



Horticultural Study on Cucumber Cultivation; Pest and Disease Control from Traditional Approach

A. Nur Nasyfah Bongkang¹

¹Department of Biology, Faculty of Mathematics and Natural Sciences, Hasanuddin University, Indonesia



*Corresponding Author: A. Nur Nasyfah Bongkang

Article Info

Article history:

Received 16 September 2021

Received in revised form 16 October 2021

Accepted 28 October 2021

Keywords:

Cucumber Cultivation

Pest and Disease

Traditional Approach

Abstract

The aims of the study to know Horticultural Study on Cucumber Cultivation; Pest and Disease Control from Traditional Approach. Cucumber offers several health advantages, including a high concentration of Vitamin A, anti-cancer properties, the ability to absorb pollutants, and the ability to provide energy. cucumber is high in provitamin A, which helps to preserve eye health by acting as an antioxidant. It also helps to prevent damage to body cells that leads to premature aging by acting naturally. cucumber fruit has been shown to be effective in reducing the development of intestinal cancer.

Introduction

Cucumber is an annual plant that belongs to the horticultural plant group of the pumpkin family (Cucurbitaceae). It may be consumed either fresh or processed further, depending on the method of preparation. cucumber is also extensively utilized as a raw material in the cosmetics sector, in addition to being used as a culinary component (Hossain et al., 2020). Among the other advantages of cucumber are the cucumber seeds, which contain a hypoxanti-type alkaloid poison that may be used to cure children who have intestinal worms or diarrhea, decrease high blood pressure (hypertension), and avoid poisoning during pregnancy. In its natural state as a vegetable, cucumber is a rich source of vitamins and minerals that the body need.

Cucumber output has been known to diminish in recent years, and data suggests that cucumber plant production in Indonesia has also declined throughout this same period, according to the researchers. According to data from 2013, the overall output of cucumbers throughout all areas of Indonesia was 491,636 metric tonnes. During 2014, the total decreased to 477,989 tons, and during 2015, the total fell once more to 447,696 tons. At the same time, cucumber output in Riau Province itself has decreased, which is a cause for serious worry. Cucumber output in Riau reached a total of 20,727 tons in 2013. During 2014, it decreased to 19,331 tons, and during 2015, it decreased to 14,175 tons (BPS, 2016). In order to improve the output of zucchini, it is vital to understand how to develop zucchini both generatively and vegetatively.

Despite the fact that cucumber is now extensively recognized and enjoyed across the world, it is a relatively young plant in Indonesia. Cucumber may be grown at any time of year and does not recognize the seasons. Typically, this cucumber is drunk as a cool and pleasant beverage. Cucumber, despite the fact that it tastes fresh, is also high in minerals that are good to the body's health.

Cucumber offers several health advantages, including a high concentration of Vitamin A, anti-cancer properties, the ability to absorb pollutants, and the ability to provide energy. cucumber fruit is readily distinguished by its bright yellow color and form, which is similar to that of a cucumber but somewhat bigger and rounder. cucumber fruit has been shown to be effective in

reducing the development of intestinal cancer. cucumber is high in provitamin A, which helps to preserve eye health by acting as an antioxidant. It also helps to prevent damage to body cells that leads to premature aging by acting naturally. cucumber also has a significant amount of vitamin C, which has the ability to prevent the onset of flu and infectious disorders due to the nature of vitamin C's ability to work as an antiviral and prevent infection. Cucumber also contains significant amounts of important minerals, including as calcium, phosphorus, and iron, in addition to vitamins (Sharma et al., 2020).

Cucumber is a creeping perennial plant with a shallow root system that thrives in a shady area. Cucumber plant stems are 1-3 m in length and have unbranched tendrils at the ends. The leaves are triangular circular, somewhat heart-shaped, 7-25 cm wide, and have a rough surface owing to the presence of hairs on the leaf surface. The petiole is 5-15 cm long, and the flowers are bell-shaped and yellow.

Morphology of Cucumber Plant

cucumber is a creeping or climbing annual plant supported by a spiral-shaped holder that allows it to climb. The stems are moist and coarsely hairy, with a booky texture. It may grow to be between 0.5 and 2.5 meters in length, is branching, and has tendrils that grow on the side of the leaf stalk. The plant's stem is erect in order to promote healthy growth and ensure that the plant's development is straight. It is intended that in this manner, the base of the stem would be able to grow firmly straight, stimulating the development of shoots at the top while simultaneously decreasing the density at the bottom.

