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The Kingdom of Plants

By C. Gerald Van Dyke, PhD

I have training in plant pathology; and during my thirty-eight years of service at North Carolina State University (NCSU), I taught courses and conducted research relative to plants and their disease organisms, mostly fungi.

I have written articles for the TASC newsletter on the wonderful world of fungi and one on the unique fungal-plant interrelationships.^{1,2} In this article I will describe some of the unique features of plants. In this article my objectives are:

1. To describe the many different kinds of plants, their diversity, and significance.
2. To describe some phenomenal aspects of plant functions.
3. To illustrate and enumerate how evolutionary explanations concerning the origins of plants and their functions is not logical or scientific and that the evidence better supports the work of a designer in all that we know and understand about plants.

According to the Genesis record, God indicates that He created the “vegetation” on the third day.

And God said, “Let the earth sprout vegetation, plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, on the earth.” And it was so. The earth brought forth vegetation, plants yielding seed according to their own kinds, and trees bearing fruit in which is their seed, each according to its kind. And God saw that it was good. And there was evening and there was morning, the third day. (Genesis 1:11–13, ESV)

I do not know what the Hebrew words “let the earth sprout” mean, but nevertheless plants, i.e., vegetation occurred early in the creation week according to Genesis.

The study of plants is called botany. Plant fossils are abundant in rock layers, presumed to have been buried mostly as a result of the Noachian Flood. The fossil plants found preserved in rocks appear to be different from plants we see today. Some appear to be large representations of present-day plants. Perhaps conditions for the growth of plants were much different before the worldwide flood. Large plants with abundant bark would be consistent with evidence that coal, in some areas is composed of plant bark, the outer layers of most trees. Creation scientists have suggested that large trees floating on water during the flood scraped together, dislodging the bark which formed coal and is manifested today as coal seams imbedded between rock layers in masses that cover areas of multiple states in the Midwest. These coal layers are found on all continents, and if the model of coal formation according to Creationists is correct, they would have required many plants and massive amounts of bark. Dr. Stephen Austin is one of the proponents of this model. His doctoral thesis from Pennsylvania State University was accepted as a reasonable model for this phenomenon.³ Those who deny the worldwide flood of Genesis claim that coal formed in peat bogs or by other processes over millions of years. I will not discuss those models but indicate they do not satisfy the evidence found in coal seams. (Search online for “how is coal formed” for references.)

In addition to coal formation there are other unique plant fossils such as vertical petrified tree trunks (often called polystrate fossils). These are fossil trees traversing through multiple layers of sedimentary rocks (Fig. 1)

¹ Van Dyke, CG (2011) Designed interactions between fungi, plants, and animals, <<https://tasc-creationscience.org/article/designed-interactions-between-fungi-plants-and-animals>> Accessed 2021 Sep 11

² Van Dyke, CG (2021) The kingdom fungi, <<https://tasc-creationscience.org/article/the-kingdom-fungi>> Accessed 2021 Sep 11

³ Austin S, Sanders RW (2018) Historical survey of the floating mat model for the origin of carboniferous coal beds. Proc Eighth Intern. Conf. Creationism, 8:277–286



Figure 1. Polystrate fossil trees



Figure 2. Petrified wood

found in several locations. Also petrified tree trunks lying exposed on the ground are found in Arizona and other places (Fig. 2).

The naming of “vegetation” or plants has been the life work of hundreds, perhaps thousands, of scientists over centuries, including Old Testament times.

As more is learned about different plants there is more information to decide whether certain plants should be in the same group or in separate groups.

Examples of organisms considered to be classified as plants include algae, mosses, ferns, gymnosperms (cone bearing plants), and angiosperms (flowering plants.) Today the angiosperms are the predominant plants on the earth. Those who subscribe to an evolutionary model of life believe that an original cell divided randomly into many more cells, which then formed a so-called “primitive” plant, which eventually became an alga, which then became a moss, which then became a fern, which then became a gymnosperm and finally angiosperms were formed. In introductory botany books the claim is made that this sequence is known to be true; however, at the end of the chapter on mosses, for example, there is a statement such as “we know absolutely nothing about where mosses came from.” The same or a similar statement is made with reference to the angiosperms. I was always amazed how some of my colleagues at NCSU could devote many lectures explaining how they thought the plant groups originated, one after another, without any reference to the evidence of such ideas. I personally chose to talk about the significance of plants and fungi to us in the

present world setting. My opinion is that God made each plant type uniquely different from other plant types.

