

OBSERVATIONS ON THE NATURAL REGENERATION OF SILVER FIR  
(*ABIES PINDROW*) IN MALKANDI 3(ii), KAGHAN FOREST DIVISION

G.M. Khattak and Ashiq Ahmad\*

**Summary.** Observations were recorded on the occurrence of natural seedlings of fir and its relationship with slope, ground vegetation and light intensity. Better regeneration was found on steeper slopes. Poorest regeneration was associated with turf, followed by *Rumex* and *Paeonia*. More seedlings were present where ground vegetation was predominantly herbaceous. More seedlings also occurred inside *Skimmia* and *Viburnum* shrubs unless they were too thick. Light intensity over plots bearing fir seedlings varied from 16 to 58% of full sunlight and that over plots without fir seedlings, 63 to 100%.

An area of about 2.3 ha was fenced in pure silver-fir forest of Malkandi in 1974 after removing single trees from fully stocked patches to create one tree wide gaps in the canopy. Forestry students re-visited this area in May 1979 and the following is a resume of their observations on the occurrence of natural regeneration of fir and its relationship with slope, ground vegetation and light intensity.

**Method.** The fenced area was divided into 5670 plots, 2 x 2 m each, by stretching ropes up and down and across the slope. To compare regeneration inside the fence with that outside, 2095 plots were also taken on the eastern, northern and southern peripheries of the fence. At each plot, observations were recorded on the presence or absence of regeneration, slope, ground vegetation and light intensity.

**Results and Discussion.** *Grazing.* The proportion of plots with fir seedlings, inside and outside the fence was as follows:

	Total numbers of plots	% of stocked plots
Inside fence	5670	51
Outside fence		
due north	625	57
due south	234	55
due east	1035	34

Thus fencing has not significantly improved fir regeneration. The lower percentage of stocked plots on the eastern periphery is probably due to its proximity to a village path used by a lot of cattle. The lack of significant difference in the number of stocked plots inside and outside the fence may be due to two factors: To protect the fenced area from grazing, the watchman attempts to keep away cattle even from its periphery. Since the fence is never in perfect maintenance, some grazing does take place even inside the fenced area.

\*The authors are Director General, and the Assistant Entomologist respectively at the Pakistan Forest Institute, Peshawar.



*Slope.* The slope of each plot in the fenced area was visually graded as 'gentle' (0-25°), 'moderate' (25-40°) or 'steep' (over 40°). The percentages of stocked and unstocked plots under these categories were as follows:

<i>Slope</i>	<i>Number of plots</i>	<i>% of stocked plots</i>	<i>% of unstocked plots</i>
Gentle	1368	37	63
Moderate	1519	53	47
Steep	2783	57	43

The significantly better regeneration on steeper slopes indicated by the above data has also been reported by Qazi and Rehman (1969) and Khattak (1970).

*Ground vegetation.* The plots were classified on the basis of predominant ground vegetation. The percentage of stocked and unstocked plots in each type of ground vegetation is given below:

<i>Predominant ground vegetation</i>	<i>Total number of plots</i>	<i>% of stocked plots</i>	<i>% of unstocked plots</i>
Turf	395	17	83
Rumex and Paeonia <sup>1</sup>	491	40	60
Viburnum and Skimmia <sup>2</sup>	1099	55	45
Herbs <sup>3</sup>	3685	55	45

The poorest regeneration of fir is associated with turf. Ground vegetation of Rumex and Paeonia also does not appear to favour regeneration. Turf occurs in large blanks which are old grazing grounds. Both light and soil condition on such sites would be unfavourable to the establishment of natural regeneration of fir. Rumex occurs on dry shallow soils and on such sites too, fir seedlings would not survive. Herbs occur on deep moist soil under moderate shade and also do not offer too much competition to fir seedlings. Viburnum and Skimmia offer protection to fir seedlings from grazing and from severe insolation and therefore favour their survival unless they grow so thick that the seedlings are suppressed.

*Light intensity.* Twenty patches, each comprising 20 plots (2 × 2 cm), ten with seedlings and ten without, were marked on the ground. 200 light intensity measurements were taken on stocked plots and 200 on unstocked plots using the method of C.A. Wellner (1979), from 1130 to 1230 hours on 25th and 26th May. Standing in the centre of a plot, a white card was held horizontally. The observation was recorded as 'full/sun' if the card was in the sun, and 'shade' if the card was in the shade. The average light intensity in the stocked and unstocked patches was determined from the formula

<sup>1</sup>*Rumex nepalensis* and *Paeonia emodi*.

<sup>2</sup>*Viburnum nervosum* and *Skimmia laureola*.

<sup>3</sup>*Fragaria vesca*, *Viola serpens*, *Valeriana wallichii*, *Ranunculus scleratus*.

$$\frac{A(y) + B(x)}{100}$$

where,

- A = % of 'full sun' observations  
 B = % of 'shade' observations  
 x = Average intensity of shade, taken as 7.  
 y = Intensity of full sun light, taken as 100.

The mean light intensities in the stocked and unstocked patches were as follows (% of full sunlight):

Stocked patches	Unstocked patches
-----------------	-------------------

21	100
58	67
23	63
49	100
40	67
45	77
16	86
16	86
26	63
49	95

Thus the presence of fir regeneration was associated with a range of 16 to 58% mean light intensity and the absence with 63 to 100%.

### References

1. KHATTAK, G.M. 1970. Occurrence of natural regeneration in the fir (*Abies pindrow*) forest of Kaghan. Pakistan J. For. 20(2): 157-62.
2. QAZI, I.A. and S.M. REHMAN. 1969. Some observations on natural regeneration of fir, *Abies pindrow*. Pakistan J. For. 19(3): 17-22.
3. WELLNER, A. 1979. Estimating light intensity beneath coniferous forest canopies: simple field method, USDA For. Ser. Res. Note INT-250.