INTEGRATION OF FRUIT SPECIES WITH HIGH ORNAMENTAL POTENTIAL IN URBAN LANDSCAPE DESIGN

INTEGRAREA SPECIILOR POMICOLE CU POTENTIAL ORNAMENTAL RIDICAT IN DESIGNUL PEISAGER URBAN

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Abstract. The research aims to integrate fruit species with high ornamental value into landscape design because this concept represents an increasingly appreciated approach that combines aesthetics, functionality and sustainability, also accessing resources regarding the marketing of these fruits, which have a high nutritional potential and an attractive taste. This practice transforms green spaces into productive environments, contributing to local food security, increasing biodiversity and improving the quality of life. Research in this area is crucial to optimize the benefits and overcome the challenges associated with this initiative. The theme addresses the visual perception of the public and the potential to create interesting landscape structures through the shape, color of flowers and fruits, as well as how these plants contribute to the creation of shade areas, spatial delimitation and attraction for local fauna.
Key words: fruit species, ornamental, landscape design, biodiversity**.**

Rezumat. Cercetarea urmărește integrarea speciilor pomicole cu valoare ornamentală ridicată în designul peisager deoarece, acest concept reprezintă o abordare tot mai apreciată, care îmbină estetica, funcționalitatea și sustenabilitatea, accesand si resurse privind comercializarea acestor fructe, care au un potențial nutrițional ridicat și un gust atractiv. Această practică transformă spațiile verzi în medii productive, contribuind la securitatea alimentară locală, la creșterea biodiversității și la îmbunătățirea calității vieții. Cercetarea în acest domeniu este crucială pentru a optimiza beneficiile și a depăși provocările asociate cu această inițiativă. Tema abordează percepția vizuală a publicului și potențialul de a crea structuri peisagere interesante prin forma, culoarea florilor și fructelor, precum și modul în care aceste plante contribuie la crearea de zone de umbră, delimitare spațială și atracție pentru fauna locală.
Cuvinte cheie: specii pomicole, ornamental, design peisager, biodiversitate.

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INTRODUCTION

The integration of fruit species into urban and rural landscape design is an increasingly appreciated approach that combines aesthetics, functionality and sustainability (Jones and Sanyang, 2009). This practice transforms green spaces into productive environments, contributing to local food security, increasing biodiversity and improving the quality of life. Research in this area is crucial to optimize the benefits and overcome the challenges associated with this initiative (Lauri et al., 2022; Sroka and, 2021). The theme addresses the visual perception of the public and the potential to create interesting landscape structures through the shape, color of flowers and fruits, as well as how these plants contribute to the creation of shade areas, spatial delimitation and attraction for local fauna.

Concept and Evolution. Traditionally, urban green spaces were dominated by strictly ornamental species. Currently, we are witnessing a reevaluation of the role of plants, with fruit trees increasingly being included in:

Street alignments: Use of decorative fruit species (e.g. ornamental cherries, some columnar pears, *Pyrus calleriana*) or even productive ones adapted to urban conditions.

Parks and public gardens: Creation of community orchards or inclusion of fruit trees as isolated or group pieces, which decorate with flowers (spring), foliage (autumn) and, in addition, provide fruit (Negrea et al., 2010 and 2011; Narandžić et al., 2023; Pașcu et al., 2022).

Private gardens and balconies: Popularity of low-growing varieties, such as columnar or dwarf fruit trees, which maximize the limited space.

The inclusion of fruit trees brings a triple **benefit**:

Ecological and Environmental: contributes to biological diversity (through flowers and fruits, they attract pollinators); improve air quality and provide necessary shade; contribute to regulating the urban microclimate (Hickman et al., 2021; Thierry et al., 2023; Dascalu et al., 2013).

Social and Community: Encourage the concept of community gardening and promote a healthy lifestyle; stimulate citizen responsibility and education in the field of environmental protection and food sources; contribute to better food security at the local level (Tsalikidis et al., 1999; Bernardis et al., 2022; Bălan et al, 2015).

Aesthetic and Functional: provide increased visual interest throughout the year (flowers, fruits, autumn colors); can be managed in artistic forms, such as palisades, adding architectural value to the landscape (Antić et al., 2021; Gullino et al., 2009; Istrate et al., 2025).

The success of this integration depends on the correct choice of species and varieties adapted to: difficult urban conditions: resistance to noxious substances, pollutants, compacted soils and extreme temperatures (Căpraru et al., 2009; Schippa et al., 2018; Padulosi et al., 2013; Ochoa et al., 2010). Also, maintenance needs: pest and disease management, specific pruning, may be greater than in the case of strictly ornamental species.

