

ЗАХИСТ ЛІСУ

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SPREAD AND INJURIOUSNESS OF STEM INSECTS IN UNCLOSED SCOTS PINE PLANTATIONS IN PINE FORESTS IN SIVERSKY DONETS RIVER VALLEY DEPENDING ON FOREST SITE CONDITIONS

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Distribution of pine stands by forest site conditions in the territory of pine forests in Siversky Donets river valley (so called "Near-Donets bors") and its relations with spread and injuriousness of stem insects in unclosed Scots pine plantations of this region were studied. It was shown that, from northwest to southeast, the part of area with relatively poor site conditions (B) decreases, the part of poor site conditions (A) increases, the part of fresh hygrotops decreases, and the part of very dry and dry hygrotops increases.

Mean population density of pine weevil (*Hylobius abietis*) and bark beetles (*Hylastes ater*, *Hylastes opacus*, *Hylastes angustatus* and *Hylurgus ligniperda*) in all forest site conditions is slightly greater in the forest-steppe part of Near-Donets bors than in the steppe part of it. Abundance of stem insects is in concordance with wood stock which determines the amount of substrate for colonization and depends mainly on forest site conditions. High positive correlation is calculated between stem insects abundance and the part of damaged seedlings. At similar abundance of stem insects, mortality of seedlings with the lowest root collar diameter is the most likely.

Key words: pine forests in Siversky Donets river valley (so called "Near-Donets bors"), stem insects of unclosed plantations, pine weevil, bark beetles, forest site conditions, population density, injuriousness.

Introduction. Pine forests in Siversky Donets river valley (so called "Near-Donets bors") cover the area in the left bank of this river with its tributaries and form an unified natural territorial complex. Considerable part of these forests is artificial and often damaged by insect pests, especially in the first years after planting.

Spread of insect pests depends on ecological conditions of particular stands, which differ by attractiveness and favorability for forming the foci of mass propagation [5, 10, 14]. Suitability of stands for foliage browsing insects is the best studied. Approach to evaluation of the threat of foliage browsing insects' outbreaks in the particular forest sub-compartments has been developed taking into account forest site conditions, age, density of stocking, tree species composition and some other characteristics [5]. It was implemented in different natural zones of Ukraine [1, 9]. Similar approach has been developed for pine bark bug (*Aradus cinnamomeus* Panz) and implemented in Novgorod-Siverske Polissya [8].

Pine weevil (*Hylobius abietis* Linnaeus, 1758) and bark beetles (*Hylastes ater* Paykull, 1800 (= *H. angusticollis* Eggers, 1929), *Hylastes opacus* Erichson, 1836, *Hylastes angustatus* Herbst, 1793 and *Hylurgus ligniperda* Fabricius, 1792) damage and colonize Scots pine (*Pinus sylvestris* L.) in the first years of its growing [6, 7, 12, 16–18]. The spread of these pests depends on availability of substrate for colonization and food supply for maturation feeding. The both parameters depend on timber stock which is greater in more fertile and humid site conditions [4].

Distribution of pine stands area by forest site conditions influences the growth and condition parameters of pine forests, including their susceptibility to insect damage. Indirectly it is supported by statistical data on pine plantations quality in Near-Donets bors region. So the average quality class of pine plantations in fresh relatively poor site conditions is 1.5–1.7, in fresh poor site conditions it is 2–2.2, and in dry poor site conditions it exceeds 2.3 [10].

The aim of this work was to recognize the peculiarities of pine stands area distribution by forest site conditions in the territory of Near-Donets bors and its relations with spread and injuriousness of stem insects in unclosed Scots pine plantations of this region.

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Materials and methods. Forest inventory Database of Production Association “Ukrderzhlisproekt” was analyzed for the State Forest Enterprises which are located in the Near-Donets bors. Kharkiv region was represented by six State Enterprises (SE) of the Left-bank Forest Steppe Zone: “Vovchanske Forest Economy” (“Vovchanske FE”), “Chuhuievo-Babchanske Forest Economy” (“Chuhuievo-Babchanske FE”), “Zmiivske Forest Economy” (“Zmiivske FE”), “Balakliiske Forest Economy” (“Balakliiske FE”), “Skrypaivske Training & Experimental Forest Economy” of Kharkiv National Agrarian University named after V. V. Dokuchaev (“Skrypaivske TEFE”), and Kharkiv Forest Research Station (“Kharkiv FRS”) and by one State Enterprise of the Steppe zone: “Iziymske Forest Economy” (“Iziymske FE”). Luhansk region was represented by three State Enterprises: “Sievierodonetske Forest & Hunting Economy” (“Sievierodonetske F&HE”), “Kreminske Forest & Hunting Economy” (“Kreminske F&HE”) and “Stanychno-Luhanske Experimental Forest & Hunting Economy” (“Stanychno-Luhanske EF&HE”).

Coordinates for forests of each forest enterprise were evaluated as centroids of respective contours of the territory using MapInfo Mapping Package.

Forest site conditions were specified by classification of Alekseev-Pogrebnyak [11].

Survey of stem pests of Scots pine plantations and assessment of insect population density was carried out by standard [15] and original methods (especially using traps and pits with logs and branches) [6, 12, 13]. Intensity of seedling damage was evaluated according to [6, 12, 13].

