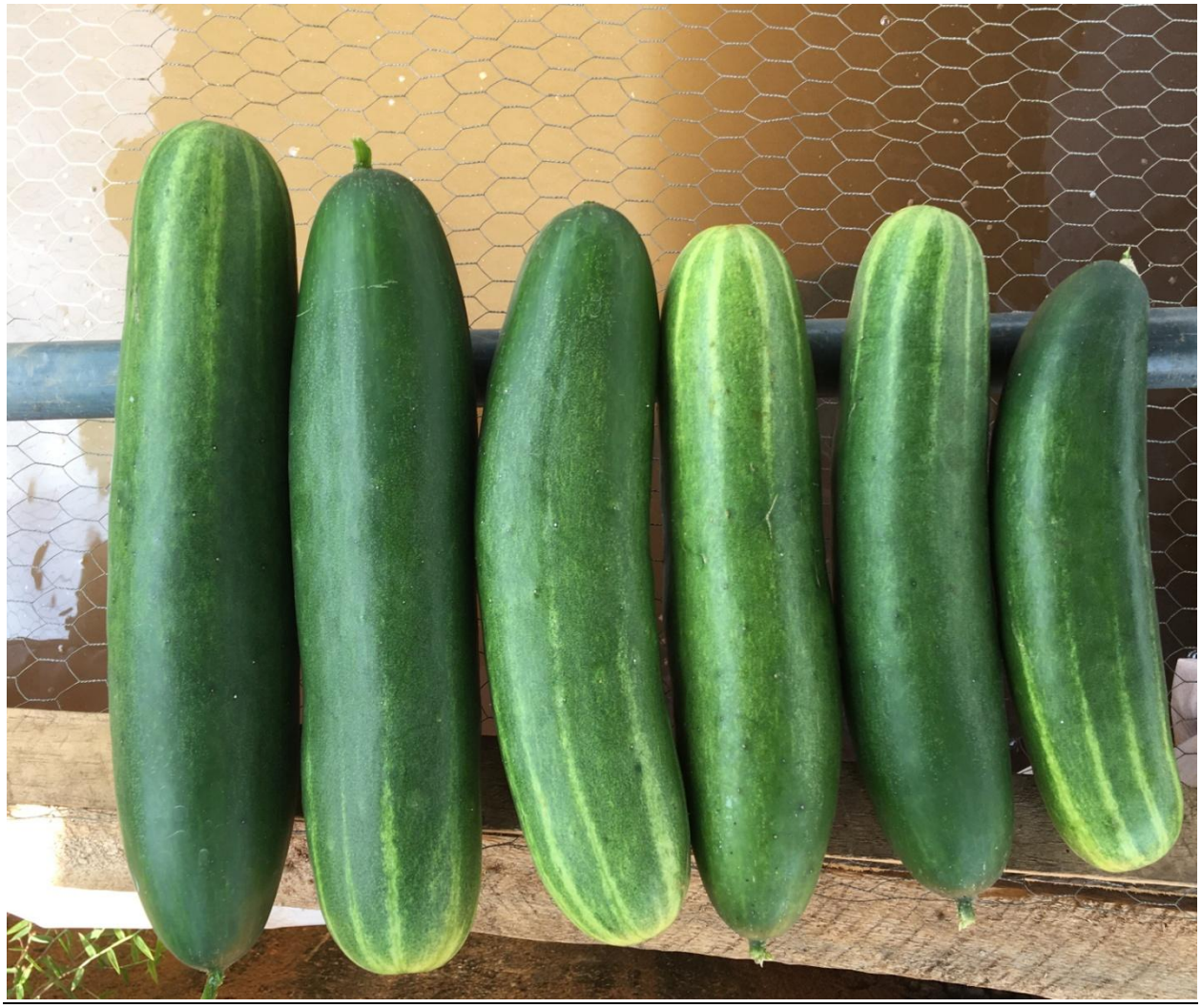
The Art of Growing Cucumber Successfully



Some cucumber from my first harvest overseeing my first catfish production (netted)

The Art of Growing Cucumber Successfully

The first and often most important step to growing any crop successfully is to understand the true nature and lifecycle (with physiological changes and problems that occur at each stage) of such crop. This allows one in knowing, preparing and making available, growth requirements for and in enhancing production for the crop of interest throughout its lifecycle.

I remember writing on how one could innovatively and cost-effectively grow a high fruiting cucumber variety in a small space and in sacs and see massive yield, income and profit – that one could realize a 1,750kg (2,500 fruits) yield of cucumber from a half-plot cultivation of 100 sacs of cucumber, with just a production cost of ₦37,500 and earn over five times this, ₦264,000.

The dream was lofty, and even when cucumber growing tends to be easy and the aforementioned result possible however, I did not warn on how delicate a crop cucumber can be and its cultivation; that just as it's easy to grow it can, without proper knowledge, also be challenging and can take one's investment if not careful.

