



An applied research on the effect of the geophysical conditions of Mars on plants

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World Space Week 2022

Under the banner of space and sustainability

research aims

- Studying the effects of Martian geological properties on plants.
- Find out whether the physical properties of the Martian climate have a positive effect on plants or not.
- How can these findings be used in plant gene-editing research?

Search execution mechanism

First: A collection of all the geological properties of Mars that have been observed by the international space agencies, such as the properties of the soil and its components, as well as the physical properties such as temperature, gravity, atmospheric pressure and the gases that make up it.

Second: Searching for plants that can tolerate living in these difficult conditions

Third: Creating an environment that simulates the environment of Mars and planting plants in it

Fourth: Monitoring changes in the plant and recording the results

Information collected about Mars:

- It mainly contains carbon dioxide (95.32%).
- Molecular nitrogen gas (2.6%)
- Argon gas (1.9%).
- It also contains trace levels of water vapor, oxygen, carbon monoxide, hydrogen and other noble gases.
- The carbon dioxide-rich atmosphere of Mars is about 100 times less dense than Earth's on average
- It is nonetheless dense enough to support weather, clouds, and winds.
- The density of the atmosphere varies seasonally.
- The average temperature is about minus 80°F (-60°C) and minus 195°F (-125°C) near the poles in winter, and 70°F (20°C) at midday near the equator.
- Water is found on the surface of Mars in the form of ice often, and the two ice sheets in the north and south poles of the planet represent most of the ice on the surface, and there is also some ice in the rocks of the Martian crust
- There is also a small percentage of water vapor in the atmosphere of the planet, and on September 29, 2015 NASA officially announced the presence of salty liquid water flowing on its surface.
- The InSight rover that landed on Mars in September 2019 detected mysterious magnetic pulsations, as well as magnetic oscillations consistent with a reservoir of liquid groundwater extending deep beneath the entire surface of Mars. Liquid if there are salts and indeed there are salts on the surface of the planet.



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The tools used in the research



Empty containers



rocky soil



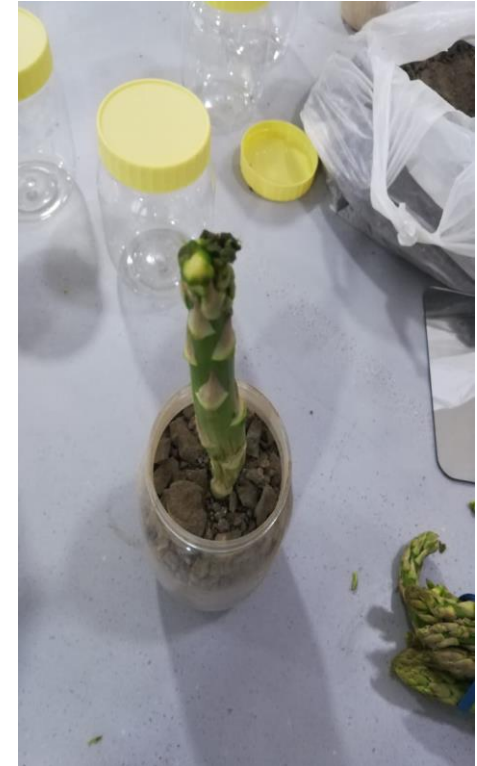
Asparagus





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Preparing the plant



- In this picture, we turned one of the samples upside down because we couldn't simulate twice the gravity of Mars
- We hypothesized by research that gravity has an effect on plant growth
- As it is known that the gravity of Mars is equal to 38% of the gravity of Earth
- Therefore, if gravity affects the height of the plant, then it is expected increase in plant height that the plant will grow in an upside-down position, in an upright position.
- We will multiply the difference between the two lengths by 62%, which is what would the height of the plant be if it were transplanted to Mars?





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- To ensure that the light reaches well, we put a lamp under the samples to replace the sun



- To save carbon dioxide, we put dry ice in a glass of water so that it sublimates and then enters the containers in which the plant is installed



- We compare the results with a control sample grown in natural ground conditions and with organic soils to notice the difference



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Project conclusion

Allah Almighty said in the Noble Qur'an: "Oh group of jinn and men, if you are able to pass through from the regions of the heavens and the earth, then execute (Surat 3)."

Just as God enabled us to reach a place like Mars, so that perhaps we will find in it knowledge that will benefit mankind, so we must not get tired or tireless in obtaining it. .

Source links

<https://www.reuters.com/article/oegin-mars-life-sg7-idARAOLR71944320080627>

https://ar.m.wikipedia.org/wiki/%D8%AA%D8%B1%D8%A8%D8%A9_%D8%A7%D9%84%D9%85%D8%B1%D9%8A%D8%AE

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<https://www.twinkl.co.uk/teaching-wiki/kwkb-almrykh>

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