

## Study of Regeneration in Natural Stands in Caspian Forest

Seyed Armin Hashemi<sup>1</sup>, Abdolkarim Keshavarz<sup>2</sup>, Mirmozaffar Fallah chai<sup>3</sup>

<sup>1,3</sup>Department of Forestry, Lahijan Branch, Islamic Azad University, Lahijan, Iran

<sup>2</sup>Department of Environment, Lahijan Branch, Islamic Azad University, Lahijan, Iran

### ABSTRACT

Since environment destruction especially in respect of forests, decreased forest area and natural regeneration due to performing some silvicultural techniques are critical warnings and among major issues for human, then it's necessary to consider most important factor in survival of forests namely natural regeneration. First, 200 circular sample plots has been selected by use of random systematic inventory. Single selection system is completely suitable for severe conditions of regeneration in mountains. Conducting group selection system in mountainous forests will decrease number of seedlings in hectare. Results of this study were consistent with mentioned study. Determine sustainable development level of Belt forests, single selection system is more suitable than group single selection system. Single selection silvicultural system in mountainous forests is more suitable than group selection due to extreme ecological conditions.

**KEY WORDS:** Natural regeneration, Tree selection system, Group selection system.

### INTRODUCTION

Since environment destruction especially in respect of forests, decreased forest area and natural regeneration due to performing some silvicultural techniques are critical warnings and among major issues for human, then it's necessary to consider most important factor in survival of forests namely natural regeneration [1].

Firstly, it must be kept in mind that it is necessary to preserve biodiversity stability by using most suitable silvicultural system for forest stands with typical species [2]. Selection and execution of suitable silvicultural system can create a forest stand with good natural regeneration (quantitative and qualitative), normal and desired structure (normal species composition, normal stand density normal or ordinary blending from, normal diagonal distribution and scattering, existence of all germination stages including sapling, seedling, loose and spot) [3].

Then forest's beautiful view, natural form of waterway and natural components of habitat will be preserved wholly with biodiversity stability [4]. Therefore, results of performing forestry plans must be evaluated to recognize process of sustainable forests development and spread [5]. In fact best indicator and natural result of conducting these plans is young established stands developed by using natural regeneration in other words seedlings established instead of harvested trees [6]. Then most suitable measure to evaluate success of forestry plans is extent of establishment natural life restoration [7].

Performing group single selection system will decrease natural life restoration strength and will bring down species diversity [4]. Silvicultural system has adverse effects on soil composition. Various effects of silvicultural systems on leaf litter and soil nitrogen mineralization [3]. Regeneration as one of most important measures of evaluating sustainable management of natural forests [7]. Forest survival has meaningful dependence on key goal must be considered.

Preserving biodiversity stability through finding most suitable silvicultural system for stand. Then major goals of program could be achieved and measurements of developmental periodic evaluation towards these goals could be performed. According to the fact that natural regeneration is most inexpensive and sustainable regeneration system, then its establishment is major goal of all silvicultural systems.

### MATERIALS AND METHODS

**Study area:** This study performed in district Guilan province in north of Iran. The area of district is 2145 hectares.

**Studied plots:** 200 circular sample plots and each sample plot containing 10 micro plots (4×4m) totally 2000 micro plots.

**Sampling method:**

Firstly, using random systematic inventory moved from defined base point on a baseline in forest and 200 sample plots were selected with consistent distribution. 100 sample plots of those plots were centered with a log cutt15 years ago with 45cm diameter. Then 18 micro plots were defined in each plot first micro plot was defined in the centre of plot and 4 micro plots with equal distance (4m) were defined in each of 8 main directions. (Totally 2000 micro plots). In addition, additional 100micro plots were selected adjacent to undisturbed or control parts and 18 micro plots were defined as previously in each sample plot. Finally in each micro plot following parameters were measured such as situation of plot, physiographic, soil status, forest stand status, typical plants, qualitative and quantitative status of maternal trees.

**Statistical system of data analysis:**

Processing data analysis, comparison and evaluation of silvicultural systems were performed by software Excel, SPSS. Interpretation or evaluation of regeneration status results in respect of sapling and seedlings frequency (in 2 growing stage ), percent of seedlings qualitative status were performed using figures resulted from EXCEL and Chi-square test. Mean frequency of sapling and seedling of various species in tree , group and control single selection silvicultural system were compared using results of one way analysis and multiple – ranges turkey – HSD Test in significance level of 5%.

Table 1. Mean frequency of sapling and seedlings of *Fagus orientalis*, in tree group and control single selection systems.

Kind of management	Fagus seedling tree in hectare	Other specres seedling tree in hectare
single selection system	10743	2035
Group selection system	1243	1563
Control (undisturbed)	2563	1544

**RESULTS AND DISCUSSION**

**Results of sapling and seedling number comparison in different treatments:**

The greatest number was in single selection system with 8354 seedling in hectare. Number of seedling in single selection system was greater than number of seedling in control but number of seedling in group single – selection system was lower than number of seedlings in single and control single selection system. There is significant statistical difference between group selection and single selection systems (Figure 1).

