



International Plant Physiology Virtual Symposium
2021 (IPPVs -2021) on
**“Physiological Interventions for
Climate Smart Agriculture”**

11 - 12th March, 2021



Souvenir & Proceedings

Organized by

**ICAR-Sugarcane Breeding Institute, Coimbatore
Indian Society of Plant Physiology (ISPP), New Delhi,
Society for Sugarcane Research and Development (SSRD),
Coimbatore
&
NAAS Chapter Coimbatore**



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&
NAAS Chapter Coimbatore

International Plant Physiology Virtual Symposium 2021 (IPPVS -2021)

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Message



TAMIL NADU AGRICULTURAL UNIVERSITY

Prof. N. KUMAR, Ph.D., F.H.S.I., F.S.P.H.,
Vice-Chancellor

Coimbatore - 641003
Tamil Nadu, India

MESSAGE

I am glad to note that the ICAR-Sugarcane Breeding Institute in collaboration with Indian Society of Plant Physiology (ISPP), New Delhi, NAAS Chapter, Coimbatore, Society for Sugarcane Research and Development (SSRD), Coimbatore and SAU'S South Zone is organizing the International Plant Physiology Conference on "*Physiological Interventions for Climate Smart Agriculture*" during 11-12 March 2021 at ICAR – SBI, Coimbatore, Tamil Nadu.

Climate change is perceived everywhere in every sphere and Agriculture is not an exception. Owing to the change in climate perceptible all through the World, it poses newer challenges to the agricultural scientists especially in terms of enduring the crops with resistance to abiotic stresses like increased salinity, flash flooding, drought, heat stress, cold stress etc. and biotic stresses involving pest and pathogens, directly impacting the food production *vis-a-vis* the food security of Nation.

Handling the upheavals of the climate change involves the understanding of the basics of Climate Smart Agriculture, its components and practices. This Conference will pave a platform for the scientists and academicians to interact and evolve newer consensus to face the impact of climate change in the farming sector to enhance the capability of the farmers, traders and other stakeholders.

I congratulate the organizers for taking up the theme and wish the participants to have lively sessions, wonderful stay and fruitful deliberations. Deliberations will bring out solutions which would heal the crops.

I wish the organizers for the successful conduct of the seminar.



(N. KUMAR)

Date: 24.02.2021
Place: Coimbatore

Message



ಡಾ. ಮಹಾದೇವ ಬ. ಚೆಟ್ಟಿ

ಕುಲಪತಿ

Dr. Mahadev B. Chetti

M.Sc. (Agri.), Ph.D. (IARI, New Delhi), Post Doc. (UCLA, USA)

VICE-CHANCELLOR



ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
UNIVERSITY OF AGRICULTURAL SCIENCES, DHARWAD

MESSAGE

I am happy that the **International Plant Physiology Virtual Symposium 2021 (IPPVS-2021) on “Physiological Interventions for Climate Smart Agriculture”** is being organized by ICAR-Sugarcane Breeding Institute (SBI), Coimbatore, Indian Society for Plant Physiology (ISPP), New Delhi, NAAS-Coimbatore Chapter and Society for Sugarcane Research and Development (SSRD) in association with SAU's South Zone on 11-12 March 2021.

Considering the importance of enhancing the crop productivity, especially under stress conditions resulting from climate change, the Conference emphasizes on the theme area of physiological interventions in cereals, pulses, oilseeds, commercial crops, horticultural crops, and medicinal and plantation crops.

It is felt in many crops that the yield levels have reached a plateau, and improving the productivity under abiotic stress conditions like drought, high temperature and salinity resulting from climate change is a great challenge. I am sure the experts in the field would discuss the current understanding on the molecular basis of physiological traits along with advanced phenomics and other multiomics for breaking the yield barriers and improving crop productivity as it has demonstrated in a few crops. The outcomes would not only help the young researchers to gain up-to-date knowledge, but also contribute for devising the useful strategies.

I wish all the participants of IPPVS-2021 a productive virtual get together and a successful Conference.

(M.B.Chetti)

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Message



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Main Campus, Vellanikkara, K.A.U. P.O., Thrissur - 680 656, Kerala

R. CHANDRA BABU, Ph.D., Post-doc., (USA)
VICE - CHANCELLOR

No.VC/31/2021

Dated 08/03/2021

MESSAGE

I appreciate the joint initiative of Indian Society for Plant Physiology (ISPP), New Delhi, ICAR-Sugarcane Breeding Institute (SBI), Coimbatore, NAAS - Coimbatore Chapter & Society for Sugarcane Research and Development (SSRD) in organizing the International Plant Physiology Virtual Symposium 2021 (IPPVS-2021) on 11 & 12 March, 2021. The deliberations on "Physiological Interventions for Climate Smart Agriculture" will definitely contribute in improving and stabilizing the crop productivity in stressful environments.

