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Ontogenetic structure of populations of forest-forming species of the Left-Bank Polissia of Ukraine

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Abstract

The results of study of the population ontogenetic structure of the main forest-forming species (*Pinus sylvestris*, *Quercus robur*, *Acer platanoides*, *Betula pendula*, *Populus tremula*) of the Left Bank Polissia of Ukraine are presented. The study covered plant communities, which are the most common and typical in the region. They are represented by four formations of forest vegetation, viz. *Pineta sylvestris*, *Querceta roboris*, *Betuleta pendulae*, *Populeta tremulae*, and belonged to 24 syntaxes in the rank of association groups and up to 42 syntaxons in the rank of associations. The study was based on the use of geobotanical and population-ontogenetic approaches and methods. It was established that in the forests of the region, the most part of main forest-forming species populations have left-sided ontogenetic spectrum. Invasive populations are the predominant category. Only in the populations of the species involved in the formation of the second and especially the first tier of stands reveals the centred and bimodal spectra. In these species, the frequency of normal population occurrence increased, but their proportion was within 6.7–13.6%. No regressive populations were found in the main forest-forming species of the region. It was fixed that the ontogenetic spectra of the most of populations of the studied species were incomplete due to the absence of plants of some ontogenetic states. It was noted that the individual extinction of the young generation before they reached the generative ontogenetic state, was the clear evidence of significant disturbance in the region forests of the generation variability in forest-forming species. The limited representation of windfall microsite complexes in the composition of the forest plant communities of the Left-Bank Polissia of Ukraine as well as gaps enough in size to ensure successful undergrowth development and formation of a continuous flow of generations is one of the consequences of long-term man-made impact on these forests.

Keywords: forest phytocoenosis, forest-forming tree species, population analysis, population structure, ontogenetic spectrum, Polissia of Ukraine

Introduction

Forest plant communities are an important part of the planet vegetation. They have great economic value and they are also environmental stabilizers, biodiversity centres, regulators of the water regime of large territories and part of the eco-network. Therefore, assessing the stability of forest plant communities and their ability to sustain themselves is an important field of scientific analysis (Loreau et al. 2001, Snyder et al. 2004, Tomppo et al. 2008, Klymenko 2011, Skliar and Skliar 2003).

Ukrainian Polissia belongs to the areas with the highest forest cover (up to 29%) (Lukash and Andrienko 2014). This region extends from west to east for 750 km and occupies about 20% of the country area. The Polissia is distinguished by the originality of biological diversity. It is the centre of specific postglacial vegetation and flora, including glacial relics. Ukrainian Polissia ranks first among regions of the country plain part in the conservation of natural vegetation (Andrienko 2006).

Within Ukrainian Polissia, the high level of representativeness, conservation value and ecological-stabilizing significance is characteristic for the forests of its Left Bank part.

Considering the ecological, conservation value and economic importance of the forests of the Left Bank Polissia of Ukraine, it is especially important to carry out research aimed at studying the features and regularities of the natural renewal process as the main mechanism for ensuring the long-term existence and functioning of in these forests (Van Deusen 2002). The study of the population structure (in particular ontogenetic one) of forest-forming species is an important component of research aimed at clarifying the features and patterns of natural forest renewal (Rabotnov 1950, Uranov 1975, Uranov and Serebryakova 1976, Zaugolnova et al. 1988, Skliar 2013a, Skliar 2013b, Skliar and Dehtiarov 2013, Skliar and Zlobin 2013, Skliar 2014, Tsaryk et al. 2001).

The use of population-ontogenetic studies is extremely relevant. The self-sustaining of any forest plant communities is determined by the possibility of sustainable turnover of generations of forest-forming tree species. The study of generational flows in populations of edificatory species is important for understanding the formation mechanisms of the heterogeneous existence environment of forest plant communities and maintaining it in a stable permanent-dynamic state.

The aim of the work was to establish ontogenetic structure of populations of the main forest-forming species of the Left-Bank Polissia of Ukraine (*Pinus sylvestris* L., *Quercus robur* L., *Acer platanoides* L., *Betula pendula* Roth., *Populus tremula* L.) and characteristic features of their ontogenetic spectra in different forest vegetation conditions and on this basis to evaluate the success of natural processes in the regional forests ensuring their sustainable functioning.

