Scientific Papers. Series B, Horticulture. Vol. LXIX, No. 2, 2025
Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653

STUDIES ON THE DEVELOPMENT OF A PAULOWNIA PLANTATION IN ROMANIA

Roberto Renato BERNARDIS[1], Adrian NISTOR[1], Daniela Sabina POȘTA[2]

[1]"Ion Ionescu de la Brad" Iași University of Life Sciences, 3 Mihail Sadoveanu Alley, Iaşi, Romania
[2]University of Life Sciences "King Mihai I" from Timisoara, 119 Calea Aradului Street, Timişoara, Romania

Corresponding author emails: roberto.bernardis@iuls.ro, danielaposta@usvt.ro

Abstract

Paulownia is a remarkable tree, known for its rapid growth, being one of the most promising horticultural species in Romania. With impressive development, this plant can reach commercial maturity in just 3-6 years, provided that certain essential factors are respected, such as pedological, agrochemical, and agrotechnical conditions, along with specific maintenance work. In a detailed study, two hybrid varieties of Paulownia were analyzed: 'Cotevisa 2' and 'Superhibrid Z07F1'. These are cultivated in the Paulownia Sipote plantation, located in the picturesque village of Sipote, in Iași County. The plantation was established in 2021, which is also when the measurements began. During the first four years of development, the establishment and maintenance work, as well as the growth of these varieties, were closely monitored. Rigorous statistical calculations were performed to evaluate progress and identify the factors contributing to the successful cultivation of Paulownia in Romania. The main goal is to collect and analyze valuable data to support farmers in the efficient cultivation of this promising tree.

Key words: *Paulownia, tree, variety, irrigation, diameter, experimental variants.*

INTRODUCTION

Paulownia, also known as the "princess tree", is a fascinating presence in the botanical world, having been cultivated for thousands of years and revered in Chinese culture as a symbol of luck and prosperity. Genus *Paulownia*, initially classified in the Scrophulariaceae family, has had its genetic affiliation updated based on modern genetic research and now belongs to the *Paulowniaceae* family (Abdel-Moniem et al., 2021; Criscuoli et al., 2022; Hamad, 2023; Icka et al., 2016; Jakubowski M., 2022, Simion, 2009). It comprises numerous species of deciduous trees originating from China and Southeast Asia, but their rapid growth rate and good adaptability to various edaphic-climatic conditions have enabled their spread to Europe, North and Central America, Australia, sometimes becoming invasive (Criscuoli et al., 2022; Guo et al., 2023; Rodríguez-Seoanea et al., 2020; Sławińska et al., 2023; Yadav et al., 2013).

Paulownias are cultivated as ornamental trees but have numerous other economic uses, especially due to the quality of their wood. The wood of many *Paulownia* species and hybrids is soft, low-density, knot-free, dries quickly, does not crack, and is easy to shape, making it highly valued for furniture, sculptures, musical instruments, crafts, boxes, lightweight skis, etc. Although light, it is a hard wood, resistant to water and decay, has dimensional stability, low thermal conductivity, and a high ignition point, recommending it for construction, quality lumber, reinforcement filler for thermoplastic composites, specialized applications requiring fire protection, sandwich structures applied to ships, aircraft, automobiles. Thin stems and branches are used for the production of particle boards, cellulose, paper, biofuels, biomass, etc. (Abdel-Moniem et al., 2021; Baier et al., 2021; Barbu et al., 2022; Costea et al., 2021; Jakubowski, 2022; Langowski et al., 2019; Ptach et al., 2017; Rodríguez-Seoanea et al., 2020).

Other parts of *Paulownia* plants find uses in various fields. Flowers, fruits, leaves, bark are used in traditional medicine in Asian countries, as well as in the pharmaceutical industry, for their antioxidant, anti-inflammatory, antibacterial, antiviral, hypoglycemic, neuroprotective properties, etc. (Costea et al., 2021; Criscuoli et

al., 2022; Guo et al., 2023; Rodríguez-Seoanea et al., 2020). Flower extracts are used in the perfume and cosmetics industry. Flowers and leaves, rich in lipids, carbohydrates, and proteins, are used in human nutrition and animal feed, and the essential oil from flowers, due to its chitosan content, presents great potential for food preservation.

Spreading the use of this species will bring major benefits to the environment, in terms of health and economic aspects of life (Zlati et al., 2024). Flowers also have honey value (Costea et al., 2021; Guo et al., 2023; Hamad, 2023; Langowski et al., 2019).

