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Shattering the glass ceiling for women in gardening and landscaping: a mini-review

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The history of gardening and landscaping has historically been a male monopoly, and until the 20th century, women could not get anywhere near a career in these fields. This brief review focuses on some of the women who paved the way in Europe and the USA. It also attempts to tell some lesser-known stories, focusing on those who turned to gardening and landscaping, subjects that have been much less explored in floriculture. This review does not claim to be exhaustive, although it does attempt to draw attention to a historical period between the Victorian age and the present day. Women's significant contributions range from dissemination to teaching, research, education, association and popularization of gardening and landscaping. In this paper, we briefly discuss, in the 21st century, men and women who may have similarities in education and work experience, but these similarities do not lead to comparable careers or positions in academic departments. Some scientific studies that have an impact on the design and sustainable management of green spaces linked to ecosystem services are considered. Finally, the contribution of women in landscape architecture is briefly examined.

KEYWORDS

dissemination, ecosystem services (ES), equity, gender, green spaces, history, science

1 Introduction

When women try to climb the managerial ladder, they often face a glass ceiling (Powell and Butterfield, 2015; Babic and Hansez, 2021). The term "glass ceiling" first appeared in popular culture (Hymowitz and Schellhardt, 1986) and then spread rapidly.

One of the first gardening books for women, *The Country Housewife's Garden* (Lawson, 1618), invited women to take part in garden design: "The number of forms, mazes, and knots is so great that I leave every housewife to herself, lest I take away all her pleasure and direction." Nevertheless, the history of gardening and landscaping has historically been a male monopoly, and until the 20th century, it was virtually impossible for women to even come close to pursuing a career. But that does not mean they were not interested in or involved in the practice.

In this paper, we introduce some of the women who paved the way in Europe and the USA. Moreover, we attempt to tell some lesser-known stories, focusing on those who turned to gardening and landscaping, subjects that have been much less explored in floriculture. Women's significant contributions included the dissemination, teaching, research, education, association, and popularization of gardening and landscaping. In the following, we briefly discuss some studies, conducted by scientific women, that have an impact on the design and sustainable management of green spaces and some that are associated with ecosystem services (ES). Finally, the contribution of women in landscape architecture is briefly examined.

This review does not claim to be exhaustive, although it does attempt to draw attention to a historical period between the Victorian era and the present day.

2 Methodology

We hypothesized that:

- i) Women from 1837 to today have given and continue to give significant contributions to the dissemination, teaching, research, education, association, and popularization of gardening and landscaping, but have always been kept into less consideration by men, similarly to what happened in the past. Therefore, there is a need to shatter the glass ceiling for women working in gardening and landscaping.
- ii) Women scientists working in a male-dominated academia contribute with their research to the construction of the best practices in the design and sustainable management of green spaces.
- iii) The contribution of women in landscape architecture offers a new holistic and previously unseen perspective, often generating interconnected networks rather than compartmentalizing issues because of their different histories, socializations, and backgrounds.

This review explored the experiences of women. The qualitative analysis was based on relevant studies, published and written in English, that collected information on personalities, careers, findings, and contributions in the context of gardening and landscaping.

Two main areas were consulted to choose the most prevalent names today with regard to women in landscaping and gardening: from the field of research and education in academia and from public foundations and private professional associations (Supplementary Table S1).

The relevant studies taken into consideration were in previously published reviews, monographs, collective books, peer-reviewed scientific journals, international academic proceedings, websites of prestigious associations and universities, and digital libraries with bibliographic databases. The literature search was conducted using the following databases: Web of Science, Scopus, Google Scholar, and JSTOR. The search was performed using all possible combinations of the following keywords:

