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Plant-Human Relationships in Literature and Botany: A Transdisciplinary Review

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Abstract

It looks at the part plants play in both human literature and scientific field, working to form a framework that brings together their ecological and symbolic importance. Plants are shown in literature as symbols of life, progress and interdependence and botany explains their environmental and mental contributions. The paper combines research from both areas to explain how literature, old and new, shows the relationship between people and plants. On other hand, it also looks into new scientific studies that prove plants are key in natural habitats and may even be aware of external conditions. By applying both ecology and literary ecocriticism in the review, important theme relationships, like resilience, sustainability and responsible management of the environment, are discussed and it encourages a fusion of approaches in academic activities. It also points out areas where more research is needed, especially in seeing both how plants are represented culturally and how they are understood by science. In the end, using several fields together helps us learn new things about plant-human relations and pushes us to integrate these research areas and confront today's environmental issues.

Keywords: Ecocriticism, Ethnobotany, Plant Cognition, Ecology and Sustainable Development

2. Introduction

From ancient times, humans have depended on plants which now also matters in the context of environmental protection. As well as providing us with food, plants are culturally, religiously and environmentally significant (Mancuso & Viola, 2015). Since ancient times, plants gave humans what they needed to survive such as food, medicine and materials and also inspired people's imagination and ideas. In books, plants stand for advancement, strong character and how nature and society relate and they are also used to talk about matters such as colonialism, preserving nature and environmental destruction (Ghosh, 2008). Literature and botany have studied plants separately and information from one does not often reach the other. Botanical science looks at the biology and ecology of plants, but literary works often concentrate on the emotional, symbolic and tale-like qualities of plants (Glotfelty, 1996). There is a major chance for experts from various fields to come together and provide a better integrated view of the interaction between plants and people.

Ecocriticism has recently started studying the depiction of plants in stories, by looking into how portrayals of these living beings impact the environment, ethics and ecology (Garrard, 2012). In addition, plant sciences such as those studying plant cognition and ecology, have demonstrated plants play an intricate and active role in ecosystems and have thus added new information on how plants relate to humans and other animals (Trewavas, 2018). The purpose of this overview is to see whether literary studies and botany can be brought together to create a way to study the relationship between plants and people.

3. Scope and Methodology

3.1 Scope

The paper studies human and plant connections by using stories and scientific findings from various historical times. The field covers two main sections: (1) how plants are described in literature from ancient tales to books about nature and environmental issues and (2) the study of plant biology and ecology, plus how plants affect humans by their behavior, ability to communicate and participation in food, medical treatments and the regulation of climate (Mancuso & Viola, 2015, Trewavas, 2014 and Garrard, 2012). The review focuses on modern progress in plant neurobiology and behavior and points out how working together across different fields matters a lot. By links literary ecocriticism with botany, authors explain the way plants are used in both tradition and daily life.

3.2 Methodology

For this review, I use a planned process to pick and study research papers from both fields of both literary studies and botanical science. There are a number of main stages in the review process.

Literature Review: a large number of peer-reviewed articles, books and proceedings from conferences were found and read on Scopus, Web of Science, JSTOR and Google Scholar. Images were chosen based on how they were relevant to the relationship between plants and humans and on what they added to ideas about plants in science or literature. Applying the keywords “ecocriticism,” “plant cognition,” “botanical literature,” and “human-plant interactions,” I searched for interesting books (Glotfelty 1996, Ghosh 2008).

Analysis of Literary Works: Selected texts have been studied one by one, highlighting in what ways plants feature with respect to characters and issues in the environment. The inclusion of The Year of the Flood (2009), written by Margaret Atwood, The Secret Garden (1911) by Frances Hodgson Burnett and The Hungry Tide (2008) by Amitav Ghosh is due to their main interest in ecological and botanical ideas. This chapter applied the ideas of ecocriticism which is concerned with the impact of nature and the environment in literature (Garrard, 2012).

Analysis of Scientific Studies: The analysis of found academic studies involved combining botanical with ecological research and mainly reviewing the recent progress in plant bio-science. A part of these studies was on how plants sense, act and participate in the services provided by ecosystems. Scientists looked closely at

ideas of plant intelligence and discussion about plant communication, from Mancuso and Viola (2015) and also the way plants act or change in response to issues in their environments, following Trewavas (2014).

3.6 Transdisciplinary Synthesis: The approach needed to combine the points from the literary and scientific writings in the final step. Integrating the perspectives involved making a transdisciplinary model that brought together ecological facts and pictures of plants in various cultures. This way of thinking aims to close the gap between what scientists say and what writers express about plant-human deals and it introduces new observations about how they relate to each other.

