

2022

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Overtones of Symbiosis in Barbara Kingsolver's *Prodigal Summer*

TRIBHUVAN UNIVERSITY

**Overtones of Symbiosis in Barbara Kingsolver's *Prodigal Summer***

**A Thesis Proposal Submitted to the Central Department of English, T.U.**

**In Partial Fulfillment of the Requirements for the**

**Degree of Master of Arts in English**

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**Kirtipur, Kathmandu**

**March 2022**

Tribhuvan University  
Central Department of English

Letter of Recommendation

Aayush Dhakal Chhetri has completed his thesis “Overtones of Symbiosis in Barbara Kingsolver’s *Prodigal Summer*” under my supervision. He has completed his research on March 2022. I hereby recommend this thesis to be submitted for viva voce.

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Assist. Prof. Mahesh Poudyal

Supervisor

Date: \_\_\_\_\_

## Acknowledgements

I would like to express my sincere gratitude to my research advisors Assit. Prof. Mahesh Paudyal, Central Department of English for his intellectual guidance, critical comments, genuine suggestion, and providing essential materials. His supervision and inspiration suggestion helped me to prepare this research paper.

I am deeply indebted to Prof. Dr. Jib Lal Sapkota, the head of Central Department of English, Tribhuvan University, for approving this research paper in present form. I am grateful to him for his valuable suggestions and guidance.

I would also like express my gratitude to other lectures and my colleagues who really motivated me while making my research paper.

Likewise, I must whole heartedly acknowledge my deep gratitude to my father, mother, sister, and brother for this great encouragement.

March 2022

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## Overtones of Symbiosis in Barbara Kingsolver's *Prodigal Summer*

### Abstract

*This research paper seeks to explore the complex connectivity of human beings, diverse animal world, plants and landscape relation in Barbara Kingsolver's novel Prodigal Summer from an Ecocritical perspective. The researcher claims that the loss of chestnut from the Appalachians landscape is the cause for other species to be lost those are dependent for the survival. Due to the loss of chestnut Appalachians people and different species get suffers in their life. As a result Appalachians lament for the local seeds of the chestnut thus local seeds which grown at any specific geographical landscapes need to be protected. The design of interconnection among organisms in nature that function for the well-being of the environment is difficult to understand by the normal gaze of human beings. The anthropocentric tendency of human being tries to consume nature for its benefit without thinking about its consequences so that environmental degradation takes place. Though humans are different species than coyotes, moths and trees all deserve a place in a world since we depend on each other for different functions. By taking theoretical insights related to nature- human symbiosis and eco-criticism proposed by Allenna Leonard, Rosterfer Howard and Grey Garrard, this research finally concludes that the increasing of globalization has served western interest and has created deeper colonization of other cultures and planet's life. Kingsolver's novel prioritizes the equal role of human and non-human entities in nature and a reciprocal relationship for the sustainable future of environmental concerns.*

Key Words: Ecocriticism, symbiosis, mutualism, preservation, commensalism

This research paper focuses on the mutual relationship between organisms of nature and human responsibilities to save the non human world. It exposes how symbiots are embedded in a web of interconnections. Barbara Kingsolver's novel *Prodigal Summer* (2000) represents how members of the community in Appalachia, share the ethics and norms with the environmental surrounding. Especially, focusing on the lives of Deanna Wolf, Lusa Maluf Landowski and Nannie Land Rawley characters are solitary individuals who have a unique view of their natural surroundings. During spring and summer, their life changes and they accomplish that celebration with nature is not solitary. Living and non-living beings are part of a complex web that connects all. Kingsolver's novel depicts humans to the other forms of life shares their local environment. It vibrates stories of human love, lives, and forms of southern Appalachia throughout humid summer.

Characters of this novel face the difficult situation but find a connection to one another to the flora and fauna which they necessarily share a place. Without fictionalizing the environment, this novel is a song to the wilderness that celebrates the prodigal spirit of human nature and nature itself. King solver especially focuses on environmental concerns, the struggle of rural life and the depiction of pastoral beauty as it is. In *Prodigal Summer* Kingsolver exposes her academic knowledge in evolutionary biology and ecology, her deep-rooted concern for community and family, and her intimate knowledge of particular place combine to produce no less than a master plan for saving the small family farm and for restoring ecological balance in the southern Appalachian bioregion that is struggling to survive.

In the view of Suzanne W. Jones, "Kingsolver demonstrate that both the survival of Widener farm and the well-being of southern Appalachia ecosystem depend on understanding the complex interconnection between human and non-

human worlds, between native and newcomers, the local and the global” (95). After the death of Cole, Lusa takes responsibility to save this Widener’s property from debt and does goat farming hoping that income will help her for paying the debt of Widener’s farm and to repair the roof of their farmhouse.

*Prodigal Summer* Kingsolver focuses on the symbiotic bonding between the human and non-human world. The symbiotic relationship creates balance in nature. As we take Deanna to illustrate the mutual relationship between humans and nature. She displays the connection of species in the environment by referring to the perspective of the food chain and their existence by co-relationship. Sarah Stanbury in her, “Green Ethics and Medieval Nature” asserts “ In *Prodigal Summer*, Barbara Kingsolver adjust the relation that would see things as an “I” and a “thou,” or even as man and nature” (1). Humans seek to create a relationship with nature and even they predict nature as their own. Nannie Rawley growing organic apple depends on nature. Similarly, the Widener family grew potatoes, cucumbers and other cash crops in the lap of nature. Thus, human and non-human organisms share a global community of resources. It is human responsibility to perform an ethical obligation to promote human-nature relationships to keep nature stable for own welfare and wellbeing of the whole environment.

Creadic Anna, notes that Kingsolver has argued “*Prodigal Summer* is “not even mostly” about its character but rather is about “whole system,” a short of biological parable of the human/animal/insect/plantscape we inhabit” (132). To run out the whole ecosystem every tiny organism are valuable. The life of a human being could only sustain without isolating from the connection of non-human beings. Plant for human beings carries a significant role in their daily activities. Trees are the sources of firewood, lumber, medical herbs and also humans an animal needs plants

for their survival. “Garnett even remember the bunch grasses that use to grow here naturally, the blue steam and such. It must seem strange to the animals to have a new world entire sprouting all around them, replacing what they’d known. What a sadness, the baby quails lost in the jungle with nowhere to go. But you had to have hay”(138). Humans are ethically responsible to take care of the plants so, human and plants share their relationship for the benefit of both. Similarly, animals and insects depend on plants and the litter and the dead animals consumed by plants so they can grow well. Here we can observe the reciprocal relation and a system where everything becomes on balance ecologically.

