

DENDROCTONUS MICANS (KUG.) AS A PEST OF SCOTS PINE,
PINUS SYLVESTRIS L.

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The great European spruce bark beetle, *Dendroctonus micans* (Kug.), has spread in the whole Eurasian zone of coniferous forests from Britain and France to the Sakhalin Island and Japan. Throughout its range, *D. micans* attacks a number of native and introduced conifers, the list of its host trees includes at least 25 species (Gregoire, 1988).

According to many publications, *D. micans* has been considered to be a spruce insect; its usual hosts are *Picea abies*, *P. sitchensis*, and *P. orientalis*. Usually, only accidental attacks to pine have been mentioned. However, a more profound study of related literature, and our personal long-term observations affirm that Scots pine, *Pinus sylvestris*, is a common host tree for *D. micans*. In the central and eastern part of its range, there are sufficient evidences of attacks to Scots pine (Voolma, 1994). Even more, in some regions, *D. micans* have been a serious pest of Scots pine (Kolomiets, 1990). Large-scale outbreaks in the plantations of Scots pine have been recorded in Estonia, Russian Karelia and West Siberia during recent decades.

Many records on the occurrence of *D. micans* as a pest of Scots pine in natural forest have been published since the 19th century. Already Lindemann (1879) wrote that, without a doubt, *D. micans* attacks pines not in exceptional cases but inhabits there regularly. A lot of facts about damage caused by *D. micans* to pine trees differing in age have been reported. In the vicinity of Moscow, the 40-year-old pines growing on a moist site were attacked in 1873. In 1887 an outbreak of *D. micans* was observed in a young pine stand with the height of 3-6 m in the Eastern Prussia (Altum, 1888). In a pine stand of *Pinetum sphagnosum*-type near St. Petersburg, more than 50 % of the trees were damaged by *D. micans* in 1928-1929; *D. micans* attacked pines of different age including small trees with the height of 1.5 metres. In peatland forests of Byelorussia, *D. micans* have been considered to be the main reason of the perishing of Scots pine. In north-west of Russia (Kola Peninsula) as well as in East Siberia, attacks by *D. micans* to old-growth pines were reported. The population of *D. micans* on old pines may be very numerous – even 2.5 thousand of adults of *D. micans* were collected from an old pine tree with the diameter of 50 cm in Siberia (see references in Voolma, 1994).

In Estonia, *D. micans* as a pest of Scots pine was discovered for the first time in a 21-year-old plantation on the Island of Muhu in 1971 (Rõigas, 1975; Voolma, 1980, 1986) while in spruce stands of Livonia (now South Estonia and Northern Latvia) the species was known from the last century (Seidlitz, 1875). Over 15,000 specimens of bark beetles collected since the middle of the 19th century are preserved in the insect collections of Estonia (Voolma et al., 1997). Among them, 188 specimens of *D. micans* collected in 1931-1998 were detected. According to labels, *Picea abies* as the host tree was indicated for 79 specimens, *Pinus sylvestris* for 69 and *Picea mariana* for 4 specimens; the remainder were not provided with the data about host trees. All specimens of *D. micans* collected from Scots pine were dated later than 1971.

An observational study of the distribution of *D. micans* on different host trees in Estonia has been conducted since 1971. In addition to the data and specimens preserved in the insect collections, the observations made in 1971-1998 resulted with the 48 records of the occurrence of *D. micans* on Scots pine, 22 records were registered from Norway spruce, three ones from *Picea pungens* and two from *Picea mariana*. A record means one or several

infested or damaged by *D. micans* trees in a locality. The observations refer to a rather widespread distribution of *D. micans* in pine forest, particularly in the Western Estonia.

In spruce stands, *D. micans* sparsely attacks trees growing in different site conditions throughout the whole distribution area but the outbreaks are reported mostly on the western and southern edges of its expanding range. In pine stands, on the contrary, the outbreaks of *D. micans* are clearly associated with site conditions. The trees of *Pinus sylvestris* about 20 years of age growing on unfavourable sites, where the normal development of root system has been hindered due to a limestone bedrock, tight stratum of clay, or high level of ground water and acidic poorly decomposed peat layer, are more susceptible to attacks by *D. micans*. Typical pine stands growing on light sandy soils are usually not infested by *D. micans*; outbreaks occur on the edges of ecological range of Scots pine.

In Estonia, *D. micans* occur preferably in pine plantations established in alvar sites with humic carbonated soil on limestone, as well as in sites with drained peat soils or on transitional bogs. The trees about 10-12 years of age were attacked but the most susceptible to damage were 18-25-years-old pines. According to the data from the sample plots established in plantations of Scots pine on the Island of Muhu, 59-84 % of the trees were injured by *D. micans*, and 12-54 % of the total number of trees perished as a result of damage.

Forest ecologists consider the thicket-stage, when the trees start to grow with mutual crown contact, to be a critical period in the development of a pine stand; in this period the greatest discord between the development of a crown and a root system exists. Dry and warm weather also contribute to the physiological weakening of trees, particularly in the early summer (in June) when trees are intensively growing in height and the consumption of water is the greatest. At the same time, the infestation of trees by *D. micans* and oviposition take place.

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