Materials and methods

The Left Bank Polissia of Ukraine is located in the east direction from the Dnieper to the border with the Russian Federation on the north and has an area of about 20 thousand km^2 (Lukash and Andrienko 2014) (Figure 1).

The Left Bank Polissia is located within two regions and thirteen districts according to the physiographic dividing. Eight of them correspond to the physical and geographical area of Chernihiv Polissia and five ones to Novhorod-Siverskyi Polissia (Marynych et al. 2003). It is proved that the districts of the Left Bank Polissia differ significantly in the level of forest cover: in Zamglai-Sednivskyi district it reaches almost 40%. In other ones (Liubetsko-Chernihiv, Dobriansko-Horodnianskyi, Koropsko-Baturynskyi, and Kozeletsko-Kulikovskyi ones) it ranges from 7 to 18%.

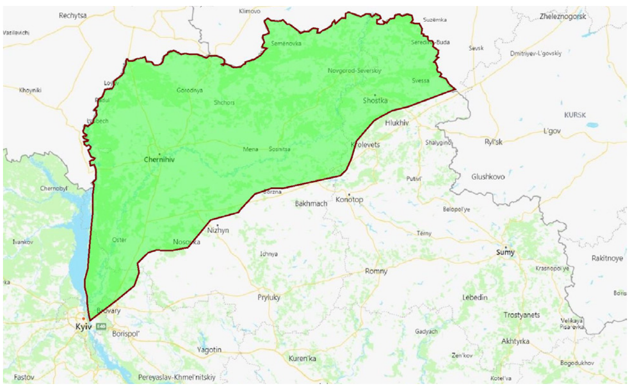

Figure 1. Study area: the Left Bank Polissia of Ukraine

Within the territory of the Left Bank Polissia, the most common are forests with the dominance of *P. sylvestris*, and, more rarely, *Q. robur*. The main feature of the forests of the Left Bank, as well as Polissia as a whole, is their edaphic conditionality. The predominance of sandy soils associated with the impact of the glacier has led to the dominance of *P. sylvestris*. A limiting factor for the spread of *Q. robur* is soil poverty, not the climatic conditions that are generally favourable for its growth. This species is usually confined to the more fertile soils formed on loess carbonate moraines. The predominant group of pine forests is a community of *Pineta (sylvestris) hylocomiosa* formation. Birch forests of *B. pendula* grow mostly in areas that have been occupied by pine and oak-pine forests or meadows in the past. For these forests, as well as for forests dominated by *P. tremula*, there is a rather high frequency of occurrence, but they do not form large arrays. Phytocoenoses with dominance and codominance of *A. platanoides* on the territory of Left-bank Polissia are in relatively small areas. However, *A. platanoides* as an asectator is often represented in many communities. These communities are not only typical of the area, but also correspond to climax or late-successional stages of forest community development (Sheliah-Sosonko 1970, Andrienko and Sheliah-Sosonko 1983, Andrienko 2006).

The basis of this work were materials of field research carried out in the Left-Bank Polissia of Ukraine during 2002–2018. Common geo-botanical methods were used to establish the state and structure of forest plant communities under the canopy, where natural regeneration of the main forest-forming species takes place (Yakubenko et al. 2018). The phytocoenotic affiliation of the researched communities was determined based on the materials of geo-botanical descriptions with reference to the dominant classification.

In general, the detailed study of the ontogenetic structure of the main forest-forming species of the Left Bank Polissia was carried out in the most common and typical plant communities of the region (Table 1). They belong to 24 syntaxes in the rank of association groups and 42 syntaxons in the rank of associations.

To establish the ontogenetic structure of main forest-forming species populations, their plants were differentiated by different ontogenetic states. This was done according to the method developed by O.V. Smirnova (2001), A.A. Chistiakova (1987), L.B. Zaugolnova (1988) and others and this concerned the periodization of trees in general and for each species (*P. sylvestris, Q. robur, A. platanoides* etc.) (Kyiak 2015).