Cucumber leaves are large circular and single leafed, with a pointy tip resembling a heart shape with jagged edges. Cucumber flowers are small and white. Plants with tall stems and green leaves alternate the position of their leaves on their stems, with one leaf on one side of the stem and the other leaf on the other (Grieve, 2013). The leaves of this plant grow alternately out of the nodes (segments) of the stem and are 7-18 cm long and 7-15 cm broad.

The blooms of the cucumber plant are yellowish-white in color, and both the male and female flowers are trumpet-shaped and coated with hairs (Loughmiller et al., 2018). The inflorescence is symmetrical, with male flowers on one side and hermaphrodite blooms on the other (sissy). Male flowers are the first to bloom, and they do so at a young age of 4-5 weeks on average. If the development of the following blooms is excellent, they will be sissy flowers. One plant may yield up to 20 fruits, however in cultivation, the quantity of fruits produced must be regulated in order to get a decent fruit size.

Cucumber fruit may be found beneath the armpit, between the leaves and stems of the cucumber plant. Shapes and sizes vary; however, they are often long or short circular in shape. Some of the fruit's skin contains nodules, while other parts are smooth and shiny. The hue of the fruit skin ranges from pale green to light green to dark green to yellow.

Cucumber seeds are distributed uniformly in the centre of the fruit, in great numbers, and have a tapering oval shape (flat). The skin is white or yellowish white to brown, and the seeds are white or yellowish white to brown if the cucumber is split lengthwise. There are lenders on the surface of the seeds, which means that they must be dried before usage as seeds.

Cucumber Plant Cultivation Generative

There are three distinct stages of plant development that occur between the time of planting and the time of blooming. It is during the embryonic phase when a male gamet and a female gamet come together, resulting in the formation of an embryo (zygote). The juvenile stage lasts from the time of seed germination till the time of blossoming (adult). At this time of year,

vegetative growth is quite prevalent. Several modifications in plant morphology occur during the juvenile stage, including changes in leaf shape, growth character, and, in certain cases, the development of thorns on the plant.

The plant did not respond to blooming cues while it was in the juvenile stage, which was disappointing. The transition phase is the time period that occurs between the juvenile stage and the reproductive or adult stage of development (adult stage) (Bolten et al., 2003). When a plant is in this transition stage, it experiences changes in leaf structure as well as growth patterns, and it also starts responding to blooming cues. Plants respond in a variety of ways to environmental changes during this transition phase, with some plants responding slowly and others responding quickly. Aside from genetics, environmental modification treatments and particular plant treatments may also have an impact on the blooming time.

Cucumber is a plant that is readily adapted to a wide range of temperatures and growing conditions (Cargnelutti et al., 2006). Nonetheless, for the best results, cucumber should be grown in a dry region with temperatures ranging between 21 and 27 degrees Celsius and little rainfall. Loose soil with a lot of humus and appropriate nutrients is ideal for the development of cucumber. The soil should also be quickly absorbed by water, have excellent water management, and have a pH of between 6-7.

Watering should begin as soon as the cucumber seeds are transplanted to the culture area to ensure that the seedlings do not wither and can adapt rapidly to their new environment. cucumber plants are hardy plants that can withstand periods of drought and extreme heat (Ali et al., 2019). The fact that cucumber plants are resistant to dry weather does not imply that they do not need watering on a regular basis. Watering must continue to be done on a need-to-know basis. Every morning and evening, routine watering is carried out by flushing or flooding the land for 15-30 minutes, depending on the weather. Aside from that, watering is only carried out when absolutely necessary, and it is increased again throughout the blooming and fruiting periods.

In embroidery, the process of replacing seeds with aberrant growth or death is called embroidering. Seedlings that develop unnaturally or die are removed and replaced with fresh seeds from a different batch of chosen seeds. If you see a lot of weeds growing around the plants, you should weed them out. Weeding should be done around the base of the stem or bed of the plant. In the region where the plant reproduces, there is no need to do this.

After the seeds have released their tendrils, the stakes are placed in the ground. The stake is around 150-200 cm in height. Ajir is built of sturdy material, and it can sustain a fruit weight of around 2-3 kg without breaking. The location of the stake is roughly 25 cm from the edge of the mound on both the right and left sides of the stake. The addition of long bamboo, which is put at the top of the triangle between bamboo or wood that crosses, following the row of markers behind it, may help to make the stakes more durable. The leaves that have become excessively thick are clipped 3 weeks after planting, either in the morning or in the evening.