I know a person who followed the write up and took to production but recorded losses. The saving grace was that it was done on a small scale.

However, I wasn't immune to losses, either. The first cucumber production I did was fair. I harvested some cucumbers of huge size and sold them at good price, I nonetheless battled diseases which reduced the yield. My second production did not go quite well too, pests and diseases came early to ravage it. And the third was worst, with fat and short cucumber forming bulk of the yield.

Fat and short cucumber harvest from my third production

But I learnt from the failures. I spoke with more experienced farmers, read, researched, and experimented. I learnt what works and what doesn't, the best practices to heed.

So, evidently, I haven't had much luck raising cucumbers and thus will not be telling you what you need to know to grow cucumber from a place of success, but rather from failure, experience and learnings.

Before I go on I would like to clear air on some things. When I wrote that first article I previously told you about, I promised I was going to write a sequel to it on how to grow cucumber; well, this isn't it - rather, this write up is about what should be known before committing to the actual cucumber growing but can, however, be a good preceding read to it. I intend to write on the actual growing soon.

Also, it's important to note that a true successful cucumber growing measures, also, on profitable sales of harvest and not just production. But this write up isn't about that, and while it is not I intend to write on it too, in the future. Ok, enough digression! Let's go do justice to what this article is about.

This is the one thing you should know about cucumber

If there is anything you need to know and have at the back of your mind that would be very beneficial in growing cucumber successfully, it is that cucumber has evolved to grow very fast and bear considerable fruits (size and numbers) in short time with adapted features and mechanisms –it has well developed tap root and vascular systems, creeping stem setting numerous chloroplast-dense broad leaves, efficient metabolism and pollination, to enable rapid water transport and photosynthesis, translocation of nutrients, biomolecules, and reproduction, for quick growth, development and fruiting.

Now, whether the reason cucumber does such is for survival from an evolutionary point as most plant would rapidly grow to complete several lifecycles and project their seeds (embedded in fruits and then dispersed) into the future to outcompete other plants and/or ensure multiplication of their species doesn't matter, what does is that knowing these things about cucumber would help to provide conditions that favour, enable the adapted features and mechanisms and prevent conditions that do not enable them or their proper functioning, and as a result help to grow cucumber successfully.

The cucumber fruit is 95% water and 5% nutrients. Its content is a product of photosynthesis and water absorption into the fruit. In the period of fruit growth after pollination, photosynthesis actively takes place simultaneously with water transportation from the root, where the fruit is increasingly pumped to fill with carbohydrate and other biomolecules, phytochemicals, minerals, and water.

While the end goal of raising cucumber, producing fruit, is important, the process to reaching it should be given attention too and is as important if not more, as the end goal as well; because fruit doesn't just emerge out the blue, some preceding and necessary stages – seedling, vegetation, flowering - must have occurred and gone well to reach fruiting.

Before –and even through -fruit stage products of photosynthesis and nutrients utilization are used to fuel growth and development of the cucumber plant –in terms of vertical shoot growth and building vital structures (root, stem, leaves, flowers and their anatomical contents), crucial toward fruiting.

When carbohydrate and related organic compounds are made from photosynthesis, part of them are first translocated to places where they are needed within the plant itself for energy, repair and growth functions and the remaining stored for future use or until needed, in specialized cells or can be structures as underground stem/root and fruits when the stage has been attained.

The point here is that every stage matters and builds into one another and on each other like an art and for one to successfully grow cucumber, one must come to understand the every stage, what happens there, the dos and don'ts at the respective stages, what to do to enhance functioning at each stage. This is the first most important thing to take note of.

The remaining part of this article then, necessarily, unfolds in tandem and will address lifecycle of cucumber but also featuring its nature and the problems encountered as have been said to be important to growing cucumber in the beginning of this write up.

Diagram showing the function of xylem and phloem and their interactions in transporting

Dreamstime

Get the seedling stage right first:

The foundation for good crop production starts with good seedling stage. It is why farmers often take time to nurture their seedlings well –some rather than plant seeds directly on the field start them in the nursery first to provide conducive conditions (but whether seed will be directly sowed or nursed is variety dependent).

The goal here, among few, is to cultivate a healthy and strong shoot and root system with proper nurturing that helps to form solid network of xylem and phloem vessels and leaf structure important for needed water uptake, food production and delivery for the next stage in the life of the crop, vegetative and all through its lifecycle.

The cucumber plant, at this stage, is at one of its most delicate state and needs utmost care. Its structures are yet to be fully developed and little stress could cause significant damage. For instance, while nursery could offer protection to seedlings, transplanting can be a problem as seedling roots are exposed and should be done with care; reason being that cucumber (with a sensitive root), unlike some resilient fruit crops, tends to almost instantly respond to slightest change of environment and root position. It begins to wilt in response to this and even when it recovers, effect of such stress can go on to have a lasting impact, delaying maturity and harvest periods.