The complex of the following features in plants was considered:

Seedlings (p) are plants that have no branches and form from seeds in the year of germination; have primary root and shoot with cotyledons, which can be located both above ground (in most species) and underground (in *Q. robur*).

Table 1. The classification scheme of plant communities of the forest vegetation, the Left Bank Polissia of Ukraine, covered by the study

VEGETATION TYPE – SILVAE		
Formation	Subformation	Group of associations
Pineta sylvestris	Pineeta sylvestris	*1. Pineta (sylvestris) hylocomiosa* *2. Pineta (sylvestris) calamagrostidosa (epigeioris)* *3. Pineta (sylvestris) nardosa (strictae)* *4. Pineta (sylvestris) coryloso (avellanae)–vacciniosa (myrtilli)* *5. Pineta (sylvestris) asarosa (europaei)* *6. Pineta (sylvestris) pteridiosa (aquilini)* *7. Pineta (sylvestris) franguloso (alni)–vacciniosa (myrtilli)* *8. Pineta (sylvestris) vacciniosa (myrtilli)* *9. Pineta (sylvestris) moliniosa (caeruleae)* *10. Pineta (sylvestris) sphagnosa*
	Querceto (roboris) – Pineta (sylvestris)	*11. Querceto (roboris)–Pineta (sylvestris) vacciniosa (myrtilli)* *12. Querceto (roboris)–Pineta (sylvestris) corylosa (avellanae) sparsi herbosa*
	Betuleto (pendulae) – Pineta (sylvestris)	*13. Betuleto (pendulae)–Pineta (sylvestris) vacciniosa (myrtilli)*
Querceta roboris	Querceeta roboris	*14. Querceta (roboris) majanthemosa (bifolii)* *15. Querceta (roboris) aegopodiosa (podagrariae)* *16. Querceta (roboris) convallariosa (majalis)* *17. Querceta (roboris) coryloso (avellanae)–convallariosa (majalis)*
	Acereto (platanoiditis) – Querceta (roboris)	*18. Acereto (platanoiditis)–Querceta (roboris) coryloso (avellanae)–aegopodiosa (podagrariae)* *19. Acereto (platanoiditis)–Querceta (roboris) stellariosa (holosteae)*
	Tilieto (cordatae) – Querceta (roboris)	*20. Tilieto (cordatae)–Querceta (roboris) stellariosa (holosteae)*
Betuleta pendulae	Betuleeta pendulae	*21. Betuleta (pendulae) vacciniosa (myrtilli)* *22. Betuleta (pendulae) caricosa (pilosae)* *23. Betuleta (pendulae) stellariosa (holosteae)*
Populeta tremulae	Populeeta tremulae	*24. Populeta (tremulae) stellariosa (holosteae)*

Juvenile plants (j) usually do not already have cotyledons. The primary shoot has no branch, leaves are juvenile in shape, the root system consists of the primary root and a small number of lateral roots. Seedlings and juvenile individuals are highly shade enduring.

Immature plants (im) occupy an intermediate position between juvenile and adult plants. The shoot structure consists of branches 2–4 of the (5)-th order; the crown is not yet formed. The total number of branches is insignificant, and the diameter of the trunk is no more than twice the diameter of large branches. The trunk gains in length and diameter are slightly larger than the branches. The leaves have the structure as in adult plants. The root system includes the primary root or its basal part and lateral roots. Some species form additional roots.

Virginal trees (v) have almost formed parameters of the adult tree in general, but they have not yet begun to form structures of generative reproduction. They have the maximum height gain for all ontogeny. The shoot system consists of branches 4–7 of the (8)-th order. The trunk is covered with a periderm. The root system includes the main root, the lateral roots of different orders and adventitious roots.

Generative trees (g) are crown-shaped from oval to conical with a pointed tip. The branching order, crown size and root system are maximal. The crust coarsens and covers much of the trunk. Generative reproductive structures are formed.

Senile trees (s) in most species have only a secondary crown, leaves or branches can be of juvenile type. The upper part of the crown and trunk dies. The root system is largely destroyed. The tree is not capable of seed formation.

