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Studies on Strawberry under Aeroponics System

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Aeroponics: Aeroponics is the process of growing plants in the air or mist environment without soil or an aggregate medium. The word "aeroponic" is derived from the Greek meanings of aer ("air") and ponos ("labour"). It is a subset of hydroponics, since water is used in aeroponics to transmit nutrients.

The basic principle of aeroponic growing is to grow plants suspended in a closed or semi-closed environment by spraying the plant's dangling roots and lower stem with an atomized or sprayed, nutrient-rich water solution. The leaves and crown, often called the canopy, extend above. The roots of the plant are separated by the plant support structure. Often, closed-cell foam is compressed around the lower stem and inserted into an opening in the aeroponic chamber, which decreases labor and expense; for larger plants, trellising is used to suspend the weight of vegetation and fruit.

Strawberry: The garden strawberry (or simply strawberry; Fragaria × ananassa) is a widely grown hybrid species of the genus Fragaria, collectively known as the strawberries, which are cultivated. Worldwide for their fruit. The fruit is widely appreciated for its characteristic aroma, bright red color, juicy texture, and sweetness. It is consumed in large quantities, either fresh or in such prepared foods as jam, juice, pies, ice cream, milkshakes, and chocolates. Artificial strawberry flavorings and aromas are also widely used in products such as candy, soap, lip gloss, perfume, and many others.

The strawberry is not, from a botanical point of view, a berry. Technically, it is an aggregate accessory fruit, meaning that the fleshy part is derived not from the plant's ovaries but from the receptacle that holds the ovaries. Each apparent "seed" (achene) on the outside of the fruit is actually one of the ovaries of the flower, with a seed inside it.

History: The strawberry fruit was mentioned in ancient Roman literature in reference to its medicinal use. The French began taking the strawberry from the forest to their gardens for harvest in the 14th century. Charles V, France's king from 1364 to 1380, had 1,200 strawberry plants in his royal garden. In the early 15th century western European monks were using the wild strawberry in their illuminated manuscripts. The strawberry is found in Italian, Flemish, and German art, and in English miniatures.[citation needed] The entire strawberry plant was used to treat depressive illnesses.

By the 16th century, references of cultivation of the strawberry became more common. People began using it for its supposed medicinal properties and botanists began naming the different species. In England the demand for regular strawberry farming had increased by the mid-16th century.

Description: Strawberries are often grouped according to their flowering habit. Traditionally, this has consisted of a division between "June-bearing" strawberries, which bear their fruit in the early summer and "ever-bearing" strawberries, which often bear several crops of fruit

throughout the season. One plant throughout a season may produce 50 to 60 times or roughly once every three days.

Research published in 2001 showed that strawberries actually occur in three basic flowering habits: short-day, long-day, and day-neutral. These refer to the day-length sensitivity of the plant and the type of photoperiod that induces flower formation. Day-neutral cultivars produce flowers regardless of the photoperiod.

Cultivation: Strawberry cultivars vary widely in size, color, flavor, shape, degree of fertility, season of ripening, liability to disease and constitution of plant.On average, a strawberry has about 200 seeds on its external membrane.Some vary in foliage, and some vary materially in the relative development of their sexual organs. In most cases, the flowers appear hermaphroditic in structure, but function as either male or female.

For purposes of commercial production, plants are propagated from runners and, in general, distributed as either bare root plants or plugs. Cultivation follows one of two general models— annual plasticulture,or a perennial system of matted rows or mounds. Greenhouses produce a small amount of strawberries during the off season.

The bulk of modern commercial production uses the plasticulture system. In this method, raised beds are formed each year, fumigated, and covered with plastic to prevent weed growth and erosion. Plants, usually obtained from northern nurseries, are planted through holes punched in this covering, and irrigation tubing is run underneath. Runners are removed from the plants as they appear, to encourage the plants to put most of their energy into fruit development. After harvesting, the plastic is removed and the plants are plowed into the ground. Strawberry plants produce more and better fruit when they are young. After a year or two, they decline. Replacing them annually improves yields and enables denser planting.However, this necessitates a longer growing season, for the plants to establish themselves. It also costs more to annually purchase plants, form new mounds, and cover them with (new) plastic.

Manuring and harvesting: Most strawberry plants are now fed with artificial fertilizers, both before and after harvesting, and often before planting in plasticulture. To maintain top quality, berries are harvested at least every other day. The berries are picked with the caps still attached and with at least half an inch of stem left. Strawberries need to remain on the plant to fully ripen because they do not continue to ripen after being picked. Rotted and overripe berries are removed to minimize insect and disease problems. The berries do not get washed until just before consumption.

Pests: Around 200 species of pests are known to attack strawberries both directly and indirectly. These pests include slugs, moths, fruit flies, chafers, strawberry root weevils, strawberry thrips, strawberry sap beetles, strawberry crown moth, mites, aphids, and others. The caterpillars of a number of species of Lepidoptera feed on strawberry plants. For example, the ghost moth is known to be a pest of the strawberry plant. The strawberry aphid, Chaetosiphon fragaefolii, is a bug species found in the United States (Arizona), Argentina and Chile. It is a vector of the strawberry mild yellow-edge virus. The amounts of pesticides required for industrial production of strawberries (300 pounds (140 kg) in California per acre) have led to the strawberry leading the list of EWG's "Dirty Dozen" of pesticide-contaminated produce.

Diseases: Strawberry plants can fall victim to a number of diseases, especially when subjected to stress. The leaves may be infected by powdery mildew, leaf spot (caused by the fungus Sphaerella fragariae), leaf blight (caused by the fungus Phomopsis obscurans), and by a variety of slime molds.The crown and roots may fall victim to red stele, verticillium wilt, black root rot, and nematodes.The fruits are subject to damage from gray mold (Botrytis

cinerea), rhizopus rot, and leather rot. To prevent root-rotting, strawberries should be planted every four to five years in a new bed, at a different site.The NPR1 gene from Arabidopsis thaliana, AtNPR1, confers A. thaliana's broad- spectrum resistance when transexpressed in F. ananassa. This resistance includes resistance to anthracnose, powdery mildew, and angular leaf spot.

References

1. Manganaris GA, Goulas V, Vicente AR, Terry LA (March 2014). "Berry antioxidants: small fruits providing large benefits". Journal of the Science of Food and Agriculture. 94 (5): 825–33.
2. "Strawberry, The Maiden With Runners". Botgard.ucla.edu. Archived from the original on 6 July 2010.
3. Welsh, Martin. "Strawberries". Nvsuk.org.uk. Archived from the original on 2 August 2008.
4. Esau, K. (1977). Anatomy of seed plants. John Wiley and Sons, New York. ISBN 0-471-24520-8.