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FEATURES OF MERCHANTABILITY ASH STANDS AT WOOD TYPES OF LABOR AND FUTURE USE OF ITS COMPLEX

P.P. Moseychuk, Master of Forestry
VP NUBiP Ukraine "Berezhany Agrotechnical Institute»
A. M. Grinik, candidate of agricultural sciences, associate professor
G. G Grinik, doctor of agricultural sciences, senior researcher, associate professor
National Forestry University of Ukraine

With worsening of the sanitary state of ash forests stands there is the substantial worsening of commodity structure: the particle of business wood goes down and also the particle of firewood is increased. Diminishing of relative stocking results in considerable differentiation of trees after a height, by investigation what forming of the second tier which reduces marketability of forests stands substantially is. At diminishing of relative stocking far of trees of up-ground of hornbeam pass to the second tier which results in diminishing of particle in the supply of main breed. For prevention of such phenomena it is necessary to carry out monitoring researches of the sanitary state of ash forests stands, carry out examinations in accordance with the accepted rules and shut out the decline of relative plenitude below 0,70-0,75. With the purpose of the effective use of arboreal resources offcuts of business wood, liquid from a crown and bough it is expedient to use as raw material for making of arboreal pelet's (arboreal preform), that on the whole can improve an ecological, economic and social situation in a region.

Common ash, commodity structure, Podillya Sublimity, pelet's (arboreal preform)

Given the significant resource potential of Ukraine has a significant base for the development of both the forest and timber industry. It should be noted that the integrated use of forest resources involves the use of whole tree biomass, including wood waste, generated in the timber and its processing to logging companies. This will allow more efficient use of wood and forest resources increase as output per hectare forested area and one cubic meter of timber harvested. Integrated management of forest resources involves the processing of low-grade wood and wood waste, produced in the process of forest management.

Ash (Frahinus ehselsior L.) marked quite rapid growth and provides high-quality wood, which is in great demand in the domestic market [2, 7, 6, 13].

Today ash in Ukraine is being actively investigated, and how tree species and as dominant in the stands. In particular taksatsiyniy plane models and developed researches table sums sectional area and a full inventory stands ashen [8]; The features of the dynamics of aboveground biomass in stands of ash, including simulated settings tree crowns dominant species [9]; simulation results obtained generatrix of the barrel [5]; studied floodplain ash groves lower reaches of the river Sudost River [1], found sickness Ash on the tail Ukraine [14] analyzed the ash in the forest cenosis plains of Ukraine [2], the result features of formation of gum plantations western steppes of Ukraine [7], detailed features of the process drying Ash in the west of Ukraine [10], comparison of features of formation of fresh maple-lime and Lypovo-ash oak Slobozhansky forest typology area [11] conducted quality control of wood and studied bioecological and biometric features of ash from the wavy-cross-grained wood [13] .

The aim of the study was to analyze commodity structure stands gum central Podolsk Upland, opportunities and prospects of complex use of wood.

Materials and methods of research. Plots laid in gum plantations on the territory of Ternopil region (SE "BEREZHANSKY forestry"). Age stands was 72-73 years. Research conducted in the central part of the prevailing Podolsk Upland types of site conditions, such as in fresh (D2) and wet (D3) chest, where most growing ash stands.

The method of this study is to use conventional approaches taksatsiynyh forestry and forestry-installation for taksatsiynyh characteristics stands, as well as research and analysis of their commodity structure. The source of input data served as field plots materials, processing results are given in Table 1.

1. Forestry taksatsiyna characteristic plots

Plots	Forestry	Quarter/ board	Area, ha	Age, years	Background, forest type	Breed	Fraction	Number of trees, pieces. • ha^{-1}	The average height, m	Average diameter cm	Class of growth class	Total cross-sectional area, $m^2 \cdot ha^{-1}$	Stock, $m^3 \cdot ha^{-1}$
						Ash	5,7	113	27,4	31,3	I[a]	8,7	116
						Oak	0,3	18	21,5	19,7	II	0,5	6
1	Urmanske	45/12	0,9	72	D_3, гД	Hornbeam	4,0	307	14,2	17,7	IV	7,6	82
						Together	10,0	438	–	–	–	16,8	205
2	Konyuhivske	12/4	2	73	D_2, гД	Ash	1,8	73	25,1	23,8	I	3,2	41
						Maple	0,3	8	24,8	29,6	I	0,5	7