This conference should play key role in highlighting the importance of physiological understanding and resultant interventions in modulating plant responses to environmental vagaries, through genetic and management strategies. I am certain that the conference will serve as an apt platform for productive scientific deliberations between several subject experts and young researchers and students. The novel strategies for climate smart agriculture focusing on the mechanisms of yield formation, resilience and crop quality under climate stress will have positive impact in ensuring food and nutritional security. In this direction, plant physiological and agronomic research has advanced with the advent of precision phenotyping tools viz., remote sensing, robotics, sensor technology, drones, machine learning, artificial intelligence for high throughput phenotyping of germplasm performance in stress environments. Deep learning technologies have aided big data analytics translating the understanding into plant-specific models for climate smart precision agriculture. This conference assumes great potential in promoting collaborations for interdisciplinary research in similar areas across the country and with international partners.

I wish all success for this virtual symposium

(R. Chandra Babu)

Message



डा. बक्शी राम
निदेशक
Dr. BAKSHI RAM
Director

भा.कृ.अ.प - गन्ना प्रजनन संस्थान
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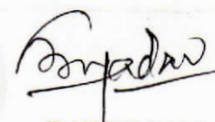
MESSAGE

It is, indeed, a great pleasure to welcome the participants of the International Plant Physiology Conference entitled on "*Physiological Interventions for Climate Smart Agriculture*" scheduled during March 11-12, 2021 at The World renowned ICAR - SBI, Coimbatore. The Conference is being organized by the ICAR-Sugarcane Breeding Institute in collaboration with Indian Society of Plant Physiology (ISPP), New Delhi, Society for Sugarcane Research and Development (SSRD), Coimbatore, NAAS Chapter Coimbatore and SAU'S South Zone

The theme of the conference on "*Physiological intervention for developing climate resilient crops*" is appropriate and calls for immediate attention by plant physiologist and other scientist across the country. Plant physiologist along with breeders and molecular biologist form a cohesive group that is entrusted with the responsibility of improving the productivity of crop plants keeping the view the dwindling natural resources and climate change. The understanding of the mechanism underlying the physiological process and effective manipulation of these processes to tailor plant types with improved resources use efficiency, stress tolerance, quality and productivity of the crops is the need of hour.

I am very glad that there has been a very overwhelming response from the scientific community from different parts of the country and from eminent international researchers.

I wish all the success to this event


(BAKSHI RAM)

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Message



**National Academy of Agricultural Sciences (NAAS)-
Coimbatore Chapter
ICAR-Sugarcane Breeding Institute
Coimbatore 641007**

**Dr. R. Viswanathan FNAAS
Convener**

03.03.2021

The National Academy of Agricultural Sciences (NAAS), established in 1990, is among the youngest of the Science Academies in India. It owes its origin to the vision of the late Dr. B. P. Pal, FRS. The Academy's role is to provide a forum to Agricultural Scientists to deliberate on important issues of agricultural research, education and extension and present views of the scientific community as policy inputs to planners, decision/opinion makers at various levels. To achieve this, the Academy organizes and supports national and international congresses, conferences, seminars, symposia, workshops and brainstorming sessions on critical issues in the field of agricultural sciences. The Academy accords recognition to scientists at various levels, and encourages cutting edge research in different fields of agricultural sciences.

To support NAAS activities, 12 NAAS Regional chapters have been functioning in the country. Coimbatore chapter which covers Tamil Nadu, Kerala, Puducherry and Lakshadweep is functioning from 2018 onwards at ICAR-SBI and conducting meetings, brains storming sessions and discussions on the issues related to the region. The chapter has 36 NAAS Fellowships of eminent scientists in various sectors of agriculture. Also NAAS policy papers are being translated to Tamil and Malayalam for the benefit of the famers and stakeholders in the region by the chapter. The chapter has joined hand with Indian Society for Plant Physiology (ISPP), New Delhi in conducting International Plant Physiology Virtual Symposium 2021 (IPPVS -2021) on "Physiological Interventions for Climate Smart Agriculture" March 11-12, 2021 along with our Institute and SSRD. The Conference is expected to highlight climate change issues pertinent to the region, impact to crop production and agricultural policies and climate mitigation strategies for better future. I thank ISPP for providing us a platform to hold the Brainstorming Session (BSS) on "Impact of Climate changes on abiotic and biotic stresses in crop plants" to be conducted during the conference. Since the climate change issues directly impact both abiotic and biotic stress factors across the crop and animal systems, the proposed BSS will deliberate and discuss on this area to identify key action points for policy planning and mitigation strategies.