Women AND gardeners; Women AND gardening, Women AND garden designers, Women AND landscaping, Women AND

horticulturists, Women and Science, Women and research, Women AND doctorate, Women AND scientific AND disciplines, Women AND gardening AND Edwardian Age, Women AND gardening AND Victorian Age, Women AND gardening AND magazines, Women AND gardening AND books, Women AND gardeners AND career, Women AND horticultural AND school, Women AND gardening AND Twentieth century, Women AND naturalistic AND gardening, Women AND landscaping AND Twentieth century, Women AND gardeners; AND journalist; Women AND gardeners AND writers; Women AND gardening AND Twenty-first century, Women AND landscaping AND Twentieth century, Women AND Dissemination AND gardening; Women AND teaching AND gardening, Women AND research AND gardening, Women AND education AND gardening, Women AND gardening AND Clubs, Women AND association AND gardening, Women AND popularization AND gardening, Women AND Dissemination AND landscaping; Women AND teaching AND landscaping, Women AND research AND landscaping, Women AND education AND landscaping, Women AND association AND landscaping, Women AND popularization AND landscaping, Women AND ecological AND gardening, Women AND ecological AND landscaping, Women AND Plants AND Ornamentals, Women AND planting AND design, Women AND Academic AND Department, Women AND Emeritus AND Landscaping, Authors AND Woman AND scientist AND ecosystem AND services AND Green AND spaces.

To identify additional potentially relevant studies, we employed a manual search of relevant published studies, screening the top journals in the research area. We excluded studies with inaccessible full texts. A total of 56 full articles were assessed for reference eligibility.

We took into consideration, given the broad pool of sources, the highly quoted studies. Since this is a mini-review, we were obliged to trim down the number of possible sources, i.e., to the most quoted in the field of peer review articles and alternative sources (Supplementary Table S1).

3 Victorian and Edwardian ages

The Victorian age (1837–1901) was a time of great change for Britain, with rapid industrialization and urbanization. Alongside these well-documented shifts, another less well-known development was taking place: the rise of women passionate about gardening and landscaping (Bilston, 2008; Horwood, 2010; Wilkinson, 2011), compared to the previous century, which saw exclusively as protagonists male gardeners and landscape designers such as Henry Wise, Charles Bridgeman, William Kent, and Lancelot “Capability” Brown (Bell, 1990).

In the editorial panorama of gardening manuals, Jane Webb Loudon (1807–1858), largely ignored by historians and literary critics, noticed a lack of texts suitable for a passionate female audience: the existing works, written by men, were characterized by a technical structure that presupposed knowledge of basic professional skills already acquired (Desmond, 1980). Loudon (1840) published her first text, *Instructions in Gardening for Ladies*, that had considerable success, selling 20,000 copies.

Loudon was convinced that gardening could be an input, a healthy diversion, and an opportunity for bourgeois ladies, whose lives essentially revolved around managing the home and caring for the family, to show their creativity (Hultzsich, 2020). In 1841, she edited *Ladies' Magazine of Gardening*, specifying that, through these choices, she did not intend to “usurp” the role of men, but rather to make women more aware of their potential, encouraging them to develop and channel it in a positive and rewarding way. Within the late Victorian and Edwardian movements, unfortunately, the only horticultural work available to women was weeding, and they were known as “weeding women.” Opitz (2014) claimed that horticulture became available to women in England for the worsening effect of the 1880s Agricultural Depression and the large numbers of unemployed single middle- and upper-class women. As a response, the British government sponsored horticultural education and research for both men and women. Between 1889 and 1940, there was a boom in the development of women’s horticultural colleges. Frances Evelyn Greville (1861–1938), Countess of Warwick, founded in England the first women-only collegiate center for agricultural education in 1898 (Shteir, 1996). Similarly, in Ireland, several horticultural schools for women, which had been founded at the beginning of the 20th century, were closed in the mid-1920s. The courses included theoretical and practical instructions and covered aspects of botany, soil science, fruit, vegetable, and flower production, ornamental gardening, and marketing (Forrest and Ingram, 1993).

