

VSI

BULLETIN


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Foreword

Foreword ...

During the 2022-23 crushing season, 211 sugar mills in Maharashtra started their crushing season of which, 108 are in cooperative and 103 are in private sector. Maharashtra produced 10.54 million tonnes (white value) of sugar during 2022-23 which was less by 23.18% as compared to the previous season's sugar production 13.72 million tonnes (2021-22). Out of 211 operating sugar mills, 121 sugar mills were diverted BH molasses/cane/syrup for ethanol production by sacrificing 1.34 million tonnes of sugar. In the forthcoming season 2023-24, it is expected that state will likely produce 9.40 million ones of sugar by crushing of around 97.00 million ones of sugarcane and around 1.50 million ones of equivalent sugar will be diverted for ethanol production. There will be likely reduction in production of sugarcane crop due to average rainfall which affected decrease in area under sugarcane and cane yield in major sugarcane producing belts of the state viz, Kolhapur and Sangli.

The Indian sugar industry is having a huge opening stock of sugar of 10.12 million ones at the start of the season 2022-23. During current season, 532 operating sugar mills have produced 32.97 million tonnes of sugar by crushing of 331.20 million tonnes which was 8.31% less than the last season (35.96 million ones) mainly because of decrease in sugar production in major states viz. Maharashtra (22.00%), Gujarat (18.22%), Karnataka (9.68%) and Madhya

Pradesh (7.41%). Around 4.30 million tonnes sugar will be diverted for ethanol production. According to the Indian Sugar Mills Association's preliminary estimate, sugar production of the country will be around 36.20 million tonnes in forthcoming 2023-24 season out of which around 4.50 million tones of equivalent sugar will be diverted towards ethanol production.

During the quarter, the institute has organized the training programs/workshop/Seminar for the sugarcane growers, sugar mill and Maharashtra government officials and it is reflected in this issue of VSI Bulletin

I happy to inform you that, VSI is organizing 3rd International Conference & Exhibition at VSI campus, Pune during January 12-14, 2024 and the theme selected for the Conference on **"Sustainability: Challenges & Opportunities in Global Sugar Industries"**. In this event distinguished speakers across the globe are attending and they will share their knowledge and global trends in various areas. This event will be unique for all the stakeholders, researchers & scientists, policy makers and public representatives. I hope that technological advancement related to sugarcane agriculture and sugar industry issues will be deliberated and discussed for holistic improvement of sugarcane agriculture and sugar & allied industry. I request all the readers to please visit Website : www.vsiconindia2024.org and share this information to others to make this event grand!!!

RM Devarumath
(RM Devarumath)
 Editor


VASANTDADA SUGAR INSTITUTE

EVENTS

A Memorandum of Understanding (MoU) between “Technology Innovation Hub (TIH) Foundation for Internet of Things (IoT) and Internet of Everything (IoE), Mumbai and Vasantdada Sugar Institute (VSI), Pune”

A MoU signed between TIH Foundation for IoT and IoE, Mumbai and Vasantdada Sugar Institute, Pune on July 4, 2023 for collaborative research work. Mr. Kiran Shesh, CEO, and Dr. Sachin Parmane, CTO from TIH Foundation and Mr. Sambhaji Kadupatil, Director General, Dr. Preeti Deshmukh and Dr SG Dalvi from VSI were present. In a collaborative work, both the organizations will undertake joint efforts for development of internet of things and *artificial intelligence* based technologies for the sugarcane crop



MoU between VSI and Directorate of Onion-Garlic Research (DOGR)

VSI and the Directorate of Onion-Garlic Research (DOGR) in Rajgurunagar have signed an agreement for sharing laboratory facilities and technology for collaborative research work to promote sustainable onion and garlic production. This collaboration is expected to benefit sugarcane, onion, and garlic farmers. The research collaboration agreement was signed by Mr. Sambhaji Kadupatil, Director General of VSI, and Dr. Vijay Mahajan, Director, DOGR. Dr. AD Kadlag, Principal Scientist & Head of Crop Production and Protection, along with Dr. Suresh Gavande, Principal Scientist from DOGR, and Dr. Sunil Dalvi, Scientist from the Tissue Culture Section at VSI,

were present. Dr. Dalvi emphasized the need for research in the application of Vasanta Urja, a popular bio-stimulant developed by VSI, in onion farming. While Vasanta Urja's extensive use in sugarcane farming is well-known, its application in onion farming has not been scientifically studied and recommended. Therefore, this collaboration holds significant importance in exploring the potential of Vasanta Urja to reduce the use of chemical pesticides in onion and garlic crops, achieve sustainable production, improve post-harvest management, enhance shelf life, and boost medicinal properties

77th Independence Day

VSI celebrated 77th Independence Day of India on August 15, 2023. National flag was hoisted by Mr. Sambhaji Kadupatil, DG at VSI campus. Mr. Shivajirao Deshmukh, Advisor, Mr. DB Ghule, Registrar/Principal, staff members and students

were present. On this occasion Mr. Shivajirao Deshmukh and Mr. Sambhaji Kadupatil gave awards to meritorious children of VSI employees for their excellent academic achievements.



TRAINING

Valedictory Function on Agri-clinic and Agri-business Management Training Programme

Vasantdada Sugar Institute is recognized as a Nodal Training Institute under Agri-clinics & Agri-Business Centers (AC & ABC) scheme by National Institute of Agriculture Extension Management (MANAGE), Hyderabad. Under this scheme, Institute had organized 45 days residential training programme during May 26 to July 9, 2023.

The main aim of this training programme is to tap the expertise available in the large pool of agriculture graduates.

We invited experts from different disciplines as well as visits were made to agriculture related industries in different places for this training.

AC&ABC training programme had concluded at Vasantdada Sugar Institute on July 9, 2023. On this

occasion, Mr. Sambhaji Kadupatil, Director General, Dr. AD Kadlag, Principal Scientist, Head of crop production & crop protection Dr. Preeti Deshmukh, Nodal Officer and Head of Agriculture Department with all 34 participants were present.

In the concluding remarks Mr. Sambhaji Kadupatil said that business is profitable only if it requires hard work. At the same time, while doing any business & considering the profit it is important to keep the very good quality of your products.

All the candidates expressed satisfaction that VSI provided the entire facilities during training program. Dr. Samadhan Surwase, training coordinator expressed his gratitude and concluded the training programme with vote of thanks.



Oos Sheti Dnyanyag and Oos Sheti Dnyanlaxmi

In memory of founder President of VSI late Padmabhushan Dr. Vasantdada Patil, a four days residential training programme was organized for

sugarcane Men farmers as *Oos Sheti Dnyanyag* and *Oos Sheti Dnyanlaxmi*. Training program was conducted and the details given in following Table.

Sr.No.	Programme	No. of Participants
Second Batch – Pune, A'Nagar, Nashik , Solapur – July 4-7, 2023		
1	Malegaon SSK Ltd., Pune	50
2	Bhimashankar SSK Ltd., Pune	31
3	Ashok SSK Ltd., Ahmednagar	40
4	Dnyaneshwar SSK Ltd., Ahmednagar	30
5	Dwarakadhish Sugar, Nashik	11
6	Vitthalrao Shinde SSK Ltd., Solapur	36
7	Pandurang SSK Ltd., Solapur	08

Sr.No.	Programme	No. of Participants
8	Shankarrao Kale SSK Ltd., Ahmednagar	07
9	Individual	00
	Total	213
THIRD BATCH – MARATHWADA , KHANDESH – July, 10-13, 2023		
1	YM Krishna SSK Ltd., Satara	32
2	MVK Sugar, Nanded	60
3	Rena SSK Ltd., Latur	27
4	LSS Mazalgaon SSK Ltd.,	02
5	Manjara SSK Ltd., Latur	21
6	Dr. BR Ambedkar SSK Ltd.,	07
7	Natural Sugar , Ranjani, Dharashiv	10
8	Vighnahar SSK Ltd., Pune	20
9	Sant Tukaram SSK Ltd., Pune	04
10	Ayan Sugar, Nandurbar	10
11	NSL, Beed 755931085, (Formerly, Jai Mahesh)	06
	Total	199
Forth Batch – Women – July, 18-21, 2023		
1	Rajarambapu SSK Ltd., Sangli	13
2	YM Krishna SSK Ltd., Satara	27
3	Dr. PK Sonhira SSK Ltd., Sangli	15
4	VN SSK Ltd., Sangli	07
5	Ajinkyatara SSK Ltd., Satara	22
6	Pandurang SSK Ltd., Solapur	27
7	Sant Tukaram , Pune	02
8	Bhimashankar SSK Ltd., Pune	13
9	Vighnahar SSK Ltd., Pune	13
10	T K Warana SSK Ltd., Kolhapur	08
11	Dr. BR Ambedkar SSK Ltd.,	07
	Total	152

A training programme was conducted under the guidance of Mr. Sambhaji Kadupatil, DG, VSI. Mr. BH Pawar has coordinated this activity with the help of HODs & HOSs and staff of AS & T Division.

Total 213, 199 and 153 farmers were participated in three batches in the training programme. The training was inaugurated by Mr. Sambhaji Kadupatil, Director General, Dr. AS Kadlag, Principal Scientist (Production and Protection), Head of section and representative from farmers.

Mr. BH Pawar, welcomed the participant and gave brief information about training information. Mr. Sambhaji Kadupatil, DG in his inaugural speech highlighted the importance of the seed material, soil analysis and integrated approach to use the VSI's products etc.

The training programme conducted in the form of theory lectures and practical field demonstrations on various topics like sugarcane varieties & varietal planning, three-tier seed nursery programme & its implementation, tissue culture, modern planting

techniques, weed management, soil fertility & fertilizer management, irrigation water management, use of bio-fertilizers & bio-control agents, farm mechanization, economics of sugarcane cultivation ratoon management, integrated disease & pest management etc.

In the plenary session, the participants discussed their doubts with the subject experts. In the concluding remarks, trainees expressed their views about training. The certificates along with group photos were distributed to the trainees and function concluded with vote of thanks.

Batch No. : II



Batch No. : III



Batch No. : IV



Modern Technologies in Sugarcane Agriculture

The three days residential training program for men and women farmers were organized at VSI sponsored by ATMA. The objective of the training was to train the participant, about modern technologies in sugarcane agriculture. The training program was conducted on July 14-16, 2023. Total 186 participants from ATMA, Sambhajnagar, (Phulambri - 25; Gangapur - 41; Kannad - 23; Paithan - 15; Vaijapur - 12); ATMA, Sangli (Kadegaon, Miraj & Tasgaon - 10 each) and Purna SSK Ltd., Hingoli (40) were attended the training program.

The training programs were inaugurated by Mr. Sambhaji Kadupatil, Hon. Director General, in presence of Heads of Sections and staff members from Agriculture Sciences and Technology Division.

Mr. BH Pawar, Sr. Scientist and Head, Plant Pathology section welcomed the participants and others. In the inaugural speech, Mr. Sambhaji Kadupatil highlighted the importance of the training. He also talked about the importance of tissue culture plantlets for preparation of seed nursery. He appealed to farmers and staffs to adopt integrated cropping system and

focus on integrated pest management for increasing the productivity of sugarcane yield.