(R. Viswanathan)

IPPVS 2021 - Preface

Climate change is taking a toll on India's agricultural productivity and farmers' income. Farmers have been facing challenges of unprecedented rainfall and temperature extremes. As a result crops are exposed to multiple stresses such as drought, flood increased high temperature, elevated carbon dioxide and incidence of pests and diseases. All these factors reduce the crop productivity, accounting for huge economic loss which calls for immediate attention and intervention from the scientific community. To deal with such situation, a basic understanding of the stress tolerance mechanisms and innovation in mitigation strategies are essential. In this context, the International Plant Physiology Virtual Symposium 2021 (IPPVS-2021) on "Physiological interventions for climate smart agriculture" is proposed to be organized for improving and stabilizing the crop productivity under the climate change scenario. The conference will also provide an opportunity for the researchers to discuss strategies to combat the adverse effects of climate change on important crops.

The Indian Society for Plant Physiology (ISPP), established in 1958, is one of the oldest academic societies in India. It owes its origin to the vision and zeal of eminent plant scientists Prof. Boshi Sen, Prof. R.D. Asana, Prof. J.J. Chinoy and Prof. K.K. Nanda and the financial support of Government of India. The main focus of the society is to bring plant scientists together to work synergistically towards solving the pressing problems facing humankind and to generate a critical mass to provide a strong platform for deliberations on important issues of agricultural research, education and extension and presenting views of the scientific community as policy inputs to planners and decision makers at national/ international levels.

To achieve this, the society organizes and supports national and international conferences, seminars, symposia, workshops and brainstorming sessions on important issues of plant biology and agricultural sciences. About 1700 life members and more than 2000 annual members from 5 five administrative zones are actively associated with this prestigious ISPP. In South zone, we do have about 200 life members including starworts like Prof. Dr. Gurumoorthy, Prof. Udaykumar, Prof. A.S. Ragavendra, Prof. M. B. Chetty, Prof. R. Chandarababu, Prof. Vijayaragavan are associated with ISPP and promote the activities pertaining to plant physiology related areas among our emerging scholars and students of this region. The society has been continuously engaged in highlighting the advances in the field of plant physiology and related disciplines by way of organizing national and International conferences in a systematic manner and also by publishing the scientific work in Plant Physiology Reports formerly known as Indian Journal of Plant Physiology. Which is Scopus indexed journal published by springer publishers. I happy to highlight that Plant Physiology Reports soon find the place in JCR listed journals. The society aims to inculcate the research spirit among the scientific community associated with plant and life sciences through national and zonal seminars.

IPPVS 2021 - Preface

In this context, International Plant Physiology Virtual Symposium 2021 (IPPVS -2021) on “Physiological Interventions for Climate Smart Agriculture” is organized at ICAR- Sugarcane Breeding Institute, between 11 & 12 March, 2021, by Indian Society for Plant Physiology-South zone, in collaboration with National Academy of Agricultural Science (NAAS), Coimbatore chapter, Society for Sugarcane Research and Development (SSRD), Coimbatore & State Agriculture Universities of south zone.

There was an awe-inspiring response from the researchers and scholars from all over the globe for the symposium and a total of 245 abstracts were received in five different themes i.e. physiological interventions in cereals and fodder crops, pulses and oil seeds, commercial crops, horticultural crops and medicinal and plantation Crops. Over all 310 participants including lead lecturers from Kansas State University, USA and University of Western Australia. Nationwide delegates from 28 universities/ institutions representing from 12 states and have shown their keen interest and participated in offline as well as through online mode of Zoom and Webex platforms of this conference.

The editorial committee thanks all the participants for sending the abstracts in time and also acknowledges the scientists Dr.V.Krishnapriya, Dr. T. Arumuganathan, Dr. G. S. Suresha, Dr. R.Valarmathi, Dr.P.Geetha, and Dr.S.Anusha for reviewing and compiling the abstracts. Thanks are also due to Dr. D. Puthira Prathap, Dr. P. Murali, Mrs. D. Subhadra, Mr. S. Karupusamy, for facilitating online connectivity of Zoom and Webex platforms of this international conference

We thank the registration committee chairperson Dr. N.Geetha and Committee members for their wonderful support. Thanks are also due to Dr. C. Sankaranarayanan for arranging nice refreshment to offline participants as a committee chairperson. Thanks to Smt. Lalitha Rani, for her secretarial support for the IPPVS-2021. Special thanks to Dr. P. Jeyakumar, Dr. A.H. Prakash, Dr. M. K. Kalarani, Dr. A. Senthil and Dr. A. Selvi for screening the technical abstracts.

We hope the proceeding of IPPVS, 2021 will serve as highly valuable document for the scientist, researchers and policy makers across the globe, who were involved in combating climate change effect and mitigation strategies through physiological interventions.

