Stand structure and disturbance history of old-growth Korean pine-leaved forests of the Sikhote-Alin Mountains

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Ухваткина О. Н., Омелько А. М. Структура и история разрушений древостоя старовозрастных кедрово-широколиственных лесов Сихотэ-Алиня

Coniferous-broadleaf forests of the Russian Far East cover around 720 000 km^2. Such forests can include in their composition up to 30-40 tree and shrub species (with around 20 being common) and more than 70 herbaceous species. All these species demonstrate varying ecological requirements, levels of reaction to changes in growing conditions, life strategies and influence on their surroundings. The combination of topographical complexity (providing a diversity of microclimatic conditions) and the varying life strategies and ecology of woody species increases the structural complexity and diversity of these vegetative communities. Our research was conducted on two permanent sample plots in the Sikhote-Aline mountain range (Verkhneussurisky Research Station of IBSS FEB RAS and Sikhote-Alin Biosphere Reserve, Primorsky Territory, Russia). The study plots are located in unaltered mature forests typical of Korean pine-dominated communities at the northern end of the Korean pine range, where it forms stands in mixture with spruce and broadleaf tree species. Stand history was analyzed with the use of the “boundary-line release criterion” methodology (Black & Abrams 2003). For analysis of horizontal stand structure we used the function of paired correlation (Wiegand & Moloney 2004). The analysis was conducted with the help of Programita software. Analyses identified periods of partial decays of stands on two sample plots. Decays occur simultaneously on both plots at intervals of about 40 years and cause accelerated growth of trees of all stand layers. The undergrowth location is not determined by the canopy layer trees placement, but associated with previously existing gaps . Development of conifer undergrowth occurs in several stages: first, it accumulates under the stand canopy, then (after decay) extends up to the canopy sublayer and upper canopy layer. Thus, formation and separation of generations (Ivashkevich 1927) may not depend on tree absolute age. Periodic improvements of conditions leads to a stepwise development of the trees, with fast growth alternating with long periods of suppression.