

Fascination of Plants Day May 2021, by NIPGR, New Delhi

A PEEK INTO THE SECRET WORLD OF PLANTS

Press- Note

Date: 31-05-2021, Monday

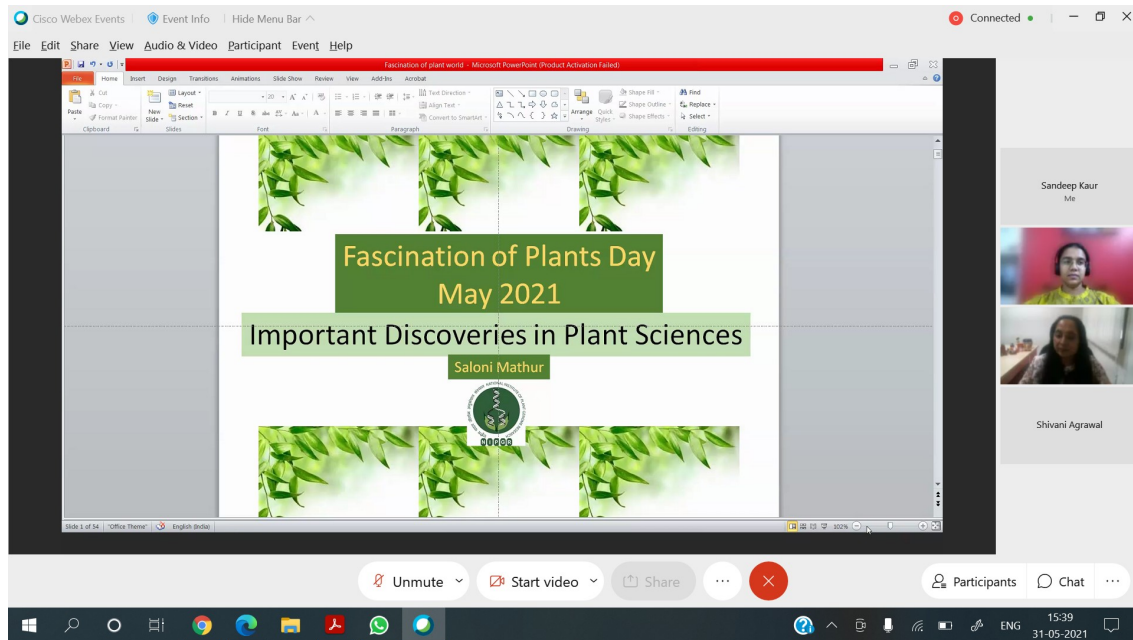
**Resource persons: Dr. Subhra Chakraborty, Director, NIPGR and
Dr. Saloni Mathur, Staff Scientist IV, NIPGR**

The Department of Biotechnology, Government of India, has planned an event to celebrate Fascination of Plants Day May 2021 “A Peek Into The Secret World Of Plants” as a virtual platform to connect research Institutes with undergraduate students. Under this, our college has been assigned to National Institute of Plant Genome Research (NIPGR), New Delhi. NIPGR is an autonomous institution aided by the Department of Biotechnology. Research at NIPGR focuses on functional, structural, evolutionary and applied genomics of plants, including crop plants. Through this event, our students and faculty virtually connect with NIPGR, New Delhi and got to know about the multifarious kinds of plant based research. It is a unique opportunity for science students at undergraduate level to get an exposure to high-level research.

Dr. Pinky Agarwal, Scientist, NIPGR gave welcome note on this event. **Resource person: Dr. Subhra Chakraborty, Director, NIPGR** showed all the labs to participants to NIPGR through a virtual tour. She started her lecture by telling the participants about the basics of science and research. She explained about the genesis of NIPGR laboratory and the work carried out by their students. She stressed upon the facilities available and research activities carried out in NIPGR. She explained Integrated Omics Analysis which included Metabolomics, Proteomics, Transcriptomics, Fingernomics and Genomics. She concluded her lecture discussing the Future of plant research mitigating Agricultural and clinical needs towards food & nutritional security. She mentioned the need to breed nutritive value added crops for better human nutrition and feed; breed varieties as source of medicinally important biomolecule for plant and human health; breed improved varieties resistant to specific diseases, pests and insects; linking agricultural innovations with clinical nutrition.