						Oak	1,0	29	24,7	29,3	I	2,0	24
						Hornbeam	6,7	310	21,2	23,6	II	13,5	155
						Beech	0,2	2	26,8	43,1	I^a	0,3	5
						Together	10,0	422	–	–	–	19,5	231
3	Podgaetskiy	8/3	1,7	72	D_2, гД	Ash	2,4	39	25,3	35,8	I	3,9	50
						Maple	3,5	84	24,9	30,6	I	6,2	74
						Hornbeam	3,9	156	21,3	25,3	II	7,9	83
						Linden	0,2	4	24,8	29,0	I	0,2	3
						Together	10,0	283	–	–	–	18,2	210
						Ash	4,5	86	28,1	33,5	I^a	7,6	95
						Linden	1,8	46	16,8	17,0	III	1,0	39
						Maple	0,5	22	17,1	17,3	III	0,5	11
4	Podgaetskiy	6/3	0,5	73	D_2, гД	Oak	1,2	36	25,1	27,2	I	2,1	26
						Hornbeam	1,9	130	18,7	19,7	III	3,9	39
						Together	10,0	320	–	–	–	15,2	210

Results and discussion. According to the analysis of primary data field research, it was found that the plots №1, №3 and №4 Ash trees are in the first tier.

Unlike other test areas where ash trees mostly uneven, the rest of the plots most instances is even-aged. The result is significantly below the value of the average diameter for trees to ash plots №2 - 23,8 cm and less, compared to the rest of the plots, the value of average height - 25.1 m. The first floor also are: a trial Square №1 - oak on plots №2 - oak, beech and maple, the plots №3 - maple and linden and the plots №4 - oak.

The rest of the species on the plots form the second tier of the tent. Mainly it Hornbeam tree on №2 plots of Ash trees on plots №4 - lypy and small-leaved maple.

It should be noted that stands on plots is rather sparse, resulting in the formation of the second tier and a significant number dribnomirnyh Hornbeam trees, which adversely affects both the total stock of the stand and on its commodity structure.

Using the "advanced spreadsheet amounts sectional area and stocks ashen stands for completeness 1.0 [8]," found that the relative completeness №1 on plots of 0.49, the plots №2 - 0,57, on plots №3 - 0,54, and the plots №4 - 0,44.

One reason for the substantial liquefaction investigated stands is their poor health status, including much of Ash trees suffered damage pathogenic fungi and pests stem [10, 14].

As a result of the processed data field research analyzed the commodity structure of wood in all plots that are shown in Table 2.

It was established that the share of the total commercial timber stock on all plots are rather low: the plots №1 - 14,7%, №2 - 5,4, №3 - 15,3%, №4 - 22,8% . On plots №1 largest share of industrial wood accounted for ash wood - 14.0%, the plots №2 - 3,6%, №3 - 7,1%, №4 - 17,7%. On plots №3 significant share of industrial wood accounted for maple trees (4.2%) and Hornbeam (4.0%). These trees are in the first tier, are well cleared of twigs trunk and crown, which begins at an altitude of 8.5 meters. The plots №4 oak trees accounted for 3.7% of the timber. On the other plots the share of industrial wood for trees of oak and maple is small and varies from 0.6 to 1.3% of the total stock of wood. The total stock of commercial timber on plots №1-4 is 30.1 m3 • ha-1, 12.4 m3 • ha-1, 32.1 m3 • ha-1 47.9 m3 • ha-1. Large commercial timber volume on average as little squares: №1-4 of 30.1 m $^{3}\cdot ha^{-1}$, 12,4 $m^3\cdot ha^{-1}$, 32,1 $m^3\cdot ha^{-1}$ 47,9 $m^3\cdot ha^{-1}$. Large commercial timber volume on average as little squares: the plots №1 - 20,5 $m^3\cdot ha^{-1}$ (10,0 %), on plots №2 - 4,8 $m^3\cdot ha^{-1}$ (2,1 %), on plots №3 - 23,5 $m^3\cdot ha^{-1}$ (11,2 %) and plots №4 - 34,7$m^3\cdot ha^{-1}$ (16,5 %).

However, it must be noted that the share of firewood on all plots are large: the plots №1 - 68,2% of the total stock stand on plots №2 - 77,1%, №3 - 67 9 №4 - 59,7%. The highest share of firewood is available on plots №2, for which characterized by uneven Ash trees that are in the first and second tiers of the tent, which leads to significant differentiation for their size-quality indicators and to reduce the share of industrial wood (5.4%) and an increase in wood burning (77.1%). The results of correlation analysis revealed that there is a close relationship between the share of firewood and the share of the total number of trees Hornbeam (r=0,82$^{\pm 0,02}$).