In conclusion, the integration of fruit species into the urban landscape is a modern strategy that transforms green spaces into multifunctional areas, which not only beautify the city, but also nourish it and make it more ecologically resilient.

MATERIALS AND METHODS

The research aims to integrate fruit species with high ornamental value into landscape design because this concept represents an increasingly appreciated approach that combines aesthetics, functionality and sustainability, also accessing resources regarding the marketing of these fruits, which have a high nutritional potential and an attractive taste.

We used an extensive bibliographic analysis and case studies to evaluate the potential for integration into urban landscaping and functional gardens.

As a planning tool SWOT analysis was used and it's focusing on the main Strengths, Weaknesses, Opportunities, and Threads of the location (Pașcu et al., 2018). The role was as to ascertain the feasibility of the research. Taking into consideration this opportunity, we consider opportune the development of a model of "green oasis". This implies the need for rehabilitation/development/construction works, in order to create a sustainable and environmentally friendly places for community.

RESULTS AND DISCUSSION

The results obtained from research on the inclusion of ornamental tree species in urban landscape design are multiple and relevant, addressing both aesthetic and ecological aspects, as well as socio-economic ones. Research on the inclusion of ornamental tree species in urban landscape design offers a wide range of valuable results, contributing to the development of more functional, aesthetic and sustainable urban green spaces.

Discussions on the inclusion of fruit species in landscape design focus on integrating functionality (fruit production) with aesthetics and ecological benefits. This approach is increasingly popular, especially in the context of sustainable development and urban green spaces.

Depending on the desired role, species of the following genera can be chosen:

- ***Malus*** and ***Pyrus***: Ornamental varieties with abundant flowers or small fruits, as well as classic fruit varieties.
- ***Prunus*** and ***Cerasus***: Spectacular spring flowers; sour cherry often has a smaller habit, suitable for confined spaces. *Prunus cerasifera* Nigra for leaf color, used in groups or alignments.
- ***Juglans*** and ***Corylus***: Used as a large tree for shade and fruit value.

For the successful integration of fruit species, specific aspects must be taken into account high aesthetic value (persistent fruits on branches even in the cold season), source of food for local fauna (especially birds) and good adaptability and resistance (table 1).

Species Selection: There are preferred varieties with adapted habit (dwarf, columnar or semi-dwarf) for small spaces or alignments (e.g., in cities). Resistance to diseases, pests and specific conditions of the urban environment (pollution, poor soils) is taken into account, although, in general, fruit trees require more careful phytosanitary care.
Location and Form: They can be used as isolated pieces (solitary) to highlight the shape of the crown or in groups to create shady areas. Artificial forms, such as palisade or trimmed crowns, provide an artistic touch and save space.
Maintenance: Requires regular pruning for shaping and fruiting, which must be integrated into the landscape maintenance plan. Fruit management (harvesting and cleaning) must be planned to avoid public sanitation problems (fallen fruit).

In figure 1 there are exemplified some ways of using tree species as mixed compositions for private gardens (a and b) or urban landscape design-squares (c and d).

Table 1

List of fruit tree species with high ornamental value for landscape design

Nr. crt.	Specie name	Ornamental element	The use in the design
1	*Aronia melanocarpa*	habitus, fruits	groups
2	*Castanea sativa*	habitus	alignments and groups for parks
3	*Cornus mas*	habitus, fruits	groups
4	*Cornus sanguinea*	habitus, branches	groups
5	*Corylus avellana* Contorta	habitus, branches	alignments and groups
6	*Ficus carica*	habitus	solitary, center of interest, groups
7	*Juglans regia*	habitus	alignments and groups for parks
8	*Malus floribunda*	habitus, flowers	solitary, center of interest
9	*Mespilus germanica*	habitus	groups
10	*Pyrus calleriana*	columnar habitus, leaves colour during autumn	street alignments
11	*Prunus cerasifera* Nigra	red leaves	street alignments, groups
12	*Rosa canina*	habitus,flowers, fruits	groups, pergolas
13	*Rosa centifolia*	habitus,flowers,	groups, pergolas
14	*Sambucus nigra*	habitus, flower, fruits	groups
15	*Sorbus aucuparia*	habitus, fruits	groups
16	*Vaccinum corymbosum*	habitus, fruits	groups
17	*Ziziphus jujuba*	habitus, fruits	groups