Plants do have some common characteristics, the major one being that they contain chlorophyll, a pigment enabling plants to initially make carbohydrates, sugars, and other variations of sugar-containing chemicals. I must qualify that statement to say that there are a few examples of plants that lack chlorophyll and are parasitic on other plants. That is, because they lack chlorophyll, they are unable to make their own food and must obtain it from another plant. Plants have other characteristics in common with other living organisms. Usually, we characterize plants as being stationary or not able to move to distinguish them from animals or humans; however, plants do have some parts that move, such as sperm cells.

I want to focus on what I believe are amazing characteristics of plants. The make-up of plants enables them to utilize carbon dioxide, combine it with water, and synthesize a six-carbon compound called glucose. The carbohydrate glucose is composed of carbon, hydrogen, and oxygen atoms. When plants respire, they release carbon dioxide. We usually think of plants only absorbing carbon dioxide and releasing oxygen, which they do; however, they also release carbon dioxide. The net release is more oxygen than carbon dioxide.

Among the most unique features of plant life is the following. Plants have chlorophyll, an organic compound similar to hemoglobin, the oxygen-carrying molecule found in blood. The primary difference between the two is that hemoglobin has an iron attachment whereas chlorophyll has a magnesium attachment. Chlorophyll is located inside of an organelle known as a chloroplast (Fig. 3). This

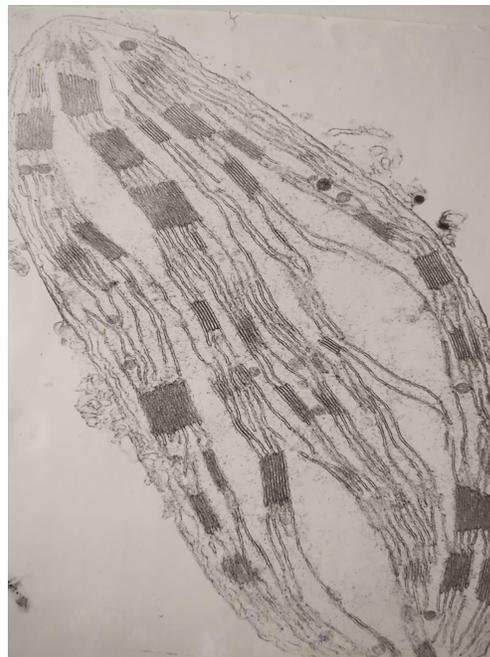


Figure 3. Chloroplast

organelle and the chemical chlorophyll are found only in plants. The chlorophyll reacts through a complex series of events with carbon dioxide and water to produce a six-carbon compound. The conventional explanation from those who believe in random processes and accidental occurrences is that chloroplasts were accidentally formed from random materials. That, in itself, is outrageously contrived, but then they say that the chloroplast invaded a cell (that is, as if it was engulfed by a plant cell), becoming one of the cell's internal parts, thus producing the first cell that started the process of organisms we call plants. Evolutionists will go to the most extreme fabrications in their attempt to explain organic evolution. Such thinking is so illogical that it shows what extremes they will go to for an answer to the puzzles of life. In most of their arguments for random processes forming things, they lack any explanation of first cause. That is, they don't have an answer to the question of where did a chloroplast originally come from. In fact, they think their explanation is better than admitting a higher power could create these marvelous organisms. Considering the apostle Paul in Romans 1:20, "They are without excuse," they will have to someday answer for denying what is obvious in creation.