Due to their ability to grow in different types of soil and climate (Danciu et al., 2016.,), *Paulownia* species, hybrids, and clones from agro-forestry plantations reduce the effects of flooding and soil erosion, help recover abandoned agricultural land, improve soil fertility through nitrogen input, and contribute to the phytoremediation of soils polluted with heavy metals due to their ability to accumulate Cu, Zn, Ca, K, Mg, Na, Fe, Cd (Abdel-Moniem et al., 2021; Barbu et al., 2022; Costea et al., 2021; Fan et al., 2017; García-Morote et al., 2014; Rodríguez-Seoanea et al., 2020).

Compared to other tree species, *Paulownia* has a considerable growth rate, making it an excellent choice for farmers seeking quick profits. In the first 12 months, a *Paulownia* specimen can reach up to 3 meters in height, and in just 3-6 years, it can reach commercial maturity (Wang & Shogren, 1992). Other studies mention growths of 10-20 m in height and 30-40 cm in diameter (DBH), with a volume of approx. 1 m^3/tree at the age of 5–7 years (Hamad, 2023).

For wood production, hybrids obtained from popular species (*P. elongata, P. fortunei, P. tomentosa*) are frequently used, with high productivity and adaptability to the environment (Jakubowski, 2022).

Although they have reduced sensitivity to soil type, they prefer permeable, well-drained soils with a pH between 5 and 8 (optimal 6-7), well supplied with water and nutrients (García-Morote et al., 2014; Szabó et al., 2022). A soil analysis before planting is vital to determine what type of fertilization is necessary, and the application of organic fertilizers can significantly influence plant growth. Also, constant soil moisture, especially in the early stages of development, is very important, as lack of water can lead to slow development and, in extreme cases, even plant death (Aspinall, 1980).

Considering that interest in *Paulownia* agroforestry crops has increased in Europe in recent years (Barbu et al., 2022), they can represent an interesting opportunity for farmers and investors in Romania. However, it is important to conduct further research and consult experts before initiating such a crop, as its success depends on several factors, including proper crop management and identifying potential markets for the products obtained (Stringer et al., 1992).

This paper aims to analyze the effect of irrigation on the growth of plants from two *Paulownia* hybrids ('SuperHybrid Z 07' and 'Cotevisa 2') cultivated in a plantation located in the N-E area of Romania. Both varieties taken into cultivation are appreciated for commercial uses due to their rapid growth and superior wood quality. 'Cotevisa 2' stands out for its accelerated growth rate, reaching commercial dimensions in 3-4 years, making it ideal for wood production. 'SuperHybrid Z07', although growing more slowly, reaches maturity of harvesting in approximately six years. Both varieties are adapted to various climatic and soil conditions, preferring sunny locations and well-drained soils.

MATERIALS AND METHODS

The study was conducted between 2022 - 2024 in a 4-year-old *Paulownia* plantation, part of the "*Paulownia* Șipote" company, located in Șipote commune (55 km from Iași municipality), aimed at producing trees for timber. The biological material consisted of two *Paulownia* biotypes ('SuperHybrid Z 07' and 'Cotevisa 2'), promoted for forest and agricultural plantations due to characteristics that make them attractive to farmers or investors in horticulture and forestry.

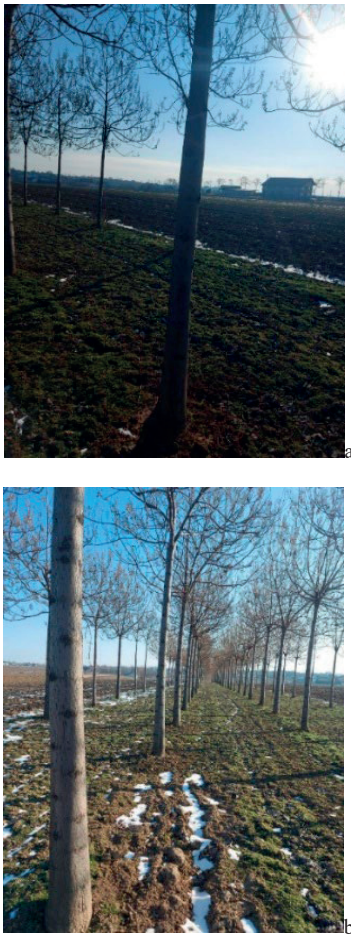
'SuperHybrid Z07' (Pao Tong) resulted from the hybridization of three *Paulownia* species (*P. tomentosa x P. fortunei x P. kawakamii*). The material used for establishing experimental plantations was obtained by cloning seedlings from their own nurseries, being part of the elite segment. It requires six years of vegetation to

