained at its lowest ebb. Out of three *Juniperus* species taken for investigation maximum biomass production was recorded in *J. variegata*; *J. prostrata* came at number two position, whereas *J. chinensis* showed least production of biomass among all the coniferous species taken for investigation. *J. variegata* showed maximum of its biomass production during the month of February of spring season next to autumn season production. Same is the case in *J. prostrata*. One interesting point noted here that both *J. variegata* and *J. prostrata* remained vegetative throughout the period of our investigation. This showed that plant having less or no reproductive phases tend to produce more biomass. In case of *J. chinensis* where we have male cone production in the summer season, biomass production was found to go high during winter, summer and also in February of spring season. But the total overall biomass production was least in this species. From the entire study we found these coniferous species as good biomass resources of the forests to be exploited for various purposes.