When the apostle Paul speaks of the evidences of a Creator from the observation of creation, we usually think in terms of the sun, moon, stars, earth, and the life forms; but I believe when we look more carefully at the details of living organisms and their intricate parts and workings, we are even more convinced of the beauty and marvel of God's creation. Now for the additional wonders of plant life: the plant makes only a six-carbon molecule "sugar" from the photosynthesis process. From there the plant is "programmed"—I say "programmed" because the genetic codes found in plants enable the plant to make everything it needs to grow and reproduce as well as to make many by-products that are of use to us and animals, and even to parasites that interact with plants. The numerous "chemistry" products that plants make are still being discovered. From the relatively simple six-carbon sugars made in the photosynthetic process, the plant can make other organic compounds such as amino acids (building blocks for proteins), fatty acids (building blocks for fats and other lipids), and nucleotides (building blocks for genetic materials such as deoxyribonucleic acids [DNA] and ribonucleic acids [RNA]). Then there are the many compounds extracted from plants that are used in the chemical industries and medicine.

When I was studying plant and fungal organisms in undergraduate and graduate schools, I had been taught that all things came into existence by evolution (godless processes) and that evolution was the only explanation for the universe, earth, and life. I didn't think to question conclusions some scientists had espoused; however, I intuitively believed there must have been a "higher Power" that orchestrated all that is seen. Fortunately, I trusted Jesus as

my savior and Lord shortly after I began my service at NCSU; I then began to investigate what the evidence for the things that exist actually showed. This was a blessing because I could be prepared to help students investigate the facts and draw their own conclusions about how everything came into existence. It also gave me guidance in my research to think as a Christian that what I observe will be seen with eyes open for seeing God in His creation. I was not allowed to teach from a creationist model, but I certainly took every opportunity to expose false evidences and contradictory statements relative to evolution. In the realm of my research, which involved observing plant and fungal structures, with various microscopes, including light and electron microscopes, I saw close-up life details. As has been indicated in other articles, the concept of irreducible complexity—i.e., all the parts must be present from the beginning for the system to operate, individual parts don't function by themselves—leaves one with the conclusion that the unique structures and workings of living organisms are not easily explained by subsequent accidents.

Algae represent a group of plants that inhabit almost every environmental condition from arid to totally aquatic. Algae are particularly important in aquatic food chains, providing initial food for aquatic animals. They rank in size from single-celled organisms to large sea kelps. Fossil diatoms (diatomaceous earth) presumably deposited during the worldwide flood are mined for their use in filtering systems and many other applications.

Plant groups such as mosses, ferns, and others play significant roles in ecosystems. For example, they make up part of the early fauna of plant successions, invading and covering exposed bare soil or rock areas. They provide undercover plants in forest areas to stabilize soil and prevent erosion.

Gymnosperms literally means "naked seeded" plants because their seeds are exposed when a tree's cones open and the seeds fall out. Most people are particularly familiar with the group of gymnosperms known as pines. There are other types of gymnosperms such as junipers, cedars, and sequoias, to name a few. Once again evolutionists propose that gymnosperms evolved from fern-like ancestors, but each of these groups has its own unique characteristics. Gymnosperms are also early invaders in plant succession development in exposed grasslands or bare soil environments.

Angiosperms, which literally means "enclosed seeds," also called the flowering plants, differ from gymnosperms with their exposed seeds. I indicated earlier that scientists, though they claim angiosperms evolved from gymnosperm ancestors, have little evidence for how angiosperm plants came to be. This statement is from Britannica webpage for Plant (organism):

Approximately 130 million years ago, flowering plants (angiosperms) evolved from gymnosperms, although the identity of the specific gymnospermous ancestral group remains unresolved.

Angiosperms, the most diverse and numerous of all plants on earth today, come the closest to plants described in Genesis because they mostly reproduce from their “kind” by seeds. Some plants also reproduce from various plant parts, i.e., leaves, roots, or stems. The Irish potato is an example of reproduction from tubers which are underground stems. Sweet potatoes can be propagated from other sweet potatoes which are roots. It appears that God planned for all of these plants. He knew we humans would need them for food. Once again, I reiterate that plants make a relatively simple sugar in the photosynthesis process and then are able to synthesize most of the major compounds we need for nourishing our bodies. Humans have discovered unlimited uses for plants besides foods and food products, examples being wood for lumber, carving material which I use frequently, pharmaceuticals, fiber products, timber, ornamentals, and other commercial products. There seems to be minimal evolutionary advantage for angiosperms to consist of so many colorful flowers, but they certainly make for a beautiful gift from a God who cares for us and wants us to enjoy His creation.