Richard M. Magee states “in an ecological framework of *Prodigal Summer*, the web of familial, economical and emotional interconnections that make up the community symbolizes the larger web of environmental interconnections” (19). Kingsolver shows the familial relationship of different characters in her novel. Lusa is an outsider for Widener's house and she shows sympathy for her sister-in-law and their son and daughter Lowell and Cries. Even she got ready to adopt them and her will to assign the Widener’s farm giving them citizenship from Widener’s name. The emotional interconnections have also been seen in this novel after the death of Cole all relatives, families join the Widener house and share emotional sympathy to Lusa. Moreover, Rawley organic apple sold to local and global markets shows economical connections in the novel.

*Prodigal Summer* exposes the pastoral landscape of Southern Appalachia which shares the story of the relationship between wild animals, plants, insects, creek, bugs and moths in Zebulon. Human and non-human share their environment and it is how the design of nature works. Nannie takes care of her organic farm, Garnett cross the fertilizing field, Widener’s farm with the obligation taken care of by Lusa. The

way of caring for the land from the perspective of the character has some connection with land which shows their land of legacy and responsibility. Harper Collins traces:

Barbara Kingsolver's genre is fiction that relates humans to the other forms of life that share their local environment, without fictionalizing the environment or the forms of life. Her characters are connected with the web that surrounds them. Scarcely a paragraph passes without a sense of that connection. This is true of all her writing, most notably *Animal Dreams* and *The Poisonwood Bible*, but *Prodigal Summer* is thus far the masterpiece of the genre. (159)

This is not only an adequate justice for the work *Prodigal Summer*; there are different ways to see nature and perspective to see the motion and dimension.

The setting of this novel is the Zebulon landscape and the place near it. This novel pictures the activities that are done by a human for their daily lives, how they share the relationship with non-human and what difference is there in the rural geographical surrounding is exposed in the novel. The main character of this novel observes and experiences the land from their understanding and shows some empathy to the land which they share for living as if having some kind of obligation that is what differences rural people thinking to land in comprising to urban people thinking about land and nature. Garnett says to Nannie "I have to take care of my Chestnut and Nannie replies... my apple crop is my living. Your trees are a hobby" (273). Rural people are kind to nature they could find the essence of their surroundings. They feel, taste, smell, hear and see the mystery occupied by the landscape. Narduzzi Dilia asserts that:

This is a novel focused largely on human and their different relationship to the rural landscape of the Southern Appalachians, situated on the border of Virginia and Kentucky. This novel is contemporarily set in twenty-first

century and life with the questions about the relationship that human beings have with places where they live. It focuses especially on the relationships that Deanna, Lusa and Garnett have with other people, animals, and the landscape that specifies their experiences with this place. Human beings' relationships to urban or non-rural surroundings are recognized in this novel but are positioned as notably different from the relationships humans have with a “natural” landscape. (59)

People living in rural areas make a close relationship with nature as they understand nature through their experiences. They feel some kind of attachment with the landscape as if that landscape is the source of earning and living their daily lives compared to people living in urban areas. Rural people could understand the mutual relations with the environment rootedness lies with them for the understanding of environmental surrounding where they share a place. Even they could feel healing while working with the land so that landscape as an essential part of their lives, people being able to value of landscape and follow the human ethics to the environment for their living.

The struggle of female characters, the obstacles they faced in their lifespan how they came out with suspicion, contempt, and ridicule during an encounter with a male character and how female character scan convince male characters regarding the dignity of the environment surrounding is interwoven throughout the novel. Xianmin Shenjudged *Prodigal Summer* in the following ways:

The novel centers on the three female protagonist, each of whom faces suspicion, contempt, and even ridicule during contract with her male counter. Nevertheless, the persistent environmental endeavors of each woman do pay off. Deanna is able to protect the Coyotes, Lusa finally settles down to

continue her more eco-friendly farming, and Nannie is able to convince Garnett of nature's benevolence and dignity.(8)

Deanna first encounters Eddie Bondo, a man with a gun from Wyoming, in Appalachian woodland to hunt at last being convinced with Deanna and she can protect the coyotes. In the conversation that lies between Deanna and Eddie, she tries to convince him about the misconception of people in understanding coyotes. She says that people think only for their advantage, coyotes are not only predators as people think they hunt livestock of farmers. Moreover, it also plays a significant role in the cycling ecosystem. Deanna finally succeeds to change the concept of Eddie by explaining that different species of nature has their value for existing. The loss of one organism is also the loss of another organism because organisms are embedded with symbiotic bounding in the environment. The use of herbicide by Garnett in his farm could directly or indirectly harm Nannie's organic farm. Nannie feared for her certificate of organic apple farming, with many disputes, suspicion, contempt and ridicule behaviors by Garnett she being able to convince him by telling nature benevolence and its dignity.

Although the above-mentioned critics and reviewers examined *Prodigal Summer* from different perspectives like environmental ethics, land ethics, the life of Southern Appalachian identity, eco-feminism and arrived at the different findings including issues of eco-criticism, symbiosis has not been yet advocated thus the researcher felt like making a claim on the issue of overtones of symbiosis and the mutual relationship between organisms of nature. So, the researcher found a gap on these issues for analyzing the text.

*Oxford Advanced Learner's Dictionary* defines symbiosis as, "the relationship between two different living creatures that live close together and depend

on each other in particular ways, ease getting particular benefits from the other” (1588). Lynn Margulis outlines the concept and development of symbiosis he says that “symbiosis” was defined first by German mycologist H.A. DeBary (1879) as “unlike organism living together” (673). The phrase, *unlike organisms*, soon came to mean several different species. Margulis noted that research scientists today studying symbioses embraced DeBary’s original definition in modern guise: symbiosis refers to protracted physical associations among organisms of different species, without respect to outcome. For Margulis:

If symbiosis is defined as a beneficial relationship between organisms of different species, it is difficult to distinguish it from mutualism. Recent biology texts use mutualism to refer to social relationships among organisms, of the same species or of different species that need to be physically associated. Because symbiotic partners must be members of different species that are in physical contact with each other according to the text-book definitions, symbiotic relation should be a subset of mutualistic relationships. Both symbiosis and mutualism are considered to be positive, or favorable, relationships, as opposed to negative relationships such as parasitism. (673-74)

Association between two species population that lives together and could get benefit from their physical contact is symbiosis for Margulis. He stands on the favourable relationship between two symbionts that share a positive association. He focuses on the positive relationship between two species which is quite opposite to the negative relationship as parasitism. The association between two species that live together, where species benefit without ill effect and harm to each other. If there is ill effect and harm caused between the physical associations of two different species it is parasitism to him.