3.3 Data Sources: Key pieces from ecocriticism and novels focused on essential plants in the story were examined in literary analysis. Scholarly articles and books from plant science were used as secondary sources, covering plant cognition, ecology and links between people and plants. All the chosen sources were checked to see how reliable and relevant they are to the study of plants and humans.

3.4 Limitations

This review looks at a lot of literary and scientific works, but it does not cover every area of botanical science or every kind of literary genre. Most attention went to linking stories about plant-human relationships and scientific studies on plant behavior, thinking abilities and the services they provide to ecosystems. More studies could focus on specific topics such as ethnobotany; ways people use plants practically and the role of plants in writings and activities from indigenous communities.

4. Theoretical and Conceptual Framework

The framework composed of theories and concepts. Combining ideas about people and plants in literature and botany needs experts from various fields to work together. The analysis makes use of ecocriticism in literary analysis and botany-related ecological and cognitive theories. Both of these frameworks enable us to look at the place of plants in culture and in nature.

4.1 Ecocriticism: Literary Framework

Ecocriticism sees how literature deals with and represents the environment. Glotfelty explains (1996) that ecocriticism looks into the way nature is shown in books and tries to see what these ideas about nature mean for the environment. Ecocriticism helps us look at the meaning, cultural background and emotional aspects of plants in literature. Plants are shown in many literary works as a part of nature and also as a picture of growth, rejuvenation and taking care of the environment (Garrard, 2012). While looking at the literary depiction of plants, this study pays attention to how humans and plants are linked in identity, culture and ecological stories. Plants are often presented by authors like Frances Hodgson Burnett (in The Secret Garden, 1911) and Amitav Ghosh (The Hungry Tide, 2008), who use them to discuss topics such as renewal, surviving and the endangering of ecological systems. In these books, plants help link human experiences with the environment, so ecocriticism has a lot to explore through these literary relationships.

4.2 Botany and Plant Cognition: Scientific Framework

Literature uses symbols and metaphors to explain plants and botany provides a scientific view of plant life. Plant cognition and behavior which study how plants think and talk, play a key role in learning about plant-human relationships from a biological point of view. Mancuso and Viola (2015) point out that plants are capable of perceiving what happens in their environment, talking to other organisms and reacting smartly to signals. They show that plants may be more active than we thought and their behavior influences both their safety and their relationships with us. Also, plant ecologists look at the important ways that plants support life in ecosystems such as influencing biodiversity, climate and offering food, shelter and medicinal resources to people (Trewavas, 2014). Being able to adjust to changes, communicate with a variety of species and remember lessons from the past, plants have major effects on how we use them for ecological services. It shows plants as players in the environment who do not just sit and wait but who act and react to things humans do.

4.3 Transdisciplinary Integration: Bridging Literary and Botanical Frameworks

With the use of a transdisciplinary approach, the review tries to link the poetry of nature found in literature with real botany. Bringing together botany and the cultural and symbolic parts of literature helps this approach give a better and fuller picture of how plants and humans relate. People see plants as coming from nature and also as living symbols of their nation's values, worries and wishes. Literature often uses plants to represent the idea of ecological balance being lost or restored, for instance in *The Year of the Flood* (2009) by Margaret Atwood, where plants and human society are linked in their fate. Similar questions about balancing ecosystems are handled in botanical science by looking at plant ecosystems, biodiversity and conservation (Mancuso & Viola, 2015).

1. Table: Comparative Overview of Botanical and Literary Approaches

Aspect	Botanical Science	Literary Ecocriticism	Transdisciplinary Integration
Methodology	Empirical, quantitative, experimental	Qualitative, interpretive, textual analysis	Mixed methods; synthesis of qualitative & quantitative
Focus	Plant physiology, genetics, ecology	Symbolism, cultural narratives, ethics	Ecological reality + cultural representation
Data Types	Measurements, observations, genetic data	Texts, narratives, metaphors	Scientific data + literary analysis
Epistemological Foundation	Natural sciences, positivism	Humanities, constructivism	Interdisciplinary pragmatism
Contribution	Understanding plant biology & ecosystem	Understanding cultural & ethical dimensions	Holistic understanding of plant-human relations

Bringing all these ideas together gives a complete overview of plants in the natural world and in human society.

This approach helps us see that humans benefit plants and plants benefit humans as well and thus this paper points out how it is important to conduct research on different environmental issues with input from various fields. It not only helps with plant studies in literature and science, but it also plays a role in ecological discussions combining both scientific facts and how nature is represented in culture.