The origin of natural planting, which is getting the spotlight facing natural and environmental problems in modern times, can be found in wild gardens. These were started by William Robinson (1838–1935) and concretely embodied by Gertrude Jekyll. The same Robinson described, in *The English Flower Garden* (Robinson, 1896), Jekyll as “the greatest of living women-gardeners,” while Ellen Willmott (1858–1934), author of the famous book *The Genus Rosa*, published in England in two volumes between 1910 and 1914, was described as “foremost among women in practical horticulture” and “a conscientious and painstaking botanist.” Gertrude Jekyll (1843–1932), a renowned British horticulturist, garden designer, and writer, was highly influential due to her pioneering work in garden design (Hinge, 1982). She crafted over 400 gardens across the United Kingdom, Europe, and the USA. Jekyll’s gardening style melded botanical expertise with an artist’s sense of color, height, texture, and flowering times of individual plants, ensuring that their arrangement always produced an engaging and harmonious effect (Desmond, 2020). Her approach embraced a naturalistic garden design, which has stood the test of time as it could be adapted to gardens of any size (Bisgrove, 1992). In addition, Jekyll made significant literary contributions, penning over a thousand articles for gardening magazines and producing 13 gardening books (Orestano and Vickers, 2023).

4 The 20th century

In England, just at the beginning of the 20th century, middle-class women began to consider horticulture as respectable a career

as nursing or teaching. Kew Gardens in London took on its first female apprentices in 1901. However, it was only when the traditional hierarchies were overturned during the Second World War, when many of the able-bodied men had gone off to war, that Christine Falwasser was promoted to deputy head gardener at Eltham Palace in Southeast London (Horwood, 2011).

Victoria Mary Vita Sackville-West (1892–1962) was an English author, poet, and garden designer best known for creating the gardens at Sissinghurst Castle (Kent, England). She created a new and experimental system of enclosures or rooms, such as the White Garden, the Rose Garden, the Orchard, the Cottage Garden, and the Nuttery. She also invented gardens with a single-color theme and design principles that invite visitors to discover and explore (Nagel, 2015). Her weekly columns in *The Observer* were influential in popularizing gardening in post-war Britain (Martin, 2020). She wrote in an engaging and accessible style that appealed to a wide readership, from gardening novices to seasoned experts. The garden provided Sackville-West with a place where she could freely live out the ideals of beauty and passion, even if they were generally frowned upon by society (Skene, 1996). In 1937, Sylvia Crowe (1901–1997), trained in horticulture, won a Chelsea Gold for Cutbush Nurseries. Her uncredited design was based on bluebell wood, an amazing precursor to today’s naturalistic style.

Looking into Continental Europe, in particular into Vienna, after the First World War, as lots of men had died or were severely disabled, more and more women were forced to earn their living, thus gaining economic independence. They tried to find their place in society between adopted traditions and progressivism (Krippner and Meder, 2011). Grete Salzer, a liberal Jewish woman born in 1892, founded the horticultural school “Hortensium” for boys and girls at the beginning of the 1920s, which prepared pupils for further training in this field. In 1939, she emigrated to London, where she died during the war (Meder and Krippner, 2009).

In Italy, Giuliana Luigia Evelina Mameli, better known as Eva Mameli Calvino, was a true pioneer of scientific disciplines. She was born in Sassari in 1886 and completed her studies in natural sciences at the University of Pavia, where she was appointed “*libera docente*” (professor) of botany in 1915, making her the first woman to be awarded such a title in a subject area (Gullino, 2023). Her research ranged from botany to plant physiology, from mycology to plant pathology (Mameli Calvino and Pollacci, 1910).

In the USA, Marie Clark Taylor (1911–1990) was the first African American woman to earn a doctorate in botany. She was a plant physiologist who first made a name for herself by studying how plants react to light. As head of the Department of Botany at Howard University, Clark Taylor contributed to the design and construction of a new biology building with a greenhouse laboratory on the roof (Warren, 1999). Perhaps her greatest calling, however, was to help other educators, scientists, and engineers develop—not only at the university but also at the elementary and high school levels. She developed curricula, sparked curiosity, and popularized new methods for teaching science (Rudolph, 1982; Eckelbarger et al., 2021).