In this training modern and scientific sugarcane cultivation technology was taught which covered the lectures on various topics like sugarcane varieties and varietal planning, seed nursery management, tissue culture, modern planting techniques, weed management, soil fertility and fertilizer management, irrigation management, use of bio-fertilizers, farm mechanization, ratoon management and integrated disease & pest. All the agriculture scientists conducted theory lectures with the help of power point presentation. More emphasis was given on practicals and field demonstrations during the training programs. In the plenary session of all the batches, Mr. BH Pawar, took the review of training. During discussion participants resolved their doubts from the subject experts. In the concluding function, the representative trainees expressed their views about the training and facilities provided to them. The certificates were distributed to the trainees. The program was concluded with vote of thanks.



Advanced Technologies in Sugarcane Agriculture

The residential training programme was organized for officers and staff members of Divisional Joint Director of Agriculture Aurangabad and Latur sponsored by National Food Security Mission. The objective of the training was to train the participant about advanced technologies in sugarcane agriculture. The two days training programme was

conducted on September 15-16, 2023. Total 35 participants from Divisional Joint Director of Agriculture, Aurangabad (20) and Divisional Joint Director of Agriculture, Latur (15) Agriculture Officers, Agriculture Assistants and Agriculture supervisors were attended the training program.

The training was inaugurated by the Mr. BH Pawar, Training Coordinator and Senior Scientist and Head, Plant Pathology Section in presence of Heads of sections from Agriculture Sciences & Technology Division. Dr. GS Kotgire, Scientist, Plant Pathology section welcomed all the participants and others.

Modern and scientific sugarcane cultivation technology was taught during the training period which covered the lectures and practical's on various topics like sugarcane varieties and varietal planning, seed nursery management, tissue culture, modern planting techniques, weed management, soil fertility and fertilizer management, irrigation water management, use of bio-fertilizers, farm mechanization, ratoon management and integrated disease and pest management during two days training program. All the agriculture scientists conducted theory lectures

with the help of power point presentation. More emphasis on practical's and field demonstrations was given during the programme.



In the plenary session, the participants resolved their doubts from the subject experts. In the concluding function, the representative trainees expressed their satisfaction about the training, lodging and boarding facilities provided to them. Officials asked

questions about organic sugarcane agriculture and appealed to scientists to focus on it. The certificates were distributed to the trainees. Hon. Director General, VSI discussed with participants during farewell function about the difficulties faced by them in sugarcane agriculture in their area and appealed them to adopt modern technologies in sugarcane. The program concluded with Vote of thanks

Short Term Training Programme for Officers of Maharashtra State Excise

Commissioner of State Excise, Government of Maharashtra State requested VSI to arrange a short term training programme for their experienced as well as newly appointed officers. In this regard Department of Alcohol Technology & Biofuels (AT & B), VSI conducted tailor made short term training programme from 26th June to 7th July 2023 (First lot) for the Deputy Superintendent (1 Officer) and from 31st July to 11th August 2023 (Second lot) for the Asst. Commissioner Superintendent, Probationary (1 Officer) and

Dy. Superintendent, Probationary (3 Officers), State Excise, Government of Maharashtra.



The courses were inaugurated by Dr. KS Konde, Head, Professor & Technical Adviser, Department of AT & B. He introduced the staff of department of AT & B to the trainee participants. He elaborated the importance of the course

to the participants. He also thanked the Commissioner of State Excise, Government of Maharashtra for sending the officers for the training at VSI.

Both the short term courses covered topics such as Composition of molasses & its storage, Preservation and maintenance of yeast cultures, Propagation of yeast culture on industrial scale, Global and national scenario of distillery industry and potential of the country to meet the demand and supply of alcohol, Latest technologies of alcohol production from various feedstock, Various types of fermentation & distillation processes, Operating parameters and operational efficiencies, Alcoholometry, Microbial analysis of molasses, Estimation of viable yeast count, Fuel ethanol production by molecular sieve dehydration technology, Production process of country liquor and Indian made foreign liquor (Whisky, Brandy, Rum, Gin & Vodka), Malt alcohol production, Indian standards (BIS) for alcohol, liquors, beer and wines, Concept of microbrewery, Denaturant, denatured spirit and denaturation of spirit, Records and registers to be maintained in CL & IMFL, Maturation & aging, taxes and duties on molasses and alcohol etc. The course also included important demonstrations/practicals in the training programme, which will be helpful for the

State Excise Officers while working at distilleries and liquor manufacturing units. The demonstration of alcohol estimation and sugar estimation of molasses were shown to the participants. The analytical facilities of the department were introduced to the participants. The officers were quite impressed after seeing the facilities such as GC, GC-MS, HPLC, Densitometer, FTNIR, pilot winery, nano brewery etc.

To understand the record keeping of excise molasses & alcohol and alcohol fermentation process conducted in distillery, the visit of participants was arranged to Malegaon SSK Ltd. The officers were impressed by visiting the distillery.

To understand the liquor manufacturing process conducted in liquor unit, the visit of participants was arranged to United Spirits Ltd., Pimpali, Tal. Baramati. The officers were impressed by visiting the liquor manufacturing unit.

On the occasion of the concluding session the training, certificates distributed to the officers by Dr. KS Konde. The participated officers appreciated the overall training programme organized by VSI.



SEMINAR SEMINAR

जागतिक निसर्गसंवर्धन दिनाच्या निमित्ताने परिसंवादाचे आयोजन

वसंतदादा शुगर इन्स्टिट्यूट, पुणे येथे शुक्रवार दि.२८ जुलै २०२३ रोजी, जागतिक निसर्गसंवर्धन दिन व वसंतऊर्जा जैव संजीवक उत्पादनाच्या पंचवर्षपूर्तीच्या निमित्ताने “शाश्वत कृषी उत्पादनासाठी वसंतऊर्जा जैव संजीवकाचा वापर” या विषयावर एक दिवसीय परिसंवादाचे आयोजन केले होते. निसर्ग संवर्धन करण्यासाठीच्या उपाययोजनांची जनजागृती एक भाग म्हणून रासायनिक निविष्टांचा वापर कमी करून पर्यावरणपूरक शाश्वत शेतीला प्राधान्य देऊन निसर्ग संवर्धनासाठी वसंतऊर्जा जैव संजीवक जास्तीतजास्त शेतकऱ्यांपर्यंत पोहचवणे हे परिसंवादाची मुख्य उद्दिष्ट होते. परिसंवादामध्ये विविध कृषीसेवा केंद्रे, विविध कार्यकारी सहकारी, स्वयंसेवी महिला व पुरुष बचत गट, सहकारी शेतकरी संघ, साखर कारखाने इत्यादींचे १४५ प्रतिनिधी सहभागी झाले होते.

या परिसंवादात शाश्वत कृषी उत्पादनासाठी बहुउपयोगी वसंतऊर्जा याअत्यंत प्रभावी, किफायती आणि शेतकऱ्यांमध्ये लोकप्रिय जैव संजीवकाबद्दल माहिती, उपयोग व कार्यप्रणालीयाविषयी सविस्तर मार्गदर्शन करण्यात आले. वसंतदादा शुगर इन्स्टिट्यूट, पुणे व भाभा अणु संशोधन केंद्र, मुंबई यांनी संयुक्तरित्या गामा किरणोत्साराचा वापर करून “वसंतऊर्जा” ही नॅनो कणस्वरूपातली कृषी निविष्टा संशोधित केली आहे. वसंतऊर्जा अंतर्भूत पीक उत्पादन धोरणअवलंबल्यास पिकांमध्ये एकाच वेळी जैविक (विषाणू, जिवाणू आणि बुरशी जन्य रोग) आणि अजैविक (क्षार, वाढतेतापमान/ ऊन, पाण्याचाताण, थंडी, पूर, अन्नद्रव्यांची कमतरता) ताणांविरुद्ध प्रतिकारशक्ती निर्माण होऊन उत्पादनात लक्षणीय वाढ होते.

परिसंवादास मुख्य अतिथी म्हणून महात्मा फुले कृषी विद्यापीठ, राहुरीचे माजी कुलगुरू व राज्यातील कृषी विद्यापीठांच्या संशोधन प्रकल्पाचे विद्यमान अध्यक्षमा. डॉ. राजाराम देशमुख उपस्थित होते. त्यांनी शाश्वत शेती उत्पादनासाठी सेंद्रिय शेतीचे महत्व या विषयावर अत्यंत विस्तृत, सखोल आणि प्रभावी मार्गदर्शन केले. तसेच रासायनिक कीटकनाशके आणि रसायनांमुळे पर्यावरणावर ओढवणारे दुष्परिणाम आणि मृदाऱ्हास या संबंधित माहिती दिली व शाश्वत शेती उत्पादनासाठी जैव संजीवकाच्या उपयुक्ततेचे महत्व पटवून दिले. प्रा.डॉ. राजीवनाईक (माजी विभाग प्रमुख, जीव रसायनशास्त्र विभाग, महात्मा फुले कृषीविद्यापीठ,राहुरी) यांनी पिकातील जैविक, अजैविक ताण आणि जैव रासायनिक अभिक्रियांचा समन्वयामध्ये वसंतऊर्जा जैव संजीवकाची

भूमिका या विषयावर उपस्थितांना मार्गदर्शन केले.तसेच प्रा.डॉ. प्रशांत बोडके (अधिष्ठाता तथा शिक्षण संचालक, कृषी विद्याशास्त्र विभाग, डॉ. बाळासाहेब सावंत कोकण कृषी विद्यापीठ, दापोली) यांनी कडधान्य पिकांमधील, डॉ. आर. बी. सोनावणे (सहयोगी प्राध्यापक, कांदा व द्राक्ष संशोधन केंद्र, पिंपळगाव-बसवंत, नाशिक) यांनी द्राक्ष पिकांमधील आणि डॉ. किरण खंडागळे (संशोधन सहयोगी, भा.कृ.सं.प.-कांदा आणि लसूण संशोधन संचलनालय, राजगुरुनगर, पुणे) यांनी कांदा पिकांमधील वसंतऊर्जा जैव संजीवकाच्या विविध संशोधन चाचण्यांचे निष्कर्ष उपस्थितांसमोर मांडले. यातून वसंतऊर्जा जैव संजीवकाचा ऊस पिकाव्यतिरिक्त इतर पिकांच्या उत्पादन वाढीसाठीची उपयुक्तता अधोरेखित केली गेली. डॉ. अशोक कडलग यांनी शाश्वत शेतीसाठी व्ही.एस.आय.च्या कृषी निविष्टांचे संशोधन आणि निर्मितीविषयी सखोल माहिती व मार्गदर्शन केले.तसेच त्यांनी व्ही.एस.आय.संशोधन प्रक्षेत्र, साखर कारखाने आणि प्रत्यक्ष शेतकऱ्यांच्या शेतांमध्ये झालेल्या विविध चाचण्यांची माहिती दिली. परिसंवादामध्ये विविध ठिकाणांहून आलेल्या प्रगतशील आणि प्रयोगशील शेतकऱ्यांनी वसंतऊर्जा जैव संजीवकाच्या वापरल्यामुळे पीक उत्पादनामध्ये झालेली वाढ आणि बुरशी, जिवाणू, विषाणू आणि किडींपासून मिळालेले संरक्षण याविषयी अनुभव सांगितले. यामध्ये शेतकरी श्री. संदीपरामभाऊ आदक आणि श्री. गोपाळ लक्ष्मण गवारी (मु.पो. भागडी, ता.आंबेगाव, जि.पुणे), श्री. आदित्य गणेश गुळमे (मु.पो. करकंब, ता.पंढरपूर, जि.सोलापूर), श्री. अरुण नरहरी शिंदे (मु.पो. शिंदेवाडी, ता. माढा, जि.सोलापूर), श्री. आशिषराव शिवाजीराव खराडे-पाटील (मु.पो. अकलूज, ता.माळशिरस, जि.सोलापूर), श्री. साहेबराव जाधव (मु.पो. कडेगाव, जि.सांगली), श्री. संजय सांळुके (मु.पो. वाशिंबे, ता. करमाळा, जि. सोलापूर) आणि श्री. हेमंत शांताराम कारे (मु. पो. सोनगाव, ता. निफाड, जि. नाशिक) यांनी वसंतऊर्जा जैव संजीवकाच्या वापरामुळे विविध पिकांच्या उत्पादनातील आणि गुणवत्तेतील वाढीबाबतचे आपले अनुभव सांगितले.