The data were analyzed using standard procedures of descriptive statistics, correlation analysis and ANOVA [2] using *Microsoft Excel*.

Results and discussion. *Distribution of pine stands by forest site conditions in Near-Donets bors.* Analysis of forest fund of the State Forest Enterprises in the region of Near-Donets bors shows that pine stands grow mainly in poor and relatively poor site conditions (Fig. 1). The part of area with relatively poor site conditions (B) decreases ($r = 0.87$), and the part of poor site conditions (A) increases ($r = 0.86$) from northwest to southeast (see Fig. 1).

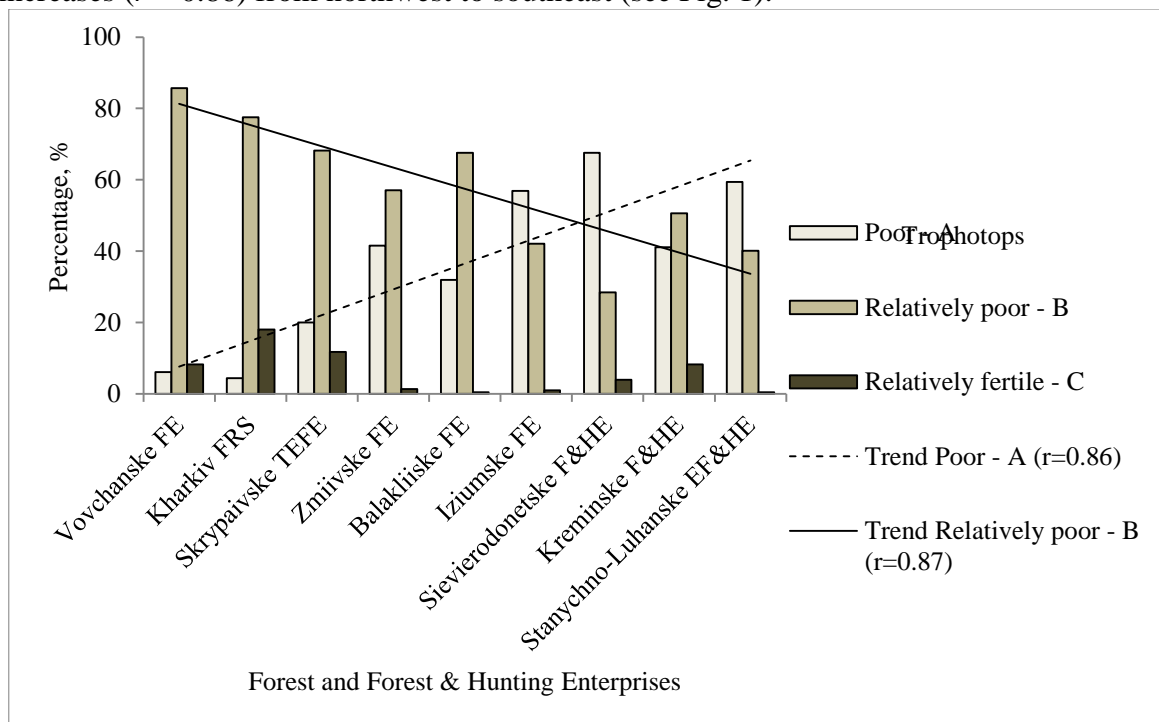


Fig. 1 – Distribution of pine stands area of Near-Donets bors by trophotops (Forest Enterprises are sorted in order of decreasing latitude from 50°17' N in SE “Vovchanske Forest Economy” to 48°38' N in SE “Stanychno-Luhanske Experimental Forest & Hunting Economy”)

In the same direction the part of fresh hygrotops decreases ($r = 0.56$), and the part of very dry and dry hygrotops increases ($r = 0.83$) (Fig. 2).