Ethel Earley Clark (1899–1976) became the first president of the “Negro Garden Clubs” of Virginia (in this text, the authors have chosen to quote the original name from 1932 and to adopt its initial

definition) in 1932, and she brought thousands of African American women gardeners together to compare growing tips and beautify local neighborhoods. Clark represented and organized a growing number of black women who used garden clubs as a means of civic engagement (Way, 2023).

At present, gardeners use ecological gardening practices, also known as sustainable or naturalistic. They are characterized by growing plants within the limits of local resources, matching physical site conditions with specific plant species that thrive under the same conditions, and conserving resources (Porta, 2023). The principle that gardening should be in harmony with ecological processes is attributed to Beth Chatto, born in 1923. When she died in 2018, *The Guardian* hailed her as “one of the most influential horticulturalists of the past 50 years.” Known for her pioneering work in ecological gardening, she stressed the importance of looking at the whole plant, both foliage and flowers, and judging the quality of a plant by observing it throughout the seasons. Her books are treasured for their ecological approach to gardening (Howcroft, 2015). By typing her famous and fundamental principle in horticulture and landscaping—“The right plant for the right place”—you get up to 3.15 billion results in a Google search. It emphasizes the importance of matching a plant’s needs and characteristics with the specific conditions of the location where it will be planted, leading to healthier, more sustainable gardens and landscapes under climate change conditions worldwide (Kisvarga et al., 2023).

Allaback (2022) added a rich new layer to our understanding of Marjorie Sewell Cautley’s contribution to landscape architecture, particularly her nuanced adaptation of public park programs to different users, her strong planting designs, and her frequent use of native plants. Cautley (1891–1954) was the first woman to design state parks as a landscape architect, the first to plan the landscape of a state-sponsored housing project, and the first to teach urban planning at the University of Pennsylvania. After graduating from Cornell University of Agriculture in 1917, where she studied landscape architecture, she opened her office in New Jersey and designed the 30-acre Roosevelt Common community park in Tenafly in 1921. Cautley lectured at Columbia University and the Massachusetts Institute of Technology and worked with the Civilian Conservation Corps in New Hampshire. She wrote for numerous magazines and was the author of *Garden Design: The Principles of Abstract Design as Applied to Landscape Composition* (1935).

5 The 21st century: women teachers and researchers linked to the ecosystem services of green spaces

Men and women may have similarities in education and work experience, but these similarities do not lead to comparable careers or positions in academic departments (Bruer, 1983). Compared to their male colleagues, women are still inadequately rewarded with salary, promotion, and permanent employment (van Veelen and Derks, 2022). Academic women, for the most part, have been invisible recently. There is a well-documented discrepancy between the number of scientific papers produced by women and

those produced by men, which has clear consequences for the retention and promotion of women (Ross et al., 2022). Some exceptions to the shadow state should be noted: in 2017, the Italian prestigious Accademia dei Georgofili appointed Elena Accati Garibaldi “emerita.” She is a full professor of Floriculture at Turin University (Italy). Currently retired, she deals with green, landscape, park, and garden issues and has founded a specialization course in “Parks, Gardens, and Green Spaces” and a specialization school in “Parks and Gardens” recognized by the EFLA (European Foundation for Landscape Architecture). Maria Antonietta Cocozza Talia, full professor of Floriculture, was in Italy in the early 1980s, coordinator of the PhD in Landscape Study and Design.

Nina L. Bassuk, emeritus professor at the School of Integrative Plant Science Horticulture Section, Cornell University, works on improving the quality of urban life by enhancing the functions of plants within the urban ecosystem. She integrates plant stress physiology, horticultural science, plant ecology, and soil science and applies them to three broad areas of inquiry.

Considerable progress has been made in identifying, quantifying, and valuing multiple urban ES, but this knowledge is still insufficiently implemented in urban green space and management (Jahrl et al., 2022).

