National report on health status of main tree species on the basis of defoliation

2015 Bulgaria

The forest condition survey in 2015 is conducted on 159 Level I permanent plots of the national systematic grid and includes a total of 5513 sample trees. Observations on the defoliation, biotic and other stress factors are carried out at sample plots on the coniferous tree species *Pinus sylvestris* L., *Pinus nigra* Arn., *Picea abies* (L.*)* Karst. and *Abies alba* Mill., as well as on the deciduous tree species *Fagus sylvatica* L., *Quercus frainetto* Ten., *Quercus petraea* (Matt.) Liebl., *Quercus cerris* L., *Quercus rubra* L., *Tilia platyphillos* Scop. and *Carpinus betulus* L.. The total number of the assessed coniferous sample trees is 2386 and the number of the deciduous trees is 3127.

The predominant part of the observed trees 73.7 % of the monitored trees have a degree of defoliation up to 25 % which coincides with the results obtained in 2014. The highest percentage of trees with average degree of defoliation is 17.61, determined within the interval between second and fourth classes, which is 4.21 % less than the respective percentage in 2014. In comparison with the study results, obtained in 2014, the percentage of the healthy trees is increased by 6.5 %. The percentage of the highly defoliated and dead trees of third and fourth degrees is increased by 4.25 %.

The observed deciduous trees are in better condition than the coniferous trees. 84.4 % of the studied deciduous trees have a defoliation degree up to 25 %, which represents an increase of 4.3 % in comparison with 2014. As for the coniferous tree species, 59.97 % have a defoliation degree up to 25%, which is 5.9 % less than the results reported in 2014.

The health condition of *Fagus sylvatica* L. is very good. The variation between the different sample plots is associated with effects of abiotic and biotic character (*Nectria* sp., *Ascodichaena rugose*, *Fomes fomentarius*, *Orchestes fagi*, *Mikiola fagi*, etc.). The increased percentage of the trees of third and fourth degree (heavily damaged and dead trees) – 2.0 % and 7.0 % respectively, is due mainly to ice damages and anthropogenic impact.

The oaks (*Quercus cerris* L., *Quercus frainetto* Ten., *Quercus petraea* (Matt.) Liebl. and *Quercus rubra* L.) maintain their health status at the level of the previous years. The decrease of serious damages within the second and third degree is due to the lack of calamities of the main leaf-gnawing insects (*Lymantria dispar*, *Geometridae* and *Tortricidae*). The slight increase of heavy damages in the Turkey oak is caused by the main stem pathogens (*Hypoxylon mediterraneum* and *Diplodia mutila*), and in the Sessile oak and Hungarian oak – by the tracheomycosis disease (*Ceratocystis roboris*).

There are no significant changes in the health status of *Carpinus betulus* L. and *Tilia platyphillos* Scop.

The best condition of the coniferous tree species under 60 years of age is determined in *Picea abies*, where 86.7 % of the observed trees have a defoliation degree up to 25 %, followed by *Pinus sylvestris* and *Pinus nigra*. Regarding the observed stands over 60 years of age, the best condition is also determined in *Picea abies* - 88.5 % of the trees have defoliation up to 25 %. The worst condition, compared to the other tree species, is reported in the *Pinus sylvestris* stands, where 13.6 % are in 3+4 defoliation degree. In comparison with the results for 2014, the percentage of healthy trees of the species *Picea abies* and *Abies alba* is increased; the percentage of the fourth degree is also increased. Higher percentage of defoliation is determined in *Pinus nigra* and *Pinus sylvestris*, as well as increase of those in fourth degree.

The described biotic damages and their causes did not lead to significant changes in the condition of the studied trees.

The impact of the abiotic factors, mostly wet snow, fallen in April in some parts of the country, as well as windthrows, windbreaks and snow breakages, is more significant. A tendency of increased areas, affected by these factors, has been observed in the recent years. In 2010 a total area of 3 776 ha was affected, in 2011 there was an increase by 268.5 %, in 2012 – by 569.4 %, in 2013 – by 386.8 % and in 2014 – by 698.8 %.