

Proceedings of the One-Day International Webinar on Speed Breeding of Crops

Organized by the Institute of Horticulture Technology (IHT) in Collaboration with Saveer Biotech Limited

16th November 2024 | Greater Noida, Uttar Pradesh, India



ISO 9001 : 2008

INTERNATIONAL WEBINAR ON SPEED BREEDING OF CROPS

Jointly Organized By

Institute of Horticulture Technology & Saveer Biotech Limited
Greater Noida, Uttar Pradesh, India Greater Noida, Uttar Pradesh, India

Date: November 16, 2024

Venue
Institute of Horticulture Technology, Greater Noida, U. P., India



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Introduction

The International Webinar on *Speed Breeding of Crops* convened experts, researchers, and stakeholders to address global agricultural challenges—climate change, food insecurity, and the need for sustainable practices. Speed breeding, a transformative technique leveraging controlled environments to accelerate crop cycles, emerged as a pivotal solution. Over 100 delegates participated in the event, which featured keynote addresses, technical sessions, and a virtual tour of Punjab Agricultural University's (PAU) speed breeding facility.

Inaugural Session

Dr. R. S. Kureel, Director IHT, welcomed attendees, stressing the urgency of climate-resilient crops for food security. Notable addresses included:

1. **Dr. A.K. Singh**, Vice Chancellor, RLB Central Agricultural University:
 - a) Highlighted speed breeding's potential to reduce breeding cycles from years to months.
 - b) Emphasized interdisciplinary collaboration for sustainable agriculture.
2. **Dr. Sudhakar Pandey**, ADG (Horticulture), ICAR:
 - a) Outlined ICAR's initiatives integrating speed breeding with genomics and molecular markers.
 - b) Advocated for public-private partnerships to scale innovations.

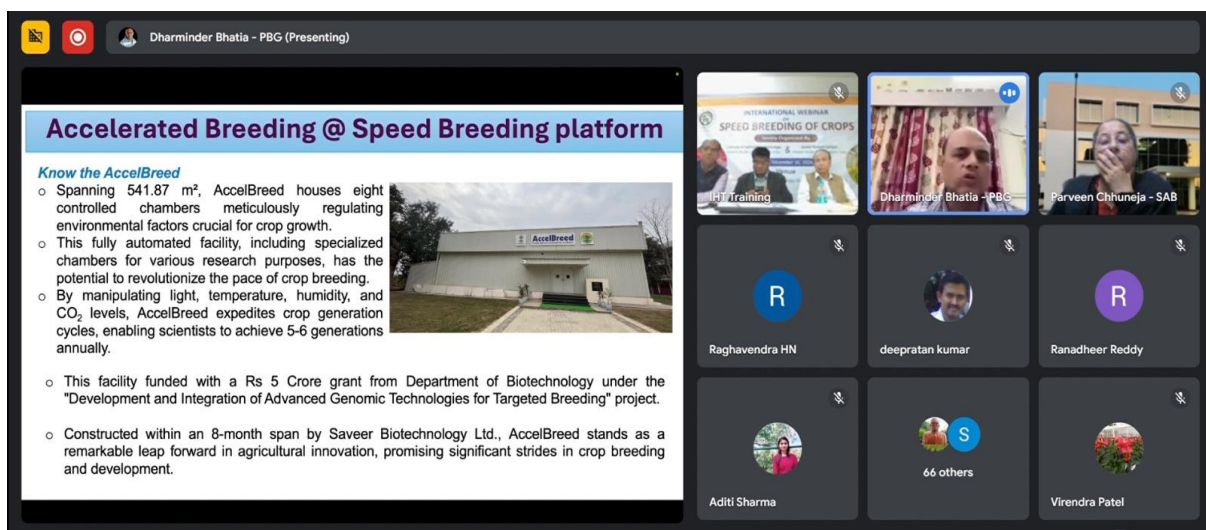
Technical Sessions

Session 1: Varietal Development Using Speed Breeding

Chaired by **Dr. Praveen Chhaneja** (Director of the Department of Biotechnology at Punjab Agricultural University (PAU), Ludhiana), Rapporteur: **Dr. Vijay K. Koul** (Associate Director, IHT Greater Noida)