reach minimum economic efficiency and withstands temperatures down to -33°C.
'Cotevisa 2' is a sterile hybrid between *P. elongata x P. fortunei*, which reaches economic efficiency in just four years of vegetation and withstands temperatures down to -25°C.
Experimental crops were established in 2021 with cuttings from *Paulownia* Șipote (Poșta et al., 2022). Planting was done at distances of 4 m between rows and 4 m between plants in the row.
The quantity and quality of *Paulownia* wood production are correlated with the application of appropriate cultivation technology both at establishment and subsequent maintenance of crops, which should meet plant requirements but be adapted to local pedo-climatic conditions. Before planting, the land was cleared (Figure 1.a), deep soil mobilization was done, and organic and chemical fertilizers were administered. Seedlings were planted in 15x15x15 cm holes, and a drip irrigation system was installed for irigated variants. Water was administered 2-3 times a week, 12 liters per watering, depending on weather conditions, especially in critical periods after planting. In the first year, seedlings were protected from herbivorous animals by temporary fencing. Phytosanitary treatments and weed control measures (chemical and mechanical) were also applied.
An essential task for managing and caring for *Paulownia* was technical pruning, aimed at shaping and controlling tree growth. The task was performed after the first year of vegetation (during the dormant period) and consisted of cutting stems at 5 cm above ground level (Figure 1.b). From the shoots emerging in spring, the most vigorous one was chosen to project the final tree stem.

a) b)

Figure 1. Works applied in the experimental plot:
a) preparing the land for planting; b) technical pruning

Experiments were bifactorial and organized in randomized blocks with three repetitions (five plants/repetition). The first experimental factor (biotype) had two variables represented by the cultivated *Paulownia* hybrids: 'SuperHybrid Z 07' and 'Cotevisa 2'. The second factor was irrigation, with two variables: non-irrigated and irrigated (Al-Jurdi et al., 2009).
During the period 2022-2024, the following determinations were made:
- growth increment in height and diameter;
- correlation between analyzed parameters (diameter, height, and volume);
- linear regressions between analyzed parameters (diameter, height, and volume).
From the combination of these factors, four experimental variants resulted:
-V1 - 'SuperHybrid Z07' non-irrigated;
-V2 - 'SuperHybrid Z07' irrigated (Figure 2.a);
-V3 - 'Cotevisa 2' non-irrigated;
-V4 - 'Cotevisa 2' irrigated (Figure 2.b).



a)

b)

Figure 2. Aspects from the irrigated experimental crops:
a) 'SuperHybridZ07'(V2); b) 'Cotevisa 2' (V4)

Biometric determinations conducted during the period 2022-2024 focused on stem height, trunk diameter at 1 m height (diameter at breast height - DBH), the degree of stem branching, and the volume of wood mass of the tree trunks. The method for calculating the volume was adapted from dendrometric tables established for forestry species (Popescu-Zeletin et al., 1957) and from simulations estimating the trunk volume of *Paulownia* trees (Szabó et al., 2022). Based on these data, the growth rate in height, diameter (DBH), and trunk volume was evaluated through comparisons between 2022 and 2024, and linear correlations and regressions were calculated between the analyzed parameters in 2024 (diameter, height, and volume).

For the statistical analysis of the data (Tables 1 and 2), confidence intervals for the mean values, correlation coefficients(r),determination coefficients (R^2) between measured parameters (Apostol et al., 2024; Cojocariu et al., 2024; Ozarchevici et al., 2023), and linear regression lines between parameters (Ungureanu et al., 2023; Chiruță et al., 2023; Draghia et al., 2025) were used. The analysis was performed using the MS Excel application from the MS Office Professional 2016 package, with a significance level of 0.05.

