

Regeneration just after clear cutting at Sugi(*Cryptomeria japonica*) and Hinoki(*Chamaecyparis obtusa*) plantation

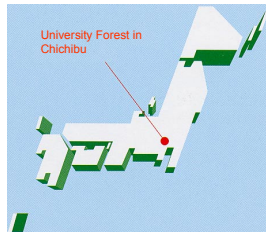
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Introduction

The area of plantation in Japan is about ten million hector and many of them has grown thirty to fifty years old that reached the age for cutting. However, many forest owners don't want to cut their forest because low price of timber and difficulty of regeneration by planting. Some of them plan to try naturally regeneration after clear cutting. In this study, we discuss about possibility of early natural regeneration just after clear cutting at conifer plantation.

Study Site

The study site is located at compartment no.3 at University Forest in Chichibu, The University of Tokyo. This site was 87 years Sugi (*Cryptomeria japonica*) and Hinoki (*Chamaecyparis obtusa*) plantation and clear cut in 2001. We set 6 plots (5m x 5m) in study site and checked regenerated seedlings in spring and autumn of 2002, 2003 and 2004. Each 2 plots are located at upper, middle and lower site of slope and one of each is located at after site preparation and another at no preparation. We got sample of soil from each plot for checking the buried seed and set seed traps near each plot for checking the seed from another forest.



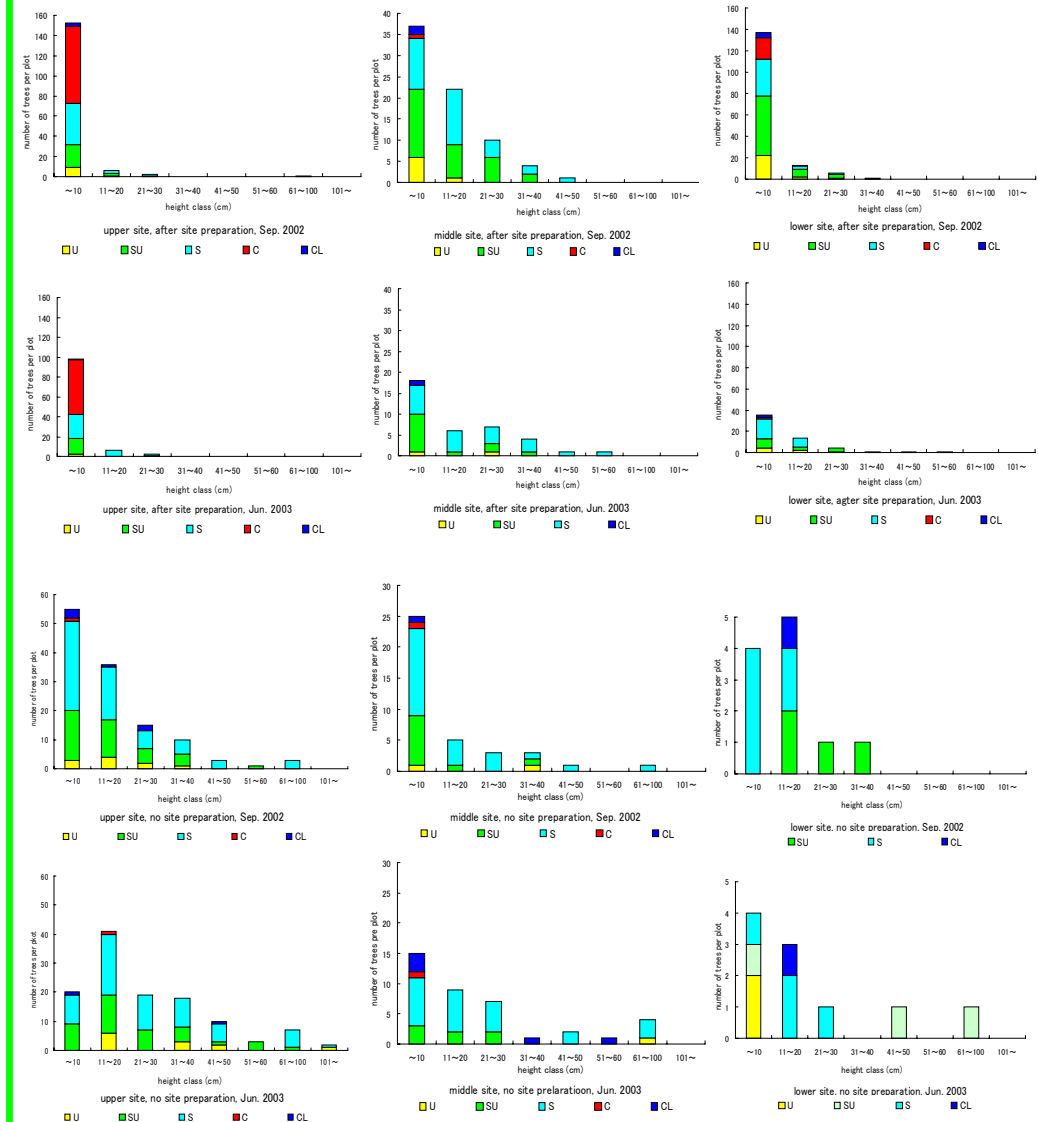
Location of University Forest in Chichibu