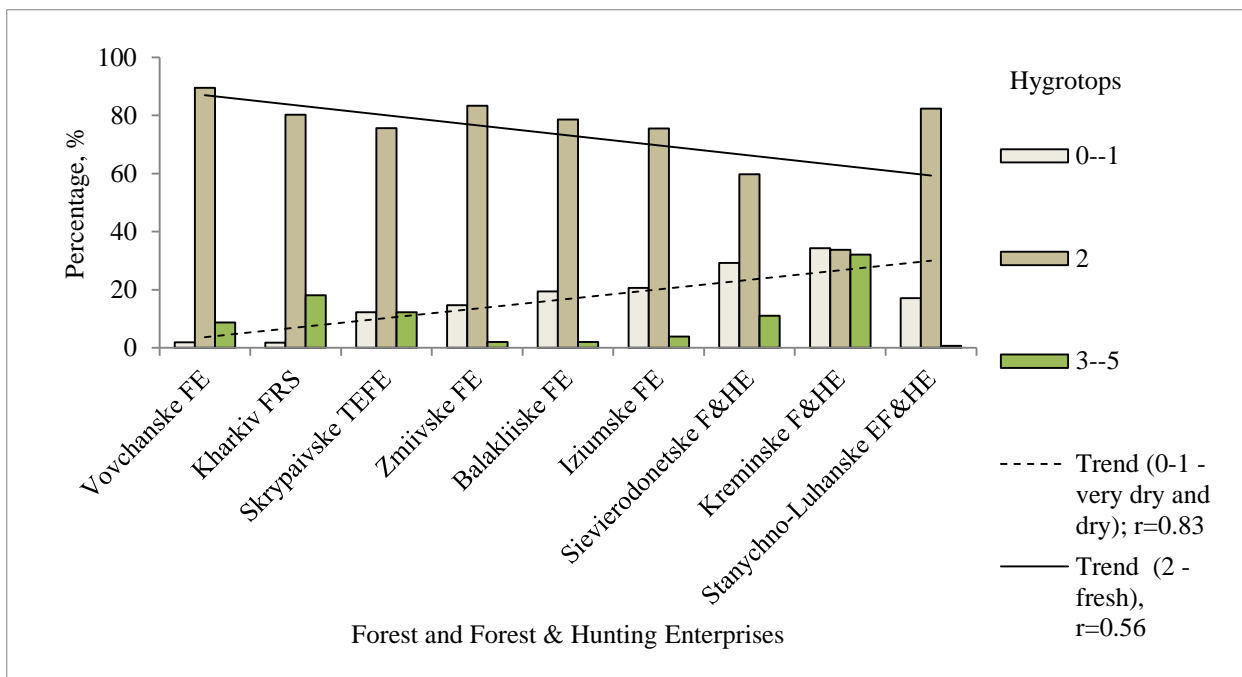


Fig. 2 – Distribution of pine stands area of Near-Donets bors by hygrotops (Forest Enterprises are sorted in order of decreasing latitude from 50°17' N in SE “Vovchanske Forest Economy” to 48°38' N in SE “Stanychno-Luhanske Experimental Forest & Hunting Economy”)

In the generalized data on all analyzed State Forest Enterprises of Near-Donets bors, the weighted average age of pine stands tends to increase with the growth of richness and humidity of forest site conditions ($r = 0.65$). For example, the weighted average age of pine stands in A₁-C is 51 year old, and in B₂-дC it is 63 years old (Fig. 3).

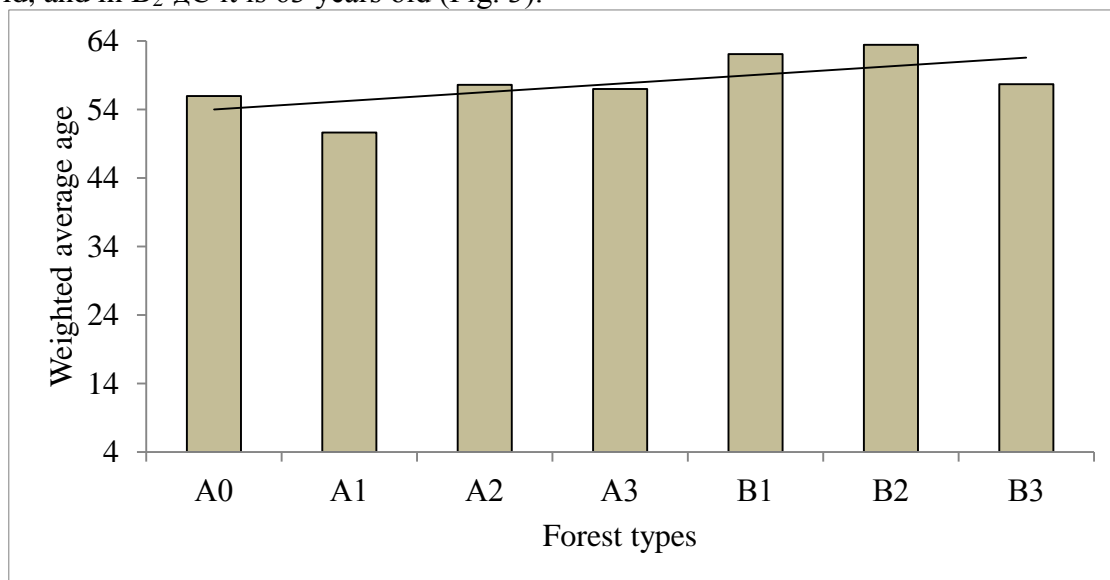


Fig. 3 – Weighted average age of pine stands in different forest site conditions of Near-Donets bors ($r = 0.65$)

Weighted average age of pine stands tends to decrease from forest-steppe to steppe part of Near-Donets bors ($r = 0.49$). It is 63 and 70 years old in “Vovchanske FE” and “Chuhuievo-Babchanske FE”, respectively, 54 and 49 years old in “Sievierodonetskе F&HE” and “Stanychno-Luhanske EF&HE”, respectively (Fig. 4).

The above pattern appears clearer for particular forest site conditions (Fig. 5). For example, weighted average age of pine stands in relatively poor forest site conditions (B₁) of “Vovchanske FE” and “Chuhuievo-Babchanske FE” is 88 and 66 years old, respectively, and in the same forest

site conditions of “Sievierodonetske F&HE” and “Stanychno-Luhanske EF&HE” it is 41 and 47 years old, respectively (see Fig. 5).

Obtained data are considerably related with pine stands distribution by forest site conditions in different parts of the region (see Figs. 1–2).