Table 1. Trunk diameter - DBH (cm)

Variants	Years	Average	Confidence Interval*
V_1	2022	4.20	[4.053, 4.347]
	2024	12.40	[12.27, 12.53]
V_2	2022	8.00	[7.869, 8.131]
	2024	18.40	[18.27, 18.53]
V_3	2022	5.30	[5.174, 5.426]
	2024	15.00	[14.10, 15.90]
V_4	2022	10.60	[10.461, 10.739]
	2024	26.80	[26.69, 26.91]

*level of confidence 0.05

Table 2. Total stem height (cm)

Variants	Years	Average	Confidence Interval*
V_1	2022	244.00	[242.418, 245.582]
	2024	410.00	[408.62, 411.38]
V_2	2022	305.00	[303.832, 306.168]
	2024	618.30	[618.19, 618.81]
V_3	2022	204.00	[202.383, 205.617]
	2024	553.00	[551.96, 554.04]
V_4	2022	503.00	[501.988, 504.012]
	2024	896.67	[896.54, 896.80]

*level of confidence 0.05

RESULTS AND DISCUSSIONS

The results regarding the average of the parameters recorded during the mentioned period (total stem height, trunk diameter - DBH, number of branches per plant, volume of wood mass) were documented in Table 3. Stem branching began in all experimental variants in 2024, the third year after establishment, hence the recording of this parameter was only done in 2024. Additionally, trunk volume was evaluated only in 2024, as the results from 2022 were irrelevant due to the small diameter values (Table 3).

It was observed that both in 2022 and 2024, the highest values for trunk diameter and stem height were recorded in the irrigated variants of both varieties (V2, V4).

Regarding the branching capacity of the trees, the non-irrigated variant of the 'SuperHybrid Z07' hybrid shows a much more evident influence of irrigation, in the sense that in the non-irrigated variant (V1), the plants did not form branches, compared to the irrigated variant which formed 4 branches per plant.

Table 3. Averages of analyzed parameters

Variants	2022			2024			
	DBH (cm)	H (cm)	V (m^3)	DBH (cm)	H (cm)	V (m^3)	NR
V_1	4.2	244	-	12.4	410	0.05	0
V_2	8.0	305	-	18.4	618.3	0.13	4
V_3	5.3	204	-	15	553	0.08	2.7
V_4	10.6	503	-	26.8	896.7	0.4	6

Note: DBH - diameter at breast height; H - height total; V - volume; NR - no. of branches

The data from Table 3 served as the basis for calculating the growth increase of *Paulownia*, an indicator resulting from the comparison of the two production years and very important from an economic perspective.

Growth increase in height and diameter (Differences between 2024 and 2022)

The growth increment represents an important analysis for studying the economic evolution of *Paulownia* trees. Regarding the growth increment of DBH between 2024 and 2022 (Table 4), average values varied from 8.2 cm for 'SuperHybrid Z07' non-irrigated (V1) to

16.2 cm for 'Cotevisa 2' irrigated (V4). From the graphical representation of averages, minimums, and maximums of the DBH growth increment (Figure 3), it is observed that the differences between maximums and minimums were relatively small (indicating uniformity of this characteristic). The exception was variant V3, where the amplitudes between values were larger, indicating the reaction of the 'Cotevisa 2' hybrid under non-irrigated conditions through an increase in the non-uniformity of this characteristic.

Table 4. Diameter growth increase (cm)

	V_1	V_2	V_3	V_4
Minimum	7.700	10.000	7.800	15.900
Maximum	8.600	11.000	11.800	16.400
Average	8.200	10.400	9.700	16.200

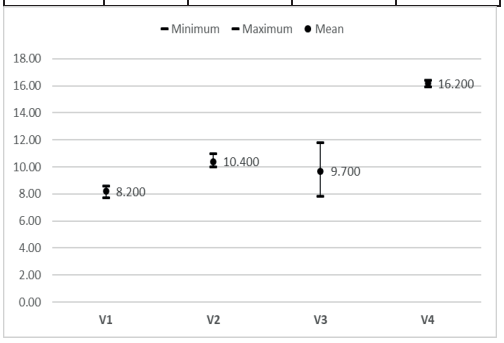


Figure 3. Diameter growth increase (cm)

The height growth increase resulting from the comparison of data from 2024 with those from 2022 highlighted the evolution of the trees in the same order as the DBH increment. More significant height increases were observed in the irrigated variants (V2 and V4), and among the hybrids, the largest differences, both in irrigated and non-irrigated conditions, were found in 'Cotevisa 2' (Table 5).

Table 5. Height growth increase (cm)

	V_1	**V_2**	**V_3**	**V_4**
Minimum	165.000	310.600	348.000	392.000
Maximum	167.000	315.100	350.000	396.300
Average	166.000	313.300	349.000	393.670

The uniformity of this characteristic within each variant can be observed in Figure 4, where for all variants, the maximums and minimums are very close to the average.