Also, the seedlings' tap root not fully formed means that nutrients have to be made available for assimilation at the topsoil level. This is that the tap root is still at shallow level in the soil and the fibrous or lateral part of it has not completely emerged hence the young plant will not be able to access/reach for nutrients below in the soil profile except those made available or within its reach. This is why it is preferable to plant cucumber on beds having loosened soil making nutrients readily available and accessible at the topsoil.

However, the common mistake often made here -whether in an attempt to remedy this or not -is to apply fertilizer. This can be non-beneficial. It is understandable that the crop at this stage needs the basic elements of nitrogen, phosphorus and potassium for cellular growth, enzyme function and as building block units for formation of vital compounds. These 3 nutrients are much needed at this stage of the plant with nitrogen and phosphorus helping with the structural formation of the xylem, phloem and leaf tissues. But (it's in my opinion that) organic fertilizer is best for supplying them, which is less harsh, and must have been rolled into the soil to degrade properly long before planting. Nonetheless fertilizer can be added to the soil but in safe quantity and proximity. Moreover, fertilizer could be added long before as would manure to allow for proper breakdown and safe absorption by the young root.

The issue here with using inorganic fertilizer is that roots of cucumber are exposed and fragile (even throughout lifecycle) and fertilizer, especially for young roots, could damage them when in contact with them. Another reason fertilizer is not much needed at this stage is that cucumber seedlings have no true leaves yet to carry out photosynthesis but instead cotyledons which are food reserve themselves (of starch, lipid, protein, etc.) and although are capable of photosynthesis but only begin to undertake such function when their stored food is used up; and when they resume photosynthesis, nutrients in the soil

from decomposed manure are enough else additional nutrient application could be toxic; thus, no urgent need for food and inputs (partly from fertilizer in making structure) for producing biomoecules.

In addition to factors that deteriorate seedling root, wet conditions of the soil should be avoided as it not only makes it difficult for root to take up oxygen for cellular respiration to generate energy but also facilitate pathogen attack, fungi causing root rot and damping off where the shoot tips over and the plant fall off. The soil can be heated and/or treated with fungicide as a preventive measure to kill incubating pathogens, but the result could still be impacted if wet conditions are allowed. On the other hand, a balanced ph helps to maintain root health and potassium enable root growth, plant resistance to diseases, and regulates plant's water loss to the surrounding, keeping the plant hydrated and therefore both must be ensured adequately.

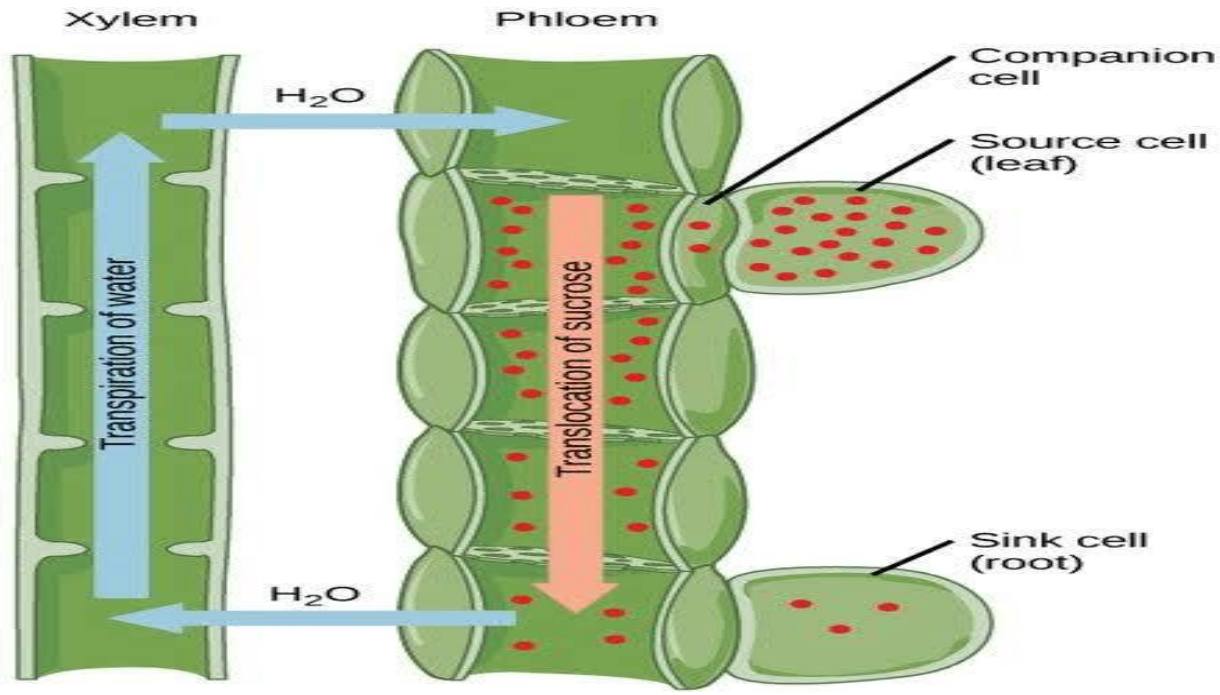
The shoot system is kept firm and erect with water within cells of the shoot. It is important to watch out for white flies at this stage that not only suck cell saps and have the shoot tender and weak but also transmit virus to it. Transpiration is another problem here especially when seedlings are planted under scorching sun. Water in the shoot is rapidly driven out into the environment and this situation is worsened when seedlings do not get required water needs. Farmers have learnt to remedy this problem growing seedlings in the nursery where transpiration and impact of relative humidity are checked under regulated environment. Nonetheless, transpiration and relative humidity are important to and can be leveraged to enhance cucumber growth. This will be discussed more on in the next stage.