*R. Gomathi
M. Prakash
C. Rajasekaran
Viswanathan C
Bakshi Ram*

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International Plant Physiology Virtual Symposium 2021 (IPPVS -2021)
“Physiological Interventions for Climate Smart Agriculture”

11-12th March, 2021, 9.30 AM to 06.00PM (IST)

Organized by: ICAR-SBI, Coimbatore, ISPP-New Delhi, NAAS-Coimbatore Chapter, SSRD &SAU's South Zone

Organizing Secretary: Dr.R.Gomathi, ICAR-SBI, Coimbatore

Coordinators: Dr.M.Prakash, Annamalai University, TN; Dr.C.Rajasekaran, VIT, Vellore

Contact phone and Email ID: 9487477058; ippvs2021@gmail.com

Programme Schedule

Day I: 11th March 2021	
Zoom link: https://us02web.zoom.us/j/88514959938?pwd=RHRIUmNYckgwTGM0NnF1Sk5xcU9Wdz09 Meeting ID: 885 1495 9938 Passcode: 110321	
9.30 AM to 11.00 AM	Inauguration Welcome Address: Dr.R.Gomathi, Zonal Secretary (S)- ISPP, ICAR-SBI Coimbatore Keynote Address: Dr. Bakshi Ram, Director, ICAR-SBI, Coimbatore Presidential Address: Dr M. B. Chetti, VC, UAS (Dharwad), Karnataka & President, ISPP, New Delhi Special Address : Dr. R. Chandra Babu, Vice - Chancellor , KAU, Kerala Chief Guest Address : Dr. N.Kumar, Vice - Chancellor, TNAU, Coimbatore Vote of Thanks: Dr. A. H. Prakash, Project Coordinator & Head ICAR-Central Institute for Cotton Research, Regional Station, Coimbatore
11.00 -11.30 AM	Tea Break
11.30 AM – 12.30PM	PLENARY SESSION-I Chair: Dr. M. B. Chetti, President, ISPP, New Delhi and Vice-Chancellor, UAS, Dharwad Plenary Lecture: Dr. P.Vara Prasad, Kansas State University, USA “Modelling Climate Change: Impacts on Crop Productivity”
12.30 – 12.45	Discussion
12.45- 13.30	Lunch Break
13.30–16.00	CONCURRENT SESSION A Theme I: Physiological Interventions in cereals and fodder crops
	Chair: Dr. Madan Pal, Professor (Plant Physiology), ICAR-IARI, New Delhi Co-Chair: Dr.Arun Kumar Shanker, Principal Scientist, ICAR-CRIDA, Hyderabad

	Rapporteurs: Dr.V. Ravichandran, Associate Professor, TNAU, Coimbatore Dr.M.D. Janaguiraman, Assistant Professor, TNAU, Coimbatore
Lead Speakers	
13.30-13.50	Dr. M. Maheswari, ICAR-CRIDA, Hyderabad “Physiological and molecular intervention to improve abiotic stress tolerance in major cereals”
13.50-14.10	Dr. Viswanathan C., Principal Scientist and Head (A), Division of Plant Physiology, ICAR-IARI, New Delhi “Genome editing for developing climate resilient in rice”
14.10-14.30	Y.A. Nanja Reddy Professor & Head (Department of Plant Physiology), UAS, GKVK, Bangalore, Karnataka “Finger Millet for Changing Climate Scenario”
14.30-14.50	Dr. ArunKumar Shanker, Principal Scientist, ICAR-CRIDA, Hyderabad “Chlorophyll fluorescence and fast fluorescence kinetics as a ubiquitous tool to study abiotic and biotic stress”
14.50-15.10	Dr. N. Nataraja Karaba Professor, Department of Crop Physiology, UAS, GKVK, Bangalore, Karnataka “Plant trait manipulation by using endophytes under challenging environment”
Session Speakers (Selected Oral presentation)	
15.10-15.20	K. Anitha, A. Senthil, N. Sritharan and R. Ravikesavan Assessing the Drought Mitigating Effect of Melatonin in Finger Millet
15.20-15.30	R. Megala, P. Jeyaprakash, V. BabuRajendra Prasad and D. Vijayalakshmi* Indigenous Rice Varieties with Early Flower Opening Time Escape High Temperature Stress
15.30-15.40	S. Lakshmi*, V. Ravichandran, K. Krishnasurendar and L. Arul Root anatomical and morphological changes in rice genotypes under saline stress
15.40-15.50	R Elanchezhian, Singh P, Biswas AK and Patra AK Nitrogen nutrition, uptake and its use efficiency in wheat
15.50-16.00	D.Vijayalakshmi, C. Vijayalakshmi, M.Raveendran, M.ArumugaPerumal, A. Vinitha and Mayumi Yoshimoto Canopy micrometeorology and impacts of thermal environment on physiological traits of rice to identify potential adaptation strategies
Posters Short Presentation (Recorded)	
16.00-16.20	Sourobh Maji, Nidhi Dwivedi, Mohd Waseem, Pallabi Thakur, Vinay Kumar, Swarup K. Parida and Jitendra K. Thakur The mediator subunit OsMED15a is a transcriptional co-regulator of seed size/weight-modulating genes in rice
	N. Veronica, D. Subrahmanyam, Y. Ashoka Rani, K.L.N. Rao, M. Lal Ahamed, P. Prasunna Rani, P. Yugandhar, Vishnu Kiran and S.R. Voleti Dr. Veronica Impact of high temperature on physiological, biochemical traits and yield in rice genotypes
	P.R. Soumya, Renu Pandey, Amanda J. Burridge, Nisha Singh, Ritu Batra, Sanjay Kalia, Vandana Rai and Keith J. Edwards Genome-wide association study for phosphorus efficiency traits in bread wheat (<i>Triticum aestivum</i> L.)