व्ही.एस.आय.च्या विविध कृषी निविष्टा शेतकऱ्यांपर्यंत पोहचवण्यासाठी उल्लेखनीय कामगिरी केल्याबद्दल श्री. मारुती आनंदा जाधव (संचालक, कृषी तीर्थ फार्मर्स प्रोड्यूसर कंपनी,

इस्लामपूर, ता.वाळवा, जि.सांगली), श्री. श्रीनिवास निकम (संचालक, श्री समर्थकृपा कृषी उद्योग, कराड आणि शोरे-शेणोली स्टेशन, जि. सातारा), तसेच पलूस तालुका खरेदी-विक्री संघ (पलूस, जि. सांगली) यांचा संस्थेचे महासंचालक मा. श्री. संभाजी कडूपाटील यांच्या हस्ते सत्कार करण्यात आला.

व्ही.एस.आय.निर्मित वसंतऊर्जा आणि इतर कृषी निविष्टा ह्या अत्यंतप्रभावी, निसर्ग संवर्धनाच्या दृष्टीने पूरक आणि माफक दरात उपलब्ध असून त्या शेतकऱ्यांमध्ये लोकप्रिय सुद्धा आहेत. सध्या शेतकऱ्यांना वसंतऊर्जाचा पुरवठा विविध साखर कारखान्यांमार्फत प्रामुख्याने ऊस पिकासाठी केला जात आहे. व्ही.एस.आय.च्या विविध कृषी निविष्टांचा प्रचार, प्रसार व उपलब्धता सामान्य शेतकऱ्यांपर्यंत प्रभावीपणे व्हावा यासाठी विविध कृषीसेवा केंद्रे, विविध कार्यकारी सहकारी सोसायटी, स्वयंसेवी महिला व पुरुष बचतगट, सहकारी शेतकरी समूह इ. यांनी पुढाकार घेतल्यास सर्व पिकांसाठी शेतकऱ्यांना सहजरित्या उपलब्ध होतील. परिसंवादा वेळी २२ संस्थांशी करारनामे करण्यात आहे व त्यांना परिसंवादाच्या प्रमुख अतिथींच्या उपस्थितीत व्ही.एस.आय.चे महासंचालक मा.श्री. संभाजी कडूपाटील यांच्या हस्ते करारनामे सुपूर्त करण्यात आले.

परिसंवादाच्या सांगता समारंभा वेळी संस्थेचे महासंचालक मा.श्री. संभाजी कडूपाटील यांनी राज्यातील जिल्हा सहकारी सोसायटी, कृषीसेवा संघ, विविध कार्यकारी सहकारी सोसायटी, कृषीसेवा केंद्रे, साखर कारखाने इत्यादींना शेतकऱ्यांच्या सोयीसाठी सर्वोत्तरी मदत करण्याचे आश्वासन दिले. विविध संस्था आणि केंद्रांनी शेतकरी मेळावा अथवा चर्चासत्र आयोजित केल्यास व्ही.एस.आय.चे तज्ञ मार्गदर्शनासाठी उपस्थित राहीतील असे आश्वासन दिले. तसेच लोणारवाडी (जि. पुणे), आंबोली (जि.सिंधुदुर्ग), पाथरवाला (जि. जालना) आणि बुटीबोरी (जि. नागपूर) या ठिकाणी कृषीसेवा केंद्रांच्या सोयीसाठी तसेच या शिवाय मागणीचा आढावा घेऊन आवश्यक असेल तर इतर ठिकाणी डेपो उभारण्याचा प्रयत्न करू असे त्यांनी आश्वासित केले.

परिसंवादासाठी मा.श्री. संभाजी कडूपाटील, महासंचालक, व्ही.एस.आय., पुणे; मा.डॉ. अशोक कडलग, प्रमुख शास्त्रज्ञ, पीक उत्पादन आणि पीक संरक्षण विभाग, व्ही.एस.आय., पुणे यांचे मोलाचे मार्गदर्शन आणि सहकार्य लाभले. परिसंवादाचे संयोजक डॉ. सुनील दळवी, शास्त्रज्ञ, ऊती संवर्धन विभाग आणि श्री. राजेंद्र भोईटे, प्रमुख जनसंपर्क अधिकारी, वसंतदादा शुगर इन्स्टिट्यूट, पुणे यांनी उपस्थितांचे आभार मानले.



यांत्रिक पद्धतीने ऊस पिकाची स्वच्छता संदर्भात तांत्रिक चर्चासत्र

दि. १२ ऑगस्ट २०२३ रोजी वसंतदादा शुगर इन्स्टिट्यूट येथे राष्ट्रीय सहकारी साखर कारखाना महासंघातर्फे एक दिवसीय तांत्रिक चर्चासत्र आयोजित करण्यात आले होते. या चर्चासत्रामध्ये वसंतदादा शुगर इन्स्टिट्यूटचे अध्यक्ष मा.श्री. शरदचंद्रजी पवार, उपाध्यक्ष मा.श्री. दिलीप वळसे-पाटील तसेच नियामक मंडळाचे सदस्य मा.श्री. जयंतराव पाटील, मा.श्री. जयप्रकाश दांडेगावकर, मा.श्री. राजेश टोपे उपस्थित होते.

चर्चासत्राचे प्रस्ताविक मा.श्री. जयप्रकाश दांडेगावकर यांनी केले तर ऊस स्वच्छतेच्या यांत्रिक प्रणाली बाबतचे सादरीकरण ब्राझीलचे मा.श्री. मारसीओ यांनी केले.

चर्चासत्रा दरम्यान मा.श्री. शरदचंद्रजी पवार, मा.श्री. दिलीप वळसे-पाटील व मा.श्री. जयंत पाटील यांचे मार्गदर्शन लाभले व आभार प्रदर्शन डॉ. आर.बी. डौले यांनी केले.



WORKSHOP

Novel Technologies of Agriculture: Beneficial Microorganisms for Sustainable Sugarcane Production

The monthly on 'Novel Technologies of Agriculture: Beneficial Microorganisms for Sustainable Sugarcane Production' was organized on August 26, 2023 by Agriculture Microbiology section. There were 64 participants from 37 sugar mills attended the workshop.

Mrs. Sudha D. Ghodke, Scientist & Head, Agriculture Microbiology Section prefaced the program. Mr. Sambhaji Kadupatil, Director General, VSI delivered inaugural speech for the participants.

Mr. RG Yadav, Scientist & Head, Entomology section delivered lecture on 'Integrated management of insect pests in sugarcane during rainy season'. He emphasized on the management of Internode borer, sugarcane woolly aphid, Mealy bug, Scale insects, Sugarcane leaf mite and white grub by physical, chemical and biological methods.

Mrs. Kranti G. Nigade, Scientist, gave lecture on 'Biological control of pests in sugarcane agriculture', She focused on the management of early shoot borer, top shoot borer, white woolly aphid, white fly, scale insects and white grub through biological control by Entomopathogenic fungi, Entomopathogenic bacteria & Entomopathogenic viruses.

Mr. Bibhishan Mali, Scientific Officer, Agriculture Microbiology Section, talked on 'Applications of biofertilizers in sugarcane agriculture'. He emphasized on use of nitrogen fixing endophytic bacteria (Acetobacter & Plant Health) for saving of

inorganic nitrogenous fertilizers in sugarcane crop and use of soil health product for improving soil health and nutrient uptake in soil for increasing cane & sugar yield.

Mr. Dilip Jadhav CDO, Ch. Shahu SSK, Kagal, Kolhapur, elaborated on 'Use of biofertilizers in sugarcane agriculture for increasing yield – A success story, in operational area of mill & their benefits to farmers. Mr. Vikas Tengle, CDO, Bhimashankar SSK, Ambegaon,

Pune, delivered speech on 'Biocontrol agents for the control of different pests in sugarcane agriculture - A success story' and informed the importance of use of VSI' biopesticides viz. BVM & EPN and its management of white grub.

Mr. Sarjerao Gangurde, CDO, Dwarkadhish SSK, Satana, Nashik, delivered presentation on 'Biocomposting & its enrichment by beneficial microorganisms – A success story'. He told that the mill has used decomposing culture, liquid biofungicide, biopesticides on large scale on preparing quality enriched compost which enhancing soil fertility and yield of sugarcane in area of operation.

Dr. Ashok Kadlag, Principal Scientist, Crop Production and Protection summarized the workshop. He emphasized the importance of beneficial microorganisms in soil fertility, saving of inorganic fertilizers and pesticides and increasing yield & quality of sugarcane.



Recommendations of workshop - Biofertilizers and Biocontrol agents for soil fertility & sugarcane productivity

Name of Biofertilizers or Biocontrol agent	Method of application	Time of application
Liquid decomposing culture for trash mulching	super phosphate + spraying of DC culture @ 1 lit/acre 50 kg Urea + 50kg Single in 200 lit water on trash (75 ml for 15 lit spray pump)	After harvesting of cane
Liquid Biopesticide (BVM) as a precautionary	Drenching of BVM @ 2 lit/acre in 200 lit water (150 ml for 15 lit spray pump)	At Planting/ ratooning
Liquid Biopesticide (EPN) if infestation of white grub seen	Drenching of EPN @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	At Planting/ ratooning
Liquid Biofungicide	Drenching of Biofungicide @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	At Planting/ ratooning
Soil Health(SH)	Drenching of SH @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	At Planting/ ratooning
Soil Health(SH)	Drenching of SH @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	30 days after planting/ ratooning
Soil Health(SH)	Drenching of SH @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	60 days after Planting/ ratooning
Soil Health(SH)	Drenching of SH @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	75 days after Planting/ ratooning
Liquid Biofungicide	Drenching of liquid biofungicide @ 1 lit/acre in 200 lit water.(75 ml for 15 lit spray pump)	70 days after Planting/ ratooning
Plant health	Foliar application of Plant health @ 1 lit/acre in 200 lit water. (75 ml for 15 lit spray pump)	75 days after Planting/ ratooning
Soil Health(SH)	Drenching of SH @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	90 days after Planting/ ratooning
Liquid Biopesticide (BVM)	Drenching of BVM @ 2 lit/acre in 200 lit water (150 ml for 15 lit spray pump)	120 Days after Planting/ ratooning
Liquid Biopesticide (EPN) if infestation of white grub seen	Drenching of EPN @ 1 lit/acre in 200 lit water (75 ml for 15 lit spray pump)	120 Days after Planting/ ratooning

VSI COMMITTEE MEETINGS

Purchase committee meeting was held on July 31, 2023 and Investment committee meeting was held on September 15, 2023 followed by governing council



meeting under the chairmanship of Hon. President of VSI Mr. Sharad Pawar in presence of governing council members.



