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Phytophagous insects in a siberian stone pine clone archive

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Abstract. This study was carried on in a Siberian stone pine (*Pinus sibirica* Du Tour) clone archive located in the south of the Tomsk Region. Fourteen species of phytophagous insect pests were found in this clonal archive. Pineus cembrae is the most frequent insect in the clone archive colonizing the buds, needles and the bark of the young shoots. Of all polyphagues insects, the scarab beetle *Melolontha hippocastani* Fab. and summer chafer *Rhizotrogus solstitialis* L. have the most destructive effect in the clone archive. Their larvae eat the roots of young plants. The larvae of elaters *Agrypnus murinus* L. and *Selatosomus aeneus* L. and weevil *Otiorhynchus ovatus* L. are potentially dangerous for the plant host roots. All found insect species in the clone archive are also widely spread in natural and man-made coniferous forests from the Tomsk Region. Their destructive activity in the clone archive may result in serious consequences. They should be controlled by means of pathological methods.
Key words: Siberian stone pine, *Pinus sibirica*, Pineus cembrae, clone archive, phytophagous insects, and potential pests

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Extended presentation

Introduction. Under Dr. S.N. Goroshkevich guidance a clone archive of the Siberian stone pine was created in 1996 in the south of Tomsk Region. Developing principles and technology of selection to introduce this pine into the culture as a nut tree, was the purpose of clone archive establishment. The rootstock have their origin in the local Tomsk population, while the grafts were collected from various natural populations, such as: (a) from southern taiga to the forest-tundra in West Siberia in a latitudinal profile; (b) from the Middle Urals to the Amur Region in longitudinal profile, (c) from the whole altitude profile of the Siberian stone pine natural distribution from West Siberia and Khamar-Daban Region.

The most important objective of this unique collection was to preserve and sustain its stability against the various unfavorable environmental factors, including the damage caused by phytophagous insects.

Fourteen phytophagous insects species potentially dangerous to the Siberian stone pine were found during the carried out investigations between 2003-2006, years in the clone archive.

List of potential pests in the Tomsk clone archive

(i) *Homoptera, Adelgidae: Pineus cembrae* Chol.
(ii) *Hymenoptera, Diprionidae: Neodiprion sertifer* Geoff.
(iii) *Coleoptera, Curculionidae: Callirus abietis* L., *Magdalis frontalis* Gyll., *M. violacea*

L., *Pissodes castaneus* De Geer, *P. pini* L., *P. validirostris* Gyll. and *Otiorhynchus ovatus* L.
(iv) *Coleoptera, Scarabaeidae: Melolontha hippocastani* Fab., *Rhizotrogus solstitialis* L.
(v) *Coleoptera, Elateridae: Agrypnus murinus* L. and *Selatosomus aeneus* L.
(vi) *Lepidoptera, Pyralididae:Dioryctria abietella* Den. & Sch.

The adelgid *P. cembrae* is a typical parasite of the *P. sibirica* trees during the whole vegetation period; it colonize buds, needles and bark of the young shoots. When the parasite attack is heavy needle discoloration, delay in growth, death of leading and lateral shoots and, sometimes, death of the whole young tree occurs.

The *N. sertifer* larvae eat up a considerable part of the old needles on the lower branches in some trees. Larvae of big colonies (50-70 individuals) damage young needles, terminal buds and eat up small parts of the bark of young shoots.

C. abietis damage the bark of the trees. Because the insect population was low, only slight injury was noticed during the present investigations. However, in the previous years, the number of damaged saplings in the archive plantations was as large as 20%.

The larvae of *M. frontalis* and *M. violacea* have produced cavities inside the host's shoots. The larvae of *P. castaneus* and *P. pini* have made tunnels in the bark.

In the year 2005, about 6 % of the species cones in the clonal archive were damaged by the *P. validirostris* and *D. abietella*.