1. **Dr. Uma Maheshwar Singh** (Senior Breeder, IRRI, Varanasi, UP):
 - a) Demonstrated rice breeding cycles reduced to 1–2 years via optimized photoperiods (20–22 hours) and light spectra.
 - b) Stressed the role of speed breeding in preserving genetic diversity amid climate volatility.
2. **Dr. Dharmendra Bhatia** (Senior Breeder, Dept. of Biotechnology PAU, Ludhiana, Punjab):
 - a) Showcased PAU's 8-climate-chamber facility enabling 6 generations/year for wheat/rice.
 - b) Addressed cost challenges and proposed polyhouse conversions for affordability.
3. **Dr. S. Manonmani** (Professor and Head of the Department of Rice at the Centre for Plant Breeding and Genetics (CPBG), TNAU, Coimbatore):
 - a) Reported 50% reduction in breeding time (4→2 years) for rice using controlled environments.
 - b) Highlighted synergies between speed breeding and marker-assisted selection.
4. **Dr. Pathik Patel** (Head of the Department of Genetics and Plant Breeding at Navsari Agricultural University, Navsari):
 - a) Advocated automation and LED systems to streamline speed breeding for chickpea and sugarcane.

Q&A: Discussions covered protocol standardization, cost-sharing models, and inter-institutional collaboration.



Accelerated Breeding @ Speed Breeding platform

Know the AccelBreed

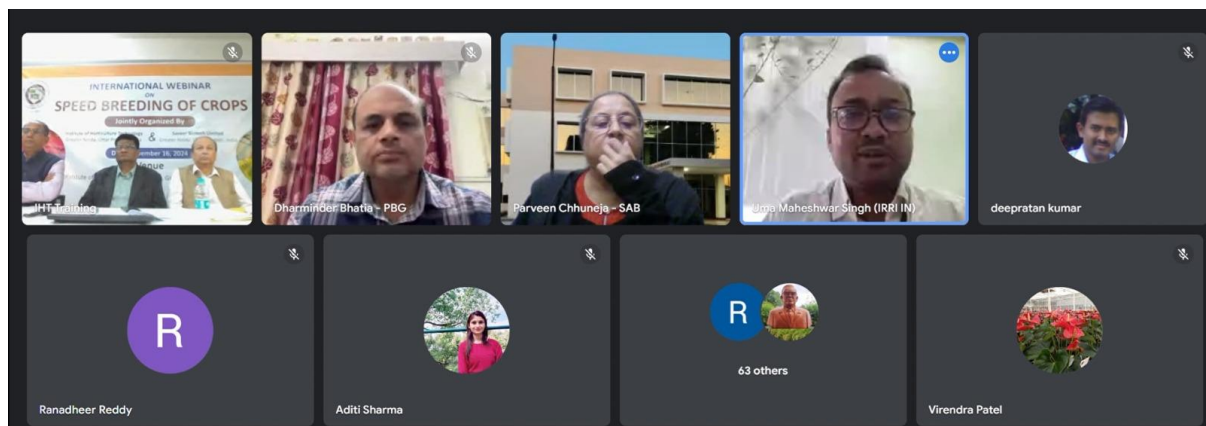
- Spanning 541.87 m², AccelBreed houses eight controlled chambers meticulously regulating environmental factors crucial for crop growth.
- This fully automated facility, including specialized chambers for various research purposes, has the potential to revolutionize the pace of crop breeding.
- By manipulating light, temperature, humidity, and CO₂ levels, AccelBreed expedites crop generation cycles, enabling scientists to achieve 5-6 generations annually.
- This facility funded with a Rs 5 Crore grant from Department of Biotechnology under the "Development and Integration of Advanced Genomic Technologies for Targeted Breeding" project.
- Constructed within an 8-month span by Saveer Biotechnology Ltd., AccelBreed stands as a remarkable leap forward in agricultural innovation, promising significant strides in crop breeding and development.