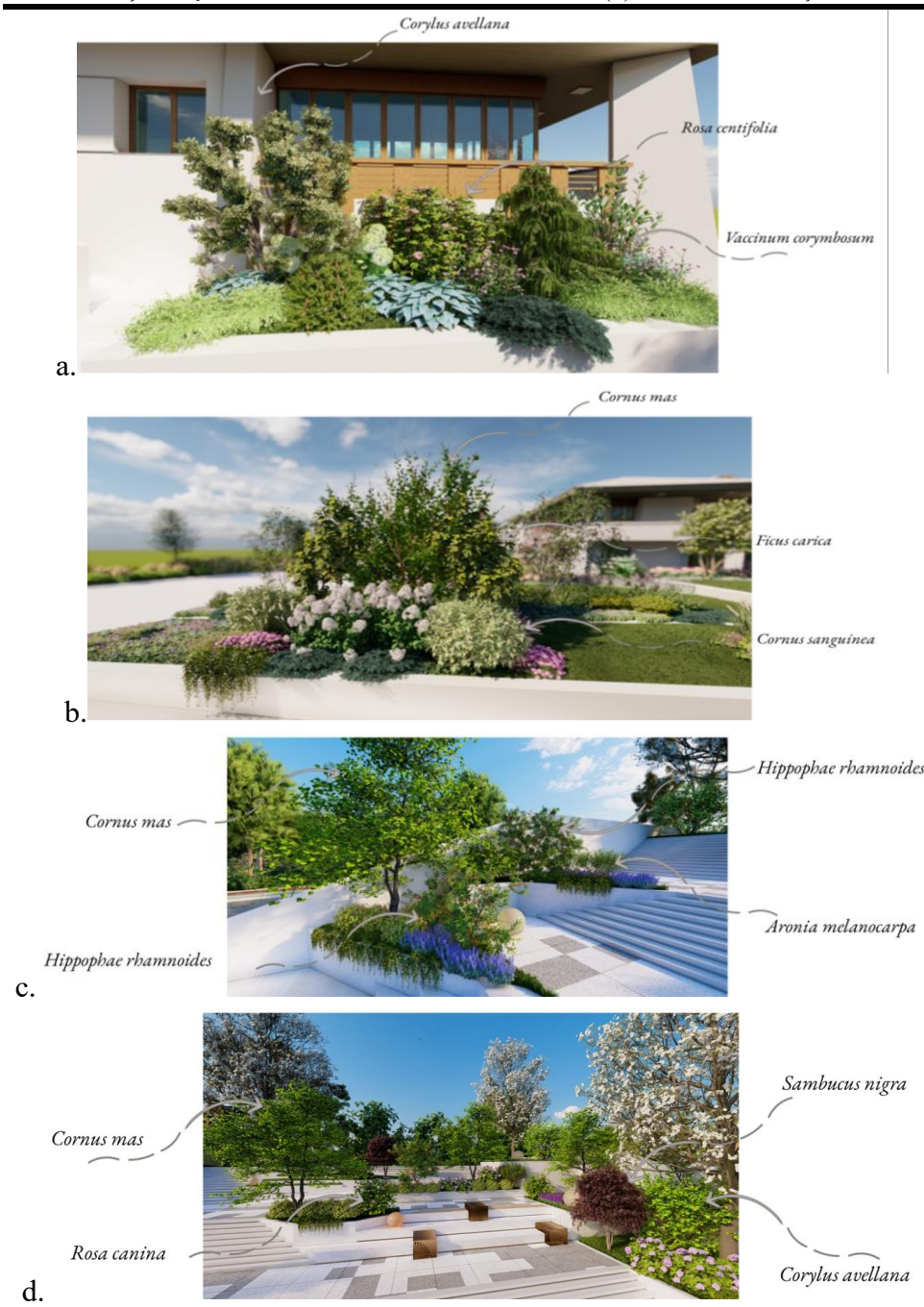

Figure 1. Examples of fruit species use in urban landscape design (photo: Ina Vladimir)

CONCLUSIONS

Revitalizing and renovating green spaces by introducing these concepts into parks and other urban developments are aspects of essential importance for creating a sustainable urban environment that meets the aesthetic, but also functional needs of users.

By integrating fruit species, a closer connection with nature is promoted, creating a friendlier and more harmonious space for the entire community and, at the same time, new sources of food, while ensuring biodiversity.

Activities that involve working outdoors with plants offer benefits for physical and mental health, such as increasing physical activity, reducing stress and improving mental well-being.

This could also bring opportunities and create jobs (in areas such as gardening, landscaping, food processing, distribution, etc.), but most importantly, it is educating new generations in the spirit of sustainability and environmental care.