Similarly, two or more than two organisms exist together and share mutual relationships that could benefit both are symbiosis. Howard Rosterfer distinguishes:

Symbiosis is a word of Greek derivation coming from “syn” meaning “together with,” and “bios” meaning “life.” “Together with life,” to be applied to natural phenomena, would mean relationships between two entirely different organisms from which they derive a mutual benefit are at least living without harm to each other. But the term has come to mean more than mutual beneficial relationship of organisms for it now extends over the entire field of parasitism . . . symbiosis is usually divided into two general groups, mutual and antagonistic, with commensalism as a neutral type between mutual and antagonistic. (23)

Symbiosis is a close relationship between two species in which at least one species gets a benefit. Mutualism for him is a symbiotic association in which both species benefit similarly, commensalism for him is a neutral type between mutual and antagonistic, where the symbionts in which one species benefits and the other species are not ill-affected. According to Rosterfer, mutual symbiosis existed in three types of association between organisms: between two different plants, between plants and animals and between animals.

Nannie LandRalway, the apple-orchard lady, is a senior citizen and she did have the best-producing orchard in five countries have a conflict with her more senior neighbor, Garnett Sheldon Walker who wants to kill weed in his farm by spraying herbicide to keep the property clean. Garnett's goal is to cross-fertilize the chestnut tree to restore an American chestnut that is immune to chestnut blight as a result Garnett lament about the historical value of America. He uses Two-Four-D herbicide to protect his plants. Kingsolver through her character tries to aware readers of the

impact of using chemical herbicides. Kingsolver attempts to balance the ecosystem without interfering with other organisms by understanding their value in the ecosystem. Nannie Rawley states “Everything alive is connected to every other by fine, invisible threads” (216). Rawley attempts to convince Garnett activities of spraying herbicide as she says:

When you spray a field with a broad-spectrum insecticide like Sevin, you kill the pest bugs *and* the predator bugs, bang. If the predators and prey are balanced out to start with, and they both knocked back the same amount, then the pest that survive will *increase* after the spraying, fast, because most of their enemies have just disappeared. And the predators will decrease because they’ve lost most of their food supply.(275)

Garnett as a vocational agriculture teacher spraying herbicide to restore the American chestnut, his activities of killing the bugs as a result pest bugs will increase after the death of predator bugs because most of their enemies got disappeared. And the predator will decrease lack of food supply. Garnett here seems unaware of the food chain process of the ecosystem that one species is connected to another species for their survival.

The organisms of ecology share the environment where they live. No species could survive in isolation but also the association with another species is sometimes close for many organisms, the habit they occupy individuals with another species for example, a prey loses its life with the encounter of a predator. The echo of the environment not only has benevolence aspects rather the malevolence aspect of the ecosystem also plays a significant role for the environment. In the environment, there is the conflict and chaos of parasitism for the ecological balance despite its beauty. One organism shares an environment with another organism to help, to improve just

themselves. There are three types of partnership or interaction and these are mutualism, commensalism and parasitism. S. Wali Abdi, in his article “Survival through symbiosis,” illustrates:

Symbiosis means the living together of two dissimilar organisms and can describe a number of different possible relationships between organisms. We define these relationships using the following terms: *Mutualism* –a relationship where both species benefit from their association; *Commensalism* –a relationship where one species gains from the relationship and the other neither gains nor loses anything as a result. *Parasitism* and *predation* –a relationship where individuals of one species harm individuals of the other species to support their existence. A parasite generally takes small amounts of materials from, though rarely kills, its “host.” Predators kill and eat individuals of their respective prey species. Yet, predators and parasites both have distinct long-term relationships with their respective prey and host species. Their population and evolution are tied to that of their symbiotic partners in life.(22)

S.Wali Abdi also focuses on the three types of symbiosis that existed in the life of organisms. He describes symbiosis and its importance in day to day lives of plants and animals. To him, symbiosis means the living association of two different organisms and can describe several different possible relationships between organisms. He gives the specific example of mutualism, commensalism and parasitism in the relationship among fungus and plant, birds and animals, animal and bacteria, predator and prey and so on. Symbiosis relation associates long term relationships between organisms for their survival either it might be a profitable relationship or an unprofitable relationship, to run the ecosystem one organism

depends on another either association might be mutualism, commensalism, and parasitism or predation.

Allenna Leonard in his article “Symbiosis as a metaphor for sustainability practice in human affairs” makes the following observation:

The notion of symbiosis appears to offer a particularly rich source of metaphors and analogies. It means, quite literally, living together. There are three main types of relation: Mutualism – where both parties benefits, although not always equally or simultaneously Commensuralism –where one party benefits and the other suffer no ill effects, and Parasitism –where one living off the other although if the parasite gets too greedy, both it and the host will die... Many types of symbiosis exist: between plants between plant and animals life and between different animals. They contribute to protection and defense, cleaning, reproduction, nutrition, transportation and illumination. Some symbiots are so tightly coupled that they are not able to exist, or exist in the same form, separately. Others can exist separately but they are less viable alone than together. Still others benefit from but do not depend upon the relationship. All seems to provide complementary features and strengths that either enhance the success and wellbeing of both or imposed a bearable burden on the non –advantaged partner. (1-2)

Symbiosis means a relationship between the organisms either it might be holistic or it might be mutualism and commensuralism. There is a chain of the relationship between the organisms of nature; the loss of organism is directly affected to the other organisms depending on their survival. The design of nature is majestic there is a chain of connections among organisms, no species could sustain in isolation for their survival.

Living together of the different organisms and could get a profitable relationship for their existence to define symbiosis. Above mention critics and theorist concludes that three types of symbiosis exist between the organisms. In mutualism, both parties win not always equally or simultaneously. In commensalism/ commensuralism one party wins and another suffers, no ill effects occur. And in parasitism, one's life or get benefits whereas another gets lost. Symbiosis occurs in such a way between two different organisms for the survival of organism one depends on another either it might be mutualism symbiosis or commensalism or parasitism. The symbionts engages with their job to get benefits with the relation of others.

Ecocriticism can be interpreted as a discourse that concerns the relationship between human and non-human worlds and encourage human to think, feel, see, understand love and act accordingly to maintain the symbiosis. Since eco-criticism has interdisciplinary nature, it invites all perspectives into it, and tends to understand the co-existence of living and non-living entities. So, ecocriticism is not just a means of analyzing nature in literature; it implies a move towards a bio-centric world view, an extension of ethics, a broadening human conception, global community to include non-human life forms and the physical environment. In biocentrism, all organisms are independent of each other. It considers humans as a member of the earth's community, where there is a complex web of interconnected elements in the universe. It views the need of human beings to exist in harmony with natural elements. From abiocentrism perspective, humans are equal members of the biotic and abiotic community. Focusing on the biotic outlook on nature, Paul W. Taylor argues:

The biocentric outlook of nature has four main components: (1) Humans are thought of as members of the Earth's community of life, holding that membership on the same terms as apply to all the nonhuman members. (2) The

Earth's natural ecosystem as a totality are seen as a complex web of interconnected elements, with the sound biological functioning of each being dependent on the sound biological functioning of the others. (3) Each individual organism is conceived of as a teleological center of life, pursuing its own good in its own way. (4) Whether we are concerned with standards of merit or with the concept of inherent worth, the claim that humans by their very nature are superior to the other species is a groundless claim.(99)

Human beings are equal members each and another of the non-human community on the planet. All have equal rights to live and blossom with their responsibility to maintain diversity in the universe. Therefore, humans must respect the biotic and abiotic community rejecting the irrational bias of their favour.