Scarab beetle *M. hippocastani* and summer chafer *R. solstitialis* have the heaviest attack in the clone archive. During additional feeding the *M. hippocastani* adult beetles damaged microstrobiles. In its period of mass flying, the *R. solstitialis* beetles have injured the Siberian stone pine needles. The larvae of this species have heavily destroyed the young seedling roots; this was because 50 individuals per 1 m^2 were found; it means 2 to 5 larvae per seedling. The larva of elaters *A. murinus, Selatosomus aeneus,* and weevil *O. ovatus* represent a potential danger for young seedlings of the Siberian stone pine.

Intensity of of Siberian stone pine .Colonization by *Pinus cembrae.* *P. cembrae* is the most numerous phytophague in the clone archive. The species frequency in 2004 and 2005 and 2006 years was 93.5% and 87.9% and 95.3%, respectively.

To estimate the colonization intensity on the tree needles, a scale was developed, such as:
1 = a single colony containing one to five subcolonies within it; it means no colonized shot;
2 = a weak colonization; approximately 1/3 of the brachyblasts and young shoots are colonized by compact colonies clearly separated from each other;
3 = intense colonization or 2/3 of all brachyblasts and young shoots were colonized;

In the 2004, 2005 and 2006 years, the colony occurrence in trees was: 68.3%, 45.4% and 59.9%, respectively. Out of the previously mentione figures, degree 1 or weak colonization degree has occurred in 20.8%, 35.3%, and 26.9% of trees in the years 2004, 2005 and 2006, respectively. An increased trend in the attack frequency to the degree 3 was recorded; this increase was 4.4 %, &.2 % and 7.8 % in the years 2004, 2005 and 2006, respectively. During the three years period 1 % of trees have died because of the insect attack.

No differences in the colonization intensity of the clones were recorded according to the latitudinal and longitudinal profiles. Colonization of altitude profile clones is reliably higher than that of the latitudinal and longitudinal ones. The greatest intensity colonization was observed in the clones originating from West Sayan Region between 1,400-1,900 meters above sea level.

All insect species obtained in the clone archive are widely spread in Tomsk Region (Krivets et al. 2004). They are numerous and often damage conifers in natural and man-made forests (Kiseleva 1951, Pozdnjakov 1959, Ivanovskaia-Shubina 1963, Kolomyetz et al. 1972). Their destructive activity in the clonal archive may result in serious consequences. Therefore, they should be controlled by means of phytopathological methods.

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Rezumat. Krivets S.A., Korovinskaya E.N., Insectele fitofage dintr-o colecție de clone de pin de stâncă siberian. Ann. For. Res. 51: 177-179.

Acest studiu a fost efectuat într-o colecție de clone de pin siberian (*Pinus sibirica* Du Tour) amplasată în sudul Regiunii Tomsk. În acestă colecție au fost identificate 14 specii de insecte fitofage. *Pineus cembrae* Chol. care colonizează mugurii, acele şi scoarța lujerilor tineri este cea mai frcventă insectă din colecția de clone. Dintre toate insectele polifage studiate, *Melolontha hippocastani* Fab. şi *Rhizotrogus solstitialis* L provocă cele mai distructive efecte; larvele lor rod rădăcinile plantelor tinere. Larvele insectelor *Agrypnus murinus* L. *Selatosomus aeneus* L. şi gândacul *Otiorhynchus ovatus* L. sunt potențial periculoase pentru rădăcinile plantei gazdă. Toate insectele găsite în colecția de clone sunt de asemenea larg răspândite şi în pădurile de conifere naturale şi arificiale din Regiunea Tomsk; activitatea lor distructivă din colecția de clone poate provoca serioase consecințe motiv pentru care trebuie combătute prin metode fitopatologice.
Cuvinte cheie: pinul de stâncă siberian, *Pinus sibirica, Pineus cembrae*, colecție de clone, insecte fitofage, dăunători potențiali
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