Furthermore, three main advances have decisively contributed to the current broad expansion of the irrigation technology (IT) sector: drip irrigation systems, soil moisture sensors, and fertigation technology. These, together with the Internet of Things (IoT), have changed data collection and analysis, enabling an overall improved communication between sensors and devices through networks in green areas. The ability to control important parameters such as humidity, temperature, and light levels has shaped a new method of smart farming and cultivation (Wani et al., 2023). In a reality exposed to often uncontrollable and harsh environmental conditions, and demanding physical labor, it is understandable that these factors may have prevented many women from joining gardening practices. Further improvements have been possible thanks to the use of artificial intelligence (AI) and machine learning (ML), mainly in two areas: flower production control and improvement of the management of the supply chain. AI algorithms allow a better overview and understanding of growth patterns, more accurate predictability, and disease control, while sensors can elaborate optimal transportation conditions and route optimization. ML is a complementary aspect in all of the previously mentioned quests, where a type of AI learns from the collected data to make smart choices that can deliver better results in the assigned field, in this case ornamental growth optimization (Benos et al., 2021).

Women scientists who focused on this topic are still in the minority compared to men, nonetheless, but the results have been very significant. Graça et al. (2022) and Pataki et al. (2021) pointed out that green spaces, including gardens, provide a range of ES, such as biodiversity conservation, noise mitigation, human health and recreation, urban temperature regulation, water flow regulation, runoff mitigation, carbon sequestration, and air quality improvement, which contribute to climate adaptation in cities (Alves and Schmidt, 2022; Van Espen et al., 2023). The links between green infrastructure and ES have long been known, but

the role of ornamental plant species has not been studied as much. [Francini et al. \(2022\)](#) critically selected the most suitable ornamental plant species (including herbaceous, succulent, woody plants, and geophytes, among others) to identify the best ideotypes of plant species that can ensure better water purification, air quality, recreation space, climate change mitigation and adaptation, and human well-being and health. This information is suitable to ensure that the protection, restoration, creation, and improvement of green infrastructure become an integral part of urban spatial planning and territorial development. [Nasehi et al. \(2023\)](#) presented a new perspective on third places, which are among the most important public places in cities, promoting social relations between citizens outside of official and family life and influencing the social sustainability of urban areas. [Larcher et al. \(2021\)](#) pointed out that, in an urban context with a growing urban population worldwide, public parks and gardens provide spaces for recreation and contact with nature and can satisfy various social and cultural needs. The findings highlighted the usefulness of stakeholder engagement in monitoring changes in the need for and perception of green spaces, which can transform the urban ecosystem by influencing planning policy to ensure greater citizen well-being. [Bulgari et al. \(2021\)](#) pointed out that the benefits that this can bring to recreational activities related to flowers and ornamental plants, as well as access to nature and the urban environment, are increasingly recognized as relevant, especially in the post-coronavirus disease 2019 (COVID-19) pandemic era. Water stress is the major constraint for plants in urban environments ([Vicente-Serrano et al., 2020](#)). A robust indication of the drought tolerance of plants is an essential criterion for the selection of plants in the city, especially when it comes to sites with paved surfaces and those exposed to higher evaporative demand due to the urban heat island effect ([Toscano et al., 2016](#); [Leotta et al., 2023](#)). Green spaces play an important role in maintaining and improving biodiversity, encouraging the reintroduction of wild plants, and providing food sources and nesting sites for many animal species. Native wildflower seed mixes can enhance biodiversity and create ecological continuity between urban and rural landscapes with low management costs ([Bretzel et al., 2016](#); [Fernandes et al., 2023](#)).

6 The glass ceiling for women in landscape architecture

In Europe, the loss and degradation of landscapes inspired the idea that balancing social, economic, and environmental concerns plays a role in improving the quality of life of citizens, as expressed in the Mediterranean Landscape Charter (1992), the precursor of the [European Landscape Convention \(2000\)](#). In this context, landscape architecture is defined as “the profession that applies aesthetic and scientific principles to the analysis, planning, and management of both natural and built environments” (as is also defined by the European Landscape Convention). The history of landscape architecture, from the earliest societies in Mesopotamia and Egypt to the present, has been presented as created by heroic male figures