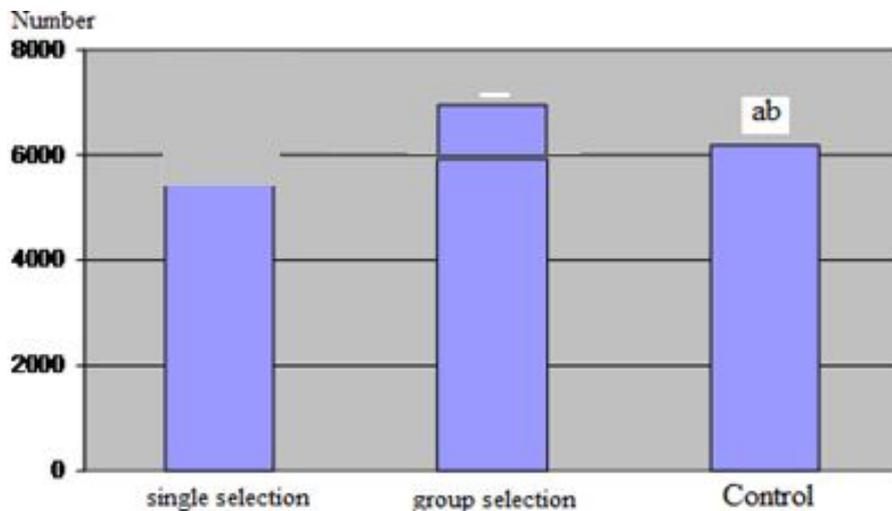


Figure 1. Comparison of mean number of saplings and seedling in group and tree single selection system.

**Comparing percent of healthy saplings and seedlings in single , group and control treatments :**

Percent of healthy seedlings in group selection ( 75% ) was lower than percent of healthy seedlings in control (85%) and tree single selection (85%) . results of chi – square test indicated that percent of difference in health of seedlings between 2 treatments is significant in level of 5 (Figure 2).

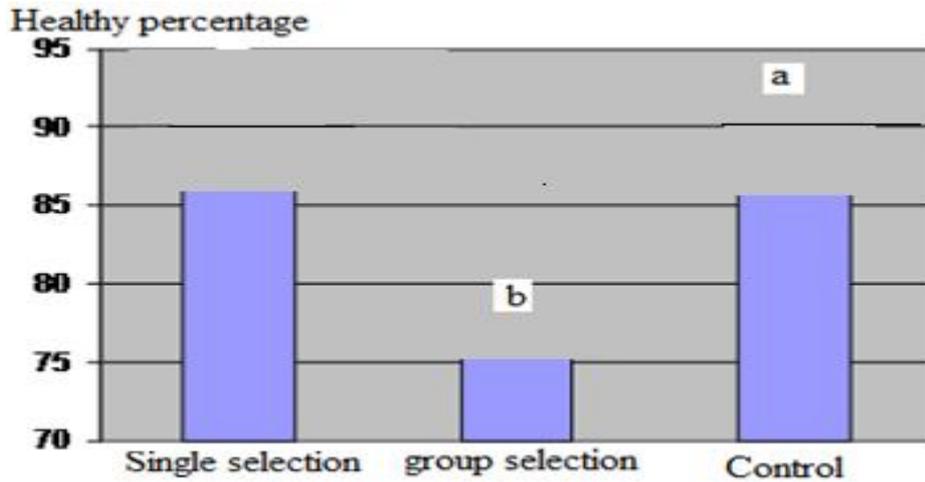


Figure 2 .Structure of qualitative status of seedlings in group single selection and tree single – selection treatments.

Percents of shining seedlings in single selection system was equal (92%) control system (92%) and group– selection system (91%) . chi–square test indicated that difference between percent of shining seedlings of treatments is significant statistical difference between group and single – selection systems. (Figure 3 ).

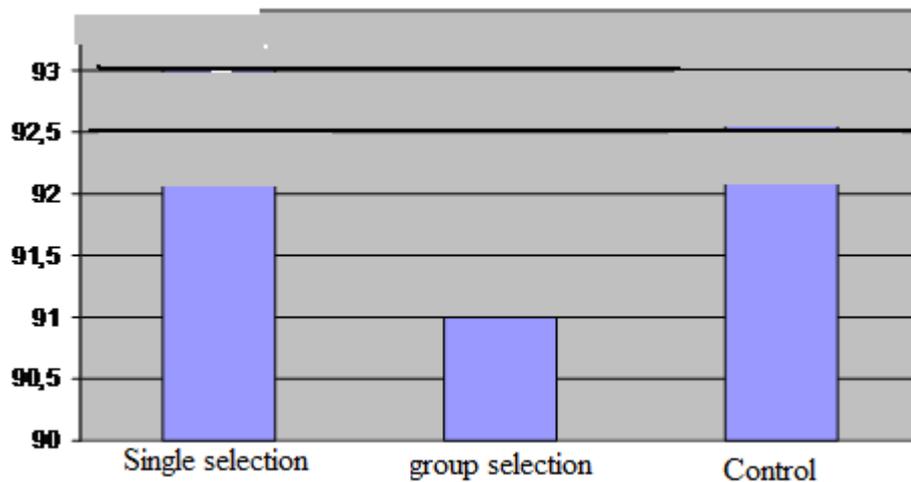


Figure 3. Structure of qualitative status of seedlings in group and single selection systems.