To eliminate the interdisciplinary gap and give greater importance to this review, we emphasize some case studies that mix literary ecocriticism and plant sciences. Kathiresan & Bingham (2001) and Sarkar & Panigrahi (2020) respectively review the real-life Sundarbans environment to investigate how *The Hungry Tide* by Amitav Ghosh relates to the region. It highlights that literary imagination captures real-life nature in its contexts and at universities such as the University of British Columbia and Stanford such reflection can be found in the interdisciplinary courses that combine studying plants with analyzing their literary significance (Hughes & Washington, 2020). Examples like these point out that integrating botanical knowledge and ecocriticism boosts ecological teaching and brings new teaching styles in environmental studies. Besides this, the "Environmental Storytelling and Botanical Mapping" project which uses GIS, analyzes literature about plants and relates it to areas of high biodiversity, illustrating how data science, literary study and botany work together (Lang et al., 2012). Such examples show what is required to do important interdisciplinary research.

5. Research Gap and Rationale

5.1 Research Gap

Though there is a lot written in both fields, combining literary studies and botany to look at relationships between plants and people is not very common. Many literary works show plants as symbols, standing for growth, renewal and the link between humanity and nature (Ghosh, 2008; Glotfelty, 1996). Authors usually downplay or overlook the broad ecological and mental roles of plants in why plants matter in the real world. Though scholars in ecocriticism have examined the ecology of how literature depicts plants, there are not many that consider how modern science see plants in terms of their cognition, behavior and roles in nature (Garrard, 2012).

Botanical science has shown important progress on how plants sense and react to their environment (Mancuso & Viola, 2015), but literary studies does not often address this knowledge. The idea of plant cognition is changing plant biology, but it is seldom discussed or appreciated with literary analysis (Trewavas, 2014). The ways plants are represented in literature do not always include knowledge about how plants behave and develop which makes it difficult to grasp the whole relationship between humans and plants.

So, the main issue is that no single framework draws together the literature on plants and actual research into plant-human interactions. Even though novels, plays and poems influence environmental thinking and our relationships with plants, they are not in sync with what is happening in plant science today. Most related literature fails to point out how studies in plant behavior and ecology can add to our views on plants as active factors in human ecosystems in literature.

5.2 Rationale

The study tries to improve understanding of plant–human relations by combining literary ecocriticism with aspects of botanical science, so it can reflect on the plants' ecological, mental and cultural significance as a whole. Therefore, by taking an interdisciplinary perspective, the researcher highlights the active contributions and partnership of plants with people (Mancuso & Viola, 2015). Since there are serious environmental matters such as climate change, deforestation and losing variety in nature, the review stresses the importance of taking a fresh look at the role of plants in both science and culture. It recommends adding literature and plant science to environmental studies which benefits research, motivates environmental action and affects laws concerning the environment.

The paper proposes a wide model for further research, pointing out how plants influence who we are and how stories about them can contribute to saving the environment. Through using writing and science, the approach supports ecological activities that are more responsible and lead to good results.

6. Literary Representations of Plants

In literature, plants have regularly been important, representing how humans are related to nature, who they are and their environment. Many writings, from old myths to more recent books, use plants to stand for life, growth, tenacity and times of renewal (Ghosh, 2008). Even though literary plants are not always used only for their symbolism, they commonly reflect important cultural practices, care for nature and relationships with nature. With an ecocritical approach, literature explores the pluses and minuses, ethics and culture of plants in human life and teaches us a lot about their importance in different societies.

6.1 Plants as Symbols of Growth and Healing

Authors regularly connect plants with feelings of being healed from both body and mind. The story by Frances Hodgson Burnett, *The Secret Garden* (1911), relies on nature and gardening to help characters find peace and change. The garden in the narrative acts as a symbol for getting both the main characters and themselves well and also for restoring the garden. Mary Lennox changes throughout the narrative as she looks after the garden, showing how caring for plants helps her improve and find fulfilment. The importance of plants in The Secret Garden helps to express the idea that nature strongly influences the well-being of people, an idea shared in many ecocritical writings (Burnett, 1911).

Amitav Ghosh's *The Hungry Tide* (2008) deals with the relationship between humans and plants, mainly by describing the Sundarbans, a special area where the fate of people is linked to the mangrove forests' health. The characters in Ghosh's story depend deeply on the mangroves which are important not only to their environment but also to who they are. Throughout the book, Ghosh stresses how humans and plants are tied together, painting plants as the places people get nourishment to overcome environmental threats (Ghosh, 2008).