When all these precautions are followed, a healthy seedling with strong xylem and phloem vessels, leaf structures are ensured, where the young plant advances into rigorous vegetative stage in 3 weeks.

Vegetative stage:

This is the stage cucumber bulks up to prepare for fruiting. Photosynthesis is at its peak here, and the leaves are much vital at this phase but so also are the phloem and xylem. The leaves make the food, the phloem delivers the made food to where it is needed, and the xylem, although transports water and nutrients, aids food delivery. The phloem and xylem are interlinked and food and other materials get transported to and fro the phloem with water from the xylem and osmotic gradient between the phloem and xylem. We have talked about ensuring the health of the vascular system in the previous session, but how do we the leaf let alone enhance its performance?

Diagram showing the function of xylem and phloem and their interactions in transporting nutrients



Biologyonline

But before this, it is quite important to see to encouraging leaf growth and even prior to this it is helpful to start thinking about cucumber's growth support structure(s). This is in understanding that without proper health of leaf food production cannot take place and in absence of proper support to position leaves to access sunlight energy, photosynthesis do not happen. Soon as cucumber begins vegetation and produces few leaves, support structure tendrils begin to emerge. Cucumber is a plant with weak stem unable to stand erect as most plants would. While its stem creeps horizontally, cucumber can yet grow vertically, climbing, when given/it sees the necessary support. This sets cucumber apart from other creeping plants where with appropriate support they still grow horizontally.

The very adaptive nature of cucumber to a tender stem is that it produces curly structures, tendrils that it uses to hold firm to support structures (trellis or others) at intervals and then keep growing vertically. This act helps it to set numerous leaves accessing sunlight and can thus carry out photosynthesis. Tendrils also assist with proper development of fruits (this shall be touched on at the fruiting stage). Therefore, in growing cucumber, providing support structure is non-negotiable. But it's not just about providing growth support, the tendrils have to be trained to grow around the crutches else the plant grows haphazardly with parts creeping on the floor and ensuing dense vegetation make the plant suffer heat stroke and attending diseases (e.g. powdery mildew).

Powdery Mildew: Its characteristic dusty white powder nature differentiates it from Downy Mildew

Cucumbers are prone to heat and good ventilation hence is a must. It is the reason proper plant spacing, trellising, and leaves pruning from time to time are encouraged for cucumber. Pruning leaves have other benefits, as helping to cut down excess load and nutrients drain weighing plant down and preventing that which should go to proper development of growing leaves and other vital plant functions and organs. It is also a common practice to remove excess growing tips at this stage for same reason. Pruned plant parts are rich in nitrogen and can be rolled back as manure to support cucumber growth.

Leaf is the basic organ that carryout photosynthesis, it contains chlorophyll that absorbs sunlight energy and in a reaction with $C0_2$ and water manufactures carbohydrate and gives off oxygen. For optimum photosynthesis it is vital to supply inputs that enable leaf growth and curb factors that impair leaf and

subsequently affect photosynthesis. Nitrogen is the fundamental skeletal unit of protein that forms structures of plants (leaves inclusive). It also an important constituent of chlorophyll, that helps with trapping sunlight energy and carrying out photosynthesis. So supplying adequate nitrogen is a must during vegetation but one must be careful with the source especially when fertilizer is used.

Ammonium-based fertilizer as nitrogen source creates imbalance in the soil, where the ammonium component increases chloride and carbon uptake and reduces potassium absorption. This drives water loss/dehydration in plant from salt build up and potassium deficiency (worsened by impaired root health) which inhibits transportation of sugar, nutrients, and increases respiration with elevated carbon level. Sugars are increasingly used up and are not replaced. All these stress plant. Alternatives are rather NPK and other fertilizers with reduced/zero concentration of ammonium.