REFERENCES

1. **Antić, M., Đurić, G. and Bosančić, B., 2021** - *Wild fruit trees in the Forest Park of Starčevica, Banja Luka, Bosnia and Herzegovina*. Acta Hortic. 1308, 13-18 DOI: 10.17660/ActaHortic.2021.1308.3 https://doi.org/10.17660/ActaHortic.2021.1308.3
2. **Bălan, V., Ţugui, I., Asănică, A.C. and Tudor, V., 2015 -.** *Species and cultivars of trees and shrubs suitable for urban agriculture*. AgroLife Scientific Journal, 4(1), 9-17. https://agrolifejournal.usamv.ro/pdf/vol.IV_1/Art1.pdf.
3. **Bernardis R., Dascălu M., Chelariu Elena-Liliana, Zlati Cristina, Paşcu Roxana, Posta Daniela, 2022 -** *The analysis of some ornamental rose varieties grow in the green spaces from Iași*, Scientific Papers Series B. Horticulture, Vol. LXVI, nr. 1, 2022 "Agriculture for Life, Life for Agriculture" Conference Proceedings, pp. 638-643, ISSN: 2285-5653, eISSN: 2286-1580, http://horticulturejournal.usamv.ro/pdf/2022/issue_1/Art93.pdf
4. **Căpraru F., Zlati Cristina**, **2009 -** *Observations regarding yield phenophases of some diseases genetic resistant apple cultivars, in the conditions of Bistrita region,* U.S.A.M.V. Iaşi, Vol. I (52) Seria Horticultură, pg. 539-544, ISSN 1454-7376. http://www.uaiasi.ro/revista_horti/files/Nr_2009/vol_52_2009%20(98).pdf
5. **Dascălu M., Istrate M., Grădinariu G., Zlati Cristina, Bernardis R., Prodan N.D., Sfichi Duke Liliana, 2013** - *Soil moisture study and its influences on blackberry culture for north east Moldova county*. Lucrări Ştiinţifice USAMV Iaşi, seria Horticultură, vol. 56, nr. 2, pp. 185 – 188, ISSN 1454-7376. http://www.uaiasi.ro/revista_horti/files/Nr2_2013/Vol%20-%2056-%202%20_%202013(30).pdf
6. **Große-Stoltenberg, A.; Hanzl, A.; Safaei, M.;** Kleinebecker, T., 2024 - *Once Common, Long in Decline: Dynamics of Traditional Orchards in a Central European Landscape*. *Land* 2024, *13*, 1639. https://doi.org/10.3390/land13101639
7. **Gullino, P., Devecchi, M. and Larcher, F., 2009** - *The cultivation and ornamental uses of persimmon in Piedmontese gardens* . Acta Hortic. 833, 83-88 DOI: 10.17660/ActaHortic.2009.833.12 https://doi.org/10.17660/ActaHortic.2009.833.12

8. **Hickman, C.; Marks, E.; Pihkala, P.; Clayton, S.; Lewandowski, R.E.; Mayall, E.E.; Wray, B.; Mellor, C.; van Susteren, L., 2021** - *Climate Anxiety in Children and Young People and their Beliefs about Government Responses to Climate Change: A global survey*. Lancet 2021, 5, e863–e873

9. **Istrate M., Zlati Cristina, Dascălu M., 2025** – *Pomicultură. Aplicații practice*, Editura "Ion Ionescu de la Brad" Iași, ISBN 978-973-147-586-8.

10. **Jones, M.P. and Sanyang, S., 2009 -** *Underutilized plants for well-being and sustainable development. Acta Hortic*. 806, 35-38 DOI: 10.17660/ActaHortic.2009.806.1

11. **Lauri, P.-É., Douard, S., Chappot de la Chanonie, J. and Normand, F., 2022** - *Biodiversified agrosystems: do we need more knowledge on plant architecture and functioning? The case of fruit trees*. Acta Hortic. 1355, 133-140 DOI: 10.17660/ActaHortic.2022.1355.17 https://doi.org/10.17660/ActaHortic.2022.1355.17

12. **Narandžić, T.; Ružičić, S.; Grubač, M.; Pušić, M.; Ostojić, J.; Šarac, V.; Ljubojević, M., 2023** - *Landscaping with Fruits: Citizens' Perceptions toward Urban Horticulture and Design of Urban Gardens*. *Horticulturae* 2023, *9*, 1152. https://doi.org/10.3390/horticulturae9101152