Environmental text can focus on the concentration of human activities towards nature. Harold Fromm opines that "ecology is a consciousness that expresses itself in such everyday form of the conservation of the environment and its concern about awareness of people's connectedness with nature" (65). Thus, it is necessary to be aware of protecting the natural things including living as well as non-living beings which are directly and indirectly connected with human beings. It is important to develop and follow environmental ethics and ecological awareness to protect humans, nature and the whole ecological system. In this regard, Grey Garrard opines:

Ecocriticism is unique amongst contemporary literary and cultural theories because of its close relationship with the science of ecology. Ecocritics may not be qualified to contribute to debates about problems in ecology, but they must nevertheless transgress disciplinary boundaries and develop their own 'ecological literacy' as far as possible.(5)

Ecocriticism cannot contribute much to debates about problems in ecology, but it can help to define, explore, and even resolve ecological problems in this wider sense. Kingsolver has Deanna think about the problems in ecology created by human beings. Deanna says the American government is on the mission of killing the coyote thinking as:

They're the most despised species in America. Even the U.S. Government is in the business of killing them, to the tune of maybe a hundred thousand animals a year, using mainly cyanide traps and gunning from helicopters. Not to mention the good work done by your pals at the predator-hunt extravaganzas. (324)

Deanna, as a wildlife ecologist and forest ranger, has minutely studied and observed the coyotes and how they became an endangered species and she finds out that it's because the government is officially in the business of killing coyotes thinking that they are the problems to local farmers that; coyotes took the life of farmer's livestock like goat, cattle and sheep.

A mutual symbiosis between animals and humans is exposed in this novel something surplus of human garbage is food for coyotes. Deanna says to Eddie Bondo "That they live on rodents and fruits and seeds and a hundred other things beside lambs" (324). Deanna defines, explore and even resolve ecological problems. Deanna even claims that coyotes are not only predator species they are also prey and what she found is that coyotes not only took the lives of livestock of farmers rather coyotes plays a vital role in decreasing environmental pollution. "Cornbread she'd thrown out... she found Coyote came to eat that cornbread" (66-67). Deanna tries to suggest that coyotes are not harmful as people think they play a significant role to decrease environmental problems like pollution and helping to maintain the ecosystem.

Leonard in this regard forwards his argument “It seems that little or nothing is wasted in nature. What is surplus or bad for one organism often another’s food directly or indirectly” (4).

Similarly, the description of nature, birds, animals and landscape of Zebulon has been portrayed in this novel. Deanna was fascinated by the rhythm of the landscape as if in the high season of courtship and mating, this music was like the earth itself opening its mouth to sing. “She needed to listen to this: prodigal summer, the season of extravagant procreation” (51). This scenario of the birds makes Deanna astonished and recalls the days of her childhood. “Its crescendo crept forward slowly as the daylight roused one bird and another: the black-capped and Carolina chickadees came next . . . The dawn chorus was a whistling roar by now, the sound of a thousand males calling out love to a thousand silent females ready to choose and make the world new”(52).

As a wildlife ranger, she mostly used to spend her time looking and taking care of wild animals, birds and plants. She used to enjoy the natural elements of Southern Appalachia and she took care of them. It seems Deanna’s attached to the landscape of Appalachia and her isolated life with relation to others creatures of nature shows she is there in search of solace in her life with natural surroundings.

Nannie had asked her once in a letter how she could live up here alone with all the quiet and that was Deanna’s answer: when human conversation stopped, the world was anything but *quiet*. She lived with the wood thrushes for company . . . A few titmice and chickadees were congregating at the spot underneath a chokecherry, a dozen yards from her cabin, where she always scattered birdseed on top of a flat boulder. She’d chosen a spot she could watch from her window and had put out seed there all winter –ordered

birdseed by the fifty-pound bag, in fact, along with her monthly grocery requisition. The Forest Service never questioned it. It wasn't exactly policy to feed chickadees and cardinals, but apparently the government was willing to do.(53)

This plotline shows the symbiosis relation between animals, birds, nature, and humans. Deanna as a wild creature lover gives birdsseeds for feeding them instead, she could get mediation with the joyous sound of birds and the cornbread thrown by Deanna was eaten by Coyote and she used to live with wood thrushes. The motives of Deanna seems as she is there at ZebulonNational forest to preserve the wild creatures. This marks the symbiosis relationship between Deanna and other creatures of the landscape.

Kingsolverconcerns about symbiosis relation among organisms in the novel. She brings many references to show how ecology could be balanced through her different character's activities. Deanna mostly focuses on the food chain and balance of an ecosystem. She states that "predator needs to be good, if they are good, then their prey is good. If not, then something is missing from the chain"(11). Deanna is a forest service officer doing her job at Appalachia Mountain and meets there with Eddie Bondo. Both have a conflict between them regarding the conception of a coyote. Eddie is there for hunting the coyote whereas Deanna's main target on the mountain is to protect the endangered coyotes from the hunters. Throughout the conversation between Deanna and Eddie, it is clear that Kingsolver demonstrates that endangered animal like coyote needs to be protected. Deanna states that people keep a lot of pets and care for them and never care about other creatures.

Similarly to Leonard mutualism symbiosis is that, "where both parties benefit, although not always equally or simultaneously" (2). Beneficial relations between the

coexistence of organisms can be found in the novel *Prodigal Summer*. This is called mutualism symbiosis. “The bee smells something sweet and goes inside and then he’s trapped in there unless he can find the one door out. So he’ll spread the pollen over the place where the flower wants it . . . this orchid would force its pollinator to drag his abdomen before allowing him to flee for his life”(22).

Plant-insect symbiosis can be found in the novel. Bees need sweet nectar to survive. Bees when travelling in search of food for survival help to another organism like an orchid for pollination. The association between bee and orchid benefit to both which shows the mutualism symbiosis. Leonard continues “Insect visits the flowers for nectar and carry the pollen from one plant to the next” (5). Furthermore to S. WaliAbdi “The symbiosis relationships among organisms depend upon the energy that they exchange, and the ways in which they are dependent upon one another” (27). Thus, bees and orchids both exchange energy with each other, like bees drink nectar from orchids and the bees transfer pollen from male to female plants it helps for the reproduction of orchids. In this way, both bees and orchids could get benefits for their survival.

