



**The Federal Scientific Center on the East Asia  
Terrestrial Biodiversity FEB RAS, Russian Federation**

**Northeast Forestry University, P.R. China**

**Kangwon National University, Republic of Korea**



**II International Symposium**

# **Korean Pine Biology and Silviculture**

**PROGRAMME & ABSTRACTS**

**September 16–25, 2019  
Vladivostok  
RUSSIA**

# II INTERNATIONAL SYMPOSIUM ON KOREAN PINE BIOLOGY AND SILVICULTURE

September 16-25, 2019  
Vladivostok, Russian Federation

## PROGRAM & ABSTRACTS



## THE SEEDS PRODUCTION AND NATURAL RENEWAL OF KOREAN PINE IN «USSURIISKY» RESERVE FORESTS

*Tatiana P. OREKHOVA*

*Federal Scientific Center on the East Asia Terrestrial Biodiversity FEB RAS  
Vladivostok, Russia*

The seeds production and natural renewal of Korean pine (*Pinus koraiensis* Sieb. et Zucc.) have been studied in the 3 types of forests (sp.7, sp. 15, sp.16) in the «Ussuriyskiy» Reserve. The 36 seed traps were placed across 20 m on every sample plots (area 1 ha). The seeds crop was investigated by visual analysis using Capper's scale and seed's trap method since 2003 to 2012. The seeds were collected every 3-4 week from May to November. The seeds quality was studied by X-ray and Tetrazolium (TZ test) methods. The renewal of Korean pine was calculated on the 5 plots (10x10 m) and the obtained data counted on 1 ha.

As known, the main source for appearance the tree's seedlings is an abundant crop of the seeds. The results of investigations revealed that the crop of trees seeds is very varies. For example, the maximum crops of Korean pine cones were in 2005 and 2007. The period of the cones falling was during 1 month. The reduction of the tree seeds productivity observed after the rich harvest and then gradual increase in crops during some years.

Based on our data the complete maturation of the seeds and fruits, the preservation of the natural renewal of woody species depend on the weather conditions. It has been established that a quantity of the empty and undeveloped seeds increases during the rainless years. The mass death of the coniferous species seedlings occurred after the dry seasons in June-July. The quantity germinating seedlings on the sp.15 in 2003 decrease from 480 ps/ha to 20 ps/ha in 2008. The quantity of germinating seedlings on the sp.7 in 2003 was 60 ps/ha in 2004, than those decreased for 20 ps/ha and after abundant crop increased to 60 ps/ha in 2008.

To appearance the germinating seedling depends on viability of the seeds falling on the soil. The seeds quality varied much even in abundant crops, the best viability of Korean pine seed was 89% on the sp.7, and 98% on sp.15 and 100% on sp.16. The quantity of empty and undeveloped seeds were from 44,5 to 100% during poor harvest.

Thus, the weak renewal of coniferous species in the forests of the «Ussuriyskiy» Reserve is probably due to the following factors: the poor seed harvest; little fruit-bearing trees and low seed vitality from the old trees; bad weather conditions in the formation period of the crop (frosts in spring, long drought in the summer, high air humidity during the pollination); thick grassy cover, which prevents the seeds to fall on the ground; active eating fruits and seeds by small animals and birds; mass reproduction of the rodents which destroy the seed crop.

The analysis of dynamic of natural renewal understory of the Korean pine indicates that the forest phytocenosis on the sample plots enters into the stage of dominant foliar trees according to B.P. Kolesnikov theory.