	Sneha, H.V. Ramegowda, Maria Vera J. Da Costa, K.N. Nataraja and P. Chandrashekhar Reddy Characterization of combined drought and heat responsive genes identified in rice
	Pragya Yadav, Shashank K. Yadav, Meenu Singh and Viswanathan Chinnusamy Regulated expression of an Isopentenyl transferase gene (<i>IPT9</i>) in rice for improvement of yield and osmotic stress tolerance

13.30 pm – 16.00	Day I
	CONCURRENT SESSION B Theme 2: Physiological Interventions in pulses and oil seeds Cisco WebexLink: https://sugarcanebreedinginstitute.webex.com/sugarcanebreedinginstitute/j.php?MTID=m7704f72c212b1ac5db6b639ac4bd7a14 Meeting number: 184 640 8972 Password: 11032021
	Chair: Dr. M. Prakash, Professor (Physiology), Annamalai University, Chidambaram Co-Chair: Dr. A. Senthil, Assoc. Professor, TNAU, Coimbatore Rapporteurs: Dr. D. Vijaylakshmi, Assoc. Professor, TNAU, Coimbatore Dr. C. Appunu, Senior Scientist, ICAR-SBI, Coimbatore
Lead Speakers	
13.30-13.50	Prof. Dr. Kadambot Siddique , The University of Western Australia(UWA), “Terminal drought and phosphorus acquisition in chickpea”
13.50-14.10	Dr. P.S. Basu, Principal Scientist & Head (Acting), ICAR-IIPR, Kanpur, UP “Physiological characterization of tolerance to major abiotic stresses in pulses for mitigating climate change”
14.10-14.30	Dr.M.Vanaja, Principal Scientist (Plant Physiology), ICAR-CRIDA, Hyderabad “Phenology, physiology and yield of pigeon pea under enhanced CO₂ and temperature”
14.30-14.50	Dr.Rathankumar Pasala, Principal Scientist (Plant Physiology) ICAR-IIOR, Rajendranagar, Hyderabad “Adaptation and mitigation strategies in oilseeds crop under abiotic stress: a progress towards climate resilience”
Session Speakers (Selected Oral presentation)	
14.50-15.00	Jeshima Khan Yasin*, Paramesh Mathavaraj, KarthigaSelvaraj, Udhayakumar M, Imran Khan A, Mohammed Ameer Suhail. S. A, Anil Kumar Singh, Arumugam Pillai, NidhiVerma, Shabir H Wani and Viswanathan Chinnusamy Induced aerenchyma confers flood tolerance in a novel pigeonpea (<i>Cajanuscajan</i> L.) line DG-Rg 76

15.00-15.10	P. Boominathan* and N. Sritharan Identification of high temperature tolerant groundnut genotypes based on temperature acclimation response.
15.10-15.20	RamyaK.T*, Ratnakumar P. and A.L. Rathnakumar Development of climate resilient sesame genotypes to enhance production
15.20-15.30	T Manjunatha* and C Lavanya Development of Parents and Hybrids in Castor in the Context of Climate Change
15.30-15.40	V Sujatha*, R. Saritha, SK. HaseenaBhanu, A. B. M. Sirisha and S.V.S Gangadhara Rao Effect of Sulphur on Growth, Yield & Economics of Sesamum(<i>Sesamum indicum</i> L.) in North Coastal Zone of Andhra Pradesh

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15.40-16.00	Aditi and Neera Garg Roles of <i>arbuscular mycorrhizal</i> species in modulating soil properties and their impact on growth, nutrients uptake in pigeonpea under Cd stress
	Aanchal Choudhary and Muthappa Senthil-Kumar Suppression of key regulators of salicylic acid pathway by drought attenuates plant defences against bacterial pathogens under combined stress
	Mareyam Mukhtar, E. Kokiladevi and L. Arul Study on molecular mechanism of induced defense against gram pod borer (<i>Helicoverpa armigera</i> hubner) in pigeon pea (<i>Cajanus cajan</i> L.)
	M. Tamilzharasi, D. Kumaresan, V. Thiruvengadam, J. Souframanian and P. Jayamani . A vital role of physiological mechanism towards powdery mildew resistance in blackgram
4.00-4.15pm	Tea Break
4.15 - 5.40pm	Zoom link : https://us02web.zoom.us/j/88514959938?pwd=RHRIUmNYckgwTGM0NnF1Sk5xcU9Wdz09 Meeting ID: 885 1495 9938 Passcode: 110321 NAAS Brain Storming session (Hybrid Mode)