Location of Study Site

Result (Number of seedlings)

U = Species which grow upper layer
 SU = Species which grow sub-upper layer
 S = Species which grow shrub layer
 C = Conifer species
 CL = Climber species



Result 2 (Comparison of species composition)

Species composition of seedling, buried seed and drift seed											
Type	Species	Seedling		Burried seed	Drift seed	Type	Species	Seedling		Burried seed	Drift seed
		after site preparation	no site preparation					after site preparation	no site preparation		
U	<i>Carpinus laxifolia</i>	*			○	S	<i>Pieris japonica</i>	*			
	<i>Carpinus tshonoskii</i>				○		<i>Schizophragma hydrangeoides</i>	*			
	<i>Fagus japonica</i>	*					<i>Deutzia crenata</i>	*			
	<i>Betula maximowicziana</i>				⊙		<i>Hydrangea eccscandens</i>	*	*		
	<i>Prunus gravena</i>	*	*				<i>Viburnum dilatatum</i>	*	*		
	<i>Betula schmidtii</i>				○		<i>Pourthiaea villosa var. laevis</i>	*	*		
	<i>Cercidiphyllum japonicum</i>				○		<i>Qlerodendron trichotomum</i>	*	*		
	<i>Phellodendron amurense</i>	*	*				<i>Rubus crataegifolius</i>	☆	●		○
	<i>Carpinus japonica</i>				○		<i>Lindera umbellata</i>	*	●		
	<i>Castanea crenata</i>		*				<i>Hydrangea hirta</i>	*	●		
	<i>Zanthoxylum piperitum</i>		*				<i>Enkianthus moetsudai</i>	*	*		
	<i>Fraxinus spethiana</i>				○		<i>Pertya glabrescens</i>	*	*		
	<i>Betula platyphyla</i>				○		<i>Hydragea paniculata</i>	*	*		
	<i>Evodiapanax innovans</i>	*	*				<i>Buddleja japonica</i>	●	*		●
	<i>Betula ermanii</i>				●		<i>Cladrastis platycarpa</i>	*	*		
	<i>Euptelea polyandra</i>	●	*	○	○		<i>Dentzia scabra</i>	*	*		
	<i>Cornus confroversa</i>	*	*				<i>Lallicarpa japonica</i>	*	*		
	<i>Quercus mongolica var. grosseserrata</i>	*	*		○		<i>Rubus palmatus var. cooptophyllus</i>	*	●		
	<i>Betula grossa</i>			○	●		<i>Kerria japonica</i>	*	*		
	<i>Acer cissifolium</i>	*	*		●		<i>Cryptomeria japonica</i>	⊙	*	☆	○
<i>Acer nikoense</i>	*	*			<i>Chamaecyparis obtusa</i>	●	*	⊙	○		
SU	<i>Alnus firma</i>				○	CL	<i>Tsuga sieboldii</i>	*	*		○
	<i>Fraxinus lanuginosa</i>	*	*	○			<i>Actinidia arguta</i>	*	*		
	<i>Ilex macrospoda</i>	*	*				<i>Celastrus orbiculatus</i>	*	*		
	<i>Fraxinus lanuginosa var. lanuginosa</i>	*	*		○		<i>Ampelopsis brevipedunculata</i>	*	*		
	<i>Melicope myrsintha</i>	*	*				<i>Vitis coignetiae</i>	*	*		
	<i>Pterostyrax hispida</i>	*	*		○						
	<i>Acer micranthum</i>	*	*		☆						
	<i>Aralia elata</i>	☆	*	○							
	<i>Rhus javanica</i>	⊙	*	○							
	<i>Styrax obassia</i>	*	*								
<i>Clethra barbinervis</i>	*	●	○								

note : Symbols mean amount of seeds of seedlings
 Seedling ☆: n ≥ 50以上, ⊙: 50 > n ≥ 30, ●: 30 > n ≥ 10, ○: 10 > n
 Burried seed ☆: n ≥ 50, ⊙: 50 > n ≥ 30, ●: 30 > n ≥ 10, ○: 10 > n
 Drift seed ☆: n ≥ 200, ⊙: 200 > n ≥ 100, ●: 100 > n ≥ 50, ○: 50 > n

Discussion

In September 2002, height class distribution showed inverse J shape in every plots. In June 2003, inverse J shape distribution was kept in after site preparation plots. However, in no site preparation plots, peak of distribution moved to upper height class.

From the results of comparison between September 2002 and June 2003, in after site preparation plots number of trees were decreased and in no site preparation plots didn't change. However, proportion of small sized trees (less than 10cm in height) were decreased in no site preparation plots.

Most of species that we found in seedlings were quite simuler that we found in buried seeds. The effects of drift seeds for regeneration of just after cutting are not so big.

However, the number of buried seed is not big in conifer plantation, then regeneration just after clear cutting on conifer plantation is not so easy.