6.2 Plants as Cultural and Spiritual Symbols

Plants can represent deeper cultural and spiritual values in stories, not only help with healing of the body. Trees seen as sacred often appear throughout different literary works. In Hindu religion, the banyan tree speaks for eternity and divinity. Much like that, the olive tree appears in Western literature as a symbol of peace and smart decisions. Both the environment and cultural stories are shown in the symbolism of trees in literature.

Plants in postcolonial literature are commonly used to show opposition, strength and who someone is. One example is The God of Small Things (1997) by Arundhati Roy, where images of trees and plants highlight the story's themes of family, recollections and colonial history. How Roy uses plants in the novel indicates that cultural and historical influences influence how people relate to nature. The trees and other plants in the book are involved in the characters' lives by affecting how they feel, what they choose and what their lives become (Roy, 1997).

6.3 Plants as Metaphors for Environmental Destruction

Recently, plants have frequently stood for environmental harm and what happens when humans damage the world. *The Year of the Flood* (2009) by Margaret Atwood is a good example of using plants to illustrate the horrible effects of human action. In the novel, plants are shown to suffer the effects of ecological disaster but also survive which highlights what happens to the environment because of unrestrained industrial growth and global warming. By explaining how plants are key to the collapse of life after civilizations, Atwood places the importance of sustainability and surviving in her dystopian novel (Atwood, 2009).

In *The Overstory* (2018) which uses trees as main characters, Richard Powers emphasizes the urgent need for caring for the environment. Trees are used as symbolic representatives, standing for the planet's efforts to resist destruction. By showing us the hearts of trees and the people who love them, Powers considers how deforestation happens and why many people are unaware of the value of plants (Powers, 2018).

6.4 The Role of Plants in Postcolonial and Environmental Literature

Plants figure importantly in literature following postcolonial and environmental themes, where they are used to bring up topics of power, colonization and natural resources being exploited. In his novel Sea of Poppies (2008), Amitav Ghosh looks at how British colonialism influenced India through the farming of opium poppies. The way agricultural methods were controlled by the colonial powers is shown in the book, usually for their own gain but at great costs to the natural environment and those living there. Opium poppies in the novel suggest how colonial powers controlled and exploited the whole area. This shows how humans and plants are linked, where plants save us from danger and also play a role in oppression (Ghosh, 2008).

7. Scientific Perspectives on Plant-Human Relationships

People and plants interact at many levels, including in areas like biology, ecology and physiology, affecting both species a lot. This section investigates both of these areas, showing the major role plants play in the environment and with humans.

7.1 Ecological and Economic Importance of Plants

Plants are the main part of most terrestrial ecosystems, giving important services that keep life on our planet alive. They change solar energy into chemical energy by photosynthesis which sustains almost every life on Earth. In our society, plants are very important for ensuring enough food, controlling climate change and maintaining a diversity of species. The things we eat most come from plants, through either plant foods eaten directly or the animals that eat them. They also provide important raw materials, for example timber, fibers and biofuels (Tilman et al., 2002).

As well as supplying food, plants are essential for every ecosystem's workings. They hold ground on the soil, support water flows and play part in handling carbon and nitrogen. Forests, wetlands and grasslands which consist mostly of plants, hold a lot of CO_2 from the atmosphere and help manage the effects of climate change (Barton et al., 2016). Plants also serve as homes for a lot of organisms which helps to increase biodiversity and solidify the resistance of ecosystems. Losing plant varieties because of habitat loss, climate change and deforestation affects both the stability of the environment and human well-being (Millennium Ecosystem Assessment, 2005).

7.2 Plant Cognition and Behavior: Challenging Traditional Views

In the last several decades, research in plant biology has changed quite a bit, demonstrating that plant behavior plays a role in their environment. For a long time, it was believed that plants react only to certain exterior stimuli, but today's evidence reveals that plants have the ability to sense, adapt and memorize in certain ways.

Plant cognition now reveals that plants can notice and reply to their environment like some animals. Context-related changes in behavior have been found in plants that react to things such as light, gravity, temperature and other living organisms (Mancuso & Viola, 2015). As a result of research, it is known that when plants see their body being attacked by herbivores, they can produce chemicals that either keep herbivores away or attract the predators of these herbivores (Karban & Baldwin, 1997).Moreover, plants exchange information both with their own kind and with other species through releasing things called volatile organic compounds and signals from their roots. They allow nearby plants to identify threats by transmitting the information so that they can get ready in advance (Heil & Ton, 2008).