2. Commodity structure of the studied ash stands

ПП	Breed	Number of trees, pieces.			Receiver timber, $m^3\cdot ha^{-1}$							Liquid from crown, $m^3\cdot ha^{-1}$	,Knots, $m^3\cdot ha^{-1}$	Total, $m^3\cdot ha^{-1}$
					business									
		business	wood-burning	together	great	the average	small	together	wood	liquidity	waste			
	Ash	29	84	113	19,8	8,7	0,2	28,7	68,6	97,2	4,9	7,1	7,2	116,4
	oak	2	16	18	0,7	0,7	–	1,4	3,5	4,9	0,3	0,3	0,4	6,0
1	Hornbeam	0	307	307	–	–	–	–	67,4	67,4	–	2,2	12,6	82,2
	Together	**31**	**407**	**438**	**20,5**	**9,3**	**0,2**	**30,1**	**139,5**	**169,6**	**5,2**	**9,6**	**20,3**	**204,6**
2	Ash	16	58	73	2,4	5,3	0,6	8,3	25,0	33,3	1,5	1,8	4,2	40,9

	Maple	2	6	8	0,6	0,6	0,1	1,3	4,4	5,6	0,2	0,4	0,4	6,6
	Oak	4	25	29	1,8	1,1	–	2,8	17,2	20,1	0,6	1,6	1,4	23,7
	Hornbeam	0	310	310	–	–	–	–	127,1	127,1	–	5,9	21,6	154,6
	Beech	0	2	2	–	–	–	–	4,0	4,0	–	0,4	0,4	4,8
	Together	**22**	**400**	**422**	**4,8**	**7,0**	**0,6**	**12,4**	**177,7**	**190,1**	**2,4**	**10,1**	**28,0**	**230,6**
3	Ash	15	24	39	10,9	3,8	0,1	14,8	25,8	40,6	2,6	3,6	2,6	49,5
	Linden	0	4	4	–	–	–	–	2,9	2,9	–	0,2	0,3	3,4
	Maple	11	74	84	6,8	2,1	–	8,9	54,4	63,3	1,3	5,1	4,3	74,1
	Hornbeam	20	136	156	5,8	2,6	–	8,4	59,2	67,7	0,8	3,7	10,4	82,5
	Together	**45**	**237**	**282**	**23,5**	**8,5**	**0,1**	**32,1**	**142,4**	**174,6**	**4,7**	**12,7**	**17,6**	**209,6**
4	Ash	38	48	86	27,5	9,3	0,4	37,2	39,5	76,7	6,6	7,0	5,0	95,3
	Oak	10	26	36	5,5	2,3	–	7,8	13,3	21,1	1,8	1,7	1,7	26,2
	Maple	4	18	22	1,7	1,1	–	2,8	6,4	9,3	0,4	0,7	0,7	11,1
	Hornbeam	0	130	130	–	–	–	–	32,5	32,5	–	1,3	5,3	39,1
	Linden	0	46	46	–	–	–	–	33,7	33,7	–	2,3	2,5	38,6
	Together	**52**	**268**	**320**	**34,7**	**12,7**	**0,4**	**47,9**	**125,5**	**173,3**	**8,8**	**13,0**	**15,2**	**210,2**

The total share of wood waste liquidation of the crown and knots on all plots and differs insignificantly changed to plots №3 of 16.7% of the total stock of wood to 17.6% in the plots №4. However, the total stock of wood in these categories plots №1 - 4 is respectively 35.1 m3 • ha-1, 40.5 m3 • ha-1, 35.0 m3 • ha-1 and 37.0 m3 • ha-1.

Thus, the analysis of the commodity structure of the studied stands gum found that a significant proportion of wood in their wood is wood (169,6-190,1 m3 • ha-1) and waste liquidity of the crown and branches, the total the amount of which is 35,0-37,0 m3 • ha-1. The wood of these categories, the inability implementation could and should be used for further processing to wood pellets (pellets). The use of pellets is appropriate both in economic terms and with regard to environmental

safety. The trend rise in the cost of fossil fuels (gas, oil, coal) but will increase the efficiency of fuel pellets. Also important is that the raw material for their production serves wood - a renewable resource that is a natural battery that is able to accumulate a large amount of solar energy for a long time [3]. Wood pellets are energetically stable waste and environmentally-safe type of biofuel. The use of wood pellets in Europe is recognized and supported by international environmental funds (NEFCO, SIDA et al.) And community organizations. The use of biofuels elevated to national priority. [4]

In Ukraine, for the standardization of pellets was chosen newest certification system ENplus, which was developed DEPI (Deutsche Pellet Institut) for the European pellet market and transferred to the control AEBIOM (European Association for biomass). At present this certification system covers more than 60% of the European market of pellets [3]. By burning 1 ton of wood briquettes released as much energy as for burning 1.6 tons of wood, 480 m3 of gas, 500 liters of diesel fuel or 600 liters of oil.