Total tests indicated that there is significant difference of 5% between means of three treatments (Figure 1, d.f=2 , F=5.605 P=0.021)

Results of one way analysis of variance indicated that there is no significant difference between mean number of systems (d. f = 2, F = 0.012, P = 0.884). Total results of Tukey – HSD test and one way analysis of variance of three parameters of mean number of saplings and seedlings in *Fugues*, indicated that there is no significant difference between 3 treatment in 5% ( Table 1). But according to results of Tukey – HSD test there is significant difference of 5%, between number of saplings and saplings of *beech*. ( d . f =2 , F = 1.31, P = 0.506).Total results of chi–square test indicated that there is significant difference between percent of healthy, shining, evenness and verticality of seedlings in three treatments in 5 %. In other words, in respect of quality , percentage of health and shining seedlings in single selection systems is higher than group selection .( Figure 2 and 3), reverse .

### DISCUSSION AND CONCLUSION

According to results of Tukey – HSD, difference between mean number of 2 parameters of saplings and seedlings, difference of mean number of seedlings, mean number of saplings and seedlings in three treatments is significant in 5% . Then according to these results, final conclusion is that conducting group selection system not only decreased the number of seedlings in hectare but also decreased the percent of shining and healthy seedlings (Figures, 2,3).

Mean while, decrease of seedlings numbers number in hectare is severe in vegetative stage. In relation of species composition structure, performing group single – selection system when compared to control caused increase of *beech* saplings and seedlings number. In contrast, seedlings of fugues have decreased (Table 1).

#### **Influence of altitude from sea level on regeneration:**

Single selection system is completely suitable for severe conditions of regeneration in mountains [8]. Conducting groupselection system in mountainous forests will decrease number of seedlings in hectare [4]. Results of this study were consistent with mentioned study. Determine sustainable development level of Belt forests, single selection system is more suitable than group single selection system [9]. Single selection silvicultural system in mountainous forests is more suitable than group selection due to extreme ecological conditions[10].

Results indicate that single selection method was completely consistent to nature and increased natural restoration strength (Figure 1). Then, tree regeneration system's restoration strength is higher than normal. Effects of cutting of tree and group selection systems by performing control system. They funded out that performing group selection system will decrease the number of seedlings of high class species in hectare. Results of this study also is consistent to previous study (Figure 1, Table 1). Permissible basal cuttings without decreased restoration strength of forest may be continued for long time [11]. Analysis of all results and discussion can be used as typical result for tree single selection system for this forest and other similar forests which is an optimum silvicultural system. At the end, it is recommended to avoid group selection system in product forests due to decreased regeneration and causing loss of forests production power.

#### **REFERENCES**

- [1]Prescott,C.E,1996.a field guide to regeneration of salal-dominated cedar hemlock sites in the CWH.Faculty of Forestry,U.B.C.J.For,97:4-10.
- [2]Hutcheson,J.W.P.and D.,Given,1999.Potential value of indicator conservation and management of new zealand Terrestrial communities .Science for conservation.
- [3]Prescott,C.E,1997 .Effects of clear cutting and alternative silvicultural systems on rates of decomposition and nitrogen mineralization in a coastal mountain forest.Forest ecology and management ,95:253-260.
- [4]Heywood, V.H,P. and R.T.,Watson,1995.Global biodiversity assessment .Published for the united nation environment program.Cambridge university press.pp.140.
- [5]Sardar,M.R.,1996.Imprtance of evaluation of forestry projects with refrencesto roural development Pakistan.Journal of forestry ,46:107-114.
- [6]Wang,B.G.,G.,Chen and H.,Cao,1999.assessment of the forest landscape assets of Tianzhu shan forest park in Xiamen.Journal of Beiging forestry university,21:84-88.
- [7]William ,P.J. and P.Veit,1998.Building capacity for sustainable management of natural forests in east Africa. reader in natural resources management ,71-107
- [8]Burn,F.,and B.,Gifu,1998.a mapping method for qualitative assessing the overall value of mountain forests. French Journal,131:131-147.
- [9].Brad,S.,J.P ,Kimmins,C.,Welham and K.Scoullar,1999.Defining stand level sustainability and exploring stand level steward ship.Journal of Forestry,97:4-10.
- [10]Przybylska,K.,1999.avaluing system for assessing mountain forest a adapted to forest management planning needs .Sylwan,143:27-36.
- [11]Marusak,R.1999.Problems of expected growing stock calculation with reference to calculation of long range allowable cut.Acta facultatis forestalis zvolen,40:131-144.