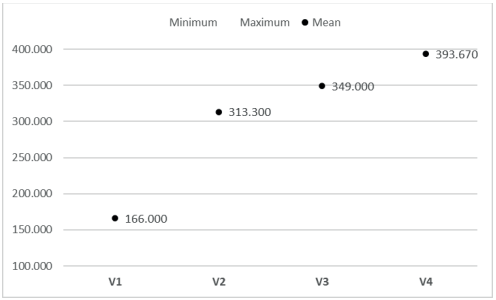


Figure 4. Height growth increase (cm)

Correlations between analyzed parameters (diameter, height, and volume)

Correlation coefficients were calculated for the pairs of characteristics established as variables (Table 6), based on the values recorded in 2024. Regarding the pair of characteristics diameter (DBH) and total height (Table 6), the value of the coefficient r was negative for 'SuperHybrid Z07', both in the non-irrigated variant (V1) and the irrigated variant (V2), which suggests that a greater increase in diameter correlates with a decrease in height growth. However, this correlation is significant only in the non-irrigated variant (r = -0.463). For 'Cotevisa 2', the correlation between DBH/height is positive (as the diameter increases, the height also increases), but significant only in the irrigated variant (V4), where the correlation coefficient was (r = 0.429).

For the pair of characteristics DBH/volume (Table 6), the correlations were negative for the variants of 'SuperHybrid Z07' (V1 and V2) and the non-irrigated variant of 'Cotevisa 2' (V3), but significant only for plants in the non-irrigated variants (V1 and V3).

It can be concluded that the volume of wood material is directly and significantly influenced by the tree diameter only in the irrigated variant of 'Cotevisa 2' (V4). A particular situation was recorded in the relationship between height and volume (Table 6).

Table 6. Correlation between analyzed parameters (2024)

V_1	Height	Volum
Diameter	-0.463	-0.529
Height	***	0.802
V_2	Height	Volum
Diameter	-0.157	-250

Height	***	0.898
V_3	Height	Volum
Diameter	0.144	-0.053
Height	***	0.867
V_4	Height	Volum
Diameter	0.429	0.505
Height	***	0.779

In all variants, the correlation was direct and strong, with r values ranging between 0.779 and 0.898, leading to the conclusion that intense growth in height results in a significant increase in wood mass volume.

Linear regressions between analyzed parameters

The relationship between variables was evaluated by calculating the coefficient of determination (R^2), which represents the proportion of the total variation of the dependent variable that can be explained by the independent variable. As with correlations, the data used for calculating linear regressions were those corresponding to the year 2024.

Initially, a multilinear regression was established between the dependent parameter (wood mass volume) and the independent parameters (tree height and diameter - DBH). From the result, it is observed from the p-value (p-value = 0.4354 > 0.05 significance level) that the tree diameter parameter is not significant (Table 7).

Table 7. Multilinear regression between wood mass volume based on height and diameter, data for 2024 (V1)

Regression Statistics				
Multiple R	0.821378901			
R Square	**0.6746633**			
Adjusted R Square	0.581709957			
Standard Error	0.007468066			
Observations	10			
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-1.3590	0.6327	-2.1478	**0.0688**
Diametrul	-0.0116	0.0140	-0.8273	**0.4354**
Înălțimea	0.0038	0.0013	2.9137	**0.0225**

The decision was made to analyze the linear regression between wood mass volume and tree height across all variants (Figures 5, 6, 7, and 8). To construct the regression lines, the dependent variable was considered to be the wood mass volume of the tree, and the independent variable was the total height of the tree. This allows for the anticipation of volume (m^3) based on the value of the other analyzed variable.

In Figure 5, the regression line between volume and height is presented for variant V1 ('SuperHybrid Z07' non-irrigated). The R^2 value indicates that for this variant, 64% of the variation in volume, as a dependent variable, is due to the relationship with total height (as an independent variable).