Resource person: Dr. Saloni Mathur, Staff Scientist IV, NIPGR gave her talk on “Ten Interesting Discoveries in Plant Sciences”. She started her lecture by telling the participants about the diversity in plants on the basis of their size, nutrition, adaptations, habit and habitat. She told about the discovery of first cell and microscope. She explained about the different discoveries made by different scientists in the field of Botany. Then she stressed upon the discoveries made by Mendel and explained his laws of inheritance. She also told the students

about discovery of transposons made by Barbara McClintock and how plants prepare their food by converting light into chemical energy. She concluded her lecture by throwing light on improved agriculture production through plant tissue culture and biotechnological techniques and describe these techniques as “game changer”. Science Faculty and nearly 50 science students attended the event. Dr. Pinky Agarwal, Scientist, NIPGR attended the questions of the participant’s and gave vote of thanks. It was an intellectual and exciting experience for all the participants.




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Speaking: Saloni Mathur

Viewing Saloni Mathur's app...nts



Wolffia
Plant size: 1/42 inch long and 1/85inch wide



Rafflesia
>3 feet

Participants: Sandeep Kaur Me, Pinky Agarwal, Saloni Mathur, Shivani Agrawal


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Speaking: Saloni Mathur

Plant size



Acharya Jagadish Chandra Bose Indian Botanic Garden
Ficus benghalensis

Participants: Sandeep Kaur Me, Saloni Mathur, Pinky Agarwal, Shivani Agrawal

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Speaking: Saloni Mathur

Viewing Saloni Mathur's appl...

Layout

Sandeep Kaur Me

Saloni Mathur

Pinky Agarwal

Shivani Agrawal

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Connected

Robert Hooke 1665

- An English scientist who cut thin sections of dried cork and looked at it with homemade microscope.
- He observed arrays of small cavities in a honey-comb like structure
- These structures resembled the box-like rooms in which monks slept and called them "cells"

Discovery of cells

Drawing by Hooke

Cork tissue

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Speaking: Saloni Mathur

Robert Brown 1831

- recognizes the “Nucleus” in orchid leaf cell.



Participants: Sandeep Kaur Me, Saloni Mathur, Pinky Agarwal, Shivani Agrawal

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Speaking: Saloni Mathur

Viewing Saloni Mathur's appl...

Matthias Jakob Schleiden 1838

- German lawyer who took up Botany into full-time pursuit studying plant parts under microscope
- suggested that every structure element of plants is composed of cells or their products
- Together with his friend Theodor Schwann, the “cell theory of life” was postulated in 1839.



Participants: Sandeep Kaur Me, Saloni Mathur, Pinky Agarwal, Shivani Agrawal

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Speaking: Saloni Mathur

Viewing Saloni Mathur's appl...

Carolus Linnaeus 1735

- Swedish Naturalist/Botanist
- his *Systema Naturae* ("The System of Nature") was published a hierarchical classification, or taxonomy. Each kingdom was subdivided into classes, orders, genera, species, and varieties
- it was the botanical section of *Systema Naturae* that built Linnaeus's scientific reputation.
- he expected each plant to possess male and female sexual organs (stamens and pistils).



Layout

Sandeep Kaur Me

Saloni Mathur (↑)

Pinky Agarwal

Shivani Agrawal

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Gregor Mendel 1866

- establishes the laws of heredity using pea plants



Layout

Sandeep Kaur Me

Saloni Mathur (↑)

Pinky Agarwal

Shivani Agrawal

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Speaking: Saloni Mathur

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Gregor Mendel 1866

- Studied traits that occur in distinct forms.
- Developed true-breeding varieties
 - When bred amongst themselves these plants produced offspring identical to the parent for that trait.
- Used mathematical analysis in his studies.

Plant Height	Tall (6-7 feet)	Dwarf (9-18 inches)
Flower Color	Purple	White
Flower Position	At leaf junctions (axial)	At tips of branches (terminal)
Pod Color	Green	Yellow
Pod Shape	Inflated	Constricted
Seed Color	Yellow	Green
Seed Shape	Round	Wrinkled

Participants | Chat

15:49
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Speaking: Saloni Mathur

Gregor Mendel 1866

- Law of dominance:** A dominant gene will express itself over the recessive gene.
- Law of segregation:** Parental genes are randomly separated to the germ cells such that each germ cell receives only one allele from each pair.
- Law of independent assortment:**

Genetic makeup (alleles)