Participants in the meeting include: IHT Training, Dharminder Bhatia - PBG, Parveen Chhaneja - SAB, Raghavendra HN, deepatan kumar, Ranadheer Reddy, Aditi Sharma, 66 others, and Virendra Patel.

Session 2: Innovations and Infrastructure

Chaired by Dr. R. S. Kureel (Director, IHT), Rapporteur: Dr. Neha Pandey (Senior Biotechnologist, IHT, Greater Noida)

1. **Er. Sanjay Sudan** (Director, Saveer Biotech):
 - a) Detailed Saveer's role in establishing speed breeding facilities at IRRI, NABI, and TNAU.
 - b) Announced plans to integrate global cutting-edge technologies.
2. **Dr. Anil Khar** (Head, Regional Research station, IARI, Pune, Maharashtra):
 - a) Shared breakthroughs in onion breeding using double haploidy and molecular markers.
3. **Dr. Umesh Kohli** (Retd. Dean Dr. YSR University, Solan):
 - a) Proposed AI and robotics to enhance phenotyping in speed breeding for vegetables.



Session 3: Policy and Future Directions

Chaired by Dr. R. K. Trivedi (Executive Director, National Seed Association of India (NSAI), New Delhi), Rapporteur: Dr. Virendra Patel (Senior Scientist, IHT, Greater Noida)

1. **Dr. Neha Pandey** (Senior Biotechnologist, IHT, Greater Noida):
 - a) Outlined IHT's training programs to operationalize speed breeding facilities and the scope of having Public – Private Collaboration for crop improvement for food security.
 - b) Proposed IHT's collaborating with stakeholders, including seed companies, research institutes, and universities as the Institute can co-develop and refine speed breeding protocols, ensuring the adoption of best practices tailored to specific crops
2. **Dr. R. K. Tripathi** (Retd., Director Seeds Ministry of Agriculture and Farmers Welfare, GOI):
 - a) Urged policy reforms to boost GM crop adoption and public-private R&D sharing.

Virtual Tour

Dr. Dharmendra Bhatia (PAU) led a tour of PAU's facility, showcasing:

- Climate-controlled chambers enabling 6 wheat/rice generations annually.
- Strategies to mitigate high operational costs (e.g., hybridizing with traditional breeding).

Valedictory Session

Dr. S. K. Malhotra, Vice Chancellor (MPHU, Karnal), concluded:

- Speed breeding is critical for pulses and staple crops to reduce import dependency.
- Called for institutionalizing speed breeding protocols across crops.

Dr. Vijay K. Koul (IHT) expressed sincere thanks to all speakers, panellists and participants for making the webinar on Speed Breeding of Crops a success. He specifically acknowledged the Chief Guest, **Dr. A.K. Singh**, Vice Chancellor of RLB Central Agricultural University, for his inspiring inaugural address, as well as **Dr. Sudhakar Pandey** (ICAR) for his keynote on speed breeding's role in global food security.

He also highlighted **Dr. S.K. Malhotra's** valedictory address, emphasizing collaborative efforts to tackle agricultural challenges.

Dr. Kureel, Director of IHT, concluded by expressing optimism that the webinar's discussions would lead to fruitful collaborations and innovations in speed breeding, advancing sustainable agriculture

Key Outcomes

1. **Technology:** Speed breeding slashes varietal development time by 50–70% via controlled environments.
2. **Collaboration:** Universities, ICAR, and private sectors must unite to standardize protocols.
3. **Policy:** Lower regulatory barriers for GM crops and incentivize infrastructure investments.
4. **Scalability:** Explore cost-effective adaptations (e.g., polyhouses) for wider adoption.

Acknowledgements

The organizers thanked IHT R&D teams, Saveer Biotech's technical support, and all delegates for fostering a collaborative roadmap to revolutionize crop breeding

