Experimental study investigation hybridization of Gobi region *Populus Laurifolia* L. with *Populus Suaveolens* Fisch. of northern region of Mongolia

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Abstract

The objective of this study was to investigate and evaluate possible breeding, propagating values of the isolated population of laurel leaf poplars in Zuunsaikhan mountain of Gobi-Altai. As being southernmost and only natural stand of *P.laurifolia* in Gobi region of Mongolia, this small population amidst of dry Gobi region presented the value of use in tree improvement programs for drought resistant poplar varieties.

During our work it was observed that in Ulaanbaatar city, flowering began since 1 of May and seed dispersal on 14 of June, which equals 40 days after flowering.

Also in one seedpod of *P.suaveolens* counted 28-32 seeds, while in branch culture it was 8-12 seeds per seedpod. Seeds germinated within 36 hours after it put on wet tissue paper. We used 2 different approaches to grow poplar seedlings first half were grown in ordinary seedbed ground of greenhouse, the other half were grown in containers.

In greenhouse condition, containerized seedlings had slightly more growth than seedlings grown in open ground.

Poplar growth was most intensive in July and August. Highest containerized seedling was 41 cm and highest bareroot seedling was 33.5 cm. Apecal growth stops by 15 August, foliage begins on 15 September and by 4 December seedlings completed winter bud dormancy.

Pollen collection: Collected pollens were stored in glass tube until the artificial pollination whit-25^{0}C. Pollen grain of Laurel leaf poplar is of orange color, 24-32 mkm, round shaped. Pollen grains that not round shaped are dead pollen unable to fertilize the egg cell.

Key words:

Populus, isolation, pollen, population structure

Introduction

In recent years, laurel leaf poplar became one of the most widely used tree species in Mongolia for urban landscaping and windbreak forest. Ease of propagation method, growth speed etc., favored this trend, but the sex and taxonomic identification of poplars used in nurseries lost clear track record. Especially the origins of poplars that planted in big cities and towns of Mongolia before 1990's are diverse and blurry, as there are mixture of *Populus suaveolens* from local river valleys,

Populus nigra from Siberia and *Populus laurifolia* also from different locations including parts of former Soviet Union. Therefore, natural distribution of poplar species in Mongolia and its potential for urban and windbreak forest is still open topic.

Wherever the windbreak forest is going created, using the natural poplars as mother stock will be more appropriate to principles of reforestation.

Objective of the study. The objective of this study was to investigate and evaluate possible breeding, propagating values of isolated population of laurel leaf poplars in Zuunsaikhan mountain of Gobi-Altai. As being southernmost and only natural stand of *P.laurifolia* in Gobi region of Mongolia, this small population amidst of dry Gobi region presented value of use in tree improvement programs for drought resistant poplar varieties.

Pollen collection

Branches were put in to water culture on April 2 of 2012, and after 72 hours male catkins emerged. Then after 7 days pollen was started to disperse.

Collected pollens were stored in glass tube until the artificial pollination whit-25^{0}C

Pollen grain of Laurel leaf poplar is of orange color, 24-32 mkm, round shaped.

Pollen grains that not round shaped are dead pollen unable to fertilize egg cell.

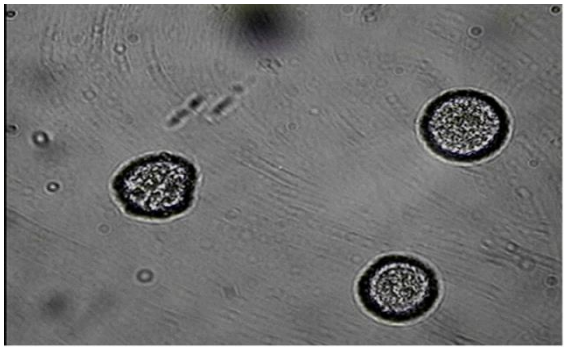

Figure 4. Pollen grain

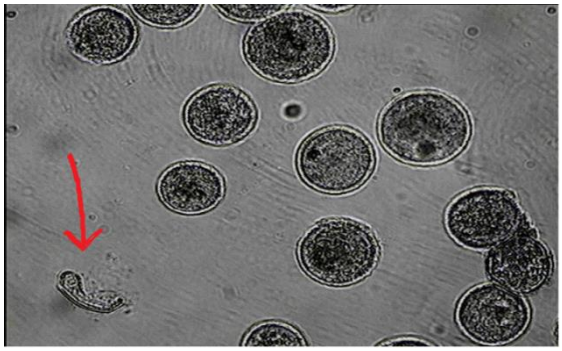

Figure 5. Red marked grain is dead pollen

Growing seedlings

When pollination is successful, ovules start to enlarge in size and stigma start to fade. During all the seed germination period changing water and renewing cuts will be done in every 48 hours. Also leaves are needed to thinning. During the seed development period there were lose of catkins, which simply falls apart from the branches when still not fully mature. Seeds started to emerge from seedpods since 22nd days after the pollination, which is relatively shorter compared with natural process. Seedlings were grown according to method described by Pyatnitsky "growing hybrid seedlings of poplar", collected seeds first germinated on wet paper tissue, then transplanted into pot filled with sphagnum peat moss growing media, and after the first leaves appeared, to the permanent growing ground.

Figure 1. Seed germination

Figure 2. Seedlings transplanted in peatmoss pot

Table 1.

Linear growth of hybrid seedlings

Seedling variety	Seedling height, cm	Root collar diameter, cm
Containerized	22.73	0.42
Seedbed	18.49	0.37

In greenhouse condition, containerized seedlings had slightly more growth than seedlings grown in open ground. Poplar growth was most intensive in July and August. Highest containerized seedling was 41 cm and highest bareroot seedling was 33.5 cm. Apecal growth stops by 15 August, foliage begins in 15 September and by 4 December seedlings completed winter bud dormancy.

Results

1. In Zuunsaikhan mountain, there were total 123 individual trees counted, of which 90 trees, or 73 percent fell into young trees that have 8-10 cm diameter by height and average 2 meters height.
2. All the branches with flower bearing bud prepared from 10 trees were male, thus evidences the other researches that in genus *Populus* it is common that in harsh conditions male trees take up to 90% of population.
3. Height of hybrid seedlings was average 20.62 cm, root collar diameter 0.39 cm.
4. In poplars, it is possible to obtain hybrid seedlings within one growing year, there is a great potential in getting drought hardy varieties of poplars by conducting research on other natural populations of poplar of Mongolia such as Mongolian Altai, Eastern Mongolia and Great Lakes region.

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