Visit of VSI Team to TIH Foundation, Mumbai

A team of Vasantdada Sugar Institute viz. Mr. Sambhaji Kadupatil, Director General, Dr. AD Kadlag, Principal Scientist, Crop Protection & Crop Production, AST & D, Mr. PP Shinde, Scientist & Head, Agriculture Engineering Section, Dr. Preeti Deshmukh, Senior Scientist & Head, Soil Science Section visited TIH foundation for IoT & IoE Mumbai On July 25, 2023.

During the visit TIH foundation CEO presented the brief overview of TIH foundation IoT & IoE about the work

done on the agriculture sector. Mr. Sambhaji Kadupatil provided the information about Institute, infrastructure, facilities, fields, trainings etc. Prof. Leena Vachhani set the expectations, objectives of the meeting and focus should be on commercialization of few technologies in a shorter time for the farmers. Also have a long term collaboration approach, involving the startups in the ecosystem. Dr Preeti Deshmukh demonstration of the TIH IoT developed products like EAgriS, SAgriS and iAgriS is done to the team.

Visit to h₂e for Hydrogen (H₂) and Sustainable Aviation Fuel (SAF) Plant at Pune

Mr. Sambhaji Kadupatil, Director General, VSI and Dr. KS Konde, Head, Professor & Technical Adviser, Department of Alcohol Technology & Biofuels, VSI visited h₂e on July 31, 2023. They discussed on the opportunities of hydrogen production & Sustainable Aviation Fuel and set up of above the plants at VSI.



Mr. Sidharth Mayur, shown h₂epower an hydrogen demo plant. He agree to install fully assembled an electrolyser system (AEM electrolyser) which can produce 2 Kg/day hydrogen. They are also willing to install co-electrolysis system for syngas generation & each module will supply hydrogen with rate of 0.5 Nm³/hr.

Visit to United Bioenergy Pvt. Ltd., Junnar, Pune

Mr. Sambhaji Kadupatil, Director General, VSI, Dr. KS Konde, Head, Professor & Technical Adviser, Department of Alcohol Technology & Biofuels, VSI & Mr. RA Chandgude, Technical Adviser & Head, Dept. of Sugar Engineering, VSI visited United Bioenergy Pvt. Ltd. Pune on August, 3, 2023. During their visit



they observed biogas generation from 10000 - 12000 m³/day from Press mud cake (PMC) and this biogas is used to produce 4000-5000 kg/day CBG. They use the technology of biochemical scrubbing for H₂S removal followed by chilled water scrubbing for CO₂ removal. Purified CBG contains H₂S less than 5 PPM and CO₂ less than 4%.

Closure MoU Meeting with BARC, Mumbai

The team of VSI viz., Mr. Sambhaji Kadupatil, Director General, Dr. AD Kadlag Principal Scientist & Head, AST & D Dr. SG Dalvi Scientist, Tissue Culture Section, Dr. RM Devarumath Scientist, MB & GE Lab., and Dr. AS Patil, Scientific Officer, Agronomy Section, attended the meeting.

The team consists of Associate Director of the Biosciences Group Dr. GhantyTapan, Head, Nuclear Agri. Biotechnology Div. Dr. Prasoon Mukharji Dr. Manjaya Sr. Pulse Breeder, Dr. Anand Badginvar, Groundnut Breeder, Dr. Souframanian Pulse Breeder, Dr. Ashish Srivastava Scientific Officer G, and Dr. Manish Pande, Scientific officer E, from BARC participated in the meeting.

VSI and BARC had a MoU for different research and developmental activities as 1) Breeder Seed multiplication of Trombay Mutant Varieties in Green Gram, Black Gram and ground nut, and evaluate them for intercropping in sugarcane 2) Multi-location evaluation of radiation-induced sugarcane mutants



3) Large scale adaptive trials of Gamma Irradiated Chitosan at differ sugar mills in different agro-climatic zones of Maharashtra 4) Utilization of fertilizer and beneficial microbes enriched biosludge amending in

the soil mixture used for Tissue culture plantlets and Sigel Eye Bud settlings in sugarcane and 5) the research activity for biochemical and molecular evaluation of Gamma Irradiated chitosan and its effects of different crops . In this context Dr. SG Dalvi presented the output of the

work as per the agenda on different aspects listed above. The work was appreciated by BARC authorities. There was a discussion on the possibility of various new collaborative projects to be taken on the recently developed ground nut variety and stem modulating *Sesbaniya* variety. BARC team showed keen interest in going ahead with R & D activities in sugarcane agriculture as well as sugarcane processing, particularly for ethanol production. The meeting was concluded with vote of thanks

81st Annual Convention and International Sugar Expo 2023 at Kerala

VSI team consisting of Mr. SC Deshmukh Advisor, Mr. SP Kadupatil, Director General, Dr. RV Dani, Dr. KS Konde, Mr. RA Chandgude, Mr. PP Shinde, Dr. JM Repale, Mr. S. Panda, Dr. N. Mahana and Mrs. Sudha D. Ghodke were participated in the 81st Sugar Technologists Association of India (STAI) - 81st Annual Convention and International Sugar Expo 2023. The convention was organized from September 6-8, 2023 at Travankor International Convention Centre, Thiruvananthapuram, Kerala.

The convention was commenced on 6th September. Mr. Sanjay Chopra, Secretary, Department of Food and public distribution, Government of India graced the session as the Chief Guest. Welcome Address was delivered by Mr. Sanjay Awasthi, Executive President of ISSCT and President of STAI. The Introductory session open up with the felicitation of Chief Guest and other dignitaries followed by the lightning of the lamp.

Mr. Sanjay Chopra delivered Chief guest address to the participant. The Keynote Address was delivered by Mr. Ranjit Puri, Chairman, Organizing Committee & Chairman, ISGEC Heavy Engineering Ltd. The Sugar Expo was inaugurated by chief guest and other dignitaries. During the function Mr. RA Chandgude, VSI awarded with J.P. Mukherji Gold Medal for the Best Engineer of the Year 2023 and STAI Silver Medal for best research paper to Dr. RV Dani in Processing/ Co-products.

VSI's team has attended the SN Gundurao Memorial Lecture and Plenary Session, in which the distinguished speakers delivered speeches on different important topics.

On September 7-8, 2023 the authors from VSI, Pune had presented their research papers from Agriculture, Sugar engineering, Sugar process & Alcohol technology & biofuels departments. Following research papers were presented by the respective authors

Sr.No.	Title of the technical papers	Name of the presenting author
1	Option to Reduce Steam % Cane during Syrup Diversion to Distillery- Case study	Simanchala Panda, N. Mahana, RV Dani
2	Utilization of Surplus Vapours from Sugar Plant for concentration of Bio-methenated Spent Wash - Case Study by	Simanchala Panda, S. Jeelani, YS Kadam & RV Dani
3	Effect of trash mulching on cane yield and water use efficiency of sugarcane under drip and surface irrigation	PP Shinde
4	Evaluation of Promising Sugarcane Genotypes at VSI.	JM Repale
5	Isolation and Characterization of Manganese Solubilizing Bacteria for Increasing Availability of Manganese in Sugarcane	Sudha D. Ghodke

Dr. RV Dani, Mr. RA Chandgude and Dr. KS Konde chaired the Sugar Engineering, processing/ co-products sessions respectively. Mrs. Sudha Ghodke Co-chaired the sugarcane agriculture session and Mr. S Panda co- chaired the factory processing session.

During the convention, there was interaction between VSI team and delegates & traders regarding

3rd international conference which is going to be organized by VSI during January 2024.

The representatives of different organizations were interacted & requested them to participate in forthcoming 3rd International Conference to be Organized on January 2024 at VSI, Pune.

52nd Annual Convention of SISSTA at Chennai

VSI team consisting of Mr. Sambhaji Kadupatil, Director General, Dr. AD Kadlag, Dr. KS Konde, Mr. S Panda, Mr. K Gangadharam, Mr. N Mahana, Mr. Sastry, Mr. PP Shinde, Mr. BH Pawar, Dr. JM Repale, Dr. SG Dalvi, Mrs. Sudha D Ghodke, Mrs. JP Kharade, Mrs. Kranti Nigade participated in the 52nd SISSTA (South Indian Sugarcane & Sugar Technologists Association) at Chennai Annual Convention of SISSTA on September 29 - 30, 2023.

Hon'be Shri. M Venkaiah Naidu Ji, Former Vice President of India graced the session as the Chief Guest. Welcome address was delivered by Mr. R Nanda Kumar, President of SISSTA. The Chief Guest and other dignitaries on the dais felicitated the Life Time Achievement awards, best research papers and sugar mills for their performance. Hon'be Shri. M. Venkaiah Naidu Ji, Former Vice President of India delivered Chief guest address to the participant. The Keynote Address was delivered by Mr. Sanjay Awasthi, President STAI. Mr. Sambhaji Kadupatil, Director General, VSI, in his guidance told about the

present situation of the Maharashtra sugar industry and different ways to forward for the industry. Dr. AD Kadlag, Principal Scientist (Crop Production and Protection) Co-Chaired the Agriculture session and Mr. S Panda co- chaired the factory processing session.

Dr. JM Repale received the Silver medal award to the research paper entitled 'Performance of promising sugarcane genotypes in South Zone of Maharashtra' by RS Hapase, JM Repale and JP Karade presented in 51st Ann. Convention of the SISSTA held at Tirupati.

