

Vol. 11 (4): 931-938 (2021)

MONITORING OF THE SEASONAL DEVELOPMENT OF IPID BARK BEETLE (*IPS ACUMINATUS*) IN SCOTS PINE STANDS BY REMOTE SENSING

Tetiana Kuchma¹, Iryna Shvydenko¹, Mariya Vysochanska¹, Oleg Yaremko², Liudmyla Raichuk^{1*},
Lyudmyla Symochko³, Mykola Kuchma¹, Yulia Havryluk⁴

^{1*}*Institute of Agroecology and Environmental Management of NAAS, 12 Metrologichna str., 03143 Kyiv, Ukraine;*

²*Ternopil Oblast Department of Forestry and Hunting, 5a Bagataya Str., 46008 Ternopil, Ukraine;*

³*Uzhhorod National University, 14 Universitetskaya Str., 88000 Uzhhorod, Ukraine;*

⁴*Luhansk Taras Shevchenko National University, 1 Gogol Square, 92703 Starobilsk, Ukraine;*

*Corresponding Author Liudmyla Raichuk, e-mail: edelvice@ukr.net;

Received August 2021; Accepted September 2021; Published October 2021;

DOI: <https://doi.org/10.31407/ijeess11.434>

ABSTRACT

The research aimed to estimate the intensity of the impact of some environmental factors on the seasonal development of apical bark beetle (*Ips acuminatus*) in Scots pine (*Pinus sylvestris*) stands in the conditions of Ukrainian Polissya, as well as to evaluate the extent and dynamics of infestation of forest ecosystems. According to the results of the classification of the obtained satellite images, the dynamics of the area and number of tree mortality foci of *P. sylvestris* per quadrant was determined, which enabled us to create appropriate maps by the area of infestation and its propagation rate. In 2018, there was an intensive increase in the area affected by apical bark beetles compared to 2017. Whereas in 2019 the expansion of the affected areas compared to the previous 2018 slowed down significantly. Approximation of experimental data revealed the presence of a logarithmically normal distribution for the infestation area, and, consequently, the size of the pest population. The Principal Component Analysis revealed that in the studied area the most important factor influencing the population dynamics of ipid bark beetle and, accordingly, the intensity of its invasion, were weather and climatic conditions. Characteristics of the stand had little effect. It was established that favourable climatic conditions led to the fact that in the territory of Ukrainian Polissya *I. acuminatus* develops in more than two generations per year, and also slightly changed the attack strategy, namely the rate of damage and selectivity. An assumption on the further forming of favourable conditions for the proliferation of *I. acuminatus*, the emergence of new, not previously characteristic of the pest features of seasonal development and, consequently, the insect invasion on stands of *P. sylvestris* was made.

Keywords: *Ips acuminatus*, *Pinus sylvestris*, populations, tree mortality, environmental factors, remote sensing, Polissya of Ukraine, climate change.