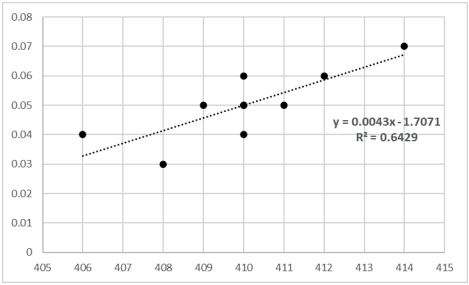


Figure 5. Linear regression line for 'SuperHybrid Z07' non-irrigated variant (V1)

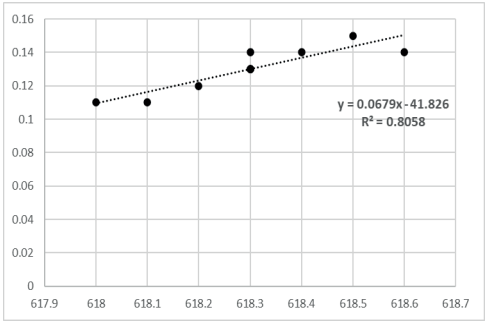


Figure 6. Linear regression line for 'SuperHybrid Z07' irrigated variant (V2)

Under irrigation conditions for the 'SuperHybrid Z07' hybrid (V2), the dependency of volume on stem height is significantly higher (80%), with $R^2 = 0.8058$ (Figure 6).

The coefficient of determination calculated for 'Cotevisa 2' indicated that the variation in volume is due to height by 75% under non-irrigated conditions (Figure 7) and only 60% under irrigation conditions (Figure 8).

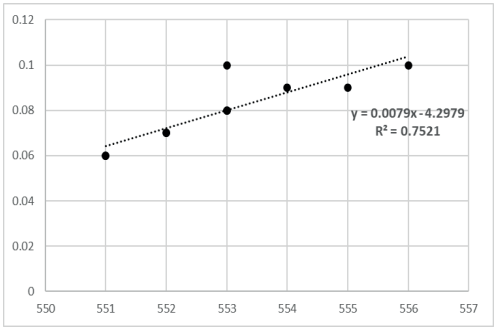


Figure 7. Linear regression line for 'Cotevisa 2' non-irrigatedvariant (V3)

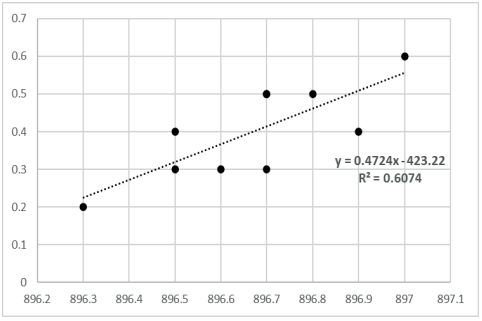


Figure 8. Linear regression line for 'Cotevisa 2' Irrigated variant (V4)

CONCLUSIONS

The research conducted led to the following conclusions:

- the quantity and quality of *Paulownia* wood production are correlated with the application of appropriate cultivation technology both at the establishment and during the subsequent maintenance of the crops.
- the increase in DBH between 2024 and 2022 recorded average values ranging from 8.2 cm for the non-irrigated 'SuperHybrid Z07' (V1) to 16.2 cm for the irrigated 'Cotevisa 2' (V4).
- the correlation between height and volume, indicating that in all variants, the correlation was direct and strong, with r values ranging from 0.779 to 0.898, suggesting that intense height growth leads to a significant increase in wood mass volume.
- under irrigation conditions for the 'Super Hybrid Z07' hybrid (V2), the dependence of volume on stem height is much greater (0.80%).
-the coefficient of determination calculated for 'Cotevisa 2' indicated that the variation in volume is due to height by 75% under non-irrigated conditions and only by 60% under irrigated conditions.
-linear regression between wood mass volume and tree height was conducted to accurately assess progress over the two years of analysis, determining a significant determination coefficient (between 0.6074 and 0.8058).

So, both varieties have great prospects to be used on a large scale.

REFERENCES

Abdel-Moniem, S.M., Youssef, N. M,. Mazhar, A.A.M., Ibrahim E.A., (2021). Valorizing the reuse of treated municipal wastewater for Paulownia seedlings cultivation by application of Moringa waste. *Egyptian Journal of Chemistry, 649*(12):6947 – 6954.

Al-Jurdi, A., Al-Khoury, E., & Mansour, S. (2009). The effect of irrigation with well water, Orontes river water, and treated water on some soil properties and cotton crop productivity in Al-Duwair area in Homs (Master's thesis). *Department of Soil and Land Reclamation, Faculty of Agriculture, Al-Baath University.*

Apostol, M., Draghia, L., Sîrbu, C., Efrose, R.C., Flemetakis, E.,, Hlihor, R.M., Simion, I.M., Armiñana, J.R. & Garcia Breijo, F.J. (2024). Morphological, Anatomical, Physiological and Genetic Studies of Iris aphylla L. Wild Species Conservation in "Ex Situ" Conditions. *Agriculture, 14,* 2358. https://doi.org/10.3390/ agriculture14122358

Aspinall, D. (1980). Role of abscisic acid and other hormones in adaptation to water stress. In: Turner NC, Kramer PJ (eds.) Adaptation of Plant to Water and High Temperature Stress. *John Wiley & Sons, New York,* pp 155–165.