Similarly, plants-fungus symbiosis is also portrayed in this novel “ragged old stump that had a garden of acid-scented fungus sprouting permanently from its base” (443). This shows a mutualism symbiotic relationship between fungus and many higher plants. In this regard S.WaliAbdi says:

The fungus coats and/or penetrates the plant root, thereby increasing the surface area for water and nutrient absorption by the plant. The fungus converts soil minerals to more useable forms, helping to absorb them into the plant root, while producing materials that protect the roots from infection by

bacteria. In return, the fungus receives energy from the sugars produced by the plant through photosynthesis. Both species benefit.(22-23)

Mutualism deals with plants and fungus which establishes the beneficial relations of both in the form of the eco process with nature. Both sources of nature grow and flourish which lies in co-relations in –between. Fungus perceives essential need to grow from the old ragged stump whereas, stump as same as fungus. These sheared processes of both sources are interwoven through the natural cycle.

Earth is a dwelling place for living and non-living beings; they all share the environment for their existence. Every organism get birth from the womb of nature and they sustain in the lap of nature. The environment is not only a place for human beings butalso a place for nonhumans therefore; every species on this earth has its own significance. Organisms on these earth share themselves directly or indirectly for the well-being of other organisms because the environment is the platform for all living and non-living beings for their survival. Dwelling place according to *Oxford Advanced Learner's Dictionary* is “the place where somebody lives” (480). Literature explores the possibility of coming to dwell on the earth in a relation of duty and responsibility. Garrard's definition of dwelling states that“‘dwelling’ is not a transient state rather; it implies the long-term imbrications of humans in a landscape of memory, ancestry and death, of ritual, life and work”(108).

This definition of dwelling also implies non-human beings because the earth is itself a dwelling place for different organisms. The glorification of the mountain is described in this novel, mountain as a dwelling place for many organisms Deanna says “these trees were the lungs of her mountain –not her mountain, *nobody's* damn mountain, this mountain that belonged to scarlet tanagers, puffballs, luna moths, and coyotes”(100). Therefore, in a mountain, there is a community of living organisms.

Kingsolver portrays symbiosis through her female characters in the novel *Prodigal Summer* during the conversation between Jewel and Lusa, Jewel suggests Lusa sell trees for earning money but Lusa replies: “I will not cut down those trees. I don’t care if there’s a hundred thousand dollars’ worth of lumber on the back of this farm, I ‘m not selling it. It’s what I love best about this place . . . the trees, the moths. The foxes, all the wild things that live up there. It’s Cole’s childhood up there, too. Along with yours and yoursister’s”(123).

Lusa is aware of the symbiotic relationship between foxes, moths, insects and all wild animals that belong to the trees for their dwelling. Plants are the source of food and shelter for animals, insects and other wild animals with the help of animals and birds plants could get chances to grow in a new place through the attachment of animal fur and stool of the animals and birds. On the other hand, plants grow well because stools of birds and animals make the ground fertile. Therefore, plants, animals and birds share a correlation for their benefits. Mutualism symbiosis between organisms is displayed in this novel.

When Cole dies and at that time Lusa was just Twenty-eight years old of her life she has to live with the remembrance of Cole. Even relatives and neighbors told her to do re-marry but she ignore those talks and despite her suffering, she took responsibility to care for the Winders farm which was in debt and she struggle to collect money to maintain the roof of a farmhouse. Once she had a conversation with Crys and she suggests to him “Every animal needs its special plant to live on. And certain plants will only grow next to certain other kinds, did you know that?” “Sang only grows under a sugar maple tree” (354). Deanna while talking with Eddie Bondo she observed and realize that “the little pink orchid was growing here where she knew it ought to be, where the soil was sweetened by pines” (21).

Agreed with the above lines on how the author displays symbiosis through dialogue. These shows one species depends on another for living. Lusa loves the trees on her farmland and she has examined the symbiosis relationship between plants, bugs and birds is an example of a food chain process so that their existence takes place for the well beings of all with their mutual relationships. Symbiosis is also exemplified by the Sang plant, which grows under the sugar maple tree. This relationship appears to demonstrate commensalism: sang plant benefits by gaining a home under the sugar maple tree, the sugar maple tree neither gains nor loses anything in return.

Similarly, Lusa suggests “Luna moths especially like hickories. Those and walnuts. They lay their egg on the leaves because that’s what caterpillars eat” (348). According to Leonard, “commensuralism means where one party benefits and the other suffer no ill effect” (2). Caterpillars of Luna moths get energy from the leaves of hickories and the walnuts so Luna moths lay eggs on these trees. On the other hand, hickories and walnuts may suffer from the decay and loss of the leaves from the plants but not entirely ill effect to the whole plants like hickories and walnuts. This is how commensuralism symbiotic relationship exists between Luna moth and the plant-like hickories and walnuts.

Deanna observed that “maidenhair ferns cascaded from outcroppings of stone” (9). This is also an example of communalism where ferns got a chance to survive and no ill effect occurred to stone. Animals, birds and insects depends on tree for their food and shelter “Squirrels, a group of turkeys and little owls roosting closer by, in the tangled branches of a huge oak that had fallen in the strome; and up ahead somewhere”(443). Trees are the shelter place for many birds, wild animals and insects. “Eddie Bondo had spoken of acron woodpeckers he’d seen in the West, funny

creatures that worked together to drill a dead tree full of little holes, cached thousands of acorns in them and then spent the rest of their days” (199). This is how acorn woodpeckers are depending on trees for their survival without ill affecting the trees is also an example of commensalism. This nurturing process of nature exposes the part and parcel of bonding. And also highlights the dwelling aspects of natural organisms.

Deanna while talking with Eddie Bondo observed and realize that “the little pink orchid was growing here where she knew it ought to be, where the soil was sweetened by pines” (21). The survival of one tree depending on the fertile land near to the next tree shows commensalism symbiotic bounding exists in nature. The chances of growing plant-like little pink orchid get direct benefits to survive near to the premises of the pines where the soil was sweetened by pine shows one plant get benefit by harmed or ill effecting to another this is categorized as commensalism /commensuralismsymbiosis between plants.

Kingsolver’s character Lusa tries to give a message to her reader that there exist symbiotic relation between species for their living and all the species has their value to run out the ecosystem. Lusa's rejection of cutting down the tree is aware of the interconnection between organisms of the environment. In this way author appeals for change in human behaviors and think for the entire ecosystem like Lusa. Kingsolver manifests ecological awareness to her readers she appeals to human beings to understand the complex web that occurs in nature for wellbeing of the entire environment.