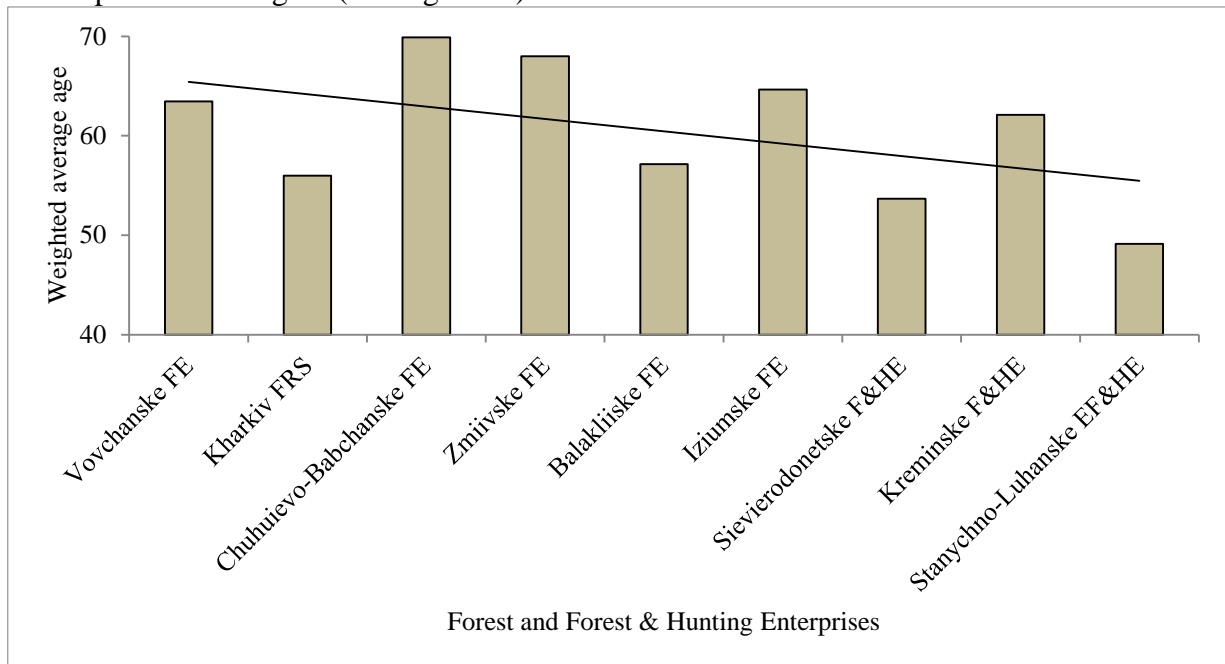


Fig. 4 – Weighted average age of pine stands in Near-Donets bors (Forest Enterprises are sorted in order of decreasing latitude from 50°17' N in SE “Vovchanske Forest Economy” to 48°38' N in SE “Stanychno-Luhanske Experimental Forest & Hunting Economy”)

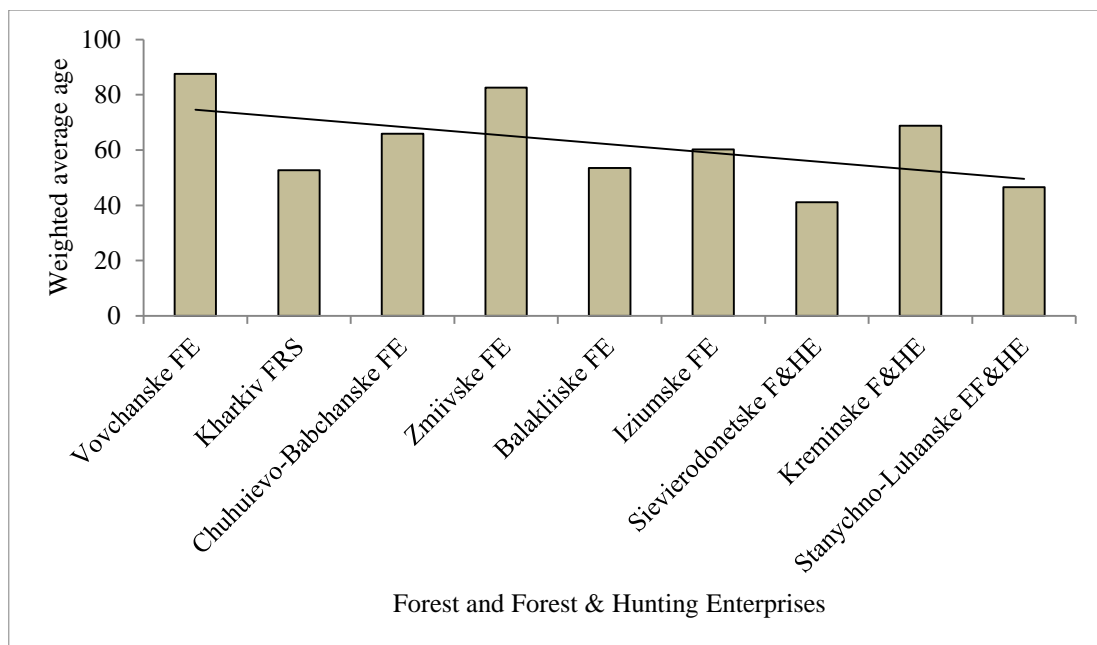


Fig. 5 – Weighted average age of pine stands in dry relative poor forest site conditions (B₁) in Near-Donets bors (Forest Enterprises are sorted in order of decreasing latitude from 50°17' N in SE “Vovchanske Forest Economy” to 48°38' N in SE “Stanychno-Luhanske Experimental Forest & Hunting Economy”)

The less age of pine stands in the steppe part of Near-Donets bors, particularly in the poorest and driest forest site conditions, shows that such stands are more susceptible to unfavorable factors, especially insect pests. Therefore new plantations are created more often in the sites where they would be damaged by insect pests.