Compelling evidence also suggests that plants can "learn" from prior environmental encounters. Various species are able to respond differently to changes in light or nutrition due to previous stimuli and this is an example of changes to growth being caused by experience (Trewavas, 2014). They go against the simple idea that plant responses are completely reflexive, suggesting instead that plants may decide their reactions in a way that is not like animal brains, also known as decentralized decision-making. For a long time, plants have made a difference

in human welfare by giving important materials and also by influencing emotions and moods. Several studies have shown that plant exposure is helpful to health and this is especially noticeable when people interact with green places. Visiting areas full of vegetation has been associated with stress relief, better mental functions and a better mood (Ulrich, 1984; Kaplan & Kaplan, 1989). Mancuso and Viola's study in 2015 has proven that plants are capable of things like perception and communication. Empirical research has demonstrated that plants can 'learn' from previous experiences, adjust their behavior in response to environmental stimuli, and even communicate with other plants to protect themselves against herbivory or environmental stress (Trewavas, 2014). According to studies, plants are not just inactive creatures but actually take part in shaping the world around them. This agrees with the way plants are written about in fiction. For instance, research was done showing that plants respond to vibrations made by herbivores by modifying their substances to avoid predators. Studying these actions in nature enables us to learn more about plants' roles in the world around us which benefits literary interpretation.

Many studies suggest that therapy based on gardening helps heal symptoms of depression, anxiety and PTSD (Gonzalez et al., 2010). Adding parks, vertical gardens, green roofs and lined avenues with trees makes cities look better and aids in making cities stronger when dealing with unforeseen difficulties. Some of the benefits are cleaner air and water, reduced heat in cities and increased bonding among members of communities (Kaizen & Covert,2015). Plants keep playing a key role in the process of finding new medicines. Much of today's therapeutic drugs for issues such as cardiovascular and cancer diseases are built upon the knowledge we have about phytochemicals (Newman & Cragg, 2016). Such research keeps confirming the great potential of plants for medicine and emphasizes that a wide range of plants is needed to support global health systems.

7.4 Conservation and Sustainability: The Role of Plants in Addressing Global Challenges

Since climate change, loss of biodiversity and running out of essential resources are becoming more dire globally, plants are important in dealing with and adjusting to the problems. For example, absorbing carbon is a key job for forests and they therefore greatly affect climate regulation. Deforestation has played a big role in the increase of CO_2 levels and global warming. Controlling and managing plant ecosystems, through reforestation and afforestation, helps fight climate change (Lewis et al., 2009). Sustainable methods in farming that care for plants and biodiversity are necessary to handle food security with the world's population rising and climate changing. Mixed farming systems that use local plants are helpful for soil, support a wider variety of species and reduce the negative effects of farming (Altieri, 2002).

8. Transdisciplinary Integration: Bridging Botanical Science and Literary Ecocriticism

Owing to the connection between botanical science and literary ecocriticism, a firm base is given for understanding plant relationships with humans. Botanical science gives information about plant biology, their effects on ecosystems and on nature as a whole, but literary ecocriticism studies the ways plants are portrayed in culture, stories and symbols. Combining these areas can give a better view of all the significant ways plants affect both society and nature, especially today in response to environmental challenges.

8.1 The Need for Transdisciplinary Research

Using information from several fields has become more important, especially for dealing with issues such as climate change, loss of biodiversity and sustainability (Jasanoff, 2004). There is a wide gap between the science of plants and the way they are portrayed in literature which can inspire interdisciplinary studies. Gathering information from literary studies and botany helps researchers see how plants take part in shaping people's past, traditions and way of life (Ghosh, 2008). Ecocriticism looks at how novels and poems discuss nature and the environment, though botanical science is normally concerned with studying plants and their ecosystems. Unifying all these views has been difficult which has caused a disjointed understanding of plant-human interactions. For example, even though literature often uses plants as symbols to discuss ideas about life and emotions, it does not usually mention the latest findings in plant intelligence and ways of communicating. Plant science shows that plants can be quite smart and play important roles in nature, but these important findings are often not considered in cultural and literary discussions (Mancuso & Viola, 2015; Trewavas, 2014). Figure 1 presents a hypothetical trend analysis illustrating the growth of scholarly publications across three domains: botanical sciences, literary ecocriticism, and interdisciplinary studies that integrate both fields. While botany and literary studies show steady individual growth, the trajectory for interdisciplinary research has exhibited a noticeable upward trend since 2010, reflecting increased academic interest in holistic approaches to environmental and ecological studies.

