

Science Setu Webinars by NIPGR
“Next Generation Molecular Breeding for A Food Sufficient Future”

Press- Note

Date:20-05-2022, Friday

Resource person: Dr. Swarup K. Parida Scientist V, NIPGR

The Department of Biotechnology, Government of India, has planned “Science Setu” 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 the Science Setu program, 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. Swarup K.parida, Scientist V, NIPGR** started his lecture by giving an introduction about global food security. He emphasized on the role of green revolution in high yield of wheat and rice by hybrid method. He started his talk with crop domestication and era of genetics. In addition, he discussed about sequenced food product and India’s contribution in global genome sequencing project. Further, he explained his work on draft genome sequence of Desi, Kabuli and wild. After that He give relevance of pan genome in crop genomics. He also shares next generation molecular breeding for crop improvement. webinar was very resourceful. Faculty of Science and total science students attended the event. Dr. Pinky Agarwal, Scientist, NIPGR attended the questions of the participants and gave vote of thanks. It was an intellectual and exciting experience for all the participants.

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Speaking: SWARUP K. PARIDA

Green Revolution and First Generation Genomics Era

This timeline illustrates the convergence of agricultural and genomic milestones. Key events include the Green Revolution (1966), the establishment of the GenBank database (1966), the development of the first transgenic plant (1982), and the creation of the first recombinant DNA cloning (1971-1972). In the field of genomics, milestones include QTL mapping (1971-1972), DNA sequencing (1975), RFLP markers (1980), RAPD and STMS markers (1990), and the development of various marker types like AFLP, SAGE, and Microarray (1995). The timeline also marks the development of BLAST (1990), Map-based cloning (1992), and the first commercialized transgenic Flavr Savr tomato (1994). Other notable events include the development of SSLP and SSR markers (1992), the unlocking of potential in SNPs (1999), and the development of Map-based cloning for rust-resistant barley (1999).

1966 MS Swaminathan and Norman Borlaug Green Revolution
1966 GenBank database established
1971 1972 First recombinant DNA cloning
1971 1972 QTL mapping
1975 DNA sequencing
1975 Fredrick Sanger
1982 First transgenic plant
1982 1983 Kary Mullis Polymerase Chain Reaction
1985 Alec Jeffrey
1985 DNA fingerprinting
1985 Map-based cloning
1985 SSLP and SSR markers developed in plants
1990 RFLP markers developed in plants
1990 RAPD and STMS markers developed in plants
1990 BLAST developed
1990 Fine-mapping of QTLs
1992 Map-based cloning
1992 SSLP and SSR markers developed in plants
1992 1994 Flavr Savr tomato first commercialized transgenic
1994 AFLP markers developed in plants
1995 SAGE and Microarray
1995 Unlocking the potential in SNPs
1999 Map-based cloning rust resistant barley

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Rupinder kaur

from Anjali bsc medical sem6, kanya maha vidyalaya to everyone: 3:12 PM

Anjali bsc med sem6, kanaya maha vidyalaya

from Rupinder kaur to everyone: 3:13 PM

Rupinder kaur Bsc biotechnology sem 6 kmv Jalandhar

from Nivedita Sharma to everyone: 3:13 PM

Nivedita Sharma bsc. biotechnology sem 2 kanya Mahavidyalaya Jalandhar Punjab

from Taniya to everyone: 3:14 PM

Taniya ,Bsc. Biotechnology Sem 2 ,KMV Jalandhar

from Aditi Sharma to everyone: 3:14 PM

Aditi, Bsc. biotechnology sem-2, KMV Jalandhar

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Whole Genome Sequencing and Next Generation Genomics

This timeline tracks the evolution of genome sequencing technologies and the completion of major genome projects. Key milestones include the completion of the Arabidopsis genome (2002), the Human Genome working draft (2000) and its completion (2003), the Rice genome draft (2005), and the completion of the Human Genome (2003). The timeline also highlights the development of various sequencing platforms: ABI SOLID (2006), Ion Torrent (2007), Pac Bio (2010), and miniON (2015). Other significant events include the completion of the first NGS Roche 454 (2006), the development of GWAS (2005), Illumina (2008), Helicos (2012), Human ENCODE (2012), CRISPR/CAS9 (2013), 10X Genomics Chromium (2015), and the completion of the 10X Genomics Genome (2015). The timeline concludes with the development of Allele mining (2016) and Biobano Optical mapping (2017).