Once inputs that enable leaf growth and photosynthesis are ensured, factors that (aid agents that) reduce leaf functioning should be seen to. Pests and diseases are of important consideration. Biting and chewing pests are a major culprit here as they defoliate leaf surface and out-rightly disrupt photosynthesis. Cucumber leaves are nutrient dense and with the requirement of such to transcend their larva stage, the green caterpillar worm actively feeds on the leaves. But this pest eradication or reduction must be pursued rationally, for reason that prevention and judicious control are often more reliable and prudent than (sole) chemical control method. This is true for cucumber diseases too.

Green caterpillar worm actively feeding on growing cucumber

Heebgrow

The caterpillars before their voracious eating stage live in the apical bud(s) of cucumber plant where they emerge from eggs laid by their moth parents and then evolve into caterpillar, eating their way out and causing destructions to plant parts. The eggs (by my observation) are laid few periods to and hatch at flowering (often like they are born strategically when nutrient is surplus –at a time when cucumber actively photosynthesizes and take up nutrients in preparation for fruiting). Thus it is more effective to anticipate the worms at this time and in those places to proactively eradicate them, and this would make chemical control more potent when administered accordingly, than indiscriminate chemical action often as a reactive measure and could build pest resistance and/or injure cucumber plant. Chemical control can be necessary especially when cucumber is done on a large scale and physical control becomes tasking or when pests and diseases are beyond threshold level and only chemical control can give quick relief. However, concentration and precautions should be adhered to for this as cucumber is very sensitive and fragile; a little mishap could seriously impact yield.

Downy mildew is one of the most devastating diseases of cucumber. When pests like aphids feed on cucumber leaf, they pass out sticky honeydew on the feeding surface, leaf. The fungus causing downy mildew act on this waste and rapidly multiply and thereby infect cucumber leaf and affect its function. The fungus would not be there or active to cause disease if there was no dew in the first place and there would be not any dew if there were no aphids. It is therefore reasonable in order to control said disease to focus on curbing aphids than downy mildew itself. Dew condition for cucumber is generally discouraged as it enables pathogens to thrive and attack, therefore why cucumber is irrigated at the root base and not on the leaves (this should be noted!). Aside through biological agent, dew can also occur naturally.

Leaves with Downy Mildew, damaged and photosynthesis affected

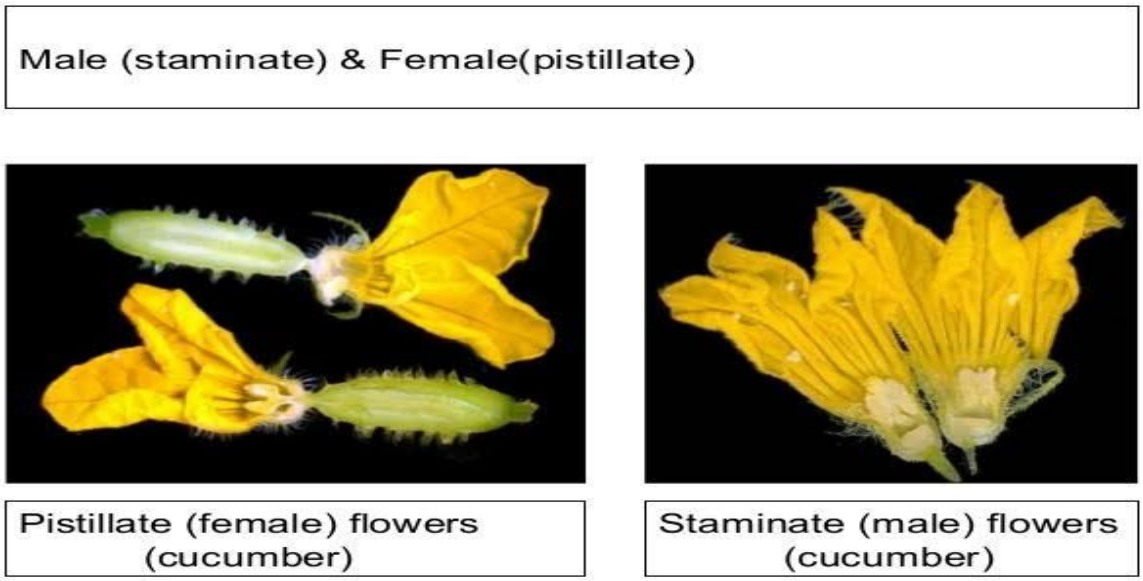
When relative humidity is high, that is, the atmosphere is saturated and water cannot move again from plant into the atmosphere, plant becomes filled with water (turgid) and excess water rather than evaporate into the atmosphere as it should, settles on leaf surface as dew. And as we have discussed about dew, this enables disease-causing microorganisms (e.g. fungus) to incubate, colonize and be virulent. Low relative humidity, likewise, is not beneficial as it rapidly drives water out of plants leaving them dehydrated. Moderate relative humidity rather is best and important for functions in plant.