The angiosperm plant leaf is a marvelous design. I have studied microscopically many of these various leaf types. Figure 4 is a diagram of the leaf looking into the cell types I will describe below. Many leaves have a cuticular (waxy) covering on their upper and lower surfaces. This was probably designed to prevent the leaf from losing large amounts of water and therefore keeping their shape and enabling them to perform photosynthetic activities. Under the cuticle is a layer of epidermal (skin-like) cells. Inside the leaf is a layer of cells that provide support for the structure of the leaf and seem to protect the cells in the lower part of the leaf from excessive light. Specialized cells that transport chemicals and water up and down the plant, from leaf to roots and from roots to leaves, are the bundles (called veins) in the plant leaf. The cells in the lower layer of the leaf have spaces between them; these

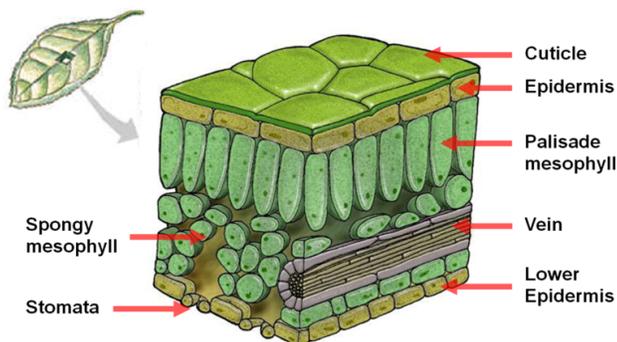


Figure 4

Stomata

- **Stomata** (sing. **stoma**) = pores in a leaf, mostly on the undersurface
- Each pore is surrounded by a pair of **guard cells**
- Guard cells can change shape to open or close the stoma

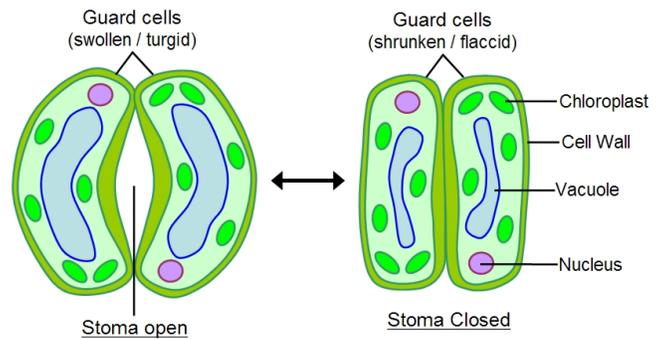


Figure 5

cells are where most of the photosynthesis occurs. The spacing between cells allows for oxygen, carbon dioxide, and gaseous materials such as water vapor to be exchanged from the outside of the leaf to the inside and the reverse exchanges. On the lower part of the leaf is another epidermal layer with cuticle. In the lower layer there are openings in the epidermal layer called stomata. These regulate the exchange of gases by mechanisms not totally understood. The stomatal opening is enclosed by two cells called “guard cells” (Fig. 5) because they regulate what comes in and out of the leaf. Figure 6 is a photograph I made using a scanning electron microscope, looking down on a leaf surface, showing guard cells with the stoma closed. The guard cells have chloroplasts, but the other epidermal cells lack chloroplasts. A simplistic explanation of guard cell opening and closing is as follows. When sunlight activates the chlorophyll within chloroplasts in the guard cells to produce sugars, this changes the osmotic balance between guard cells and other epidermal cells. This causes water to flow into the guard cells which have thick cell walls on the inner portion of the cells; thus when the guard cells expand the outer wall bulges out causing the inner wall to form an opening between the two guard cells and gasses can pass in or out of the leaf. This can be demonstrated by putting tape on one side of an elongate balloon, then blowing up the balloon, and the side of the balloon with the tape will move in the direction of the other side of the balloon which is expanding. This process is hardly believable as an evolutionary development.