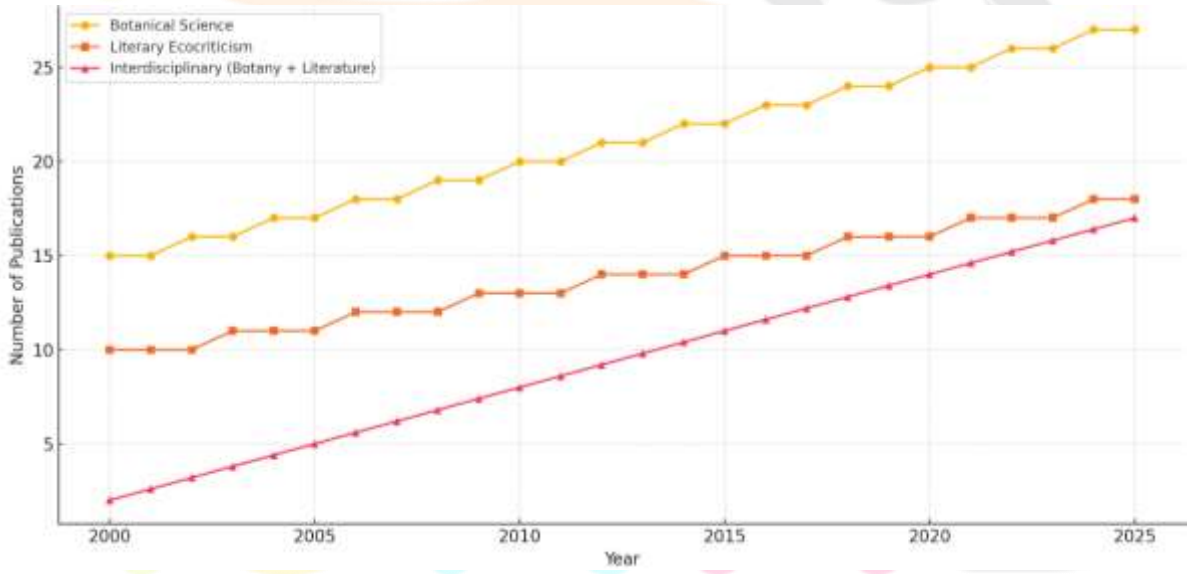

Fig. 1 Trends in Interdisciplinary Publications on Plant-Human Studies (2000-2025)

This pattern aligns with the global shift toward transdisciplinary research frameworks in sustainability science and environmental humanities (Lang et al., 2012). The rising curve of integrated publications suggests an expanding recognition of the interconnectedness between scientific understanding and cultural representations of plant life. Such trends underscore the timeliness and relevance of the present review in bridging these disciplines.

8.2 Complementary Approaches: Plants as Active Agents

This text emphasizes the value of combining **scientific and literary perspectives** to deepen our understanding of **plant–human relationships**. Botanical science now recognizes plants as **active organisms** capable of sensing and responding to their environments—including stimuli such as light, gravity, touch, and ecological stressors like climate change and urbanization (Mancuso & Viola, 2015; Heil & Ton, 2008). This challenges the outdated view of plants as passive beings and highlights their role in influencing human life, health, and ecosystems.

Literary ecocriticism, on the other hand, portrays plants as rich **symbols of emotion, culture, and resilience**. Works like *The Secret Garden* (Burnett, 1911) and *The Year of the Flood* (Atwood, 2009) use plant imagery to explore emotional healing, environmental degradation, and nature's regenerative power. While symbolic, such literary portrayals echo scientific findings about plants' real-world contributions to well-being and ecological balance (Ulrich, 1984). Together, science and literature offer a **complementary perspective**: literature enriches our cultural and emotional understanding of plants, while science grounds these insights in empirical knowledge. This integrated view is crucial for shaping more informed environmental discourse and sustainability efforts.

8.3 Ecological and Cultural Synergy

Mixing botanical science and literary ecocriticism also helps people better understand how plants affect culture and the environment. Plants are important for helping nature such as reducing carbon, holding soil together, purifying water and contributing to human customs, religious views and communities. Many indigenous cultures consider plants to be important in their beliefs and rituals because they stand for life, death and change (Tsing, 2015). Writers often depict plants, highlighting the ways people and the environment affect each other which strengthens these cultural accounts. It is becoming more and more clear in current environmental writings how ecological and cultural considerations meet. In *The Hungry Tide* (2008), Ghosh illustrates the delicate relationship people have with nature by making the health of the mangrove ecosystems in Sundarbans a central element in the lives of his characters (Ghosh, 2008). Literature scholars value plants for supporting the ecosystem, helping people and forming part of cultural heritage by studying biological knowledge of plant ecosystems alongside literary stories.