Calorific value of briquettes from waste wood is 18 MJ • kg-1, while the ability teplotvirna wet wood is 10 MJ • kg-1 dry -12 MJ • kg-1 coal -20 MJ • kh- 1, and natural gas - 32 MJ • kg-1. However, emissions of pollutants into the atmosphere by burning 1,000 tons of pellets (wood briquettes) a total of 17.69 tons of firewood - 18.9 tons sawdust - 20.0 tons of wood waste - 20.2 tons, oil - 45.90 tons, coal - 147.66 tons and natural gas - 4.70 tons [4]. Thus, the wood fuel (primarily pellets and briquettes) has more advantages in terms of air pollution, compared with fuel oil and coal, as has virtually "zero effect" on greenhouse gas emissions, especially CO2.

The use of wood fuels as energy to fully comply with the provisions of the Kyoto Protocol relating to the limitation and reduction of greenhouse gas emissions. The most important of global issues is to reduce the greenhouse effect and the risk of acid rain by reducing sulfur dioxide emissions. In turn, reduce the concentration of acid rain reduces the defoliation of woody plants and ultimately - to preserve forests. [4]

In addition, pellets also can be used as raw material for the production of biogas. It should be noted that the biogas yield during fermentation of waste pellets Hardwood noted specific dynamics, in particular, on the seventh day of fermentation for around 77 m3 • t-1; on 21st - 321 m3 • T-1, and the 35th - 385 m3 • t-1, then the process is terminated. [12] This is significantly higher than for pellets from waste stems of herbaceous plants (straw) and in the 12-15 time - a waste hairpin softwood (pine) [12].

Conclusions. The study found that in the case of low sanitary condition stands gum is a significant deterioration of commodity structure, namely the reduced volume of industrial wood in general and in particular the large and increasing volume of firewood.

Reducing the relative completeness leads to an increase in height as Ash trees and related species, resulting in the formation of the second tier of tree species, which significantly reduces their size-quality performance and reduces marketability stand in general. In addition, in case of reduction relative completeness, much of the tree seedlings Hornbeam that in a significant number present in the tabernacle stand, move to the second tier. The result is a significant reduction of the share in the stock of the main species - Ash, which also negatively reflected on the commodity structure of the stand.

To prevent such phenomena should monitor the state of gum health research stands, to care in accordance with the rules and to prevent the decline of relative completeness 0,70-0,75 below. During Inspection cuttings should be regulated in the first place, the number of Hornbeam trees, cutting grass-roots way to exercise and prevent deterioration sanitary condition of ash trees.

Given the commodity structure of the studied ash stands and the effective use of wood resources, wastes of industrial wood, liquidity of the crown and branches should be used as raw material for production of wood pellets, which in general can improve environmental (using pellets as fuel or source for the production of biogas), economic (reduction of energy dependence on fossil energy sources, reduce the cost of heating and production of "green" electricity) and social situation in the region (infrastructure through the construction of processing facilities, providing jobs and recycling timber).

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С ухудшением санитарного состояния ясеневых древостоев происходит существенное снижение доли деловой древесины, а также увеличение доли дровяной древесины. Уменьшение относительной полноты приводит к значительной дифференциации деревьев по высоте, следствием чего есть формирование второго яруса, который существенно снижает товарность древостоя. При уменьшении относительной полноты значительное количество деревьев подроста граба обыкновенного переходят во второй ярус, что приводит к уменьшению доли главной породы в запасе. Для предотвращения таких явлений необходимо осуществлять мониторинговые исследования санитарного состояния ясеневых древостоев, осуществлять уход в соответствии с принятыми правилами и не допускать снижения относительной полноты ниже 0,70-0,75. С целью эффективного использования древесных ресурсов отходы деловой древесины, ликвид с кроны и сучки целесообразно использовать в качестве сырье для изготовления древесных пеллет, что в целом может улучшить экологическую, экономическую и социальную ситуацию в регионе.

Ясень обыкновенный, товарная структура, Подольская возвышенность, пеллеты