Mr. S Panda received Silver award for the best technical paper in Factory Processing presented last year on 'Advanced raw sugar process to sustain shelf life & suitable to domestic consumption and Mr. N Mahana received Silver award for the best technical paper in co-product section presented last year on 'Spontaneous combustion of molasses- problems & remedies'. Both these paper presented last year convention at Tirupati Scientist's from VSI presented their research papers from Agriculture and Technical Division. Following research papers were presented by the respective authors

Sr.No.	Title of the technical papers	Name of the presenting author
1	Potential of sugarcane clones for yield and quality traits in Maharashtra' by Repale JM and RS Hapase (P. 45-50)	JM Repale
2	Evaluation of developed consortium of isolated efficient bacteria on physico- chemical properties of sugar effluent by Sudha Ghodke, Dr. Deepali Nimbalkar, Kranti Nigade, Dr. EA Alhat, Kapil Uphade and Farzana A.H. Shaikh (P. 218-225)	Sudha D. Ghodke
3	Evaluation of entomopathogenic fungi and their consortium for the management of sugarcane whitefly (<i>Aleurolobus barodensis</i> maskell) by Sonali Gaikwad, Sudha Ghodke and Uday Manjul (P.131-137)	Sudha D.Ghodke
4	Bio-control of root feeding white grub larvae through application of entomopathogenic nematode in sugarcane field by Kranti Nigade, Sudha Ghodke and Uday Manjul (P. 40-44)	Kranti G. Nigade
5	Revolutionizing agriculture: harnessing biosolids for sustainable waste management and crop enhancement by Dr. SG Dalvi, DM Ithape, SM Mehetre and AD Kadlag (P. 162-168)	SG Dalvi
6	Antifungal efficacy of silver nanoparticles against fusarium <i>moniliforme</i> - an incitant of pokkah boeng disease in sugarcane by Dr. GS Kotgire, BH Pawar, Dr. SG Dalvi and JH Yadav (P. 138-142)	BH Pawar

Sr.No.	Title of the technical papers	Name of the presenting
7	Performance evaluation of micro irrigation system in sugarcane crop by Mr. PP Shinde (P. 81-84)	PP Shinde
8	Impact of micronutrient application through soil and drip fertigation on growth and yield of sugarcane by Jyoti Kharade and Dr. Preeti Deshmukh (P. 177-185)	Jyoti Kharade
9	Nutrient management in sugarcane growing calcareous soil by Dr. Preeti Deshmukh, Dr. S. A. Surwase and Varsha Hingmire (P. 194-197)	Jyoti Kharade
10	Effect of Application of different entomopathogenic fungi and entomopathogenic nematode for control of white grub in sugarcane crop by Sudha Ghodke, Kranti Nigade, Uday Manjul, Datta Jadhav and Kumar kamble (P. 119-126)	Sudha D.Ghodke
11	Advantages of dilution of syrup by filtrate juice for ethanol production-case study	S Panda
12	Challenges and remedies in sugar processing during diversion of different feed stocks	K Gangadharam
13	Possibilities of carbonation refinery in Indian sugar industry	N Mahana

During the convention, there was interaction between VSI team and delegates & traders regarding 3rd international conference which is going to be organized by VSI during January 2024. The

representatives of different organizations we had interacted & requested them to participate in the 3rd international conference during January 2024 at VSI, Pune (India).



68th Annual Convention and Sugar Expo of DSTA at Pune

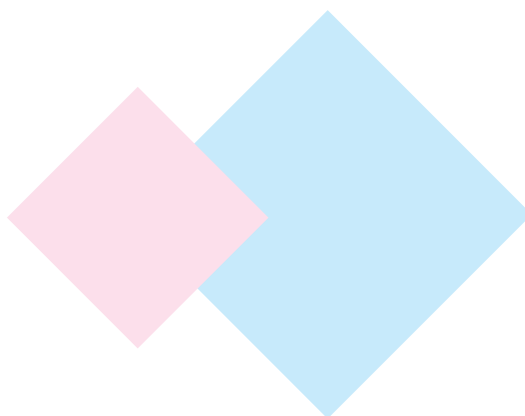
The Deccan Sugar Technologists Association (India) conducted the 68th Annual Convention and Sugar Expo 2023 in Pune on 24th & 25th September 2023. Dr. RV Dani, Head & Technical Adviser, Mr. S Panda, Technical Adviser, Mr. N Mahana, Sr. Sugar Technologist from Sugar Technology department and Dr. Dipali Nimbalkar, Head & Sr. Scientist, Environmental Sciences Department were participated in this convention.

A technical article titled 'Importance of recovery calculation during diversion of different feed stocks' submitted by S Panda, RR Patil, N Mahana, RN Ghorpade and Dr. RV Dani in the annual convention 2022 was awarded the First prize in factory processing section from DSTA.

Dr. RV Dani presented technical paper on 'VVHP raw sugar for direct consumption'. Mr. S Panda presented technical paper on 'A positive approach to improve sugar quality and reduction in steam consumption-case study' and Mr. N Mahana presented technical paper on 'Sulphurless Sugar- Future of India'.

Dr. Dipali Nimbalkar presented technical paper on 'Water as a by-product of the sugar industry: A case study implemented at Shree Datta Shetkari SSK Ltd.' (Authors: Deepa Bhandare, Eknath Alhat, Deepali Nimbalkar). Paper was presented in co-products session.

All the papers presented in the convention were appreciated and authors answered the queries from delegates.



VISITORS TO VSI

Team of NRCG, Pune

A team of scientist viz., Dr. Holkar and Dr. Anupama Naik Pune from the National Research Center on Grapes (NRCG) visited Vasantdada Sugar Institute on July 10, 2023. The purpose of their visit was to inspect the infrastructure at VSI related to the production of virus-free clean planting material and the diagnosis of virus indexing & genetic fidelity and DNA Markers for fingerprinting.

During the visit, Dr. SG Dalvi and Dr. RM Devarumath briefed the NRCG team about the activities and facilities at VSI and discussed the possibility of sharing facilities and potential collaborative work.

It was observed that Vasanta Urja has demonstrated efficacy in providing abiotic stress tolerance and biotic stress tolerance, particularly in suppressing viruses in plants. Based on these observations, Dr. AD Kadlag and Dr. SG Dalvi visited NRCG Pune and held discussions with Dr. Kaushik Banerjee, Director of NRCG, Pune.

The discussions focused on extending the MOU between VSI and NRCG to include recommending the application of Vasanta Urja through research trials, with the aim of promoting residue-free and sustainable grape production.

Visit of Mr. Ravi Kumar (IAS), Managing Director of the Mysore Sugar Company

Mr. Ravi Kumar (IAS), Managing Director of the Mysore Sugar Company undertaking of Government of Karnataka has visited Vasantdada Sugar Institute on July 26-27, 2023. Mr. Sambhaji Kadupatil, Director General welcomed Mr. Ravi Kumar and briefed about R & D, Extension services, Academics & other activities of the Institute. VSI film was displayed regarding various activities. In the welcome function

all the HODs & section heads explained their various activities and R & D projects. Mr. Ravi Kumar discussed with HODs regarding various problems and remedies. He has also discussed with Mr. RA Chandgude, Head & TA (SE), Dr. RV Dani, Head & TA (ST) and Dr. KS Konde, Head, Prof. & TA (AT & Biofuels) regarding plant modernization, cogeneration & ethanol production etc.



Visit of Members of Interis India Pvt. Ltd., Pune

Mr. Ravindra Jaywant, CEO, Director and Mr. Pirrie Averseng Sr. Technologist Interis India Pvt. Ltd. And Mr. Pierre Noel, Business Development Manager Sugar & Ethanol from De Smet S.A. Engineers & Contractors, Belgium visited VSI on August 1, 2023 to see the facilities and discussed the matter of validation work based on storage of raw sugar syrup. There was a meeting between Mr. Jaywant with Mr. Sambhaji Kadupatil, Director General, VSI and Dr. KS Konde, Head, Professor & Technical Adviser, Department of Alcohol Technology & Biofuels, VSI.

As per the discussion, they already developed the protocol for the storage of raw beet sugar syrup. Similar study will be carried out on Indian sugarcane syrup for its storage. Non-Disclosure Agreement (NDA) has been signed between VSI and De Smet S.A. Engineers & Contractors on July 17, 2023 to carryout process validation work on sugarcane juice. This study will help sugar industries to store sugarcane syrup for longer duration & utilization of this syrup during off-season.



Visit of Members of International Fragrance and Flavors, USA

Dr. Riya Bhalla and Mr. Arun Kumar from International Fragrance and flavors, USA visited VSI on August 22, 2023. Mr. Sambhaji Kadupatil, DG, welcomed guests

and briefed the activities of VSI. Later they visit department of Alcohol Technology & Biofuels. Dr. KS Konde briefed activities of the department.



CTC, Brazilian Team Visit

Dr. Michael Butterfield, Data Science and Scientific Affairs Manager, Mr Daniel Medeiros, Strategic Planning Manager and Mr. Cesar Bueno, Biotechnology Manager from CTC, Brazil Visited VSI on August 28, 2023. Mr. Sambhaji Kadupatil, DG, welcomed the guest. Mr. Shivajirao Deshmukh, Advisor, Dr. AD Kadlag, Principal Scientist, Crop protection and Crop

Production AST &D and all HODs of the section were present. The team of delegation visited Tissue Culture Section. and molecular biology and Genetic Engineering Lab, During their visit Dr. SG Dalvi explained about tissue culture activity and Application of Vasant Urja in different crops. Dr. RM Devarumath explained the activity of MB & GE Lab.



Visit of Dr. Chandrakant Pulkundwar, Sugar Commissioner of Maharashtra

Dr. Chandrakant Pulkundwar, Sugar Commissioner of Maharashtra and other official members visited VSI on September 13, 2023. Mr. Sambhaji Kadupatil, DG, welcomed guests and briefed the activities of VSI. They visited different departments.



Team of Shree Siddheshwar Sahakari Sakhar Karkhana Ltd, Solapur



Team members of Shree Siddheshwar Sahakari Sakhar Karkhana Ltd, Solapur visited VSI on September 14, 2023. The team was visited they visited all the departments of agriculture section. HODs briefed the activities of sections.

Monitoring Team Visit to ICAR-AICRP Seed (Crops) Project

A team of scientists from the Central Zone-I of National Seed Production, AICRP (crops), ICAR seed project TSP monitoring and comprising of six scientists Dr. JB Patel, JAU, Junagadh, Dr. AV Mane, BSKKV, Dapoli, Dr. Sanjay Kumar Singh, JNKVV, Jabalpur, Dr. GK Lande, PDKV, Akola, Dr. Basavaraju B, UAS, Bengaluru, Dr. Anjitha George, ICAR-IISS, RS, Bengaluru. They visited the institute on September 26, 2023 to monitor the ICAR-AICRP Seed (Crops) Project at VSI center. Dr. AD. Kadlag, Principal Scientist, welcome the team and Director General, Mr. Sambhaji Kadupatil offered Bouquetto monitoring team members. The team visited the breeder's seed plots at Lonarwadi farm and also visited to tissue culture

laboratory, Microbiology laboratory, Molecular Biology & Genetic Engineering, Alcohol Technology Department and different technologies demonstration plots in the institute's campus. The team took review of breeder's seed production & distribution of preceding and succeeding year. Successful implementation of sugarcane breeder seed production through single bud settling and tissue culture technology was appreciated by the monitoring team. The team appreciated the efforts of the VSI scientists in conducting the AICRP(Seed) research program and in producing high-quality seed. They also provided valuable suggestions for improving the seed production and research program further.



Achievements of Center

Breeder's seed production has been taken under ICAR-AICRP Seed (Crops) Project. The center had distributed 59.56 lakh two eye budded setts of breeder's seed to 38 mills during the year 2022-23 against target 90.85 lakh setts and single eye bud seedling 07.32 lakh against target 15.00 lakh. Other than this conventional seed production, Institute has supplied 6.17 lakh tissue culture plantlets during the

year 2022-23 under this project. Sugarcane seed supply target 74 % was achieved during the year.

Breeder's seed distribution programme of the year 2023-24 is going on, total 12 lakh two eye budded setts was distributed up to September to the farmers and sugar mills in the state for further multiplication of foundation seed. Now breeder's seed of different sugarcane varieties are standing on 41 ha area at Institute's farms.

Following Visitors were visited VSI during July-August and September 2023.

