PROPAGATION OF CHIR PINE (*PINUS ROXBURGHII* SARG.) THROUGH JUVENILE CUTTINGS

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Abstract

The study is an attempt to develop an appropriate technique for rooting juvenile cuttings of chirpine (*Pinus roxburghii* Sarg.) under nursery conditions. Top shoot cuttings of 2-0 seedlings were treated with various concentrations of Indole-butyric acid (IBA) in talc formulation and tested for root initiation in three different seasons i.e. March, July and October using sand media by following randomized complete block design.

The results indicated maximum rooting (85.4%) with 4000 ppm IBA treatment. Maximum average rooting was observed in October (78.0%). The untreated cuttings showed lowest rooting percentage of 15.4 and 28.6 in March and July seasons respectively. Interestingly more than 70% rooting was obtained in October without any hormone treatment. The analysis of variance indicated significant differences for rooting between treatments (F = 9.3) and seasons (F = 18.2). The observations on average root length/cutting (cm), average number of roots/cutting and average number of secondary roots were non-significant. The highest average root length/cutting (8.90 cm) was attained in October whereas maximum average number of roots/cutting (2.90) and maximum average number of secondary order roots (4.42 cm) were observed in March.

Introduction

Forest trees are mostly propagated sexually but vegetative propagation is preferred because superior characteristics are maintained better than by sexual propagation due to avoidance of assortment and recombination. In contrast to propagation by seed, vegetative propagation enables to transfer to the offspring the integral genetic material of the donor tree from which they derive. This is of paramount importance, bearing in mind that in many species, certain traits of major economic significance such as higher growth etc. are largely the result of non-additive gene effect which can not be reproduced through propagation by seed. Higher genetic gain is expected through vegetative propagation compared with sexual propagation. The genetic gain obtained by raising Norway Spruce (*Picea abies*) vegetatively was estimated as 12-31% after seven years and 33-54% in Sitka Spruce (*Picea sitchensis*) (Roulund, 1977). In view of this several other coniferous and broad leaf species like Poplars, Willows, Monterey pine and cryptomerias are some of the outstanding leafless at global level.

Besides, through vegetative propagation, a number of difficulties

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connected with the use of seed are avoided and thus, indirectly a better use of the genetic potential is attained. In some species, seed supply is also limited and variable because of bad seed years. The vegetative propagation provides means to overcome these problems and maintains regular supply of planting stock for afforestation.

Coniferous forest tree species of Pakistan are important commercial timber species and Chirpine (*Pinus roxburghii*) is one of the important species extensively planted in Pakistan. The main problem with this species is uncertainty of seed availability every year from superior genetypes. Moreover the seed does not remain viable if not properly stored. These problems hinder in achieving the planting targets fixed every year in the country. Successful production of plants by means of vegetative propagation would not only solve the problem of seed collection and handling but could also bring about economic benefits in afforestation programmes. The present cost of raising plantations through seed could also be greatly reduced.

Attempts made in the past were not successful as Chirpine (*Pinus roxburghii*) is difficult to be raised through cuttings. The main objective of initiation of this study was to determine appropriate techniques for raising the species through cuttings.

Materials and Methods

Top shoot cuttings of 15 cm size were excised from 1 and 2 year old nursery raised seedlings during March, July and October, 1997. Needles were removed from the lower 6-7 cm portion of the cuttings and the lower 2.5 cm portion of the cuttings was girdled at base by removing the bark. Cuttings were treated with three concentrations (each of 2000, 4000, 6000 ppm in talc of Indole-butryric acid (IBA). These treatments were compared with control stock (untreated) of the same species.

The basal girdled portion of cuttings was treated with above concentrations and placed in hydrobeds. The experiment was laidout in randomized complete block design with three replications having 15 cutting in each replication. A total of 180 cuttings were planted in the experiment. The trial was initiated in March, 1997 and repeated the same year in July and October.

The hydrobeds were prepared by excavating 60 cm deep soil from 3x1.2 m size beds. 45 cm excavated portion of the bed was filled with broken bricks, stones and gravels and the remaining 15 cm was filled with coarse sand. The beds were then irrigated. Having placed the cuttings in moist sand, the beds were covered with polythene sheet to increase humidity level which is one of the major factors in the initiation of rooting. The humidity in the beds were monitored