Population density of stem pests of pine seedlings in different forest site conditions. Pine weevil (*Hylobius abietis*) and bark beetles (*Hylastes ater*, *Hylastes opacus*, *Hylastes angustatus* and *Hylurgus ligniperda*) were the most abundant pests of pine plantations in the first years of their growth. Population density of these pests considerably varied in different forest enterprises and plots. Grouping respective data by natural zones shows that mean population density of pine stem pests in the traps (recalculated to 1 m²) in all forest site conditions was slightly greater in the forest-steppe part of Near-Donets bors than in the steppe part of it. Such difference reached 1.4 times in dry poor forest site conditions (A₁), 1.2 times in dry relatively poor forest site conditions (B₁). In fresh poor (A₂) and relatively poor (B₂) forest site conditions population density of pine stem pests reached 1.1 and 1.2 times, respectively (Table 1).

Table 1

**Population density of stem pests of pine seedlings in different forest site conditions
(individuals / m²)**

Hygrotops	Trophotops					
	A – poor (bors)		B – relatively poor (subors)		C – relatively fertile (sugruds)	
	Natural zone					
	Forest-steppe	Steppe	Forest-steppe	Steppe	Forest-steppe	Steppe
1 – dry	5.3 ± 0.61	3.8 ± 0.45	5.9 ± 0.72	5.1 ± 0.68	8.0 ± 0.94	–
2 – fresh	8.0 ± 0.92	7.1 ± 0.86	10.0 ± 1.11	8.7 ± 0.96	8.4 ± 0.96	8.3 ± 1.06
3 – humid	5.9 ± 0.75	–	9.6 ± 1.05	–	5.9 ± 0.75	–
4 – wet	3.6 ± 0.42	–	5.4 ± 0.67	–	–	–
5 – swamp	2.5 ± 0.36	–	3.4 ± 0.43	–	–	–

Analysis of Table 1 shows, that in the frame of each trophotop population density of stem insects was maximal in fresh site conditions and gradually decreased from humid to swamp conditions (see Table 1).

In all hygrotops stem insects tended to be more abundant in relatively poor forest site conditions than in poor forest site conditions. However, population density was higher in relative fertile forest site conditions than in relatively poor forest site conditions only in dry hygrotops. Thus, in dry poor forest site conditions, dry relatively poor forest site conditions and dry relatively fertile forest site conditions in the forest-steppe part of near-Donets bors mean population density of stem pests in the traps amounted 5,3, 5,9 and 8 individuals/m².

In fresh forest site conditions of inspected stands of the forest-steppe part of near-Donets bors mean population density of step pests in traps amounted 10 and 8.4 individuals/m² in relatively poor forest site conditions and relatively fertile forest site conditions, respectively, and in the stands of the steppe part of near-Donets bors it amounted 8.7 and 8.3 individuals/m² in relatively poor forest site conditions and relatively fertile forest site conditions, respectively (see Table 1). Obtained data are explained by the fact that pine stands are mainly mixed in relatively fertile forest site conditions, therefore amount of substrate for colonization by stem pests (stumps and roots of weakened trees in the border between forest and clear-cut) is less there.

The volume of such substrate per 1 ha is greater in the stands with more wood stock, and wood stock in pure pine stands of the same age depends mainly on forest site conditions [4].

To prove this statement, we have analyzed the data of wood stock in the 80 and 90 years old pine stands in Left-bank Forest Steppe and Steppe using data of I. V. Turkevich et al. [4]. We emphasize that both in the table 2 and in quoted source [4] data exactly on pine stock are presented, because the stands are mainly mixed in relatively fertile forest site conditions and often mixed in relatively poor site conditions.

The data of the Table 2 support the assumption that substrate volume for stem pests colonization is the greatest in the stands with the greatest wood stock. So, the stock of pine stands in all forest site conditions is slightly larger in the stands of the Left-bank Forest Steppe than in Steppe. Such difference is the most in dry poor site conditions (1.4 times). In the frame of each

trophotop, pine wood stock is maximal in fresh forest site conditions and gradually decreases from humid to wet forest site conditions (see Table 2).

Table 2

**Pine stock in the stands of 80 and 90 years old in different forest site conditions (m³/ha)
(by [4])**

Hygrotops	Trophotops					
	A – poor (bors)		B – relatively poor (subors)		C – relatively fertile (sugruds)	
	Age of stands, years old					
	80	90	80	90	80	90
1 – dry	288 / 211	314 / 229	325 / 278	354 / 301	428	474
2 – fresh	428 / 386	474 / 424	551 / 473	595 / 518	473 / 501	500 / 536
3 – humid	325	354	527	571	324	350
4 – wet	194	214	297	324	–	–
5 – swamp	135	149	183	202	–	–

Note: numerator – Left-bank Forest-steppe; denominator – Steppe. Humid poor and relatively poor sites are presented in the steppe part of Near-Donets bors, but data on their productivity are absent in given reference [4].