Address of the Visitors	Designations	Total
July - 2023		
S.N.B.P'S International School, Manjari-Keshav Nagar Road, Manjari, Pune	Teachers and Students	173
College of Animal husbandary, Baramati, Dist: Pune	Co-ordinator and Trainee	39
Pune Knowledge Cluster (PKC), Dist: Pune	Officers and students	32
Janshanti farmers group , Niphad, Dist: Nasik	Farmers	25
MVP Agriculture College, Nasik, Dist: Nasik	Principal and Faculties	5
Co-operative Department Trainee (CPTC) of Maharashtra	Trainee	18
MIT College (Kothrude & Loni-Kalbhor), Pune	Faculties and Students	80
Individual Farmers from Maharashtra State	Farmers	536
August-2023		
Somiya College, Mumbai	Faculties and Students	23
Depond Organization, Pune	Officers	2
Arham Management Institute, Manjari, Pune	Faculties and Students	30
Individual Farmers from Maharashtra State	Farmers	366
September-2023		
Institute of Biosciences & Technology, CIDCO, Aurangabad	Faculties and Students	95
Jaysingpur of Arts, Commerce, Science & Computer Science College, Jaysingpur, Dist: Kolhapur	Faculties and Students	15
Angles, High School & Junior College, Loni, Dist: Pune	Faculties and Students	198
Shree Sidheshwar Kumathe, Solapur, Dist: Solapur	Directors and Officers	23
Lokmanagal Bhandar Kavathe, Ltd., Dist : Solapur	Farmers	15
Jaywantrao Sawant College of Commerce & Science, Hadapsar, Dist: Pune	Lecturers and Students	44
Individual Farmers from Maharashtra State	Farmers	453
	Total	2172

पावसाळा हंगामात ऊस पिकांवर आढळणारे रोग व त्यांचे नियंत्रण

गणेश कोटगिरे आणि भरत पवार

कृषिशाला व तंत्रज्ञान विभाग

वसंतदादा शुगर इन्स्टिट्यूट, मांजरी बु.॥, पुणे

ऊस हे भारतातील महत्वाचे नगदी पीक असून ते अनेक राज्यात लागवडीखाली आहे. या पिकाखालील क्षेत्रातदेखील सातत्याने वाढ होतेय, परंतु, देशात ऊस पिकाचे दरमहा दरहेक्टरी उत्पादन मात्र अपेक्षेपेक्षा खूपच कमी म्हणजे मागील गळीत हंगामात ते ७५ मे.टन. इतके होते. महाराष्ट्रात मात्र ऊस उत्पादकता हेक्टरी ८५ मे.टन. इतकी होती. ऊसाचे व साखरेचे प्रति हेक्टरी उत्पादन कमी येण्याची अनेक कारणे आहेत. या कारणांपैकी ऊस पिकावर होणाऱ्या रोगांचा प्रादुर्भाव व त्यांचा वाढता प्रसार हे एक महत्वाचे कारण आहे. महाराष्ट्रात आजपर्यंत ३० रोग ऊस पिकावर आढळलेले आहेत. पिक संरक्षणाबाबत शेतकऱ्यांचे अज्ञान व त्यांना मिळणारी अपुरी माहिती, रोग निमंत्रणाबाबत शेतकऱ्यांची उदासिनता, शिफारशीत नसलेल्या ऊस जातींची लागवड, हवामानातील बदल, सेंद्रिय, रासायनिक आणि जैविक खतांचा असंतुलित व अवेळी वापर, पाण्याचा कमी किंवा अधिक प्रमाणात वापर, राज्यातील दुष्काळी चक्र, किडींचा वाढता प्रसार व प्रादुर्भाव या अशा विविध घटकांमुळे रोगाच्या वाढीस व प्रसारास योग्य वातावरणनिर्मिती तयार होवून रोगांचा प्रसार आणि प्रादुर्भाव वाढत आहे.

पावसाळा हंगाम चालू असतांना हवेत सापेक्ष आर्द्रतेचे प्रमाण जास्त असते, शेतात पाणी साचून मुळांची कार्यक्षमता घटलेली असते तसेच हलक्या, वालुकामय, मुरमाड जमिनीतून पिकास आवश्यक असणाऱ्या अन्नद्रव्यांचा निचरा होतो किंवा ती पाण्याद्वारे वाहून जातात; यामुळे पिकाचे पोषण व्यवस्थित होत नाही. पिक अशक्त बनते. अशा परिस्थितीत ऊस पिकामध्ये अनेक रोगांचा प्रादुर्भाव होतो, त्यांचा जोर वाढतो तसेच त्यांचा प्रसारदेखील जास्त होतो. पावसाळा हंगामात तसेच पावसाळ्यानंतर ऊस पिकाच्या पानांवर हवेद्वारे पसरणारे तपकिरी तांबेरा, पोक्का बोंग, तपकिरी ठिपके, आय स्पॉट (नयनाकृती दिसणारे ठिपके), झोनेट स्पॉट आणि जमिनीतून पसरणारे मर, कांडीकुजआणि मुळकुज हे रोग प्रामुख्याने आढळतात. यापैकी काही रोगाबाबत सविस्तर माहिती या लेकात देत आहोत.

पोक्का बोंग

पोक्का बोंग हा रोग फुजॅरियम मोनिलीफॉर्मि/सॅकाराय या हवेद्वारे पसरणाऱ्या बुरशीमुळे होतो. को ४१९, कोसी ६७९, व्हीएसआय ४३४, को ८६०३२, एमएस १०००१ आणि कोव्हीएसआय ९८०५

या ऊस जाती या रोगास बळी पडतात. महाराष्ट्राच्या सर्व हवामान विभागात या रोगाचा प्रादुर्भाव ऊस पिकांवर आढळतो. दक्षिण महाराष्ट्रात मात्र जास्त पाऊस पडणाऱ्या भागात आर्द्रतेचे प्रमाण हवेत जास्त काळ राहिल्याने या रोगाचे प्रमाण जास्त आहे. पावसाळा हंगामापूर्वी वळीव स्वरूपाचा पाउस झाल्यावर रोगाचा प्रादुर्भाव ऊसाच्या पोग्यात किंवा कोवळ्या पानांवर दिसून येतो.

पोक्का बोंग रोगाची लक्षणे : पोक्का बोंग रोगामुळे अनेक प्रकारची लक्षणे उसाच्या पानांवर आणि कांड्यावरती नोंदविण्यात आलेली आहेत. बुरशीची लागण झाल्यावर सुरवातीस तिसऱ्या व चौथ्या पानांच्या बेचक्यात (पानाच्या व देठाच्या जोडाच्या ठिकाणी) पांढरट - पिवळसर पट्टे दिसून येतात. लागण झालेल्या पानांवर सुरकुत्या पडून पाने आकसतात तसेच त्यांची लांबी घटते. रोगाची तीव्रता वाढते त्यावेळी पाने सडतात/कुजतात व नंतर गळून पडतात किंवा एकमेकांत गुरफटतात. कधी कधी रोगाची तीव्रता वाढल्यामुळे पोंगा मर किंवा शेंडा कुज दिसून येते. काही वेळेस रोगग्रस्त उसाच्या कांड्यांवर कांडी काप (नाइफ कट) सारखी लक्षणे दिसून येतात. रोगाचा प्राथमिक प्रसार हवेमार्फत, तर दुय्यम प्रसार पाणी, पाऊस व कितकाद्वारे होतो.



रोगामुळे पाने एकमेकांत गुरफटणे

पाने सडणे किंवा कुजणे

कांड्यांवर कांडी काप (नाइफ कट)

पोक्का बोंग रोग नियंत्रणाचे उपाय :

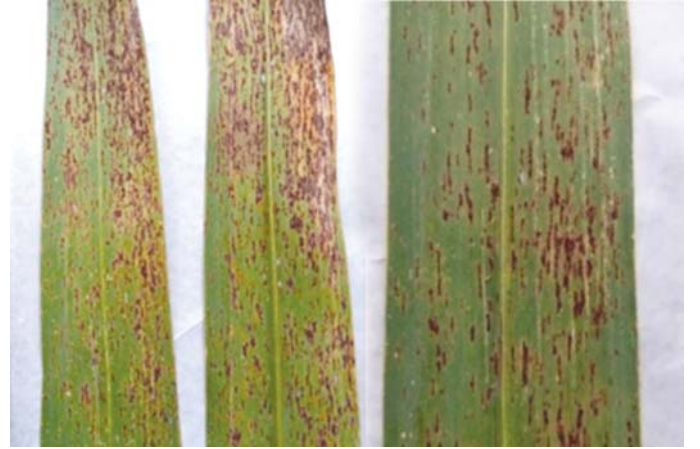
रोग लागण झालेल्या शेतातील शेंडेकुज झालेले व पांगशा फुटलेले ऊस शेतातून वेगळे काढावेत व जाळून नष्ट करावेत व नंतर रोगाच्या नियंत्रणाकरिता ०.२ टक्के कॉपर ऑक्झिक्लोराईड (१ लिटर पाण्यात २ ग्रॅम बुरशीनाशक) किंवा ०.१ टक्के कार्बेन्डेझिम (१ लिटर पाण्यात १ ग्रॅम बावीस्टीन) किंवा ०.३ टक्के मॅकोझेब (१ लिटर पाण्यात ३ ग्रॅम डामथेन एम ४५) यापैकी एका बुरशीनाशकाच्या १० दिवसांच्या अंतराने स्टीकर वापरून २ ते ३ फवारण्या कराव्यात.

पिकास खतांची मात्रा माती परिक्षणानुसार योग्य प्रमाणात योग्य वेळी द्यावी.

तपकिरी तांबेरा

तपकिरी तांबेरा हा रोग पुकसिनीमा मॅलॅनोसिफॅला या हवेद्वारे पसरणाऱ्या बुरशीमुळे होतो. तांबेरा रोगामुळे ऊस पिकाचे ४० टक्केपर्यंत नुकसान होवू शकते. को ४१९, कोसी ६७१, कोव्हीएसआय ९८०५, को १२००५, एमएस १०००१, व्हीएसआय४३४ आणि कोएम ०२६५ या ऊस जाती रोगास जास्त बळी पडतात; तर अलिकडे को ८६०३२ या ऊस जातीवर देखील या रोगाचा प्रादुर्भाव दिसत आहे. स्फुरद व पालाश जास्त असणाऱ्या जमिनीत घेतलेल्या उसपिकात रोगाची तिब्रता जास्त आढळून येते. पावसाळा हंगामात हवेत वाढणारी आर्द्रता आणि तापमान या रोगाच्या बुरशीच्या वाढीसाठी आणि प्रसारासाठी पोषक असते.