Human activities like hunting wild animals, spreading harmful chemicals, chopping down trees have been criticized in this text. The author demonstrated human activities and the appeal to take the right path for the preservation of the environment. Garnett Walker's activities in chapter “Old Chestnut” has been criticized by Nannie

Land Rawley. Rawley is “as reliable and generous as her apple tree” (388). She is an organic farmer and hates the activities of Walker spraying herbicides on the farm. She has an alternative way of killing insects instead of using pesticides. It means that Kingsolver’s novel focuses on Garnett spreading herbicides continuously on his farm to restore the American chestnut which is harmful to the entire living organism and the environment. Rawley tries to convince Garnett not to spray herbicides and writes a letter to him arguing, “To our domination over the earth, Mr. Walker, we owe our thanks for the chestnut blight. Our thanks for Kudzu, honeysuckle, and the Japanese beetle also” (216).

Nannie Rawley appeals to Garnett to think about other creatures of the earth like bugs and insects who are the victim of his activity like spraying herbicides. Kingsolver through her character Nannie tries to enlarge the boundaries of the community to include soil, water, plants and animal or collectively the land. Garnett’s self-centric notion could invite destruction in the natural environment. The loss of one organism from the ecosystem will be the loss of other organisms because organisms of the environment are embedded with the symbiotic relationship with other organisms for their survival.

Garnett seems as a lamentation for the naturalness of Appalachia. The loss of the American chestnut is a tragic moment but to harm others creatures for the sake of restoring American chestnut is against natural law. Therefore, Nannie asks “who cares if one species is lost? . . . The loss of one kind of salamander would be a tragedy on the same order to some other creature that was depending on it” (215). Kingsolver has Nannie to urge for change in human vision about their supremacy. Humans need to be rational for the preservation of species for the well-being of the ecosystem. The

activities of human in the present time lead to a living creature to be endangered.

Furthermore Rawley says to Garnett:

God gave us every herb-bearing seed, it says, and every tree in which is the fruits of a tree-yielding seed. He gave us the mystery of a world that can re-create itself again and again. To you the fruit shall be food, he's saying, but just remember, to the tree it's a child . . . And to every beast of the earth, and to every foel of the air, and to everything that creepeth upon the earth wherein there is life, I have given every green herb for meat. (217)

Nannie tries to convince Garnett to think about God's creatures, all creatures have their lives and they must not be under human domination. They have the right to live on this earth as human. Garnett's activity of spraying herbicide will be poisons for entire organisms such as animals, bugs and insects.

As Deanna states that people has a passion to kill the creatures in the environment without knowing their essence but she loves every creature in landscape because they have their own values. To save the animals for the wellbeing of an ecosystem is the main target of Deanna. She did not have any kind of business for any creatures of the environment. She states to Eddie:

I don't love animals as *individuals*, I guess that's the way to put it, she said. I love them as whole species. I feel like they should have the right to persist in their own ways. If there's a house cat put here by human carelessness, I can remedy that by taking one life, or ignore it and let the mistake go on and on . . . I'll tell you something. If a feral cat wandered up here from some farm and started wrecking nest and killing birds and having babies in the woods? I'd trap it and drown it in the creek. (177)

This shows Deanna focuses on the right to exist of any creature; if one creature like a feral cat comes on the farm and does his job of killing the birds and wrecking nests she will trap and down it in the creek. She means to say that if one creature kills many other creatures for survival then we need to think for communal benefits. For the benefit of any specific creature, other many creatures should not be victim of mass destruction.

The novel focuses on how an individual should behave towards nature and the environment. Kingsolver has Deanna's appeal for the protection of coyotes. She states that every human is a part of ecology as equal to other creatures. There is a reciprocal relationship between all the living and non-living creatures in the ecosystem. If we give value to any specific creatures and neglect others the effect will harm to entire ecosystem as Garrard asserts that “the death of an individual is also the death of all its kind” (156). There is an interconnection between species of the environment visibly or invisibly. The extinction and loss of one organism might be the cause of another for extinction as in the text “Carolina parakeet got extinct due to the scarcity of cockleburs” (247). The scarcity of cockleburs causes an effect on birds like Carolina parakeet, this shows the plants and bird symbiosis. Cockleburs are the sources of energy to Carolina parakeet for its survival in return, from the dung of Parakeet a seed of Cockleburs gets chance to grow to the next places. In nature there is a relationship between organisms, one’s life depends on the existence of another so, we humans must not neglect any species of nature. This is how mutualism symbiosis relationship between cocklebur and Carolina parakeet, plant –bird symbiotic relation is exposed in this novel *Prodigal Summer*.

Loss of naturalness due to the blooming of the industrial and agricultural revolution and modernization is the key context of this novel. The practice of

inventing a new kind of tree to native land will sometimes affect the plants that survive there such as Asian fungus which causes blight to the American chestnut. When the dominant trees of the local area get extinct, that results in the loss of other creatures like birds and animals that depend on those trees for their survival. The elimination of Chestnut, Kudzu, Coyote, Carolina parakeet, honeysuckle and other species got extinct because of the invention of modern science and technology. How U.S. people fail to preserve the richness of biodiversity, is because people are guided by the self-centric notion and unable to understand the symbiotic relationship that organisms share for their living. Deanna says:

America's richest biological home was losing its richness to one extinction after another, of plants and birds, fish mammals, moths and stoneflies, and especially the river creatures whose names she collected like beads: sugarspoon, forkshell, acornshell, leafshell. Sixty-five kinds of mussels, twenty now gone for good. There were hundreds of reasons for each death – pesticide runoff, silt from tilling, cattle in the creek –but for Deanna each one was also a piece in the puzzle she'd spent years working out. (63)

Deanna means to say that human-like other creatures, living and non-living natural elements have equal right to survive within this environment. Humans must be responsible for their domination over the environment. An understanding of nature and ecology is needed for human beings. Kingsolver tries to figure out the way how humans must understand and act with nature to keep the ecology in proper balance. The loss of different kinds of organisms is displayed in this novel. How this extinction took place because people were unable to understand the value of other organisms besides them, they think for their vested interest and the governmental policy of

pesticide runoff shows their philosophical understanding towards nature of human beings.

Nannie Rawley and Garnett are close neighbors attached to their farmland. Nannie believes in Organic farming whereas Garnett's practice of spraying herbicide on his farm to kill the weeds to restore the blight American chestnut. Nannie regularly dislikes the activities of Garnett spraying chemical insecticide and she requests him to stop such activities because it is harmful to other living organisms as well her organic apple farm. She has to keep her "NO SPRAY ZONE" (84), "Miss Rawley, as a poet said, 'Good fences make good neighbors'" (86). Although there seems conflict between them Garnett used to pee her usually and got tension when an outsider came to visit her (394-95). And Nannie said, "You gave me the singles, too. Those were a godsend" (424). This is clear that despite their different vision regarding farming Garnett has some kind of love for Nannie. And Miss Rawley help him when he stroke by turtle, she says, "But you'd better take off your boot" (90).