In all hygrotops pine wood stock is greater in relatively poor forest site conditions than in poor forest site conditions. However, increase of this parameter in relatively fertile forest site conditions compared to relatively poor forest site conditions is revealed only in the dry hygrotops. So, in dry poor forest site conditions, dry relatively poor forest site conditions and dry relatively fertile forest site conditions of the Left-bank Forest-Steppe the wood stock of pine stands of 80 years old is 288, 325 and 428 m³/ha, and wood stock of pine stands of 90 years old is 314, 354 and 474 m³/ha, respectively (see Table 2).

Pine wood stock of pine stands of 80 years old in fresh relatively poor forest site conditions and relatively fertile forest site conditions of the Left-bank Forest-Steppe is 551 and 473 m³/ha, and in the same forest site conditions of the Steppe zone it is 518 and 501 m³/ha, respectively (see Table 2).

Thus, the number of stem pests of pine in the first years of its growing considerably depends on forest site conditions, which influence on pine stock as potential substrate for colonization. However injuriousness of insect pests not always increases with the growth of their population, because it depends on attractiveness the seedlings as source for maturation feeding and plant ability to restore its condition.

Injuriousness of pine seedlings pests in different forest site conditions. Food supply for maturation feeding of stem pests of unclosed pine stands are mainly the seedlings, which are concentrated in large number in forest plantations in the clear-cuts as well as pine natural regeneration and the shoots of elder pines [18].

During inspection of pine plantations not only population density of pine stem pests but also the part of seedlings damaged and killed in result of maturation feeding of these insects were assessed.

The mean part of damaged seedlings amounted from 10.4 to 77.2 % (Table 3).

Table 3

Part of pine seedlings damaged by stem pests in different forest site conditions (%)

Hygrotops	Trophotops					
	A – poor (bors)		B – relatively poor (subors)		C – relatively fertile (sugruds)	
	Natural zone					
	Forest-steppe	Steppe	Forest-steppe	Steppe	Forest-steppe	Steppe
1 – dry	23.4 ± 3.69	41.1 ± 5.35	26.4 ± 3.47	43.4 ± 7.01	41.6 ± 7.74	–
2 – fresh	32.8 ± 4.47	48.3 ± 5.45	38.2 ± 4.05	64.5 ± 4.35	43.8 ± 9.01	77.2 ± 7.66
3 – humid	25.1 ± 3.23	–	46.3 ± 5.97	–	17.6 ± 7.19	–
4 – wet	17.3 ± 2.68	–	12.4 ± 2.04	–	–	–
5 – swamp	10.4 ± 2.40	–	10.2 ± 4.39	–	–	–

In the same forest site conditions this parameter was greater in the Steppe than in the Forest-Steppe, and in fresh conditions it was greater than in dry conditions. In the forest-steppe part of Near-Donets bors in the frame of each trophotop the mean part of damaged seedlings was maximal in the fresh poor site conditions (32.8 %), humid relatively poor site conditions (46.3 %), dry and fresh relatively fertile site conditions (41.6 and 43.8 % respectively).

High positive correlation was calculated between pine stem pests abundance and injuriousness both in the forest-steppe ($r = 0.76$) and steppe ($r = 0.80$) parts of Near-Donets bors (Fig. 6).