Baier, C., Thevs, N., Villwock, D., Emileva, B., Fischer S. (2021). Water productivity of Paulownia tomentosa x fortunei (Shan Tong) in a plantation at Lake IssykKul, Kyrgyzstan, Central Asia. *Trees,* https://doi.org/10.1007/s00468-021-02141-8

Barbu, M.C., Buresova, K., Tudor, E.M., Petutschnigg, A. (2022). Physical and Mechanical Properties of Paulownia tomentosa x elongata Sawn Wood from Spanish, Bulgarian and Serbian Plantations. *Forests 13, 1543.* https://doi.org/10.3390/, f13101543.

Chiruță, C.; Stoleriu, I.; Cojocariu, M. (2023). Prediction Models for the Plant Coverage Percentage of a Vertical Green Wall System: Regression Models and Artificial Neural Network Models. *Horticulturae,* https://doi.org/10.3390/horticulturae9040419.

Costea, M., Danci, M., Ciulca, S., Sumalan, R. (2021). Genus Paulownia: versatile wood species with multiple uses - a review. *Life Science and Sustainable Development, 2(1),* https://www.lssd-journal.com.

Cojocariu, M. Marta, A.E., Jităreanu, C.D.; Chelariu, E.-L., Căpşună, S., Cara, I.G., Amişculesei, P., Istrate, A.-M.-R., Chiruță, C. (2024). A Study on the Development of Two Ornamental Varieties of Ipomoea batatas Cultivated in Vertical Systems in the Northeastern Region of