This shows Nannie pities Garnett despite their conflict. This is what is called a mutual symbiosis relationship between characters. In this regard, Peter S. Wenz states that "Prodigal Summer is an account of love tragedy, conflict, and choice in human relationship conveys and overall message about how life should be lived" (106).

Although the major characters of this novel have lived their lives in the same territory they have some kind of love, tragedy, conflict and choice. There is love between Deanna and Eddie. Deanna is encountered with Eddie Bondo and shares the same cabin. The feeling of his touch shows that they love each other. The conflict between them is seen in many conversations that Eddie Bondo thinks about killing coyotes and Deanna tries to protect coyotes, even she didn't like to share the den of

coyotes which she saw. Similarly, Lusa and Cole love each other and after the death of Cole, she begins to love Widener's farm and families.

Kingsolver's character Garnett seems to worry about the loss of naturalness of southern Appalachia that once-dominant chestnut at the time of his forefather is no more now on the map of the Zebulon landscape of that contemporary time. So Garnett practiced for the restoration of lost American chestnut by crossing with hybrid seeds like Chinese chestnut. Garnett recalled how their forefather depended on chestnut for their living and that was gone. He could only glorify the beauty and essence of American chestnut.

He was haunted by the ghosts of these old chestnuts, by the great emptiness their extinction had left in the world . . . he admired chestnut woods . . . There was no other wood to compare with it. A man could only thank the Lord for having graced the earth with the American chestnut, that broad-crowned, majestic source of nuts and shade and durable lumber. (128-29)

Regarding the exchanging and increasing effects on natural beings Vandana Shiva elaborates the impact of local and hybrid culture in this way.

Seed is the first link in the food chain. It is also the first step toward freedom in food. Globalization is leading to total control over what we eat and what we grow. The tiny seed is becoming an instrument of freedom in this emerging era of total control- our slogan is, "Native seed- indigenous agriculture- local markets.(472)

Chestnut was the source of living for peoples of Garnett's father's time, now they are no more and only the remembrance left behind him. People depend on chestnuts for their living and they also protect and take care of the trees until Asian fungi enter the landscape of Southern Appalachia this shows the mutualism symbiosis between

humans and plants. The loss of chestnut trees due to fungus resulted loss of other species of birds and animals depend on it. Therefore, it becomes more devastating on the biodiversity of America. Susan Freinkel writes:

A century ago, the American chestnut was one of the country's most populous and important trees, a soaring tower of wood that ruled the East Coast forest from Georgia to Maine. Many considered it the "perfect tree," for chestnut had a value and versatility unmatched by any other hardwood . . . Over the course of a single generation, the blight rampaged across the Atlantic seaboard, destroying billion of American chestnut trees and devastating communities that had come to rely on them. In the space of two generations, America's perfect tree was teetering on the brink of extinction. It was one of the worst blows to the continent's ecosystem since the Ice Age. (1-2)

The fungus-like pathogen attacked to American chestnut, the dominant tree of the region for centuries long. This show human is the cause of their downfall in the name of scientific discovery and experimentation and it causes an effect on native species.

Regarding the death case of chestnut, Nannie suggests to Garnett:

Just think: if someone had shown you a little old seedling tree potted in a handful of dirt coming in on a ship from Asia all those years ago, asked you to peek into it, and remarked, These piddly little strands of fungus will knock down a million majestic chestnut trees, starve out thousands of righteous mountain folk and leave Garnett Walker a bitter old man. (216)

Garnett could only recall those trees which are no more now. Once the dominant trees have lost from the landscape may affect to the different factors of their living.

How the once-dominant trees of the landscape became the victim of death. The loss of

chestnuts affects the local people who used to depend for their survival. Author continues:

Families had lived through the winter on the gunnysacks of chestnut stored in their root cellars, and harm from the hogs they'd fattened on chestnuts, and the money they'd earned sending chestnuts by the railroad car to Philadelphia and New York City, where people of other nationalities and religious persuasion roasted them for sale on the street corners. . . Walker had lived well under the sheltering arms of the American chestnut until the slow devastation began to unfold in 1904, the year that brought down the chestnut blight. The Lordgiveth and the Lord taken away. (129)

Garnett is an old man living his life with the remembrance of the lost things like chestnut which was the source of living of his forefather's time. The Appalachians in the past century aged depending on the chestnut as a major source for their living and that is no more at the time of Garnett. And people are mourning with the remembrance of the memory. Due to the hunt by this terrible event, Garnett used to practice for the restoration of American chestnut, which was vanished from the native land. Donald E. Davis writes:

The environmental abuse of the mountains, along with their permanent removal from the traditional land base, made it extremely difficult for mountaineers to continue a semi-agrarian, and intimately forest-dependent, way of life. With the death of the chestnut, an entire world did die, eliminating subsistence practices that had been viable in the Appalachian Mountains for more than four centuries. (6)

The symbiosis relationship between the Appalachians, chestnut and other animals is connected. The dying of chestnut not only suffers to people depending on chestnut but

also the loss of trees paved the way to the blooming of industrialization and no longer the animals could be able to sustain in the Appalachian forest. With the death of chestnut people and other animals faced difficulty to continue their life. Therefore the loss of one organism directly affects other organisms depending on it for their survival animals like hogs, cattle and fish were affected with the loss of chestnut. The symbiotic nexus between man, nature and other natural elements are dominant aspects of the novel *Prodigal Summer*.

American government policy is in the business of killing them on a large scale, using mainly cyanide traps and gunning from helicopters shows how humans are shows behaviours of animals. Garrard mentions “human can both be, can be compared to animal” (139). On the next side, Kingsolver has Deanna expose how animals could have felt like humans and shares mutualism with members of their family and community:

They’d support the alpha instead, gathering food, guarding the den, playing with the pups, training them to forage and hunt after they emerged with their eyes open. If their parents got killed, the pups would hardly suffer for their absence –that was the nature of a coyote family. That was the point of it. And if Deanna’s discovery of this burrow had disturbed the pack, its members would have moved those pups already to another place, in the middle of the night. Any predator that needs to sleep at night has already lost the game, with a coyote.(57)

Animals also have a sense of feeling they could share mutual relationships with their communities. Kingsolver expresses the personification of animals-like humans and humans-like animals can be found in *Prodigal Summer* Coyote’s members have the feeling of sharing the food, take caring of the young babies by their elder and playing

with pups, and mother teach pups for hunting so that they could survive. Human-like behaviour can be seen in a family of coyotes. The symbiotic relationship between animals- animals of the same family is manifested in the novel:

*Those pups are alive*, she sang to herself in a whisper. Alive in the world with their eyes open, learning to hunt. Learning to speak. Coyote children born empty-headed like human infants, needing to learn every skill they'd need for living. Their protectors hadn't vocalized all spring, but now they would have to; no social creature could grow up mute, it wouldn't survive. (200)

The ecosystem has its way to be regulated. Nothing in this world is mortal. To born and to die is a natural law. Every living creature in the world has to die because "Living takes life" (329). And "*Predator* was a strong presumption" (5) Deanna observed the scenario of coyotes, "She kept her self still and tried to think of coyote children emerging from the forest's womb with their eyes wide open, while the finite possibilities of her own children closed their eyes, finally on the world" (330).