Day II	
Zoom link: https://us02web.zoom.us/j/88514959938?pwd=RHRIUmNYckgwTGM0NnF1Sk5xcU9Wdz09 Meeting ID: 885 1495 9938 Passcode: 110321	
9.15-12.30 am	CONCURRENT SESSION C Theme 3: Physiological Interventions in Commercial Crops
	Chair: Dr.A.H.Prakash,Project Coordinator & Head ICAR-Central Institute for Cotton Research, Regional Station, Coimbatore Co-Chair: Dr. R. Gomathi, Principal Scientist, ICAR- SBI, Coimbatore Rapporteurs: Dr.R. Arun Kumar, Senior Scientist, ICAR-SBI, Coimbatore Dr.K.Mohanraj, Senior Scientist, ICAR-SBI, Coimbatore
Lead Speakers	
9.15-9.35	Dr.KrishnaJagadish, Associate Professor (Department of Agronomy) Kansas State University, USA “Heat stress impacts on grain crops-progress and perspectives”
9.35 - 9.55	Dr.RamanjuluSunkar, Oklahoma State University,USA “Developing stress tolerance by micro-RNA-guided post-transcriptional gene regulation in plants”
10.00 - 10.20	Dr.A.H.Prakash, Project Coordinator & Head (ICAR-CICR)- Regional Station, Coimbatore “Climate Change and Dynamics of Cotton Resilience”
10.20- 10.40	Dr.P.Nalayani, Principal Scientist (Agronomy), ICAR-CICR, Coimbatore “Prospects and potential of polyethylene mulching for doubling the yield of cotton based systems in a changing climate”
10.40–11.00	Dr. R. Gomathi, Principal Scientist, ICAR-SBI, Coimbatore “Adaptive mechanism of thermo-tolerance in sugarcane”
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11.00-11.10	C. Appunu*, S. Dharshini, M. Naveenarani, R. Valarmathi, J. Ashwin Narayan, V.M. Manoj, G.S. Suresha, C. Mahadevaiah, K. Mohanraj, Ravinder Kumar, Mintu Ram Meena, Bakshi Ram Transcriptome profiling and expression analysis reveals alternate route of respiration followed in <i>Saccharumspontaneum</i> under low temperature stress condition.
11.10-11.20	K. Lakshmi*, V.P. Rabisha K. Keerthana, A Selvi, S.Vasantha, S. Sheelamary and S. Karthigeyan Identification of Differentially Expressed Transcripts in <i>Saccharumspontaneum</i> Subjected To Salinity Stress through Suppression Subtractive Hybridization

11.20-11.30	K. Nithya*, B. Parameswari, M.L. Chhabra and R. Viswanathan Grassy shoot disease caused by <i>Ca. Phytoplasmasacchari</i> , a major biotic stress and physiological intervene in sugarcane cultivation
11.30-11.40	P. Govindaraj A new source of <i>S.spontaneum</i> for introgressing drought tolerance in sugarcane
11.40-11.50	Arun Kumar R.*, Geetha P., A.S. Tayade and Anusha S., and V. Krishnapriya Radiation use efficiency of sugarcane genotypes influenced by crop geometry
11.50-12.00	A. S. Tayade*, S. Anusha and P. Geetha Climate smart weed management practices to mitigate the abiotic stresses in sugarcane
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	S. Swathi, G. S. Suresha, S. Dharshini , J. Ashwin Narayan, C. Mahadevaiah, C. Appunu and K. Hari Sub-cellular targeting of invertase inhibitor proteins: A novel approach to increase sucrose yield and to test physiological threshold of sucrose accumulation in sugarcane”
	P. Geetha, K. Hari, P. Malathi, and N. Rajendra Prasad Enhancing the growth and vigour of sugarcane settlings through Plant Growth Promoting Rhizobacteria (PGPR): A strategy to augment cane growth under changing climatic scenario
	V. Krishnapriya, E. Karpagam, R. Arun Kumar and R. Gomathi Root anatomical phenes in response to abiotic stress in sugarcane germplasm clones
	S. Kohila and R. Gomathi Identification and profiling of heat stress responsive proteins in sugarcane
9.15-12.30	CONCURRENT SESSION D Theme 4: Physiological Interventions in Horticultural Crops Cisco Webexlink: https://sugarcanebreedinginstitute.webex.com/sugarcanebreedinginstitute/j.php?MTID=m7704f72c212b1ac5db6b639ac4bd7a14 Meeting number: 184 640 8972 Password: 11032021
	Chair: Dr. M.K.Kalarani, Professor and Head, Dept. of Crop Physiology, Tamil Nadu Agricultural University, Coimbatore Co-Chair: Dr.C.Rajasekaran, Professor(School of Bio Sciences and Technology (SBST)), VIT, Vellore, Tamil Nadu Rapporteurs: Dr. V. Krishnapriya, Scientist, ICAR-SBI, Coimbatore Dr. K. Lakshmi,Senior Scientist, ICAR-SBI, Coimbatore

