

Tolerance of Scots Pine to Pathogens in the Provenance Trial of Siberia

Nina KUZMINA* – Sergey KUZMIN

V.N. Sukachev Institute of Forest, Siberian Br., Russian Academy of Science, Krasnoyarsk, Russia

Abstract – Results of resistance assessment of provenance trials in Central Siberia to fungal diseases show a genetic heterogeneity of Scots pine by the influence of ecological-climatic factors of places of origin. Dissimilar resistance to pathogens shows itself in the same Scots pine climatotypes at growing them in provenance trials at different ecological backgrounds. Pine trees growing on poor dry soils (bear berry pine forest type, sandy soil) are subjected to the common and snowy schutte (*Lophodermium pinastri* Chev. and *Phacidium infestans* Karst), cenangium necrosis (*Cenangium abietis* (Pers) Pehm in the stage *Dothichiza ferruginosa*). However, on the more humid and rich soils (dark-grey forest soil, rich in herbs pine forest type) the rusts, pathogen organisms of bladder rust or canker-blister rust have been found (*Cronatrium flaccidum* (Alb. Et Schw.) Wint. and *Peridermium pini* (Pers.) Lew. Et Kleb.).

It is known that phacidiosis (*Phacidium infestans*) occurs in natural pine forests beginning from the northern timberline. In the northern taiga subzone there are favorable conditions for development and spreading of pathogens. Their negative impact strengthens towards high latitudes as the soil-climatic regime becomes worse, the winter period becomes much longer and snow cover becomes more stable. High resistance of northern Scots pine climatotypes (subspecies “northern lapponian” and “siberian” from southern taiga subzone) to pathogens is observed in provenance trial in the Priangarie region. Therefore we can suppose that resistance to pathogens has formed and developed with the time in pine posterities of northern populations. Resistance to fungal diseases has not formed in pine climatotypes from western, central and southern regions of the areal (subspecies “kulinda p.” and “scots p.”) just in places of their origin. Therefore in the test area (under Priangarie region conditions) they are more vulnerable to pathogens. Disturbance of linear growth is observed in pine climatotypes not tolerant after snowy Schutte disease. It is connected with falling down more than 50% of needle, with drying up of a terminal bud of the central and sucker shoots and with replacement of a central shoot due to a living shoot of a lower whorl. The plant gains a bushy form in this case. Such a stem form is observed in the bear berry pine forest type (sandy soil) in climatotypes from steppe and forest steppe regions.

Literature evidences about relation of bladder rust to forest site conditions are fragmentary and contradictory. According to one authors the mass fungus spreading in young pine tree stands is observed only under unfavorable growing regimes, mainly, in lichen pine forest. According to other authors – the loss from this pathogen is found in pine stands with a better (more rich) growing regime. This disease is met in our experiment only in the more humid and more rich forest type (rich in herbs pine forest type, dark-grey forest soil). With age increase of trees the number of damaged trees not resistant to this pathogen, mainly, from southern regions of pine areal enlarges too.

* Corresponding author: kuz@ksc.krasn.ru; Akademgorodok, Krasnoyarsk, 660036 Russia