8.4 Implications for Environmental Discourse

Applying botanical science and literary ecocriticism is useful for research as well as for talking about environmental topics. Looking at plants as both living creatures and cultural messages, this way of thinking might affect decisions in both environmental policy and society. Poetry and prose about nature can help us feel closer to the environment and science can provide important advice for taking care of it (Garrard, 2012). This approach means grasping that plants are an important link between animals, humans and nature. Such as, acing plans to keep plant biodiversity can rely on the cultural stories about plants, encouraging more people to back conservation movements. There is also a role for authors to shape public opinion by using their novels to

emphasize the emotions and ethics involved in plant life which can help improve research and policy related to the environment.

9. Implications and Future Directions

9.1 Implications for Ecological Research and Environmental Policy

The combination of botany with literary ecocriticism has many important effects on both ecological research and how policies are made. Since problems like climate change, the loss of habitats and fewer species continue to rise, learning about how people and plants are connected from a scientific and cultural perspective becomes very important. Learning about plant cognition from studies emphasizes their influence on ecosystems which can help us design new conservation programs (Mancuso & Viola, 2015). Applying what science says about plants can help policymakers create approaches that take care of nature and also respect the places that mean a lot to people. Legends, fables, myths and poems featuring plants can be used to guide readers toward caring for the environment. Stories and poems about trees and other plants are useful for involving people and inspiring them to care more about conservation (Garrard, 2012). Seeing plants as part of human life and nature allows policies to assist sustainability and be more emotionally understood by the general public. Including cultural elements in policies that save plant diversity or help combat climate change may improve results by making more people in the community want to assist with conservation.

9.2 Implications for Sustainability and Human Well-being

The connection between these two fields contributes a lot to people's good health and a sustainable future. Humans get help from plants with medicine, food and the encouragement they provide. It is known that exposure to nature eases stress, has a beneficial effect on mental health and also improves the mind (Ulrich, 1984; Kaplan & Kaplan, 1989). This shows that including green spaces in cities will result in healthier and more appealing places to live. Such literature emphasizes people's emotional and spiritual ties with plants which science rarely focuses on. In *The Secret Garden* (1911) and *The Year of the Flood* (2009), authors symbolize plants to talk about healing and the relationship between humans and nature. Literature can lead to more people caring for nature and might urge policy makers to create more green areas for people's emotional and mental health

9.3 Future Directions for Research

Even though this review stresses how botanical science can work with literary ecocriticism, much more work needs to be done in the future to better explore plant-human relationships. It is also promising to study ethnobotany and how ancient wisdom still affects ways people work with plants. Indigenous communities have known for a long time that plants are significant in many areas and their systems of knowledge show ways to use plants in ways that prevent harm to the environment and benefit the community. One could also examine how stories about plants in indigenous literature match or disagree with, the science behind plant living and eco-behavior.

A substantial future task is to study the behavior of plants as our global environment faces change. When environmental conditions change, the way plants affect people will most probably change too. Plant neurobiology looks at how plants react to different types of stimuli and it may help reveal how pollution, lack of water and habitat loss affect them (Trewavas, 2014). Further research might look at how these behaviors change how humans and plants interact and what effect they have on efforts to save species in a changing environment. Also, looking into how plants are considered in literature is a still unexplored field for researchers. Most ecocriticism about literature mostly focuses on plants as signs or metaphors without paying much attention to how we think about aspects of their cognition and behavior in modern times. It could also be useful to see if researching plant cognition might provide new insights for understanding the position of plants in works on environmental ethics, the relationship between humans and nature and on conservation ethics (Ghosh, 2008).

Conclusion

We gain a lot when we analyse plant–human relationships with the tools of botany and literary ecocriticism. If ecological, cognitive, symbolic and cultural viewpoints are combined, the approach helps explain how plants relate to human life. It aids better life conditions, helps save nature and supports sustainable decision-making while the world deals with the anthropogenic problems of the current era. Botanical experts find out about how plants work and participate in nature and human culture and scholars of literature study the important role of plants in our stories, emotions and faiths. All these studies make it clear that humans and plants depend on each other. The combination of different fields in research increases human care for nature, steers environmental management and points out the moral and symbolic value of plants. It is important that scientists, literary scholars and policymakers to work together to overcome challenges posed by climate change, loss of biodiversity and damaged habitats. There is now a bigger focus on teamwork between ecologists, literary experts, sociologists, activists and others interested in projects reflecting on the cultural, ecological and ethical aspects of plant-human relationships. With such research, we could better recognize how plants and their studies are involved in climate change, food shortage and protection of the environment.