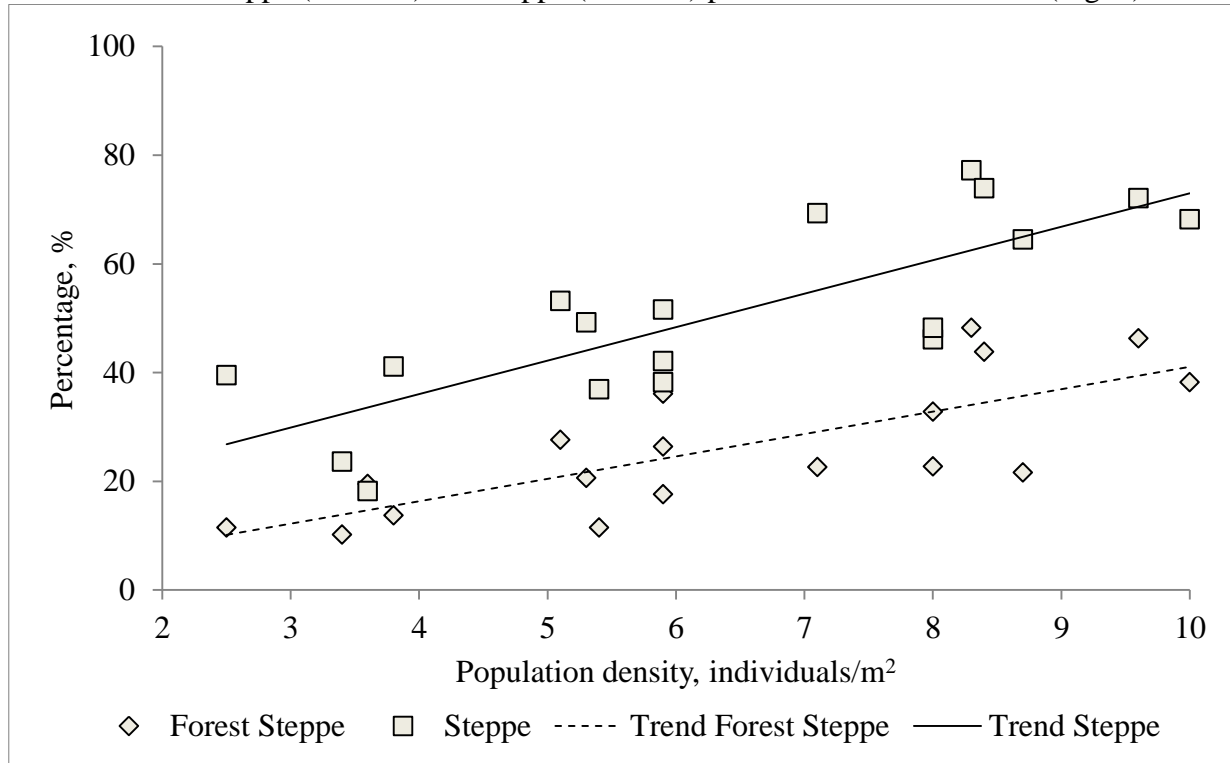


Fig. 6 – Relations between the part of damaged pine seedlings and abundance of stem pests in the Steppe ($y = 6.16x + 11.39$; $R^2=0.65$) and Forest-steppe ($y = 4.12x - 0.17$; $R^2=0.57$) parts of Near-Donets bors

Analysis of presented graphs shows, that at similar insect population density the part of damaged seedlings was greater in the steppe part of Near-Donets bors than in the forest-steppe part of it. Such results can be explained by the fact, that in the Forest-Steppe zone stem pests have the larger possibilities to carry out maturation feeding also on natural regeneration and on shoots of elder pines near the clear-cut. Another explanation is the decrease of seedlings resistance to damage in dry steppe conditions.

Differences of seedlings' resistance to damage and ability to recovery in the forest-steppe and steppe parts of Near-Donets region are revealed more clear in mortality level (Table 4).

Average mortality of pine seedlings as a result of damage by stem pests in inspected plantations of Near-Donets bors amounted from 1.6 % (humid relatively fertile forest site conditions, forest-steppe part of the region) to 24.1 % (dry poor site conditions, steppe part of the region) (see Table 4).

Among hygrotops of forest-steppe part of region, seedlings mortality as a result of damage by stem insects was the lowest in fresh and humid relatively fertile forest site conditions (1.6 and 2.5 %, respectively), fresh and humid relatively poor forest site conditions (2.5 and 3 %, respectively), fresh and humid poor forest site conditions (5.1 and 7.1 % respectively). Pine seedlings mortality as a result of damage by stem insects in the fresh poor forest site conditions and relatively poor forest site conditions in the steppe part of region was 2 and 2.9 times less, respectively, than in dry poor forest site conditions and relatively poor forest site conditions (see Table 4).

**Mortality of pine seedlings as a result of damage by stem pests
in different forest site conditions (%)**

Hygrotops	Trophotops					
	A – poor (bors)		B – relatively poor (subors)		C – relatively fertile (sugruds)	
	Natural zone					
	Forest-steppe	Steppe	Forest-steppe	Steppe	Forest-steppe	Steppe
1 – dry	9.3 ± 3.74	24.1 ± 5.52	8.8 ± 4.02	16.8 ± 5.29	5.1 ± 3.46	–
2 – fresh	5.1 ± 2.45	12.3 ± 3.67	2.5 ± 1.57	5.8 ± 2.34	1.6 ± 2.27	2.8 ± 2.99
3 – humid	7.1 ± 4.05	–	3.0 ± 2.04	–	2.5 ± 3.52	–
4 – wet	8.4 ± 9.81	–	5.4 ± 4.88	–	–	–
5 – swamp	8.7 ± 9.66	–	7.5 ± 7.62	–	–	–

At the same forest site conditions, seedling mortality as a result of damage by stem insects was greater in the steppe part of Near-Donets bors (see Table 4). In contrast, the proportion of damaged plants, mortality of seedlings was characterized by negative correlation both with population density of stem insects and with the part of damaged plants with high variation of correlation coefficients in different data samples (from 0.24 to 0.58). It means that the greater number of seedling was damaged the less part of them died. Such regularity was connected with peculiarities of maturation feeding of pine weevil on different parts of seedlings, especially on needles, buds, bark of branches and stem. Among different types of seedlings' damage by this pest, the most dangerous is gnawing through the stem and bark browsing in the most part of stem circumference. Therefore at similar abundance of pine weevil, mortality of seedlings with the lowest root collar diameter is the most likely. Even if planting material from the same greenhouse or nursery was taken, its growth is more intensive in fresh and humid conditions comparing to dry or wet and swamp conditions. This statement is reflected particularly in “Instruction for planning, technical acceptance, registration and evaluation as silvicultural objects” (Attachment 34) [3]. According to it, forest plantations are transferred to the land covered with forest vegetation in Forest Steppe Zone one year earlier than in Steppe zone, and in the poorest and driest conditions (A₀, A₁, B₀, B₁) the height of pine of the third quality class must exceed 0.9 and 0.8 m in Forest Steppe zone and Steppe zone, respectively, particularly exceed 1 and 0.9 m in fresh and humid poor forest site conditions (A₂ and A₃), and exceed 1.4 and 1.2 m in fresh and humid relatively poor forest site conditions (B₂ and B₃), respectively.

Conclusions.

