The BIEA International STEM Competition

The Benefit of AI in the Fight Against Nematodes

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Introduction

Istanbul is known as a preferred migration route for plant species when the world witnesses huge climate transitions. As a result of the advantages provided by the climate, Istanbul has a wide range of plant species, some of which can be found in Anatolia and the Balkan Peninsula.

The vineyards and gardens of Arnavutköy, one of the most beautiful and favourite neighbourhoods of Istanbul, have been famous since the 6th century. It is known that the history of viticulture in this region 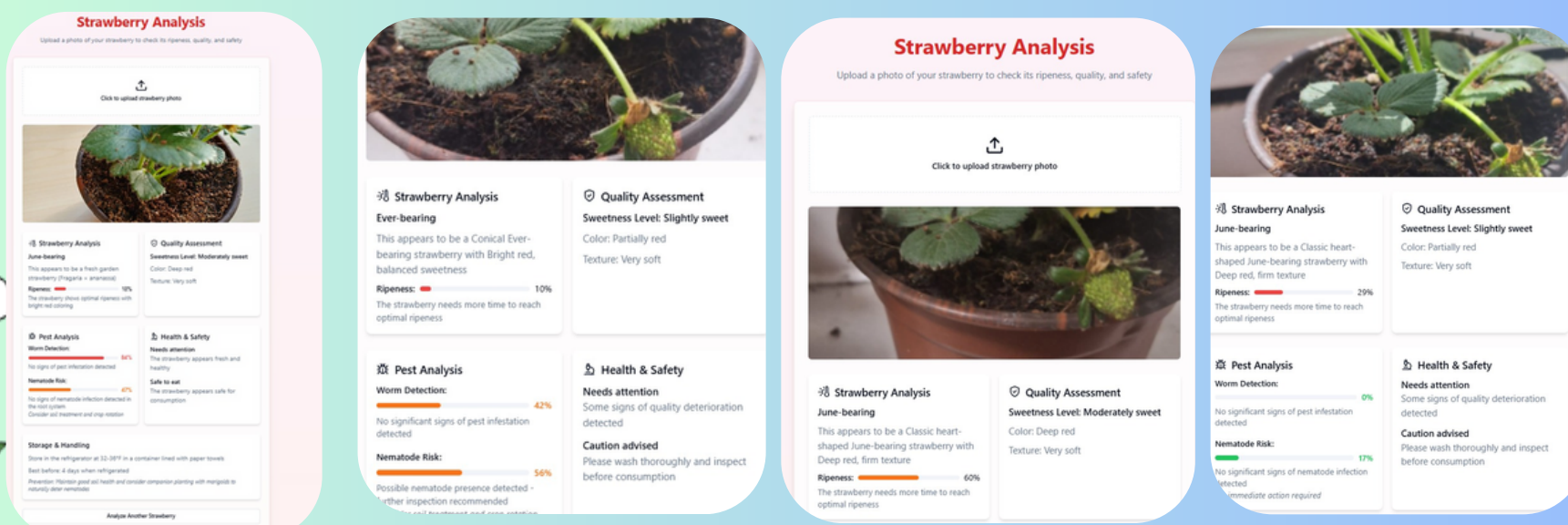goes back to the Byzantine period. However, the history of the village's eponymous strawberry is not as old as one might think.

In 1798 Aleksandros Ipsilantis came to Arnavutköy after his duty as Wallachian Bey and started to grow strawberries. The reputation of these strawberries produced with the name Arnavutköy Strawberry has spread all over Turkey.

The rapid urbanisation -concreteisation- that started in the 1960s also defeated the famous fragrant strawberry, apartment buildings prevailed instead of strawberry fields and Arnavutköy Strawberry could no longer be grown.

Materials

Strawberry (Fragaria) is the common name of a genus of berry plants in the Rosaceae family and the fruits of the species in this genus.

The first mentions of strawberries as an ancient continent were found during the Roman civilisation. Strawberry fruit was mentioned in ancient Roman literature with reference to its medicinal use.

At that time and afterwards, strawberries are generally at the forefront with their medical benefits. It is said to be good for many things from gout to kidney stones, from high fever to melancholy. In mythology, it symbolised Venus due to its red colour and heart form. Strawberry Planting: Seedlings should be planted in cool and humid weather. Life water is given after planting. In summer planting, plants should be watered very well for 15 days, at least 3 times a day. In summer planting, flowers that bloom 6-8 days after planting should be plucked.

Strawberry is a plant sensitive to excessive water. Jaundice and fungal diseases occur as a result of excessive irrigation. If the salinity of irrigation water is more than 5.0 millimost, it should not be used. The best fertilisation is based on soil and leaf analysis. Ammonium sulphate is given as soon as the flowers bloom.

Strawberry diseases are seen in root, fruit and leaves. Since root diseases are transmitted from the soil, soil fumigation or sterilisation is essential. Against fruit rot, systemic fungicides should be applied several times after fruit set. The best way to get rid of virus and nematode problems is to use healthy seedlings and fight against nematodes. Strawberry nematode (Aphelenchoides fragariae) is one of the biggest problems in strawberry production. It causes great damage to the national economy. Strawberry nematode is 0.45-0.80 mm in length and both sexes are thread-shaped. They can stay in the soil for 1 year. To protect against nematodes, contaminated strawberry cuttings should not be used. A 3-year rotation should be applied in infected areas.

Methods

We analyze the development process of strawberries with the artificial intelligence-supported software we developed. We aimed to take precautions against strawberry nematodes by examining the possibility of nematode formation in strawberries. For this, we used the 'Horizans AI' software. First, we took photos of strawberries at certain intervals and calculated the possibility of nematodes in strawberries with the help of this software. We also measured the water needs of strawberries with artificial intelligence and watered them accordingly. We tried to prevent the growth of nematodes. We ensured that our strawberries grow healthily with AI.

Arnavutköy- Istanbul (1700) created by AI

20th March 2025

29th March 2025

5th April 2025

12th April 2025

Our strawberry

Our strawberry

Our strawberries grown with vertical farming and artificial intelligence

Results and Discossion

Since the 1700s, the address of strawberries in Istanbul, Beşiktaş district, where our school is located, has been unable to grow strawberries since the 1960s due to unplanned urbanization. We wanted to protect our district and also our cultural heritage, "Arnavutköy Strawberry". We showed that even if there are no gardens left in Arnavutköy, strawberries can be grown on balconies and terraces. At the same time, we tried to prevent the "Nematode" problem, which is the biggest problem in strawberry cultivation, with artificial intelligence. With the software we created, we took photos of strawberries, discovered the possibility of nematodes in advance, and ensured that precautions were taken accordingly (separation or use of pesticides). Thus, we both protected the plant and prevented unnecessary use of pesticides.

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