तपकिरी तांबेरा रोगाची लक्षणे : रोगाची लागण झाल्यावर सुरुवातीस पानांवर लहान व लांबट पिवळे ठिपके पानाच्या खालच्या बाजूस दिसून येतात. कालांतराने ठिपक्यांची लांबी वाढते व त्यांचा रंग लालसर तपकिरी किंवा तपकिरी दिसून येतो. ठिपक्यांचा भाग बुरशीच्या आणि बिजाणूंच्या वाढीमुळे फुगीर होतो. त्यामुळे पानांचा ठिपक्यालगत भाग फुटून त्यातून नारिंगी किंवा तांबूस-तपकिरी रंगाचे बिजाणू बाहेर पडतात. रोगग्रस्त पानाच्या पाठीमागच्या पृष्ठभागावरून बोट फिरविले असता बिजाणूची पावडर सहजपणे बोटास चिकटते. तांबेरा रोगाचा प्रादुर्भाव व प्रसार पावसाळ्यानंतर ढगाळ वातावरण, जास्त आर्द्रता व थंड हवा असताना जास्त प्रमाणात दिसून येतो. रोगाचा प्रसार हवा, पाणी, पाऊस व किटकांद्वारे होतो.



पानावर तांबेरा रोगाची लक्षणे

तांबेरा रोग नियंत्रणाचे उपाय:

- ◆ रोगाचा प्रादुर्भाव जास्त येणाऱ्या भागात मध्यम रोगप्रतिकारक जातींची (कोव्हीएसआय ०३१०२, व्हीएसआय ०८००५) लागण करावी.
- ◆ पिकास खतांची मात्रा माती परिक्षणानुसार योग्य वेळी द्यावी. नत्रमुक्त खताचा तसेच इतर खतांची मात्रा उशिरा देऊ नये. पावसाळ्यात शेतातून अतिरिक्तपाण्याचा निचरा करावा.
- ◆ तांबेरा रोग दिसून आल्यावर लगेचच ०.२५ टक्के प्रमाणात प्रोपिनेब (उदा. अँट्राकॉल, १ लिटर पाण्यात २.५ ग्रॅम बुरशीनाशक) किंवा ०.३ टक्के प्रमाणात मॅकोझेब (उदा. डामथेन एम ४५, १ लिटर पाण्यात ३ ग्रॅम बुरशीनाशक) या बुरशीनाशकाच्या १० दिवसांच्या अंतराने स्टीकर वापरून २ ते ३ फवारण्या कराव्यात. रोगाचा जास्त प्रादुर्भाव असेल तर फवारणीपुर्वी रोगग्रस्त आणि वाळलेली पाने शेताबाहेर काढावीत.

तपकिरी ठिपके

हा रोग सरकोस्पोरा लाँग्गीपस या बुरशीमुळे होतो. पुर्वीच्या संदर्भानुसार या रोगाचा प्रादुर्भाव उसपिकावर वर्षभर आढळत असला तरी पावसाळ्यात अतिवृष्टीनंतर या रोगाची तिब्रता वाढते. जादा आर्द्रता आणि २५ ते ३० सेंग्रे दरम्यानचे तापमान या रोगास प्रादुर्भावास आणि प्रसारास अनुकूल आहे. महाराष्ट्राशिवाय या रोगाची लागण ऊस पिकावर कर्नाटक, गुजरात आणि गोवा राज्यात आढळलेली आहे. महाराष्ट्रात कोएम ०२६५ आणि को ८६०३२ या ऊस जाती रोगास जास्त बळी पडतात.

तपकिरी ठिपके रोगाची लक्षणे : रोगाची लागण पानावर झाल्याने लाल-तपकिरी रंगाचे ठिपके उसाच्या पानांवर दिसून येतात. ठिपक्यांचा आकार टाचणीच्या टोकापासून ते ३ ते १५ मिमी इतका आढळतो. पानावरील ठिपके अंडाकृती किंवा लंबगोलाकार असून त्यांच्या

सभोवतालचा भाग पिवळा दिसतो. सामान्यपणे पानाच्या दोन्ही बाजूस ठिपके सारखेच दिसतात. उसाच्या कोवळ्या पानांपेक्षा जुन्या पानांवर ठिपके जास्त प्रमाणात दिसतात; तसेच ठिपके पानांवर सर्वत्र सारख्या प्रमाणात विखुरलेले आढळतात. रोगाची तीव्रता वाढल्यावर ठिपके पानाचा पुर्ण भाग व्यापतात आणि ते एकमेकात मिसळतात. तदनंतर पाने पुर्णपणे करपतात आणि वाळतात. दूरवरून रोगग्रस्त पिक तांबेरा रोगाने ग्रासल्यासारखे दिसते. पाणांची पुर्ण वाढ होण्याआधीच पाने पिवळी पडतात आणि पानाकरवी होणारे प्रकाश संश्लेषणाचे आणि साखर तयार करण्याचे काम मंदावते किंवा थांबते.



तपकिरी ठिपके रोगाची लक्षणे

रोग नियंत्रणाचे उपाय

१. पिकास सेंद्रिय, रासायनिक आणि जैविक खताची मात्रा माती परिक्षणानुसार वेळेवर द्यावी. तसेच पावसाळा हंगामात शेतात पाणी साचणार नाही अशा पद्धतीने निचरा व्यवस्था करावी.
२. रोगाची लागण दिसून आल्यावर लगेचच ताम्रमुक्त बुरशीनाशकाच्या ०.२ % या प्रमाणात उदा. कॉपर ऑक्झीक्लोराईड २ ते ३ फवारण्या १५ दिवसाच्या अंतराने स्टिकरचा वापर करून कराव्यात. या बुरशीनाशकाशिवाय मॅकोझेबमुक्त बुरशीनाशकसुद्धा उदा. डामथेन एम ४५, ०.३ % या प्रमाणात रोगाच्या निमंत्रणासाठी परिणामकारक आहे.

याव्यतिरिक्त ऊस पिकात पानावरील ठिपके (लीफ स्पॉट) आम स्पॉट, येलो लीफ डिजीज या रोगांचा प्रादुर्भाव दिवसेंदिवस वाढत असल्याचे निदर्शनास आलेले आहे. दक्षिण महाराष्ट्र तसेच महाराष्ट्राच्या पश्चिम भागात जास्त पावसामुळे पानावरील रोगांचा प्रादुर्भाव संमुक्तरित्या आढळतो. रोगामुळे ऊसाची सर्व पाने करपून गेलेली आढळतात. त्यामुळे ऊसाच्या व साखरेच्या उत्पन्नात मोठ्या प्रमाणावर घट होते. कांडी कूज व अननस या लागणीनंतर ऊस बेण्यास होणाऱ्या रोगाचा प्रादुर्भाव जास्त खोलीयमा जमिनीत लागण केलेल्या कांड्यावर ५

टक्के पर्यंत आढळतो; या रोगामुळे ऊसाची उगवण कमी होते. याकरिता पाणी व्यवस्थापन उत्तमरितीने करावे. पाणी शेतात जास्त काळ राहून दलदल होणार नाही याची काळजी घ्यावी. ठिबक सिंचन या सिंचनाच्या शास्त्रशुद्ध पद्धतीचा वापर करणे ही काळाची गरज आहे.

पावसाळा हंगामात ऊस पिकावर रोगांचा प्रादुर्भाव आणि प्रसार टाळण्यासाठी प्रतिबंधात्मक उपाय

१. ऊस लागवडीकरिता निचरामुक्त जमिनी असाव्यात. ऊस पिकाचा कालावधी मोठा असल्याने जमिनीच्या समस्या टाळण्यासाठी जमिनीची पूर्व मशागत चांगली करावी. ऊस लागवडीकरिता रूंद सरी किंवा पट्टा पद्धतीची रानबांधणी करावी. हंगामनिहाम व जातनिहाम लागवडीचे नियोजन करावे. शिफारस केलेल्या ऊसजार्तीची लागण करावी.
२. लागणीसाठी बेणेमळमातील बेण्याचा वापर करावा. बेणे मळ्यातील बेणे उपलब्ध नसल्यास १० ते ११ महिने वय असलेल्या लागणीच्या पिकातील रोग व कीडमुक्त ऊस बेण्यासाठी वापरावा.
३. ऊस बेण्यास लागणीपूर्वी कार्बेन्डेझिमयुक्त बुरशीनाशकाची (बावीस्टीन १०० ग्रॅम) व कीटकनाशकाची (इमिडाक्लोप्रिड ७०%, ३६ ग्रॅम) १०० लिटर पाण्यात मिसळून १० ते १५ मिनिटे प्रक्रिया करावी.
४. खोल काळ्या जमिनीत उसाची लागण कोरड्या पद्धतीने करावी, जेणेकरून लागण खोलवर होणार नाही. अशा ठिकाणी रोपांचा वापर करावा.
५. सेंद्रिय, रासायनिक व जैविक खतांचा वापर माती परिक्षण अहवालानुसार व वेळेवर करावा.
६. आंतरमशागतीची कामे उदा. तणनिर्मुलन, उसाची बाळबांधणी व मोठी बांधणी वेळेवर करावी.
७. ऊस पिकावरील किडींचे निमंत्रण वेळीच करावे; जेणेकरून रोगाच्या प्रसारास आळा बसेल.
८. ऊस पिकात कणखरपणा वाढण्यासाठी सल्फर, कायटोसान आणि सिलीकॉन युक्त उत्पादनांचा वापर फायदेशीर आहे.

अधिक माहितीसाठी :

प्रा. (श्री.) भरत पवार, वरिष्ठ शास्त्रज्ञ आणि प्रमुख

डॉ. गणेश कोटगिरे शास्त्रज्ञ

ऊसरोग शास्त्र विभाग

वसंतदादा शुगर इन्स्टिट्यूट, मांजरी (बु.), पुणे. ४१२ ३०७

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वसंतदादा शुगर इन्स्टिट्यूट निर्मित जैविक कीडनियंत्रकाद्वारे ऊसातील हुमणीचे नियंत्रण

सुधा घोडके, क्रांती निगडे आणि डॉ. अशोक कडलग

कृषिसुक्ष्म जीवशास्त्र विभाग

वसंतदादा शुगर इन्स्टिट्यूट, मांजरी बु.॥, पुणे

महाराष्ट्रात मागील काही वर्षां मध्ये हुमणीचा प्रादुर्भाव वाढत चाललेला आपणांस दिसून येत आहे. सध्याच्या काळात ऊसाचे हेक्टरी उत्पादन घटत चालले आहे. त्यासाठी उसाला इतर आधुनिक तंत्रज्ञानाचा वापर करण्याबरोबरच उसाला कोणतीही कीड किंवा रोगांचा प्रादुर्भाव होऊ नये याबाबत काळजी घेणे गरजेचे आहे. ऊस पीकावर आढळणाऱ्या प्रमुख कीडी म्हणजे खोडकीड, हुमणी, लोकरी मावा, पायरिला खवले कीड, कांडी कीड व पांढरी माशी या सर्व कीडींच्या नियंत्रणासाठी शेतकरी वर्गाकडून मोठ्या प्रमाणात रासायनिक औषधाचा वापर केला जात आहे. या रासायनिक औषधांचे पर्यावरण व आरोग्य विषयक दुष्परिणाम आपणा सर्वांना ज्ञात आहेत. हे दुष्परिणाम टाळण्यासाठी कीड नियंत्रणाच्या विविध जैविक पद्धतींचा विकास झाला आहे.