In each of the studied plant communities several (usually from 10 to 15) accounting sites with an area of 400 m^2 were located. In these sites, in the woody species that make up this group, the number of plants of various ontogenetic states (seedlings, juvenile, virginal, generative, and senile) was calculated. The processing of primary ontogenetic materials was carried out applying the non-commercial software package ANONS, developed by Yu.A. Zlobin (Zlobin et al. 2013). Ontogenetic spectra were formed for the studied species (*P. sylvestris*, *Q. robur*, *A. platanoides*, *B. pendula*, and *P. tremula*). These spectra provided information on the proportion of the plants of different states in each of the plant communities.

In accordance with current scientific approaches to ontogenetic spectrum, the following indicators were also evaluated for each population:

1. Completeness of spectrum. The population was characterized as complete on the ontogenetic spectrum with the presence of representatives of all ontogenetic states; in the absence of individuals of one or another state as incomplete.
2. The symmetry of the spectrum. The nature of ontogenetic spectrum was determined with the definition of one from four types: left-sided spectra (characterized by predominance of pre-generative individuals), centred (characterized by a large proportion of generative individuals), right-sided (characterized by a large proportion of senile individuals), bimodal (having two peaks).

Population belonging to one of three categories was determined as follows: invasive – predominance of individuals of pre-generative states, generative (normal) – predominance of generative individuals, regressive – predominance of post-generative individuals (Zlobin 2009).

Results

The generalized results regarding the features of the ontogenetic population structure in different association groups of the Left Bank Polissia of Ukraine are presented in Tables 2–3. The analysis showed that the ontogenetic spectrum of wood species populations that were a part of the plant communities of *Pineta sylvestris* formations were in 97% cases incomplete due to the lack of plants of some ontogenetic states. Populations with incomplete spectrum were mainly characterized by the absence of plants of pre-generational age states (at least two) and one of post-generational ones. The probability of different ontogenetic spectrum was decreasing in a range as follows: left-sided (56.7%) → centred (40.6%) → bimodal (2.7%). Among the research populations of *P. sylvestris*, invasive ones predominated (Figure 2), and 27.6% of the populations belonged to the normal category.

The spectrum of the most *Q. robur* populations, the species that was part of many *Pineta sylvestris* formations, were left-sided, with predomination of juvenile and immature individuals. *Q. robur* also had bimodal spectrum (mainly with peaks at the level of immature and generative states). Invasive populations predominated in *Q. robur*. Only 2% of the populations showed characteristics of normal populations. Regressive populations were absent.

The populations of *B. pendula* represented in the forests of *Pineta sylvestris* formations were largely incomplete. The proportion of populations that had individuals of all ontogenetic states did not exceed 5%. Regarding the ontogenetic spectra, it was found that in this species the probability of their manifestation decreased in a series: left-sided (69.9%) → centred (27.0%) → bimodal (3.1%). In the latter variant of the spectrum, the peaks were re-

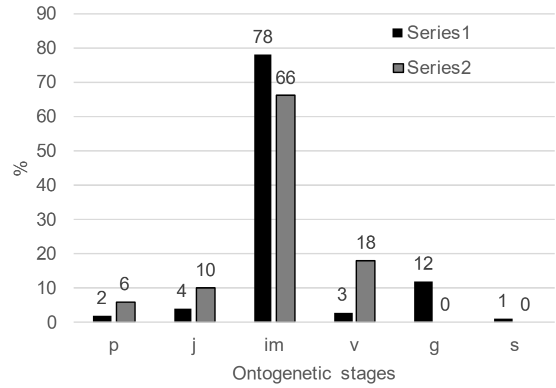

Figure 2. Ontogenetic structure of *Pinus sylvestris* L. (Series 1) and *Quercus robur* L. (Series 2) populations in one plant community of the *Pineta (sylvestris) franguloso (alni)–vacciniosa (myrtilli)* association group

Table 2. Generalized data of the ontogenetic structure of *Pinus sylvestris* L., *Betula pendula* Roth. and *Quercus robur* L. populations in forest plant communities of some association groups