Purple flowers PP White flowers pp

Gametes All P All p

F₁ generation (hybrids)

All Pp

Gametes 1/2 P Alleles segregate 1/2 p

Fertilization

F₂ generation

Sperm from F₁ plant

	P	p
Eggs from F ₁ plant	PP	Pp
	Pp	pp

Phenotypic ratio
3 purple : 1 white

Genotypic ratio
1 PP : 2 Pp : 1 pp

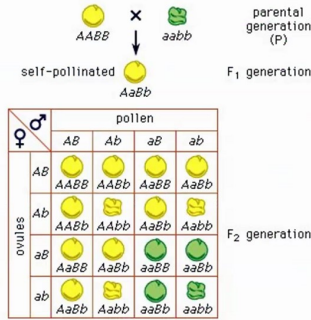
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15:50
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Speaking: Saloni Mathur, Swarup

• **Law of Independent Assortment:** Alleles of one gene are passed to offspring independently of the alleles of other genes.

- Applies to the inheritance of two or more genes simultaneously.



Sandeep Kaur Me

Swarup

Saloni Mathur

Ajeet Sharma

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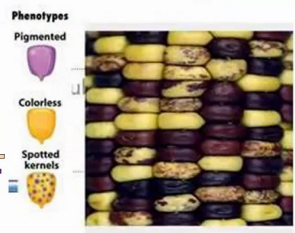
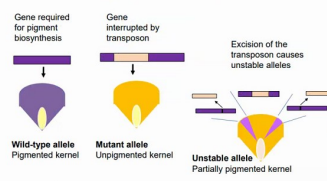
Speaking: Saloni Mathur

Barbara McClintock 1944

Maize geneticist Barbara McClintock discovers transposable elements (jumping genes) (McClintock received the 1983 Nobel Prize in Medicine or Physiology for her work)



Transposons can cause inactive or unstable alleles



Layout

Sandeep Kaur Me

Swarup

Saloni Mathur

Ajeet Sharma

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Speaking: Saloni Mathur

Viewing Saloni Mathur's appl...

Van Helmont 1643

Planted a willow sapling in a weighed amount of soil.
Only added water for next 5 years.
The tree had gained ~75 kg but soil had lost only 5g.

...wood, bark and roots arose out of water only



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Participants: Swarup, Ajeet Sharma

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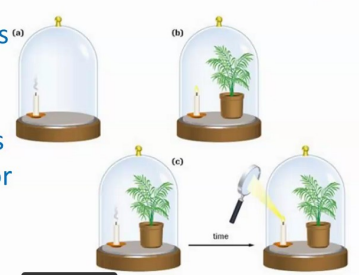
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Speaking: Saloni Mathur

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Joseph Priestley 1771

Conducted experiments with bell jar, candle and mint plant.
Discovered how gases play a role in photosynthesis.
...Plants release a gas (oxygen) necessary for combustion



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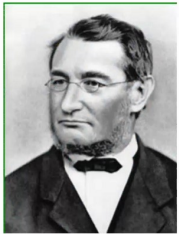
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Participants: Swarup, Ajeet Sharma

Speaking: Saloni Mathur

Julius Robert Mayer 1845

Proposed that plants convert light into chemical energy



Sandeep Kaur Me

Saloni Mathur

Swarup

Ajeet Sharma

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Speaking: Saloni Mathur

Richard Willstätter 1915

German chemist whose study of the structure of chlorophyll and other plant pigments won him the 1915 Nobel Prize for Chemistry



A. Chloroplast interior: Shows thylakoids (grana) and the Calvin cycle. Light energy is used to split water (H₂O) into oxygen (O₂) and hydrogen, which is used to reduce NADP⁺ to NADPH. CO₂ is fixed into sugar.

B. Light-harvesting chlorophyll complex: Shows chlorophyll molecules embedded in a protein matrix on the thylakoid membrane.

C. Chlorophyll molecule: Shows the chemical structure with a central magnesium atom coordinated by four nitrogen atoms in a porphyrin ring. The side chain includes a phytyl ester group (hydrocarbon tail) and a phytyl ether group (CH₂ for chlorophyll a, CHO for chlorophyll b).