Europe. *Horticulturae, 10, 133.* https://doi.org/10.3390/ horticulturae10020133.
Criscuoli, I., Brunetti, M., Goli, G. (2022). Characterization of Paulownia elongata x fortunei (BIO 125 clone) Roundwood from Plantations in Northern Italy. *Forests, 13, 1841,* https://doi.org/10.3390/f13111841.
Danciu, A., Vlăduț, V., Grigore, I., Sorică, C., Cristea, A. M., Muscalu A,. Pruteanu, A., Marin, E., Usenko, M. (2016). Considerations on the importance of the Paulownia trees planting. *Annals of Faculty Engineering Hunedoara – International Journal of Engineering, Tome XIV.*
Draghia, L, Ozarchevici, A.S., Cantor, M., Bernardis, R.R., Chiruță, C., and Apostol, M. (2025). The behavior of great camas (Camassia leichtlinii (Baker) S.Watson) in different culture systems. *Acta Hortic. 1417: 63-72. doi 10.17660/ActaHortic.2025.1417.8 V EHC – Proc. IS on Ornamental Horticulture for the Service of Society.*
Fan, G., Wang L., Dong Y., Zhao, Z., Deng, M., Niu S., Zhang, X., Cao, X. (2017). Genome of Paulownia (Paulownia fortunei) illuminates the related transcripts, miRNA and proteins for salt resistance. *Scientific Reports, 7:* 1285,| DOI:10.1038/s41598-017-01360-9.
García-Morote, F.A., López-Serrano F.R., Martínez-García E., Andrés-Abellán M., Dadi T., Candel D., Rubio E., Lucas-Borja M.E. (2014). Stem Biomass Production of Paulownia elongata × P. fortunei under Low Irrigation in a Semi-Arid Environment. *Forests, 5:* 2505-2520; doi:10.3390/f5102505.
Guo, N., Zhai, X.Q., Fan, G.Q. (2023). Chemical composition, health benefits and future prospects of Paulownia f lowers: *A review. Food Chemistry, 412,* 135496,https://doi.org/10.1016/j.foodchem.2023.13549.
Hamad, S.O. (2023). Effect of Different Irrigation Periods and Mulching on Growth of Paulownia tomentosa (Thunb.) Steud. Seedlings. *ZANCO Journal of Pure and Applied Sciences, 35*(5);195-207.
Icka, P., Damo, R., Icka E. (2016). Paulownia tomentosa, a fast growing timber. *The Annals of "Valahia" University of Targoviste,* DOI: 10.1515/agr-2016-0003.
Jakubowski, M. (2022). Cultivation Potential and Uses of Paulownia Wood: A Review. *Forests, 13, 668.* https://doi.org/10.3390/f13050668.
Langowski, A., Rolbiecki, R., Rolbiecki, S., Ptach, W., Wrobel, P. (2019). Effect of sprinkler irrigation on growth of Paulownia Shan Tong trees at first two years of cultivation in light soil. *Engineering for Rural Development, 619-624,* DOI: 10.22616/ERDev2019.18.N329.
Ozarchevici, A.S., Apostol, M., Chiruță, C., Draghia L. (2023). Preliminary Results Regarding the Behavior of Some Camassia Species in Iași Ecological Conditions (Northeastern Romania).*Scientific Papers. Series B, Horticulture.*
Popescu-Zeletin, I., Toma, G., Armășescu, S., Decei, I., Dissescu, R., Petrescu, L., Dorin, T., Stănescu, M., Predescu, Gh. (1957). Tabele dendrometrice. *Editura Agrosilvică de Stat, București.*
Poșta, S. D., Gogan, T. M., Cântar, I.C., (2022). Research on seed germination stimulation at Paulownia tomentosa Thumb Steud. *Current Trends in Natural Sciences. Piteşti, Volume 11,* Issue 22, 231-239.
Ptach, W., Łangowski, A., Rolbiecki, R., Rolbiecki, S., Jagosz, B., Grybauskiene, V., Kokoszewski, M. (2017). The influence of irrigation on the growth of Paulownia trees at the first year of cultivation in a light soil. *Proceedings of the 8th International Scientific Conference Rural Development,*
Rad J.E., Mirkala S.R. (2015). Irrigation effects on diameter growth of 2-year old Paulownia tomentosa samplings. *Journal of Forests Researches, Vol. 26* (1), pp. 153–157.https://doi.org/10.1007/s11676-014-0007-7.
Rodríguez-Seoanea P., Díaz-Reinosob B., Mourea A., Domínguez H. (2020). Potential of Paulownia sp. for biorefinery. *Industrial Crops and Products, 155,* 112739https://doi.org/10.1016/j.indcrop.2020.112739
Simion, F.O., (2009). Cercetări privind producerea materialului săditor şi introducerea în spații verzi a speciei Paulownia tomentosa Thumb Steud. *Teza de doctorat, Universitatea din Craiova.*
Sławińska N., Zając J., Olas B., 2023. Paulownia Organs as Interesting New Sources of Bioactive Compounds. *International Journal of Molecular Sciences, 24,* 1676. https://doi.org/10.3390/ ijms24021676.
Stringer, J.W., and D.H. Graves. (1992). Paulownia log grades: Specifications and uses. FOR56. *College of Agriculture, Cooperative extension Service, University of Kentucky.*
Szabó, F., Rásó, J., Ábri, T., Juhász, L., Rédei, K. (2022). Volume of Paulownia Shan Tong (Paulownia fortunei × Paulownia tomentosa) plantation in Eastern Hungary: a case study. *ACTA AGRARIA DEBRECENIENSIS, 2:*43-46.
Ungureanu, E.; Fortună, M.E.; Țopa, D.C.; Brezuleanu, C.O.; Ungureanu, V.I.; Chiruță, C.; Rotaru, R.; Tofanica, B.M.; Popa, V.I.; Jităreanu, D.C. (2023). Comparison Adsorption of Cd (II) onto Lignin and Polysaccharide-Based Polymers. *Polymers, 15, 3794.* https://doi.org/10.3390/polym15183794.
Zlati,C., Istrate, M., Pașcu, Roxana, Bernardis, R. (2024). An assessment of current status, future trends and opportunities for improving exotic and underutilized pome fruit species production in Romania, *Scientific Papers Series B. Horticulture, Vol. LXVIII, nr. 2, 2024 "Agriculture for Life, Life for Agriculture" Conference Proceedings,* pp. 224-229, ISSN-L: 2285-5653, eISSN: 2286-1580.
Yadav, N.K., Vaidya, B.N., Henderson K., Frost, Lee J., Stewart, W.M., Dhekney, S.A., Joshee N. (2013). A Review of Paulownia Biotechnology: A Short Rotation, Fast Growing Multipurpose Bioenergy Tree. *American Journal of Plant Sciences, 4:*2070-2082.
Wang, Q., & Shogren, J.F. (1992). Characteristics of the crop-paulownia system in China. *Agric. Ecosyst. Environ. 39:*145–152. doi:8809(92)90050-L