Association groups	*Pinus sylvestris* L.			*Betula pendula* Roth.			*Quercus robur* L.		
	1	2	3	1	2	3	1	2	3
Pineta (sylvestris) hylocomiosa	InC & C	im v g	93.8% 99.7% 99.5%	InC	j im g	60.1% 99.6% 99.4%	InC	j im	58.2% 93.4%
Pineta (sylvestris) coryloso (avellanae)–vacciniosa (myrtilli)	InC	g	98.6%	InC	j	99.9%	InC	im v g	50.3% 50.1% 41.9%
Pineta (sylvestris) vacciniosa (myrtilli)	InC	im v g	91.5% 99.3% 99.4%	InC	im v	78.6% 49.1%	InC	im v	44.1% 90.2%
Querceto (roboris)–Pineta (sylvestris) corylosa (avellanae) sparsi herbosa	InC	g	99.3%	–	–	–	InC	v	61.7%
Betuleto (pendulae)–Pineta (sylvestris) vacciniosa (myrtilli)	InC	g	99.5%	InC + C	im g	40.7% 40.2%	InC	im v	70.0% 99.2%
Querceta (roboris) convallariosa (majalis)	InC	im	96.7%	InC	im g	75.1% 99.5%	InC + C	j im v g	50.2% 68.9% 54.1% 49.7%
Tilieto (cordatae)–Querceta (roboris) stellariosa (holosteae)	InC	g	99.2%	InC	j	50.3%	InC	g	99.7%
Betuleta (pendulae) stellariosa (holosteae)	InC	im	98.3%	InC	v g	57.1% 87.5%	InC	im	41.4%

Note: Here and in Table 3: column 1 gives information on the completeness of ontogenetic spectrum: InC – incomplete, C – complete; column 2 shows the ontogenetic stages prevailed in the composition of ontogenetic spectrum of researched plant communities; column 3 shows the maximum plant proportion, %, of ontogenetic state fixed in the researched plant communities. The mark "–" indicates absence of species.

Table 3. Generalized data on the ontogenetic structure of populations of *Populus tremula* and *Acer platanoides* in the forest plant communities of some association groups

Association groups	*Populus tremula* Mill.			*Acer platanoides* L.		
	1	2	3	1	2	3
Pineta (sylvestris) hylocomiosa	InC	j im	71.4% 72.0%	InC	im	98.9%
Pineta (sylvestris) coryloso (avellanae)–vacciniosa (myrtilli)	–	–	–	InC	im	81,7%
Pineta (sylvestris) vacciniosa (myrtilli)	–	–	–	InC	im	99.7%
Querceto (roboris)–Pineta (sylvestris) corylosa (avellanae) sparsi herbosa	–	–	–	InC	im	90.8%
Betuleto (pendulae)–Pineta (sylvestris) vacciniosa (myrtilli)	InC	im	50.6%	–	–	–
Querceta (roboris) convallariosa (majalis)	InC	im	99.6%	InC + C	im	77.7%
Tilieto (cordatae)–Querceta (roboris) stellariosa (holosteae)	InC	j	99.5%	InC	im	61.7%
Betuleta (pendulae) stellariosa (holosteae)	InC	im g	80.2% 52.9%	InC	j im	75.0% 67.2%
Populeta (tremulae) stellariosa (holosteae)	InC	j	93.1%	–	–	–

corded at the level of juvenile and generative ontogenetic states. *B. pendula* populations with invasive features predominated. The presence of *P. tremula* and *A. platanoides* populations in the forests of the *Pineta sylvestris* formation was not constant. Their ontogenetic spectrum had a distinct left-sided character. Accordingly, all *P. tremula* and *A. platanoides* populations were invasive.

In the *Pineta sylvestris* formation, the group of *Pineta (sylvestris) hylocomiosa* associations was characterized by the greatest diversity of species composition and ontogenetic population structure. The peculiarity of the ontogenetic spectrum of *P. sylvestris* in this group of associations was the increasing of the centred type in proportion up to 45%. In general, in the formation of *Pineta sylvestris* in the following series of species *P. tremula* → *A. platanoides* → *Q. robur* → *B. pendula* → *P. sylvestris* species there was an increase in the representation of centered spectrum and populations of the normal category.