Figure 6. Guard cells flanking a closed stoma

Plant cells have a membrane composed of polysaccharides (complex

carbohydrates) and lipids. They also have a rigid cell wall on the outer part of each cell composed of cellulose (the most abundant polysaccharide on the earth and some cells have a lignin wall, another complex chemical that gives the hardness to plant parts we call “wood.”

I believe my observations from a scientific and biblical reference lead to the conclusion that plants are unique organisms specifically created by a Designer for our benefit and pleasure. This is affirmed in scripture in the first book of the Bible Genesis 1 and by the apostle Paul in his letter to the Corinthians when he says:

He (Jesus) is the image of the invisible God, the firstborn of all creation. For by him all things were created, in heaven and on earth, visible and invisible, whether thrones or dominions or rulers or authorities—all things were created through him and for him. And he is before all things, and in him all things hold together. And he is the head of the body, the church. He is the beginning, the firstborn from the dead, that in everything he might be preeminent. For in him all the fullness of God was pleased to dwell, and through him to reconcile to himself all things, whether on earth or in heaven, making peace by the blood of his cross.” (Colossians 1: 15–20)

I further conclude from my specific microscopic observations and through other studies that plants are intricately structured to provide a necessary component to life as we know it on this earth. These intricacies include chemical and physical properties of plants accomplished only in the environment found on earth. Furthermore, for these marvelous functions and structures in which the reactions occur to have come into being with such “fine-tuned” precision there had to have been a Designer to accomplish this. I have not been convinced by any experimental or observed phenomena in the physical or chemical realm that could, by themselves, have accomplished what I have observed.

Therefore, just as C. S. Lewis has said, and I paraphrase: Jesus said He was God and if He wasn’t then He was a liar and a fraud. Or if He really was God then we should worship and praise Him for what He has done for us and acknowledge Him as Savior and Lord of our lives.

The same could be said about our observations in the chemical and physical world. If they can be shown to have happened by some unknown process, yet to be discovered, then we should accept that everything is simply an incredible accident. However, if the evidence points to a Designer being the original source of all that we observe—and I think it does—then we should give Him all the glory for what He has done. This is affirmed by the psalmist who said:

The heavens declare the glory of God, and the sky above proclaims his handiwork. Day to day pours out

speech, and night to night reveals knowledge. There is no speech, nor are there words, whose voice is not heard. Their voice goes out through all the earth, and their words to the end of the world. In them he has set a tent for the sun. (Psalm 19:1–4)

“Let the words of my mouth and the meditation of my heart be acceptable in your sight, O Lord, my rock and my redeemer.” (Psalm 19:14)

Part of the mission of the TASC board of directors is to inform others of the biases in science publications. Much of what is written in secular scientific journals is predicated on assumptions that the universe, earth, and life are the result of undirected, accidental, materialistic happenings. Such authors may explicitly state this or fail to indicate that what they are concluding from their results is only a model based on the assumptions stated above. We at TASC desire to show how some of these publications do contain valid data, but that there are other ways of interpreting such data. This certainly happens with creation scientists as well. We have our convictions that what we observe is not accidental but absolutely requires a Designer. We believe that as more and more research is done, with true scientific research, the results will show that there is no reasonable or logical explanation for the universe, earth, and life to have happened by chance events. ☞

COMING EVENTS

TASC Zoom Meeting, January 13, 7:00 pm EST

The TASC talk “The Kingdom of Plants” will be presented by Gerald Van Dyke, PhD, Botany Professor Emeritus from North Carolina State University. The essence of the talk will be to explain: (1) the various organisms categorized as plants, (2) the fossil evidence of their presumed burial in the Noachian Flood, (3) unique features of the organisms called plants from Gerald’s own research, and (4) why he believes it is improbable that plants could have evolved from nonliving material or even from other life forms and therefore represent organisms that most likely came into existence on the third day of creation by a Designer, namely the Triune God.

Join Zoom Meeting

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