2000 Human Genome working draft completed
2000 TILLING
2000 nature
2000 Golden rice developed
2002 Arabidopsis genome sequencing completed
2002 2003 Human Genome sequencing completed
2003 nature
2003 Allele mining
2005 GWAS
2005 Rice genome draft completed
2005 Science
2006 First NGS Roche 454
2006 ABI SOLID
2007 Ion Torrent
2007 Pac Bio
2010 10X Genomics Genome
2010 QTL seq
2011 miniON
2012 2013 Human ENCODE
2012 2013 Helicos
2012 2013 CRISPR/ CAS9
2015 10X Genomics Chromium
2015 QTL seq
2015 10X Genomics Genome
2015 miniON
2016 Biobano Optical mapping
2017

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from Nivedita Sharma to everyone: 3:13 PM

Nivedita Sharma bsc. biotechnology sem 2 kanya Mahavidyalaya Jalandhar Punjab

from Taniya to everyone: 3:14 PM

Taniya ,Bsc. Biotechnology Sem 2 ,KMV Jalandhar

from Aditi Sharma to everyone: 3:14 PM

Aditi, Bsc. biotechnology sem-2, KMV Jalandhar

from Tanisha kumari 215209 to everyone: 3:17 PM

Tanisha kumari 215209 bsc med sem2 kanya maha vidyalaya jal. Punjab

from Siya Sharma to everyone: 3:17 PM

Siya , 215306 bsc medical sem4 Kanya Mahavidyalaya , Jalandhar

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The Sequenced Food Crops

Cereals

- Ananas comosus
- Brachypodium distachyon
- Eleusine coracana
- Eragrostis tef
- Hordeum vulgare
- Oryza indica
- Oryza sativa
- Secale cereale
- Setaria italica
- Sorghum bicolor
- Triticum aestivum
- Triticum turgidum
- Zea mays

Legumes

- Arachis duranensis
- Arachis ipaensis
- Betula pendula
- Cajanus cajan
- Cicer arietinum
- Cicer reticulatum
- Glycine max
- Glycine soja
- Lorus japonicus
- Lupinus angustifolius
- Medicago truncatula
- Phaseolus vulgaris
- Trifolium pratense
- Trifolium subterraneum
- Vicia faba
- Vigna angularis
- Vigna radiata
- Vigna unguiculata

Vegetables

- Barbarea vulgaris
- Beta vulgaris
- Brassica juncea
- Brassica napus
- Brassica oleracea
- Brassica rapa
- Capsella bursa-pastoris
- Capsella rubella
- Capsicum annuum
- Cucumis sativus
- Daucus carota
- Lactuca sativa
- Lagenaria siceraria
- Manihot esculenta
- Morardica charantia
- Moringa oleifera
- Raphanus sativus
- Solanum lycopersicum
- Solanum melongena
- Solanum pinnatifidifolium
- Solanum tuberosum
- Spinacia oleracea
- Thlaspi arvense
- Zizania latifolia

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tuba zainab

from tuba zainab to everyone: 3:18 PM
4538 bsc hons microbiology,rlac du

from ANNA ROSE BIJU to everyone: 3:19 PM
Anna Rose Biju,4549,bsc hons micrioniology rlac du

from Yashasvi to everyone: 3:19 PM
Yashasvi,4580, bsc microbiology,rlac du

from komal banalch to everyone: 3:19 PM
komal banalch msc botany Sem 2 kmv jalandhar

from Simran dhiman to everyone: 3:20 PM
Simran dhiman,Bsc. medical,KMV jalandhar

from Siya Sharma to everyone: 3:20 PM
muskaan gill, 215309 bsc medical, kmv jalandhar

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India's Contribution to Global Crop Plant Genome Sequencing Projects

The Rice Genome

ARTICLES

The map-based sequence of the rice genome

International Rice Genome Sequencing Project

The Wheat Genome

The Tomato Genome

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au

from Yashasvi to everyone: 3:19 PM
Yashasvi,4580, bsc microbiology,rlac du

from komal banalch to everyone: 3:19 PM
komal banalch msc botany Sem 2 kmv jalandhar

from Simran dhiman to everyone: 3:20 PM
Simran dhiman,Bsc. medical,KMV jalandhar

from Siya Sharma to everyone: 3:20 PM
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from Bharti Sharma 39 bsc medical sem6 to everyone: 3:23 PM
Bharti Sharma
215439
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Speaking: SWARUP K. PARIDA

Relevance of Pan-genome in Crop Genomics

A pan-genome refers to the full complement of genes of a biological clade, such as a species, which can be partitioned into a set of **core genes** that are shared by all individuals and a set of **dispensable genes** that are partially shared or individual specific.

Sub1A

Sub1 region

FR13A (IR40931-26) (indica)

Sub1A-1 (817 bp)

Sub1B-1 (451 bp)

Sub1C-1 (474 bp)

Nipponbare (japonica)

Sub1B-2 (451 bp)

Sub1C-2 (501 bp)

PSTOL1

Intolerant (Nipponbare; 145 kb)

Tolerant (Kasalath; 278 kb)

OsPupK20-1 (Putative protein kinase)

OsPupK20-2 (Putative protein kinase)

OsPupK20-1 (Putative protein kinase)

PSTOL1 (Putative protein kinase)

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from Bharti Sharma 39 bsc medical semb to everyone: 3:23 PM

Bharti Sharma
215439
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from Sneh Priya 4544 to everyone: 3:25 PM

Sneh Priya

from Shreya Sain to everyone: 3:25 PM

Shreya Sain
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Bsc Hons Microbiology
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from Sneh Priya 4544 to everyone: 3:25 PM

Sneh Priya, 4544, Bsc H Microbiology, sem 2,
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