13. **Negrea Roxana, Zlati Cristina, 2010 -** *Flowers, fruits and tree branches chromatic effect, seen as a source of colour in the vegetal landscape,* Scientific Papers of the R.I.F.G. Pitesti, Vol. XXVI, 2010, pp. 160-165, ISSN 1584-2231. http://publications.icdp.ro/publicatii/Lucrari%202010/086.pdf

14. **Negrea Roxana, Zlati Cristina, 2011 -** *Tree foliage, as main source of color in landscape composition,* U.S.A.M.V. Iaşi, Vol. I (54) Seria Horticultură, p. 531-536, ISSN 1454-7376. http://www.uaiasi.ro/revista_horti/files/Nr2_2011/Vol%2054-2_2011%20(91).pdf

15. **Ochoa, J., Muñoz, M., Vicente, M.J., Martínez-Sánchez, J.J. and Franco, J.A., 2010 -** *Native ornamental species for urban landscaping and xero-gardening in semi-arid environments*. Acta Hortic. 881, 425-428 DOI: 10.17660/ActaHortic.2010.881.68 https://doi.org/10.17660/ActaHortic.2010.881.68

16. **Padulosi, S., Bala Ravi, S., Rojas, W., Valdivia, R., Jager, M., Polar, V., Gotor, E. and Bhag Mal., 2013 -** *Experiences and lessons learned in the framework of a global effort in support of neglected and underutilized species*. *Acta Hortic*. 979, 517-532 DOI: 10.17660/ActaHortic.2013.979.56 https://doi.org/10.17660/ActaHortic.2013.979.56.

17. **Pașcu Roxana, Zlati Cristina, Bernardis R., 2018** - *The behavior in nursery of some fruit tree species with high ornamental value*, Lucrări Ştiinţifice U.S.A.M.V. Iaşi, Seria Horticultură, vol. 61 nr. 2, pp. 301-306, ISSN 1454-7376. http://www.uaiasi.ro/revista_horti/files/Nr2_2018/45.%20Pascu%20R..pdf

18. **Pașcu Roxana, Zlati Cristina, Bernardis R., 2022 -** *Rehabilitation of the dendrological park in Buhusi, Bacau county*, Scientific Papers Series B. Horticulture, Vol. LXVI, nr. 1, 2022 "Agriculture for Life, Life for Agriculture" Conference Proceedings, pp. 730-737, ISSN: 2285-5653, eISSN: 2286-1580, http://horticulturejournal.usamv.ro/pdf/2022/issue_1/Art106.pdf

19. **Poșta, D.S.; Velicevici, G.; Mălăescu, I.M.; Sărățeanu, M.; Gocan, V.;, Borsai, T.M.; Borsai, O.; Sandor, R.; Cântar, I.C.; Bernardis, R.R., 2024 -** Preliminary Study on the Influence of Potting Soil on Magnolia grandiflora L. Seed Germination and Plant Growth. Bulletin of the University of Agricultural Sciences & Veterinary Medicine Cluj-Napoca. Horticulture. 2024. https://journals.usamvcluj.ro/index.php/horticulture/article/view/14973 https://doi.org/10.15835/buasvmcn-hort:2024.0023

20. Sroka, W.; Żmija, D., 2021 - *Farming Systems Changes in the Urban Shadow: A Mixed Approach Based on Statistical Analysis and Expert Surveys*. *Agriculture* 2021, *11*, 455. https://doi.org/10.3390/agriculture11050455

21. Schippa, G.; Interlandi, S.; Russo, P. and Branca, F. 2018. - *Green restoration of the industrial area of the city of Catania for improving urban resilience and sustainability*. Acta Hortic. 1215, 307-310 DOI: 10.17660/ActaHortic.2018.1215.56 https://doi.org/10.17660/ActaHortic.2018.1215.56

22. Thierry, J., Herpin, S., Rodriguez, F., Renard, M., Gantois, M. and Bournet, P.E., 2023 - *Climatic benefits of street trees on the microclimate and thermal comfort: an in-situ experiment in Paris*. Acta Hortic. 1374, 197-204 DOI: 10.17660/ActaHortic.2023.1374.25 https://doi.org/10.17660/ActaHortic.2023.1374.25

23. Tsalikidis, I., Voyiatzi, C. and Tamoutseli, K., 1999 - *The use of the olive tree in ancient and contemporary garden design of the Mediterranean region.* Acta Hortic. 474, 767-770 DOI: 10.17660/ActaHortic.1999.474.160 https://doi.org/10.17660/ActaHortic.1999.474.160