Relative humidity and transpiration are one of the means water and nutrients are transported throughout plants (there's and another means and which is paramount for fruiting and shall be discussed at the fruiting stage). The force exerted pulling water upward and outside the plant by these two events helps to ensure that water and nutrients carried along are pulled from the ground into the roots and transported along the xylem and also in the process manufactured foods moved in the phloem to where they are sought. Continuous relative humidity action and transpiration ensures consistent delivery of water, food in plants and are important for the health of the phloem and xylem bundles. Transpiration, however, is an active process requiring (sunlight) energy to occur. And, normally, cucumber should be planted when there is good sunlight, not just because of transpiration, but as it provides optimum energy needed for growth and development –leaf growth, flowering and biomass accumulation, etc.

NB: There are numerous pests and diseases that attack cucumber than few mentioned in this section and are relevant for discussion. Nonetheless the few discussed informs the importance of cultivating prudent preventive measures routine, which can be adopted in controlling the other pests and diseases not talked about.

Flowering stage:

This stage is very crucial to cucumber production because flower is what becomes fruit and determines to a great extent eventual harvest, and if it is not gotten right or mishaps occur along the way then harvest is affected and the works put in the stages before become meaningless/wasted. On the other hand, if flower growth (in short period and large numbers) and health can be ensured, then more fruits and with remarkable quality can be harvested. This section, then, focuses on enhancing flower production, development and productivity.



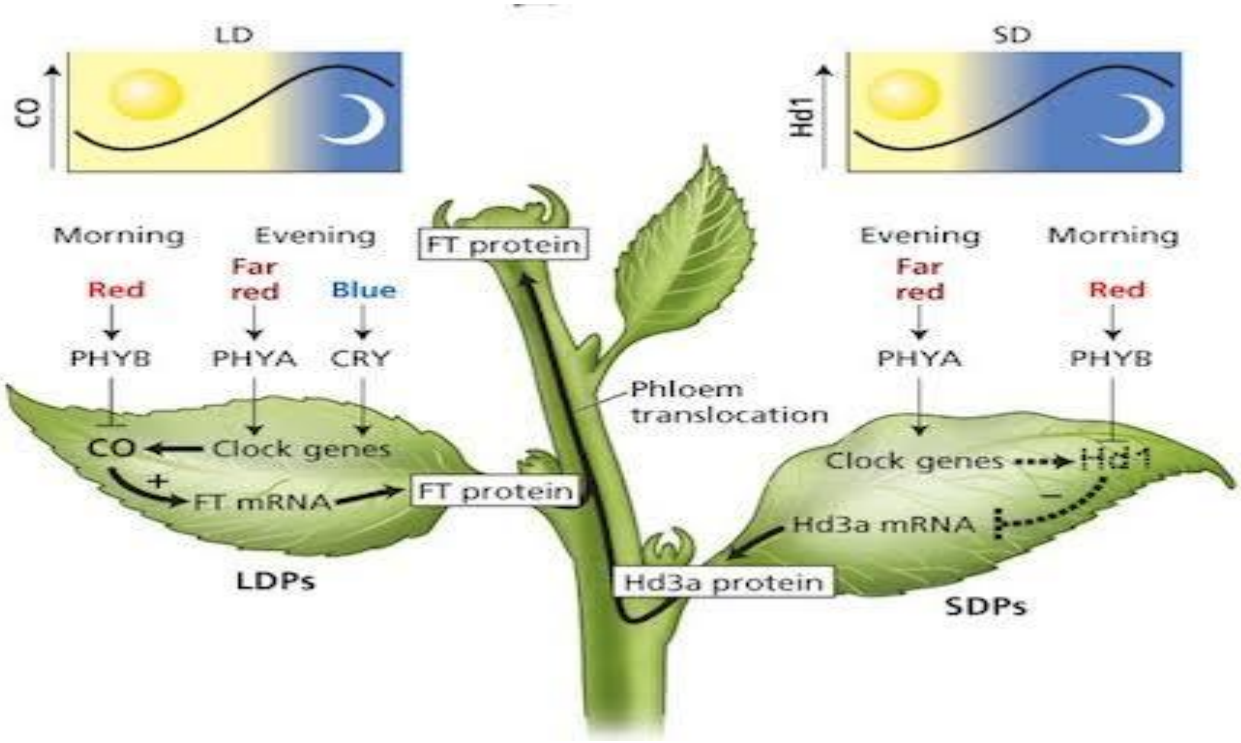
Male & Female cucumbers. The Female flower can be seen having swollen structure at its base

As it has been established in the previous section, optimum sunlight is essential for flower development in cucumber. Temperature and period of light in a day determined by sunlight generally influence plant growth and development. Light and temperature intensity encourage flower growth in cucumber. However, the degree of intensity of both impacts the sex of the flower. High light day and temperature enable the growth of male flower while, in opposite, low light day and temperature favour emergence of female flower.