1. Pine stands in Siversky Donets river valley (so called “Near-Donets bors”) grow mainly in poor (A) and relatively poor (B) site conditions. The part of area with relatively poor site conditions (B) decreases, and the part of poor site conditions (A) increases from northwest to southeast. The part of fresh hygrotops decreases, and the part of very dry and dry hygrotops increases in the same direction.

2. The weighted average age of pine stands tends to grow with increase the richness and humidity of forest site conditions, and it is the lowest in the steppe part of Near-Donets bors. The stands in the poorest and the driest forest site conditions are the most susceptible to unfavorable factors, especially to insect pests. Therefore new plantations are created more often in the sites where they would be damaged by insect pests.

3. Pine weevil (*Hylobius abietis*) and bark beetles (*Hylastes ater*, *Hylastes opacus*, *Hylastes angustatus* and *Hylurgus ligniperda*) are the most abundant stem insects in unclosed pine plantations. Mean population density of these pests in all forest site conditions is slightly greater in the forest-steppe part of Near-Donets bors than in the steppe part of it.

4. In each trophotop population density of stem insects is maximal in fresh forest site conditions and gradually decreases from humid to swamp forest site conditions. In all hygrotops stem insects tend to be more abundant in relatively poor forest site conditions than in poor forest site conditions.

5. Abundance of stem insects is in concordance with wood stock which determines the amount of substrate for colonization and depends mainly on forest site conditions. High positive correlation is calculated between stem insects abundance and the part of damaged seedlings. At similar insect population density the part of damaged seedlings is greater in the steppe part of Near-Donets bors than in the forest-steppe part of it, and in fresh conditions it is greater than in dry conditions.

6. In the same forest site conditions, seedling mortality as a result of damage by stem insects is the greatest in the steppe part of Near-Donets bors. At similar abundance of stem insects, mortality of seedlings with the lowest root collar diameter is the most likely.

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ПОШИРЕНІСТЬ І ШКІДЛИВІСТЬ СТОВБУРОВИХ КОМАХ У НЕЗІМКНЕНИХ КУЛЬТУРАХ СОСНИ ЗВИЧАЙНОЇ У ПРИДОНЕЦЬКИХ БОРАХ ЗАЛЕЖНО ВІД ЛІСОРОСЛИННИХ УМОВ

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Вивчали розподіл соснових насаджень за типом лісорослинних умов на території придонецьких борів та його зв'язки з поширенням і шкідливістю стовбурових комах у незімкнених культурах сосни звичайної у цьому регіоні. Було показано, що з північного заходу до південного сходу зменшується частка площі суборів (В), а частка площі борів (А) зростає, частка свіжих гігروتопів зменшується, а частка дуже сухих і сухих гігروتопів збільшується. Середня щільність популяцій великого соснового довгоносика (*Hyllobius abietis*) та короїдів (*Hylastes ater*, *Hylastes opacus*, *Hylastes angustatus* та *Hylurgus ligniperda*) в усіх лісорослинних умовах є дещо більшою в лісостеповій частині придонецьких борів, ніж у степовій. Чисельність стовбурових комах узгоджується із запасом деревини, який визначає кількість субстрату для заселення та залежить переважно від лісорослинних умов. Високий позитивний зв'язок визначено між чисельністю стовбурових комах і часткою пошкоджених ними саджанців. За однакової чисельності стовбурових комах найбільш імовірним є відпад саджанців із найменшим діаметром кореневої шийки.

Ключові слова: придонецькі бори, стовбурові комахи у незімкнених культурах, великий сосновий довгоносик, короїди, лісорослинні умови, щільність популяції, шкідливість.

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РАСПРОСТРАНЕННОСТЬ И ВРЕДНОСТЬ СТВОЛОВЫХ НАСЕКОМЫХ В НЕСОМКНУТЫХ КУЛЬТУРАХ СОСНЫ ОБЫКНОВЕННОЙ В ПРИДОНЕЦКИХ БОРАХ В ЗАВИСИМОСТИ ОТ ЛЕСОРАСТИТЕЛЬНЫХ УСЛОВИЙ

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Изучали распределение сосновых насаждений по типам лесорастительных условий на территории придонских боров и его связи с распространением и вредоносностью стволовых насекомых в несомкнутых культурах сосны обыкновенной в этом регионе. Было показано, что с северо-запада до юго-востока уменьшается доля площади суборей (В), а доля площади боров (А) возрастает, доля свежих гигротопов уменьшается, а доля очень сухих и сухих гигротопов увеличивается. Средняя плотность популяций большого соснового долгоносика (*Hyllobius abietis*) и короедов (*Hylastes ater*, *Hylastes opacus*, *Hylastes angustatus* и *Hylurgus ligniperda*) во всех лесорастительных условиях несколько больше в лесостепной части придонских боров, чем в степной. Численность стволовых насекомых соответствует запасу древесины, который определяет количество субстрата для заселения и зависит преимущественно от лесорастительных условий. Определена сильная положительная связь между численностью стволовых насекомых и долей поврежденных ими саженцев. При одинаковой численности стволовых насекомых наиболее вероятен отпад саженцев с наименьшим диаметром корневой шейки.

Ключевые слова: придонские боры, стволовые насекомые в несомкнутых культурах, большой сосновый долгоносик, короеды, лесорастительные условия, плотность популяции, вредоносность.

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