The ontogenetic spectra of tree species populations being a part of plant communities of the *Querceta roboris* formation were largely incomplete. This was also characteristic of the dominant populations of *Q. robur*. In populations of this species, the probability of manifestation of various types of ontogenetic spectrum decreased in the following series: left-sided (50.5%) → centred → (33.4%) → bimodal (16.1%). In the latter case of the spectrum, the "peaks" were recorded at the level of the immaturity and generative ontogenetic states. The ontogenetic spectrum of *Q. robur* often lacked virgin plants. Compared to *Q. robur*, the populations of *P. sylvestris*, *B. pendula*, *P. tremula*, and *A. platanoides* in the forests of the *Querceta roboris* formation were less constant. Their ontogenetic spectrum had a clearly distinct left-sided character (Figure 3). The populations of these five species were invasive. However, about 10% of *B. pendula* populations were an exception: their ontogenetic spectrum was bimodal (with maxima at the level of juvenile (immature) and generative ontogenetic states). In general, populations of

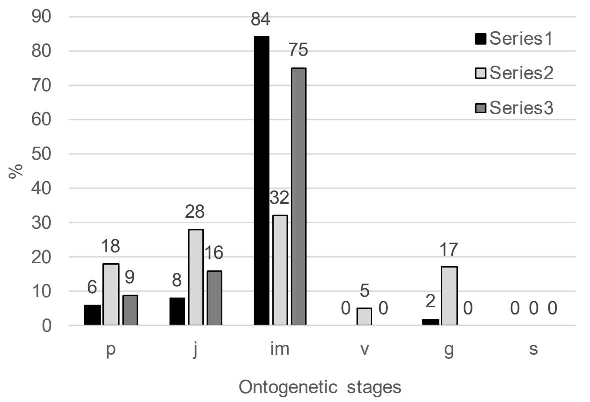

Figure 3. Ontogenetic structure of *Pinus sylvestris* L. (Series 1), *Quercus robur* L. (Series 2), *Acer platanoides* L. (Series 3) populations in one plant community of the *Querceta (roboris) convallariosa (majalis)* association group

tree species that form part of the *Querceta roboris* formations were characterized by a predominance of incomplete and left-sided ontogenetic spectrum.

Within the plant communities of the *Betuleta pendulae* formation, the ontogenetic spectrum of *A. platanoides* and *Q. robur* populations had clearly distinct left-sided type with the dominance of juvenile ontogenetic individuals in the absence of generative plants. All populations of these species had invasive features. In 66.7% of the populations of *P. sylvestris* in this formation, the left-sided spectrum was detected with the domination of immature plants proportion, and the spectrum of 33% populations were centred. In *P. tremula*, the representation of the centred spectrum increased to 50% and in *B. pendula* to 75.0%.

In the *Populeta tremulae* formation, the left-sided spectrum was common for populations of *P. tremula* and *Q. robur*. In the populations of the former species, the proportion of juvenile individuals prevailed (up to 93.1%), and the proportion of virgin ones, up to 66.9%, in the latter species. Some *Q. robur* populations had a significant proportion of generative plants, up to 30.0%. In populations of *P. sylvestris*, the centred ontogenetic spectrum presented, where the proportion of generative plants sometimes reached to 99.4%.

Discussion

Widespread presence of incomplete ontogenetic spectra in the populations of studied species, where there are no individuals of certain groups of pre-generative and post-generative plants, indicates a significant disturbance of the process of generational turnover in the dominant forest-forming species of the Left Bank Polissia of Ukraine. This is one of the consequences of long-term man-made impacts on forests, including the development of forest crops, as well as the felling of trees or woodlands of older age groups (reaching the age of economic maturity).

According to results reported by Smirnova (2004, 2017) and other scientists (Poliakova 1979, Murlykin 1985, Koviazin and Makhantseva 2011), the key of the successful ontogenetic development of young generation individuals of the forest-forming species, the achievement of their generative ontogenetic state and the formation of cycles of generation are accounted for the presence of a sufficient number of windfall microsite complexes, which are formed after the natural extinction of old trees or even old tree groups in the forest plant communities.

The windfall microsite complexes are the focuses of the emergence, consolidation and development of the young generation of tree species. Such complexes were detected by us in only 13% of the examined plant communities.