Table 1. Fertilizing Plants

Time	Dose of Macro Fertilizer (gram/tree)		
	Urea	SP-36	KCL
Age 10 days	12	12	10
Age 20 Days	12	12	10
Age 30 Days	12	8	12
Age 40 Days	12	8	20

Cucumbers may be harvested between 100 and 130 days after they are planted in most climates. In order to determine if the fruit has been detached from the stem of the plant or not, harvesting must be performed. It is possible to harvest the fruit once it has been split from the stem.

After the cucumber fruit has been picked, it is cleaned and classified according to the size of the fruit, which is a categorization system. Following that, they are packed and distributed. Depending on the growth circumstances and plant care, 10-15 harvests may be completed in a single growing season at various phases.

Asexual vegetative propagation (also known as asexual propagation) is employed for plant species that do not generate seeds on a regular basis or at all. Vegetative propagation is the practice of propagating plants by using their vegetative components (roots, stems, and leaves) in the hopes that new individuals would form from these parts (Preece, 2003; McKey et al., 2010)). Asexual plant propagation starts with the separation of non-seed plant components (vegetative) and the subsequent planting of these materials, which may include tillers, cuttings, grafts, grafting, tubers, and so on. Asexual plant propagation is also known as sexual plant propagation. Cucumber may be propagated vegetatively by taking cuttings from the plant.

Pests and Diseases and Their Control

Aulocophora similis (*Aulocophora* spp.) The wings of this leaf beetle have a simple golden color and are 1 cm in length. During strong assaults, this insect may destroy and consume the flesh of leaves, causing the leaves to become punctured; in less severe attacks, the leaves become merely bones. The pesticide Lannate L. or Sevin 85 S is used to manage this pest problem.

Dacus cucurbitae Coq is an adult fly that is 1-2 mm in length. In order to lay eggs, flies attack immature cucumbers; however, these pests may also eat away at the fruit's flesh, making the fruit abnormal and causing it to decay. The pesticide Malathion WP is used in this pest control treatment.

Aphis gossypii is a little, 1 to 2 mm-long insect that is yellow or reddish yellow in color or dark green to black in color. It is possible for this insect to attack plant shoots and cause the leaves to become wrinkled, curled, and curled. These lice are also vectors for the transmission of the virus. Pest control is being carried out utilizing the pesticide Perfekthion 40 EC.

Leaf rot is a disease that affects the leaves of plants (Downy mildew). *Pseudoperonospora cubensis* Berk et Curtis is the causative agent. Cucumber leaves get infected when exposed to high humidity, temperatures between 16 and 22 degrees Celsius, and mist or fog. Symptoms include yellow and moldy leaf patches, and the color of the leaves will darken to a brownish-yellow and decay. Fungicides such as Mankozeb or Zineb may be used to control the problem.

Powdery mildew, or powdery mildew *Erysiphe cichoracearum* is the etiological agent. When the soil is dry during the dry season and there is considerable humidity, it thrives. Symptoms include the following: the surface of the leaves and young stems is coated with white flour, which later becomes yellow and becomes dry. Anthracnose may be controlled using fungicides containing the active chemicals benomyl or carbendazim. The fungus *Colletotrichum lagenarium* Pass is the source of the problem. Brown dots on the leaves are the first signs of the disease. Leaf death is caused by the form of the spots, which are either somewhat rounded or angular in shape. Symptoms of spotting may also be seen on the stem, stalk, and fruit. A pink spore mass forms in the middle of the area when the air is moistened with dew or dewy dew. Control is achieved with the use of a fungicide containing the active component karbendazim or mankozeb.

Leaf spot with an angle. The fungus *Pseudomonas lachrymans* is the source of the problem. During the rainy season, the disease spreads. In mild assaults, just a few little yellow and angular leaf spots appear; in severe attacks, all leaf spots become light brown-gray, become dry, and develop holes. Control is achieved with a bactericide containing the active component streptomycin or oxytetracyclin, respectively.

Wilt caused by bacteria. *Erwinia tracheiphila* is the causative agent. The cucumber beetle is responsible for the spread of the illness. Symptoms include: one leaf wilting, followed by the abrupt withering of all leaves and the death of the plant; when cut, the base of the wilted stem secretes a thick and sticky white mucus. Control is achieved with the use of streptomycin bactericide.

