

Peculiarities of the state of the pine forest stands of Bryansk region exposed to radionuclide contamination in consequence of Chernobyl accident

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Long-term changes in the state of the Bryansk region pine stands in the Chernobyl accident zone are estimated. Relation of shares of pine trees of different state categories in the control stands and stands contaminated by the radionuclide is analyzed. It is established that contaminated pine stands currently are characterized by more percentage of the dead trees than the control stands: 20,81% versus 13.30 % in control plots. Percentage of two categories trees qualified as the best condition trees (trees without symptoms of debilitation and weakened trees) in composition of alive forest stand at the testable plots was 4.90% more than in control plots (48.46% versus 43.56%), and percentage of heavily weakened and shrivel trees was fewer at the same value. Detected differences in proportion of trees of different condition categories in the contaminated pine stands have no 90–95% probabilistic level that used in biology as standard for determining statistical validity of differences. The results of the made statistical test allow us to characterize marked differences in percentages of trees as slightly expressed trends [1]. The detected differences in physiological

condition of trees on contaminated and control plots lie in the ranges of the natural variability of condition indexes of ripening pine stands.

Also dynamics of annual radial growth of pine stands is considered. The results of correlation analysis show that current annual growth of the best trees characterized by the positive relationship with level of radionuclide contamination of the soil in the tested forests in all period after Chernobyl accident. Positive estimations of correlation index attest the more intensive grow of pine annual rings for the plots with more contaminated soils. The stimulated effect of the radiation factor was more appreciable for growth rate of the summer wood increment. The most considerable effect was noted in 2006–2010 when regression coefficient had achieved 9,575%. In other periods the estimations of this parameter were: 0.459% for 1986–1990, 1.313% for 1996–2000 and 3.993% for 2001–2005.

There was no reliable effect of the radiation factor to radial wood increment of weakened, heavily weakened and shrivel pine trees in all observation period.

References

1. Guidelines for forest management in the areas of radioactive contamination from the Chernobyl accident (for the period 1997–2000 rr.) / Compl.: I. I. Maradudin, A. V. Panfilov, T. V. Rusin, V. Shubin [etc.] // Approved by the Decree of the Russian Federal service of forest management from the 31.03.97 № 40. – М., 1997. – 61 с.