Understanding this distinguishing impact of varying intensity of light and temperature is vital in that it is the female flower that becomes the fruit and with a goal of a huge harvest, leveraging such insight for catalyzing the emergence of more female flowers is critical. But the problem is arriving at that mix of day light and temperature that not only yield both female and male flowers but more of female flowers,

especially when there are still other developments in plant other than flower alone and that have respective day light and temperature requirements that may not necessarily be the same as for flowering. Nonetheless, period of long day length favours cucumber growth where the vine crop adjusts to variations, and only for the sake of enhancing production we ensure/manipulate for best conditions. In greenhouse these conditions can be manipulated/simulated and not for open field cultivation. It is then be best to grow cucumber on period of slightly longer day to shorter night for open field.

Temperature and light aid flower production by signaling a floral protein, florigen, formed in the leaves, that moves from the shoot apical meristem (SAM) to the floral meristem which differentiates and develop into flower. When plants begin to grow from seed, two growth points emerge that would eventually develop into all plant parts, the root apical meristem and the SAM. The former develops into everything concerning the root and the lower regions of the plant, while the latter forms the shoot and all structures the shoot carries. The floral meristem is of the SAM.



Flowering signaled by Florigen (FT protein) produced in the leaves and catalyzed by light and temperature intensities (from red, far red, blue rays) and then mobilized in the shoot to the apical bud. This depiction is of Arabidopsis plant and not cucumber. Hd3a is the protein that performs the function of FT protein in some plants. LD (Long-day). SD (Short-day). CO & Hd1 regulate flowering time.

HowPlantsWork

Phosphorus regulates protein synthesis, cell division and development and unlocks energy for cellular functions. In this way phosphorus is essential to forming the floral protein and also giving it the needed energy to mobilize to the SAM. Phosphorus helps the floral meristem to divide and develop into flower buds. So it is beneficial to supply phosphorus during flowering. And as with other nutrients, excessive supply of phosphorus should be avoided as it could be detrimental to cucumber's health. Additionally, growth hormones can help with initiating flowers and even to sex specific –gibberellins and silver nitrate encourage growth of male flower, and auxin (Naphthalene acetic acid) and ethephone (promotes ethylene) do for female flower.

Cucumber is a monoecious crop; this means it has both male and female flowers on the same plant stand and can therefore self-pollinate, as against plants that have whole male and female plants separately and rather cross-pollinate. Male and female flowers of cucumber are distinct. The female has a characteristic small cucumber fruit structure at the base of its flower, the male does not, and it is this structure that develops into cucumber on pollination. Since the fruit does not develop from the ovary of the flower but the small cucumber structure hence cucumber is a false fruit. Sufficient pollens will have to move from the male flower to the ovary of the female flower for reproduction to occur. This is dependent on a transfer agent which is often biotic. Bees are very effective cucumber pollinators and should be introduced during flowering, but, inhibiting factors to their presence must be discouraged.

One must be careful with the use/indiscriminate use of (broad) spectrum chemicals during this period and if the need arises then target-specific chemicals should be used instead and with care, so as not to kill pollinators. When flowers are not (sufficiently) pollinated they can, still, develop into fruit but which are seedless (a case called parthenocarpy) and fat and short in size. This decreases the market quality of the fruits and makes impossible seed-harvesting for subsequent cultivation. Indiscriminate chemical application (fertilizer inclusive) -and without following appropriate recommendations -can have a broader negative impact, causing premature abortion of flowers.

In addition to enhancing the productivity of the cucumber flower, pests damaging flowers need to be controlled. (In my experience) surprisingly, it is not the regular pests that damage flowers but the ones we do not pay attention to, lizards for instance. Even, these pests do not damage flowers from feeding on them but in an act on feeding on something else. Flowers set coloured sepals and petals and put in place juicy nectar to attract pollinators (butterflies, bees etc.) but also attract other insects. These range of insects are meals for lizards and in their process of preying on them, in reckless chase, they destroy flowers. As a result, they cause double damage –eradicating pollinators and destroying flowers –and even sometimes abort developing young cucumber fruit(s).

Another way fruit production in cucumber can be improved is by purposely growing varieties that bear sole and/or more female flowers. Gynoecious cucumbers are hybrid cultivars that bear larger percentage of female flowers and can be adopted to boost fruit harvest.