Virus. Cucumber mosaic virus (CMV), Potato mosaic virus (PVM), Tobacco Etch Virus (TEV), and Potato Bushy Stunt Virus (TBSV) are the viruses that cause these diseases. The aphids *Myzus persicae* Sulz. and *Aphis gossypii* Glov. are the vector insects that cause these diseases. Affected plants exhibit symptoms such as striped leaves in dark and light green, wrinkled leaves, curled leaf margins, and reduced growth. Control measures include: decreasing insect vectors, limiting mechanical damage, removing unhealthy plants, and rotating non-Cucurbitaceae family plants in the garden.

Scabies are a kind of parasite (Scab). The fungus *Cladosporium cucumerinum* Ell.et Arth. is the source of the problem. This disease affects young cucumbers. Symptoms include moist areas that produce a liquid that, when dried, has the consistency of rubber; when it targets aged fruit, a corky scabies develops. Control is achieved with the use of a fungicide containing dithiocarbamate.

Fruit rot is a problem. The fungus *Phytophthora aphinadermatum* (Edson) Fizz., as well as *Phytophthora* sp., *Fusarium* sp., *Rhizopus* sp., and *Erwinia carotovora* pv. *carotovora*, are the causes of the disease. Infections may emerge in the garden or when storing items in storage. Symptoms include: wet rot caused by *Phytophthora aphinadermatum*, which causes the fruit to break when pressed; *Phytophthora* causes slightly wet spots that become soft and brown and wrinkled; *Rhizopus* causes slightly wet spots, the soft skin of the fruit grows with fungus, and the fruit breaks easily; *Erwinia carotovora* causes the fruit to rot, crumble, and stink; and *Erwinia carotovora* causes Control is achieved by the avoidance of mechanical harm, careful post-harvest handling, and storage in clean containers at temperatures ranging from 5-7 degrees C.

Conclusion

It is possible to propagate or cultivate cucumber plants using both generative and vegetative methods; the stages involved in cultivating cucumber plants using generative methods are plant seeding, soil preparation, planting, and plant maintenance, which includes watering, replanting, weeding, installing stakes, pruning and fertilizing plants, as well as harvesting the finished product. Cucumber may also be grown vegetatively, by cuttings, in addition to its generative culture. The stages in the cucumber plant cuttings are as follows: first, cut the stems of the cucumber plant that already has flowers with oblique cuts, then place the cucumber plant pieces in a container filled with water (a kind of glass or jar), and finally, place the cucumber plant pieces in a container filled with water. Following that, the container should be put in a shaded location and let to stand for a few days; after approximately 6 days, the cuttings will begin to show signs of root growth on the internodes or stem knuckles. A large number of roots are pulled from the cucumber plants before they are transferred into soil planting medium. After then, the last one was in charge of the ongoing upkeep of the cucumber plant.

References

- Ali, M., Ayyub, C. M., Amjad, M., & Ahmad, R. (2019). Evaluation of thermo-tolerance potential in cucumber genotypes under heat stress. *Pakistan Journal of Agricultural Sciences*, 56(1).
- Bolten, A. B., Lutz, P. L., Musick, J. A., & Wyneken, J. (2003). Variation in sea turtle life history patterns: neritic vs. oceanic developmental stages. *The biology of sea turtles*, 2, 243-257.
- Cargnelutti, D., Tabaldi, L. A., Spanevello, R. M., de Oliveira Jucoski, G., Battisti, V., Redin, M., ... & Schetinger, M. R. C. (2006). Mercury toxicity induces oxidative stress in growing cucumber seedlings. *Chemosphere*, 65(6), 999-1006.
- Grieve, M. (2013). *A modern herbal* (Vol. 2). Courier Corporation.
- Hossain, A., Dave, D., & Shahidi, F. (2020). Northern sea cucumber (*Cucumaria frondosa*): A potential candidate for functional food, nutraceutical, and pharmaceutical sector. *Marine Drugs*, 18(5), 274.
- Loughmiller, C., Loughmiller, L., & Marcus, J. (2018). *Texas wildflowers: a field guide*. University of Texas Press.
- McKey, D., Elias, M., Pujol, B., & Duputié, A. (2010). The evolutionary ecology of clonally propagated domesticated plants. *New Phytologist*, 186(2), 318-332.
- Preece, J. E. (2003). A century of progress with vegetative plant propagation. *HortScience*, 38(5), 1015-1025.
- Sharma, V., Sharma, L., & Sandhu, K. S. (2020). Cucumber (*Cucumis sativus* L.). In *Antioxidants in Vegetables and Nuts-Properties and Health Benefits* (pp. 333-340). Springer, Singapore