Basically, they were the result of the extinction of single not large trees which led to the formation of small-sized (diameter 0.5–1.5 m, depth 0.15–0.5 m) hollows. In the forests of the region, the development of micro-habitat mosaics also was the results of the activity of wild boars, *Sus scrofa* L., in 5% of the plant communities, and elks, *Alces alces* L., in 2% of plant communities. Such violations were mainly observed in the territories of the nature reserve fund. However, in all cases they were fragmentary in nature and were insignificant in area (on average 0.5–2 m^2). The formation of populations that are complete in their ontogenetic structure can be facilitated by the presence of gaps in the canopy of the forest stand. Indeed, their formation occurs especially in older forests, but the size of such gaps usually does not exceed 50 m^2. Single restoration gaps of different origin, more than 150 m^2 in size, were found in 7% of the plant communities, those comprising the area over 400 m^2 in 2.5%. Medium-sized gaps, 200–500 m^2, were generally regarded as favourable for the development of the younger generation of shade-resistant species. The transition of *Q. robur* undergrowth into the upper stories of the forest was considered possible in the gaps of at least 1,500 m^2 (Popadiuk et al. 1994).

The composition of forest plant communities of the Left Bank Polissia of Ukraine had limited representation of windfall microsite complexes, as well as restoration gaps, sufficient to ensure the successful development of young plants of the tree species and the formation of a continuous flow of generations. These data on the ontogenetic structure of populations of wood species are consistent with the results obtained by other authors in their studies of different regions of Eurasia (Mitrofanova et al. 1990, Evstigneev et al. 1992, Slavgorodskaia 2007, Grishenko 2008, Grishenko and Boldyrev 2008, Nikolaeva 2008).

The ontogenetic spectra exhibit dynamism. This is the result of variation of seed productivity by years in forest-forming species: the manifestations of "seed rich" and "seed poor" years and, accordingly, the "waves" of renewal. In "seed rich" years, the proportion of seedlings, to 80–90%, in the ontogenetic spectra increased significantly and, accordingly, the spectra acquired the distinct left-sided character and populations the features of invasiveness (Figure 4).

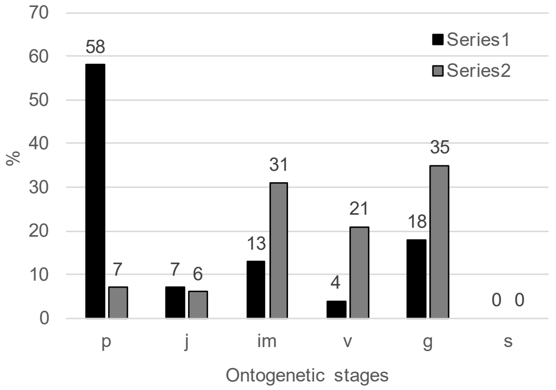

Figure 4. The ontogenetic structure of one *Pinus sylvestris* population from the *Pinetum (sylvestris) hylocomiosum* plant community (*Pineta (sylvestris) hylocomiosa* association groups) during the years of different seed productivity.

Chart bar 1 – 'seed' year, chart bar 2 – 'non-seed' year.

Conclusion

In the regional forest plant communities, populations with left-sided ontogenetic spectrum are the most widespread among the forest-forming species. Representation of the centred and bimodal spectra is characteristic of populations of wood species that participate in the formation of the second and, especially, the first tier of stands. In these species, the frequency of occurrence of populations belonging to the category of normal increases. However, the proportion of such populations is negligible, only 6.7% of the *Q. robur* populations, 9.8% of *B. pendula*, and 13.6% of *P. sylvestris* are normal. For the above-mentioned species invasive populations are the predominant. Regressive populations are not detected at all.

Significant variation of quantitative and qualitative indicators of seed productivity from year to year, as well as effect of weather and climate in terms of favourable conditions for the formation, growth and development of the young generation of forest-forming species are factors that define the dynamics of the ontogenetic spectra of forest-forming species.

With an unbiased eye the features of the ontogenetic structure of populations of main forest-forming species indicate the disturbance in formation of the forests of the Left Bank Polissia of Ukraine through steady circulation of tree species generations and the complexity of flowing natural processes aimed at ensuring stable functioning of the forests in the considered region.

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