Fruiting stage:

As this is the last stage of life cycle of cucumber before harvesting people often take it for granted since all other stages have be overcome and done well. This stage needs total attention; cucumber is often priced for its quality and neglect here could remarkably impact market quality. And as fruit quality can be improved on by preventing factors that impair it, fruit quality and even quantity can be influenced by some practices. This will be the focus of this session.

Once the flowers are sufficiently pollinated, they close up and the small cucumber structure at their base begins to grow into the real cucumber fruit. As we have come to know about fruiting stage, photosynthesis and water transportation are crucial in getting fruits to fully develop and reach the right size. Nutrients and water need to keep going into the fruits. It therefore means that leaves and root still have to be in their best form and functioning and nutrients enabling these need to be sustained while factors hindering them eradicated. It can be tempting to think nitrogen won't be needed anymore, here, since vegetations are already fully established this is further from the truth. Nitrogen, in the chlorophyll, will still help in food manufacturing (a continuous process) and continue its function, with phosphorus, of forming plant structures, which will be important for the fruit development. Potassium will still be ever important in transporting manufactured food, nutrients and water. Nitrogen, phosphorus and potassium must still be given, as needed, at this stage.

It is worthy to note that these nutrients and water depend on nutrients and water to be transported, and nutrients require water vice versa to mobilize to the points needed. This is all intertwined, can be confusing, and a bit of explanation would help. What is commonly known is the role of water in helping to absorb nutrients and moving them around and not otherwise -the role of nutrients in water absorption into and movement around the plant. Transpiration is day phenomenon powered by sunlight and relative humidity is not always promising with vagaries of weather; with this how then does cucumber get water in the night without sunlight energy and what substitutes when relative humidity conditions are not right? The answer is root pressure.

Plants' root use osmosis to absorb water and nutrients from the ground. It creates a concentrated environment than its surrounding by absorbing cations (nitrogen, potassium, magnesium, etc.) where water alongside nutrients begins to enter the root with osmotic gradient. One must watch for factors that antagonize this, for instance, ammonium fertilizer application as had been explained in this article. This fertilizer type displaces cations and enables absorption of anions (chloride and carbon), disrupting concentration-driven water absorption. The chloride taken in builds up as salt and drives dehydration, penetrates leaves and displaces iron important for chlorophyll functioning and instead cause death of the chlorophyll (chlorosis). With this, food and water content of fruits are impacted with disruption of photosynthesis and water absorption, and dehydration. The absorbed carbon aids rapid respiration (using up of stored and manufactured sugar) which reduces carbohydrate content of the fruit and energy available for plant functions. Cucumbers are heavy feeders on nutrients and water, and adequate nutrients (ones required) and water (supplemented by irrigation) should therefore be ensured.

Cucumber growing straight with no obstruction and when the plants are well held to support structure

Good Housekeeping

Quality of cucumber in terms of its freshness and intactness of its flesh influence cucumber market value. Growing young cucumber fruits are malleable, they tend to reshape (bend) in response to obstruction and this is not good for marketability where straight cucumbers are preferred. Tendrils and trellis help prevent this. Tendrils enable the cucumber plant attach firmly to trellis and set fruits. When trellises are erected properly with appropriate spacing, growing fruits are given room to grow in length with no obstruction. Pest can reduce the market value of cucumber with feeding action marking cucumber skin and their eradication and menace must be seen to. Also, cucumbers with green colour are generally more preferred than those that are slightly yellow or yellow in colour. As for leaves, chlorophyll is responsible for the green colour of cucumber and as cucumber fruits age on the stem they lose their green pigments hence it is advisable to harvest cucumbers that have shown visible maturity. This act is beneficial to young fruits as matured fruits prevent young fruits from growing by overshadowing nutrient share. Removing them makes nutrients available for young fruits.

Conclusion:

Fruit is what cucumber is valued and this is what informs production. Hence, growing cucumber, efforts will be directed to harvesting raising cucumber of good quality and size. This happens when enough nutrients –water, food, essential elements –go into the fruit. For this to occur, food making, nutrient absorption and distribution must be constant. This means that the leaf, phloem and xylem which have these functions must be in their best form. Factors impacting their productivity have to be addressed and those enhancing them ensured. But these structures do not just come by and although are important and not more important than others. The xylem and phloem develop from the embryonic root and shoot with energy from the endosperm. If these structures aren't there or are not supported with the right energy and nutrients to grow then there won't be any xylem or phloem. And the xylem and phloem aren't self-sufficient without food from photosynthesis or in the case of the xylem vessel made of dead tissues sustained with function of water transporting. Also, the xylem and phloem performing their functions without flower emerging which develops into fruits that then take in the products transported by the xylem and phloem, are useless. Thus every stage, as they matter, and the xylem, phloem and leaf requires adequate attention and are important to having good cucumber harvest.