([Streatfield, 2012](#)). We defined equity broadly as fair and just access to opportunities and resources. At present, although women comprise more than half of landscape architectural students, the number decreases when it comes to professionals in the field, with less than 30% of them being women and even less than 12% occupying leadership positions. In the Census Report 2001–2016 of Women in Landscape Architecture (<https://www.monash.edu/mada/research/project/gender-equity-in-landscape-architecture>), interesting Australian data showed how, with the rise in age, the number of women deciding to work part-time reaches over half of the entirety, while men remain in the position full-time. Gill Matthewson, a founding member of the Australian Institute of Landscape Architects (AILA), analyzing data from all the Australian Censuses of the 21st century, stated: “This suggests that the landscape architecture profession succumbs to wider, traditional societal pressures that see women bearing the responsibility of child raising.” From Australia to the USA, the difference between men and women does not change: the US landscape architect workforce in 2021 comprised 28,968 people, i.e., 34.1% women and 65.9% men (<https://datausa.io/profile/soc/landscape-architects>). The same imbalance was recorded in Great Britain (2018): 402 Landscape Institute registered practices with a combined total of 1,194 officers; of these, 270 (only 23%) are women (<https://www.landscapeinstitute.org>). Similarly, in the European framework, part-time workers are 20% more women than men ([Eurostat, 2023](#)).

The aforementioned Australian report highlighted three main obstacles in women’s careers: while the number of female scholars is certainly growing, it seems to be stuttered by sexism and similar connected factors. The first two combined challenges are the gender pay gap when a professional ages and gets older than 35 years and the number of them deciding to work part-time. Maternity or general care work inside the family could be an indicator of the necessity for part-time work. Care work is nonetheless unpaid work, which requires time and attention and is more often than not delegated to women ([Chatzidakis et al., 2021](#)). The gender pay gap settles itself on a 10% margin since more male older professionals are working full time and earn more than women who are either younger and also working full time or older and working part time. “For landscape architecture cohorts over 35, twice as many men are working full time than women.”

The third factor is that “Women, in contrast to men, are much more commonly owners of unincorporated practices, with a more than 2:1 ratio in 2016.” An unincorporated practice englobes the categories of “sole practitioners, contract workers, consultants, some traditional partnerships, and especially the self-employed working part-time,” while incorporated businesses mean that “All owners in this category would be principals or directors of firms.” The number of women as owners in incorporated businesses, which are traditionally larger than unincorporated businesses, is lower compared to their male counterparts. There is invisibility of the landscape architecture profession, where many people do not realize its importance. “When people see a landscape like Central Park, they often think it was an act of God, the hand of the landscape architect is often invisible,” says Charles Birnbaum, founder and president of The Cultural Landscape Foundation in

Washington, DC. This effect seems to spill over women landscape architects, with a steeper path in front of them. “The profession had women early on—before law, medicine, and architecture—but there were few women at the big firms, and the ones who were there were pretty invisible” (Way, 2019). The glass ceiling seems harder to break because of parameters such as gender, age, income level, and societal expectations. Women have a harder time advancing to leadership positions and earning as much as their male colleagues, as well as managing time independently from housekeeping and family duties. As well as increasing and encouraging young women and women, identifying individuals to pursue an academic career in these fields, the obstacles enlisted previously on a woman’s professional journey should be analyzed to ensure more equal access to a successful career in landscape architecture.

7 Conclusions

This review explored the experiences of women’s personalities, careers, findings, and contributions in the context of gardening and landscaping from the Victorian age to the present.

The history of gardening and landscaping has historically been a male monopoly, and until the 20th century, it was virtually impossible for women to even come close to pursuing a career. However, that does not mean they were not interested in or involved in the practice.

Women are making significant contributions in various fields, including science, technology, teaching, dissemination, and professions. Their opinions and ideas are crucial in the decision-making process.

The women mentioned in this review are just a few examples of those who are leading the way in bringing about real change. Countless other women are striving to achieve leadership roles in all sectors, not just gardening and landscaping, as part of a larger effort to achieve gender balance.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fhort.2024.1378507/full#supplementary-material>

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