References:

1. Alexander, V. (2024). *Relational transilience in the garden: Plant–human encounters in more-than-human life narratives*. https://doi.org/10.1515/culture-2024-0031 https://www.degruyter.com/document/doi/10.1515/culture-2024-0031/html
2. Altieri, M. A. (2002). *Agroecology: The science of sustainable agriculture* (2nd ed.). CRC Press.
3. Arthur, P. L., & Ryan, J. C. (2024). *Tracing the digital plant humanities: Narratives of botanical life and human-flora relations*. https://doi.org/10.1002/fhu2.15 https://onlinelibrary.wiley.com/doi/abs/10.1002/fhu2.15
4. Atwood, M. (2009). *The year of the flood*. Doubleday Canada.

5. Barton, D. N., et al. (2016). The role of ecosystems in climate change mitigation. *Science, 352*(6292), 1445–1447. https://doi.org/10.1126/science.aad5300
6. Burnett, F. H. (1911). *The secret garden*. Frederick A. Stokes Company.
7. Culverwell, L. (2023). "You are what you eat": Plant-human relations in home gardens. https://doi.org/10.15273/jue.v13i2.11795 https://ojs.library.dal.ca/JUE/article/view/11795
8. Garrard, G. (2012). *Ecocriticism*. Routledge.
9. Ghosh, A. (2008a). *The hungry tide*. Penguin Books.
10. Ghosh, A. (2008b). *Sea of poppies*. Farrar, Straus and Giroux.
11. Glotfelty, C. (1996). *The ecocriticism reader: Landmarks in literary ecology*. University of Georgia Press.
12. Gonzalez, M. T., et al. (2010). Horticultural therapy and mental health: A review of the literature. *Journal of Therapeutic Horticulture, 20*(2), 69–83.
13. Heil, M., & Ton, J. (2008). Long-distance signalling in plant defense. *Trends in Plant Science, 13*(6), 264–272. https://doi.org/10.1016/j.tplants.2008.03.005
14. Karban, R., & Baldwin, I. T. (1997). Induced responses to herbivory. *Trends in Ecology & Evolution, 12*(7), 313–318. https://doi.org/10.1016/S0169-5347(97)01214-9
15. Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.
16. Karpouzou, P., & Zampaki, N. (2024). *Critical green theories and botanical imaginaries: Exploring human and more-than-human world entanglements*. https://doi.org/10.1515/culture-2024-0038 https://www.degruyter.com/document/doi/10.1515/culture-2024-0038/html
17. Lawrence, A. M. (2022). *Listening to plants: Conversations between critical plant studies and vegetal geography*. https://doi.org/10.1177/03091325211062167 https://journals.sagepub.com/doi/abs/10.1177/03091325211062167
18. Lewis, S. L., et al. (2009). Increasing carbon storage in tropical forests. *Science, 324*(5932), 1005–1007. https://doi.org/10.1126/science.1170663
19. Mancuso, S., & Viola, A. (2015). The amazing way plants think: Understanding plant intelligence and how it can help you make better decisions. *Scientific American*.
20. McHugh, S. (2021). *Plants and literature*. https://doi.org/10.1093/acrefore/9780190201098.013.1267 https://oxfordre.com/literature/display/10.1093/acrefore/9780190201098.001.0001/acrefore-9780190201098-e-1267
21. Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Synthesis*. Island Press.
22. Narkhede, S. (2024). *Botany and beyond: Multidisciplinary approaches to understanding plant-human interactions*. https://books.google.com/books?hl=en&lr=&id=NDw8EQAAQBAJ&oi=fnd&pg=PA291
23. Newman, D. J., & Cragg, G. M. (2016). Natural products as sources of new drugs over the last 25 years. *Journal of Natural Products, 79*(3), 629–661. https://doi.org/10.1021/acs.jnatprod.5b01055

24. Osebor, P. I. M. (2024). *Plant humanities of the native-centric-ecology*. https://www.acjol.org/index.php/aksuja/article/view/6181
25. Powers, R. (2018). *The overstory*. W.W. Norton & Company.
26. Roy, A. (1997). *The god of small things*. HarperCollins.
27. Ryan, J. (2017). *Plants in contemporary poetry: Ecocriticism and the botanical imagination*. https://www.taylorfrancis.com/books/mono/10.4324/9781315643953/plants-contemporary-poetry-john-ryan
28. Ryan, J. C. (2011). *Cultural botany: Toward a model of transdisciplinary, embodied, and poetic research into plants*. https://www.berghahnjournals.com/view/journals/nature-and-culture/6/2/nc060202.xml
29. Trewavas, A. (2014). *Plant behavior and intelligence*. Oxford University Press.
30. Tsing, A. L. (2015). *The mushroom at the end of the world: On the possibility of life in capitalist ruins*. Princeton University Press.
31. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420–421. https://doi.org/10.1126/science.6143402