



Dendrochronological Study on *Cedrus deodara* in Kumrat Valley, Pakistan: The Relationship of Tree Age and Tree Growth

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Abstract: Dendrochronology, or tree-ring analysis, is the science used to calculate the exact age of a tree species by counting the rings in a tree. This study aimed to estimate the age of *Cedrus deodara* stands and to evaluate the total growth and mean annual increment of *Cedrus deodara* forest in Kumrat valley, Hindukush range of Khyber Pakhtunkhwa, Pakistan using protocol of tree ring analysis. For the study of tree-ring analysis, 70 trees of *Cedrus deodara* were randomly selected as a sample. Increment cores were collected from each sample tree at diameter at breast point by using Swiss Pressler borer and studied in the laboratory to determine the exact age, total growth, and mean annual increment of *Cedrus deodara*. Regression models were used to see the relationship between tree age and total growth and mean annual increment. It was found that the total minimum growth was 2.75 cm at 10 years and the maximum growth was 32.50 cm at the age of 60 years. There is a strong positive relationship between tree age and total growth indicated by the value of R^2 is 0.6810. On the other hand, the maximum mean annual increment was 0.075 cm at 10 years and the minimum mean annual increment was 0.012 cm at 60 years. There is a strong negative relationship between tree age and mean annual increment indicated by the value of R^2 is 0.9928. The results of this study suggest that *Cedrus deodara* is slow growing tree species, implying a long cutting rotation is required to achieve sustainable yield production.

Keywords: Dendrochronology, Tree age, Total increment, Mean annual increment