Lead Speakers	
9.15 - 9.35	Dr. K.S.Shivashankara, Principal Scientist & Head Division of Basic Sciences, ICAR-IIHR, Bangalore “Impact of Climate Change On Crop Productivity and Quality of Horticulture Crops and Mitigating Strategies”
9.35 - 9.55	Dr.I. Ravi, Principal Scientist (Plant Physiology), ICAR-NRCB, Trichy, Tamil Nadu “Physiological intervention to improve abiotic stress tolerance in Banana”
9.55 - 10.15	Dr.JagadishRane, Principal Scientist and Head(I/c) ICAR- National Institute for Abiotic Stress Management, Malegaon, Baramati “Application of phenomics tools for identification of appropriate bio-regulators to mitigating stresses in crop plants”
10.15 - 10.35	Dr. M. K. Kalarani, Professor and Head, Department of Crop Physiology, TNAU, Coimbatore “Physiological characterization of salt tolerant cassava genotypes and mitigation techniques for salt stress”
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10.35-10.45	K. Arun Kumar*, P. Jeyakumar, V. Ravichandran, R. Swarnapriya and T.Kalaiselvi Effect of bio-stimulants on growth and yield attributes of tomato (<i>Solanum lycopersicum</i> L.)
10.45-10.55	S.M. Bhavithra,* M.K. Kalarani, A. Senthil and P.S. Kavitha Effect of melatonin on gas exchange parameters in cassava (<i>Manihot esculenta</i> Crantz) under salt stress
10.55-11.05	Sanket J. More*, Suresh Kumar J., V. Ravi and Saravanan Raju Morpho-Physiological Trait-based Drought-tolerance in Cassava
11.05-12.10	Laxman R.H*, Rashmi K., Kannan S., Hemamalini P Response of Capsicum sp. genotypes under deficit water stress
12.10-12.20	Ankegowda, S.J., Alagupalamuthirsolai, M., Sivaranjani, R., Shivakumar M.S, Krishnamurthy, K.S., Mohammed Faisal Peeran Variability in physiological parameters, yield and quality of elite small cardamom (<i>Elettaria cardamomum</i> Maton) genotypes under moisture deficit condition.
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	Laxman R.H, Hemamalini P, Rashmi K., Kannan S. Estimation of leaf area and biomass in onion through machine vision under field conditions
	Kelkar K. D, Kelkar V. G., Kulkarni M. M., Burondkar M. M. Studies on effect of light intensity and irrigation on physiological attributes of pruned mango (<i>Mangifera indica</i> L.) Cv. Alphonso

12.30 -15.10pm	CONCURRENT SESSION E Theme 5: Physiological Interventions in Medicinal and Plantation Crops Zoom link: https://us02web.zoom.us/j/88514959938?pwd=RHRlUmNYckgwTGM0NnF1Sk5xcU9Wdz09 Meeting ID: 885 1495 9938 Passcode: 110321
	Chair: Dr.K.B.Hebber, Head (Acting) Division of Plant Biotech and Plant Physiology, ICAR-CPCRI, Kasaragod, Kerala Co- Chair: Dr. P. Jeyakumar, Professor (Crop Physiology) &Deputy Registrar Education, TNAU, Coimbatore Rapporteurs: Dr. P. Geetha, Scientist (Senior Scale), ICAR-SBI, Coimbatore Dr.G.S.Suresha, Senior Scientist, ICAR- SBI, Coimbatore
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12.30 -12.50	Dr. K.S.Krishnamurthy, Principal Scientist (Plant Physiology) ICAR-IISR, Calicut, Kerala “Climate Change and Climate Analogues in Black Pepper”
12.50 - 13.10	Dr.K.B.Hebber, Acting Head (Plant Biotech and Plant Physiology) ICAR-CPCRI, Kasaragod, Kerala “High Temperature induction in tree crop like coconut and its influence on Physiology of progamic phase”
13.10 - 13.20	Dr. P. Jeyakumar, Professor (Crop Physiology) &Deputy Registrar Education, TNAU, Coimbatore “Physiological Perspectives in post harvest management of crop produce”
13.40-14.10	Dr.P. Manivel , Principal Scientist & Head, ICAR-CTRI, Regional Station, Veda sandur, Dindugal District, Tamil Nadu. “Climate Change: Impact and Mitigation Strategies in Medicinal and Aromatic Plants”
	Lunch Break
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14.20 -14.30	Abhin Sukumar. P, K.B Hebbar, Sanjo Jose V, Neethu P , Arya Santhosh Predicting the current and future potential cultivation regions of Coconut (<i>Cocos nucifera</i> .L) in India under the climate change scenario.
14.30 -14.40	Sivaranjani. R*, John Zachariah. T, Alagupalamuthirsolai. M and Thankamani. C.K Effect of foliar application of chemical elicitors on growth, physiological and biochemical responses of turmeric under rainfed condition.
14.40 -14.50	PreetiChaturvedi*, Tanuja Tiwari, Deepika and SupriyaTripathi. Phytochemical profile of <i>in vivo</i> and <i>in vitro</i> raised plants of <i>Polygonatumverticillatum</i> (L.) All.,a high value astavarga herb.
	V.V. Thakur, Vaibhav D Lohot*, DikshaKumari, NK Sinha and J. Ghosh Effect of Packaging Materials and Storage Period on Seed Biochemical Constituents of <i>Schleicheraoleosa</i> (Oken.)