This paper projects the interconnection between visible and invisible things in nature as explained by Kingsolver. To keep nature in proper order human needs to understand the relationship between the organisms. People think of nature as their property and they exploit nature without understanding what the consequence might occur. Nature should not be misused by humans because nature is a source of creation for all living and nonliving entities in the world.

The major focus of the author is to change or transform the activities of human beings portray symbiotic bounding between organisms of ecosystem. Kingsolver urges human society to think from an ecological awareness point of view. Kingsolver's character Lusagive ecological conscience for her readers to aware them

how to poison things without using poison. Lusa shows ethical respect to the organisms of nature. Lusa says:

I can't stand to use a general pesticide like sevin. I use different things. I use Bt on my tomatoes . . . it's a germ, *Bacillus thuringiensis*. A bacterium that gives hornworm indigestion when they eat my tomatoes but doesn't hurt bees or ladybugs . . . I don't care what they look *like*. I just put them in to keep nematodes away from the root of the tomato plants. (376)

Kingsolver used her character –Nannie, Lusa and Deanna and shows their conscience towards nature to teach the lesson, both to her readers and to the locals emphasizing environmental ethics of care to bring balance to the ecosystem. *Prodigal Summer* constructs a sense to protect particular habitats and species and respect for all-natural elements. In this novel, an old man Walker cares for the chestnut, Deanna for the species of the coyote, Lusa for natural beauty and the farmland and finally Nannie for her organic farming of apple yard. Thus, *Prodigal Summer* is an ecological prayer for the survival of organisms.

The novel is successful to give us insight into the needs of biodiversity protection by displaying symbiotic bonding between organisms in the ecosystem. Every living and non-living organism of the world has its unique value to regulate the ecosystem and there lies a symbiotic relationship between organisms of nature. The author beautifully associates the symbiotic bonding between animals-animals, animals –plants, humans –animals, humans-plants, plants –insects and so on, which is difficult to understand by human eyes that carries self-centric vision.

*Prodigal Summer* reveals overtones of symbiosis to show how the lives of organisms depend on each other to get a benefit for their survival. The interconnection between organisms of nature for their beneficial support is explained in the novel

through contemporary scenarios, dialogue, plotline, incident and character, how people can incorporate these ideas into their lives or introduce them to their self-consciousness. Kingsolver demonstrates both the survival of Widener farm and the well-being of the southern Appalachian economy depend on understanding the complex interconnections between local and global. The expansion of globalization and colonization impact upon the form of nature means it makes the hybrid culture. Practice of hybridity causes the loss of auratic values which is against nature. Thus, humans should not forget to respect the non-human entity of ecology which plays a significant role in the survival of the whole ecosystem.

## Works Cited

- Abdi, S. Wali. "Survival through Symbiosis: Investigate these Interactions." *The Science Teacher*, vol. 59, no. 1, National Science Teachers Association, 1992, pp. 22–27.
- Creadick, Anna. "Charting Authors, Mapping Readers." *The Southern Literary Journal*, vol. 45, no. 2, University of North Carolina Press, 2013, pp. 131–35.
- Davis, Donald E. "Historical Significance of American Chestnut to Appalachian Culture and Ecology." In, *Proc. of Conf. On Restoration of American Chestnut to Forest Lands*, edited by Steiner K.C. and J.E. Carlson, Dalton State College, 2005, pp.1-8.
- Fromm, Harold. *The Nature of Being Human from Environmentalism to consciousness*. The John Hopkins University Press, 2009.
- Garrard, Grey. *Ecocriticism*. Routledge, 2004, pp. 5-156.
- Holloway, Suzanne and et al. *Oxford Advance Learner's Dictionary of Current English*. 9<sup>th</sup>Ed, 2015.
- Howard, Rostorfer. "Symbiosis." *Bios*, vol. 1, no. 3, Beta Biological Society, 1930, pp. 23–32.
- Jones, Suzanne W. "The Southern Family Farm as Endangered Species: Possibilities for Survival in Barbara Kingsolver's *Prodigal Summer*." *The Southern Literary Journal*, vol. 39, no. 1, 2006, pp. 83–97.
- Kingslover, Barbara. "Capitalism Nature Socialism." *Prodigal Summer*. vol.12, no. 2, June, 2001, pp. 159-162.
- Kingsolver, Barbara. *Prodigal Summer*. Harper Collins Publishers, 2000.
- Magee, Richard. "The Aridity of Grace: Community and Ecofeminism in Barbara Kingsolver's *Animal Dreams* and *Prodigal Summer*." *New Directions in*

*Ecofeminist Literary Criticism*. edited by Andrea Campbell. Newcastle, Cambridge Scholars Publishing, 2008, pp.15-26.

Margulis, Lynn. "Words as Battle Cries: Symbiogenesis and the New Field of Endocytobiology." *BioScience*, vol. 40, no. 9, American Institute of Biological Sciences, Oxford University Press, 1990, pp. 673–77.

Narduzzi, Dilia. "Living with Ghosts, Loving the Land: Barbara Kingsolver's *Prodigal Summer*." *Interdisciplinary Studies in Literature and Environment*, vol. 15, no. 2, Oxford University Press, 2008, pp. 59–81.

Shen, Xianmin. "Gender, Nature, and Spirituality in *Prodigal Summer*." *A Quarterly Journal of Short Articles, Notes and Reviews*, vol. 33, 2019. pp. 1-9.

Shiva, Vandana. "Ecological Balance in an Era of Globalization." *The Globalization Reader*, edited by Frank J. Lechner and John Boli, Blackwell Publishing, 2008, pp. 465-473.

Stanbury, Sarah. "Ecochaucer: Green Ethics and Medieval Nature." *The Chaucer Review*, vol. 39, no. 1, Penn State University Press, 2004, pp. 1–16.

Taylor, Paul W., and Dale Jamieson. "The Biocentric Outlook on Nature." *Respect for Nature: A Theory of Environmental Ethics*, REV-Revised, Princeton University Press, 1986, pp. 99–168.

Wenz, Peter S. "Leopold's Novel: The Land Ethic in Barbara Kingsolver's *Prodigal Summer*." *Ethics and the Environment*, vol. 8, no. 2, Indiana University Press, 2003, pp. 106–25.