Sandeep Kaur Me

Saloni Mathur

Swarup

Ajeet Sharma

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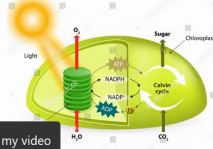
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Speaking: Saloni Mathur

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Samuel Ruben & Martin Kamen 1941

Used heavy isotope of oxygen (O^{18}) and proved that the oxygen evolved in photosynthesis comes from water and not carbon dioxide

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Participants: Swarup, Ajeet Sharma

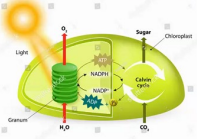
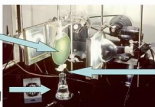

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Speaking: Saloni Mathur

Melvin Calvin 1948

Dark reaction Nobel prize-winning work

Added radioactive isotope $^{14}CO_2$ to an illuminated suspension of the single-cell green alga he stopped the alga's growth at different stages and used paper chromatography to isolate and identify the minute quantities of radioactive compounds (sugars)

Participants: Swarup, Ajeet Sharma


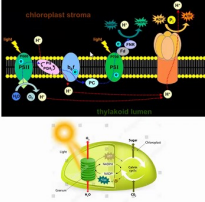
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Speaking: Saloni Mathur | Viewing Saloni Mathur's appl...

Rudolph A Marcus 1960

winner of the 1992 Nobel Prize for Chemistry for his work on the theory of electron-transfer reactions in chemical systems

Layout

Chat

This is very interesting and informative session...loved it. ☺

from atharav meena to everyone: 3:51 PM

VERY GOOD

from Aneeqa Phogaat 8b to everyone: 3:52 PM

nice

from Tushar Kaul to everyone: 3:54 PM

It's a bummer that her work didn't make part of the ncert 11/12th syllabus. We did study briefly about transposons, would have been nice to have a look at her work as well.

from AMITESH BISWAS to everyone: 3:55 PM

Mam not audible

from AMITESH BISWAS to everyone: 3:56 PM

The voice is cracking

from mishel agrawal to all panelists: 4:00 PM

so maam what components did the co2 provide?

from Vyom Singh Rajput to everyone: 4:00 PM

awesome

from Tushar Kaul to everyone: 4:01 PM

Light and dark reactions! Been a while since I revisited this.

To: All Attendees

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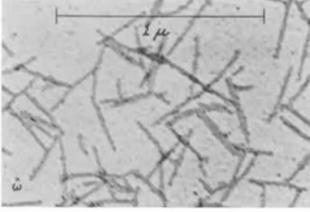

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Speaking: Saloni Mathur | Viewing Saloni Mathur's appl...

Wendell Meredith Stanley 1935

- American biochemist
- Wendell Stanley crystallizes and characterizes the first virus ever, tobacco mosaic virus (TMV).
- Stanley received the 1946 Nobel Prize in chemistry with John H. Northrop for this work

Layout

Saloni Mathur

Swarup

Ajeet Sharma

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Speaking: Saloni Mathur


Green Revolution

Norman Borlaug receives Nobel Peace Prize for his work on Green Revolution 1970

Known as the "Father of the Green Revolution," Borlaug helped lay the groundwork for agricultural technological advances that alleviated world hunger.



MS Swaminathan helped introduce Mexican semi-dwarf wheat plants to Indian fields and helped to bring about greater acceptance of modern farming methods



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Speaking: Saloni Mathur

DOMESTICATION OF CROPS



A piece of hieroglyphics showing harvesting of crops in ancient Egypt.

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Speaking: Saloni Mathur | Viewing Saloni Mathur's application

Wild Teosinte | Cultivated Modern Corn

Solanum lycopersicum

Solanum pennellii

Fruits | Leaves

1 cm | 1 cm

Speaking: Saloni Mathur

Plant tissue culture techniques
"Game changer"

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Speaking: Saloni Mathur

Scientists Gene-Edited Tomatoes to Make Them Grow Like Grapes

Look for them on the Mars menu someday.

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Speaking: Saloni Mathur

PLANT SCIENCE IS EXCITING CHALLENGING AND VERY RELEVANT

COME UP WITH NEW IDEAS, EVEN UNCONVENTIONAL IDEAS!!!!

If you know you are on the right track, if you have this inner knowledge, then nobody can turn you off... no matter what they say.

— Barbara McClintock

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Connected

Layout

Dr. Subhra Chakraborty

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Participants Chat

Sandeep Kaur Me

Abhishek Sengupta

Vandna Balya: Really nice Great am

16:19 31-05-2021