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	S. Khatri ¹ , Y. S. Shivay, L. Jelsbak, S. Sharma <i>Pseudomonas</i> spp. confer general soil suppressiveness in organic farming
	T. Arumuganathan, C. Indu Rani, M. Ramanathan, R. P. Tewari and A. S. Krishnamoorthy Modelling oxygen diffusion during storage of fresh button mushroom under modified atmosphere storage system
	<i>Kartavya Mathur and Amey Mathur</i> An insight into curative effects of ayurvedic plants on life-cycle related proteins of SARS-Cov-2
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MORPHO-ANATOMICAL MODIFICATIONS OF LEAF IN SUGARCANE HYBRIDS UNDER NORMAL AND WATER DEFICIT CONDITION

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Drought is the most important deleterious abiotic stress factor largely affecting sugarcane productivity. It is reported that among the different morphological organs, leaf is the most adaptable organ in response to water stress. In the present study five sugarcane hybrids viz., SRH-13-69, SSH-14-453, SRH-15-602, SRH-15-749 and SSH-14-356 (resistance to red rot) were evaluated for variation in morpho-anatomical characteristics of leaf under normal and water stress (moderate drought with 40-50 % of irrigation at GGP) to explain drought tolerance based on modification in internal structures. SSH-14-453, SRH-15-602 and SSH-14-356 were identified as drought resistant based on leaf morphology and cane yield. Further these hybrids were evaluated for quantitative anatomy of water-stressed leaves. Water stress had led to increased leaf cuticle (prevents excess water evaporation) thickness and also observed that lower epidermal cuticle was significantly thickened in resistant clones. Bulliform cell area was largely reduced and this obviously resulted in leaf curling (morphological adaptation) to reduce plant injuries under stress. The higher relative change of 35.8 % of bulliform cell area was observed in SSH-14-453 between normal and stress condition. Mesophyll cells were deformed to increase cell gaps as an important adaptation to reduce the metabolic cost in resistant clones. Area of vascular bundle and xylem vessels was significantly increased by above 20.0 % in SSH-14-453 and SRH-15-602 under drought and lignification around vascular bundle was also observed. This study indicates that significant modifications occur in leaf anatomy during drought and hence it is suggested for evaluation of leaf morpho-anatomical adaptations in selection of clones for drought tolerance.

A NEW GENETIC SOURCE OF DROUGHT TOLERANCE IN SUGARCANE

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Drought is an important limiting factor for crop production and is a serious constraint in many regions of world which affects morphological and physiological traits expression. Ninety seven interspecific hybrids from four different mating groups were planted along with three standards (Co 85019, Co 10026 and CoM 0265). Drought stress was induced during formative phase (60-150 days) of the crop by withholding irrigation. Morphological parameters like cane height, cane weight and Relative water content (%) were studied. Among the mating groups studied, results from *improved S. robustum x improved S.officinarum* group is presented. Twenty eight vigorous and high tillering types were identified. Wide variations for relative water content (RWC) was observed among the clones under normal and drought. Relative water content was significantly lower in water stressed clones. Among the parents RWC ranged from 52.5% (PIO 88-79) to the highest 83.2% (PIO 14-100) with a mean of 72.58 %. RWC ranged from 38.51 % to 59.66 % in the hybrids of *improved S. robustum x improved S.officinarum* under drought conditions. Under normal conditions it ranged from 57.62 to 79.11 %. A decrease in cane height (17.96 %) and stalk diameter (9.64 %) was observed in drought affected canes of mating group involving improved *S. robustum* and improved *S.officinarum*. Under drought, nine clones viz., 03-14, 07-435, 20-538, 14-198, 01-807, 07-435, 07-776, 06-028, 07-1100 had high RWC and remained green up to maturity stage (360 days). In this group, one clone 14-198 completely dried and two clones 07-50 & 07-520 recovered after drought. Eight clones had high leaf area and recorded high total dry matter in comparison with CoM 0265 and Co 10026. These clones form a new genetic source for use in breeding to develop climate resilient sugarcane clones.



Society for Sugarcane Research and Development (SSRD)

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