महाराष्ट्रात प्रामुख्याने दोन प्रकारच्या हुमणी आढळतात. त्यामध्ये नदी काठावरील व माळरानावरील हुमणी असे वर्गीकरण केले जाते. हुमणीची प्रजात लिकोफोलीस ही नदीकाठावर तर होलोट्रॅकिया ही माळरानावर आढळते. माळरानावरील हुमणीची प्रजात मोठ्या प्रमाणावर पिकांचे नुकसान करते. हुमणीच्या प्रादुर्भावामुळे ऊस उगवणीमध्ये ४०% तसेच उत्पादनामध्ये हेक्टरी १५ ते २० टनापर्यंत नुकसान होते. सद्य परिस्थितीत महाराष्ट्रात हवामानातील बदल व सिंचनासाठी उपलब्ध पाण्याची मर्यादा यामुळे उसामध्ये हुमणीचा प्रादुर्भाव वाढलेला आढळून येत आहे. राज्यात मागील काही वर्षां मध्ये मोठ्या प्रमाणात हुमणीचा प्रादुर्भाव कोल्हापूर, सांगली, पुणे, अहमदनगर, सोलापूर इ. जिल्ह्यांमध्ये वाढलेला दिसतो.

हुमणीचा जीवनक्रम

हुमणीची जीवनावस्था चार प्रमुख टप्प्यां मध्ये करण्यात आली आहे - भुंगेरे, अंडी, अळी व कोष

- प्रथम अळी अवस्था पांढरीशुभ्र, पिवळे डोके, सुमारे ८ मी.मी. लांबी असते.
- पूर्ण विकसित अळ्या पिवळट-सफेद, डोक्याचा रंग बदामी व इंग्रजीच्या 'सी' अक्षराप्रमाणे अर्धगोलाकार असते.
- पूर्ण विकसित अळीची लांबी सुमारे ४० ते ४५ मी.मी. असते.
- प्रौढ भुंगेरा - तपकिरी किंवा बदामी रंग १८ ते २० मी.मी. लांब व ८ मी.मी. पर्यंत जाड पंखाची प्रथम जोडी ढालीप्रमाणे

मजबूत, पंखांची दुसरी जोडी पातळ असते.

हुमणीचा जीवनक्रम

पहिल्या पावसानंतर मे किंवा जून मध्ये प्रौढ भुंगे सुप्तावस्थेतून बाहेर येतात. कडूनिंब, बाभूळ, बोर यासारख्या झाडांवर मिलनासाठी जमतात. सुर्योदयापूर्वी मादी जमिनीमध्ये अंडी घालते. एक मादी ५० ते ७० अंडी घालते. अंड्यातून अळी बाहेर पडते. दोनदा कात टाकून ५ ते ९ महिन्यांमध्ये पूर्ण वाढते. त्यानंतर पूर्ण वाढ झालेली अळी कोषावस्थेत जाते. साधारणतः १४ ते १९ दिवसांनी प्रौढ भुंगे बाहेर पडतात.

- मे, जून, जुलै-प्रौढ सुप्तावस्थेतून निघतात व मादी अंडी घालते.
- ऑगस्ट ते नोव्हेंबर-अळी पिकांची मुळे खावून उपजीविका करते.
- नोव्हेंबर-जमिनीत कोषावस्थेत असते.
- जानेवारी ते मे-प्रौढ भुंगेरे जमिनीमध्ये सुप्तावस्थेत राहतात.

नुकसानीचा प्रकार

प्रथम अवस्थेतील हुमणीच्या अळ्या अंड्यातून बाहेर निघाल्यानंतर जमिनीतील कुजलेल्या सेंद्रिय पदार्थावर किंवा जीवंत मुळांवर उपजीविका करतात. त्यानंतर दुसऱ्या व तिसऱ्या अवस्थेतील अळ्या ऊस व इतर पिकांची मुळे खातात. मुळे खाल्यामुळे पिकाचे अन्न व पाणी घेण्याचे कार्य बंद पडते. पाने हळूहळू पिवळी पडण्यास सुरुवात होते. ऊस निस्तेज दिसतो. प्रादुर्भावग्रस्त उसाला हलका झटका दिल्यास ऊस सहजासहजी उपटून येतो.

नियंत्रण

एक हुमणीची अळी प्रति एकर एक घनमीटर अंतरात आढळून आल्यास कीड नियंत्रण करावे. सरासरी २० अगर त्यापेक्षा जास्त भुंगेरे आढळल्यास, कडूनिंब अथवा बाभळीची पाने अर्धचंद्राकृती खालेली आढळल्यास नियंत्रणाचे उपाय योजावेत.

हुमणीच्या नियंत्रणासाठी जीवनक्रमानुसार उपाययोजना

- मे ते जुलै-प्रौढावस्थेचे नियंत्रण-प्रौढ भुंगेरे सायंकाळी जमिनीतून बाहेर येतात व बांधावरील यजमान झाडांची पाने खातात. रात्रीच्या वेळी प्रकाश सापळे लावून त्यांना आकर्षित करावे.
- संध्याकाळी व रात्री झाडांच्या फांद्या जोरात हालवून प्रौढ खाली पाडावेत. ते गोळा करून केरोसीन व कीटकनाशक

मिश्रित पाण्यात टाकून नष्ट करावेत. हे काम सामुदायिकरित्या करणे अधिक फायदेशीर ठरेल.

- उन्हाळ्यात खोल नांगरट करावी त्यामुळे कीडींच्या अंडी व अळी सुर्यप्रकाशात संपर्कात येऊन नष्ट होतात.
- अर्धवट कुजलेल्या शेणखत व कंपोष्ट खत आदींद्वारे हुमणीची अंडी व अळ्याचे शेतात प्रसरण होते.
- अळी अवस्थेच्या नियंत्रणासाठी शेतकरी वर्गाकडून मोठ्या प्रमाणात रासायनिक औषधांचा वापर केला जातो.
- रासायनिक औषधांचे दुष्परिणाम टाळण्यासाठी कीड नियंत्रणाच्या विविध जैविक पद्धतींचा विकास झाला आहे. त्यामध्ये कीडींवर पोसणाऱ्या अथवा नैसर्गिक शत्रूंचा वापर, कामगंध सापळ्यांचा वापर तसेच एकात्मिक कीड नियंत्रण पद्धतीचा समावेश होतो.

जैविक पद्धतीने हुमणीचे नियंत्रण

यामध्ये प्रामुख्याने हुमणी कीडीच्या नैसर्गिक शत्रूंचा वापर केला जातो. हुमणीचे नैसर्गिक शत्रू-जीवाणू, बुरशी, परोपजीवी सुत्रकृमी यांचा वापर कीडींचा नायनाट करण्यासाठी केला जातो.

१) मित्र बुरशींचा वापर

बव्हेरिया बसियाना व मेटारायझियम ऍनिसोपली या बुरशींचा वापर हुमणी नियंत्रणासाठी केला जातो. या बुरशी कीडींच्या शरीरात वाढतात. त्यामुळे हुमणी कार्यहीन होऊ न संपुष्टात येते. वसंतदादा शुगर इन्स्टिटयुट ने “जैविक कीड नियंत्रक” विकसीत केले आहे. यामध्ये बव्हेरिया बसियाना, मेटारायझियम ऍनिसोपली, व्हर्टीसिलियम लेकनी या बुरशींसह बॅसिलस थुरिनजेनेसिस या जीवाणूंचा समावेश आहे. हे जैविक कीड नियंत्रक म्हणजे हुमणीच्या अळी व भुंगेरे यावर वाढणाऱ्या परोपजीवी बुरशींचा समुह असलेली द्रवरूप कीड

नियंत्रक आहे. या जैविक कीड नियंत्रकाचा वापर एकरी २ लिटर ४०० लिटर पाण्यात मिसळून जमीन वाफश्यावर असताना बेटाजवळ आळवणी करावी. ही आळवणी साधारणपणे मे महिन्याच्या दुसऱ्या पंधरवड्यात व त्यानंतर जून किंवा जुलै मध्ये प्रत्येकी एकदा याप्रमाणे वापर केल्यास हुमणीचे प्रभावीपणे नियंत्रण करता येते.

वसंतदादा शुगर इन्स्टिटयुटच्या प्रक्षेत्रावर बीव्हीएम या जैविक कीड नियंत्रकाची उसाच्या शेतात चाचणी घेतल्यावर असे आढळून आले की, बी.व्ही.एम. वापरल्यास हुमणीचे नियंत्रणाबरोबर ऊस उत्पादन देखील वाढल्याचे दिसून आले.

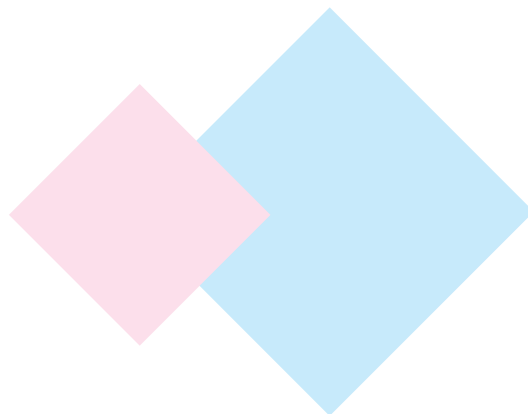
२) परोपजीवी सुत्रकृमींचा वापर (ई.पी.एन.)

एंटोमोपॅथोजेनेकि निमॅटोड (ई.पी.एन.) म्हणजे कीडीच्या शरीरावर वाढणारे सुत्रकृमी, हुमणीला रोगग्रस्त करणारे सुत्रकृमी हेटेरोबॅडिटिस व स्टॅर्ननिमिटिडीस या दोन प्रकारचे आहेत. वसंतदादा शुगर इन्स्टिटयुटने हुमणी नियंत्रणासाठी द्रवरूप स्वरूपातील ई.पी.एन. हे जैविक कीड नियंत्रक विकसित केले आहे. हे जमिनीमध्ये आढळणारे सुत्रकृमी असून, जमिनीमध्ये हुमणीला शोधून तिच्या शरीरात त्वचेवरील छिद्रांद्वारे किंवा तोंडावाटे प्रवेश करतात. किडीला रोगग्रस्त करून तिच्या शरीरात वाढतात. मृत कीडीच्या शरीरातून बाहेर पडून जमिनीमध्ये दुसऱ्या हुमणीला शोधून तिला रोगग्रस्त करतात. ई.पी.एन. या जैविक कीड नियंत्रकांचा वापर प्रति एकर १ लिटर २०० लिटर पाण्यात मिसळून जमीन वाफश्यावर असताना बेटाजवळ आळवणी पद्धतीने करावा. वापर केल्यानंतर जमिनीमध्ये वाफसा स्थिती सतत ठेवल्यास चांगला परिणाम दिसून येतो. ई.पी.एन. हे हुमणीचे नैसर्गिक शत्रू असल्याने त्यांचा जमिनीतील उपयुक्त जीवाणू, वातावरण, पिकांवर तसेच मानवी आरोग्यावर विपरीत परिणाम होत नाही. हुमणीचे नियंत्रण किडीचा जीवनक्रम लक्षात घेवून कीड व्यवस्थापन पद्धतीचा अवलंब सामुदायिक मोहिम राबवून केला तर प्रादूर्भाव आटोक्यात येतो.

LIBRARY NEWS

July to September 2023

1. **The Fertiliser Association of India (2023)** Fertiliser (Inorganic, Organic or Mixed) (Control) Order 1985 (As amended up to March 2023)(20thed.) New Delhi: The Fertiliser Association of India, (p. 359).
2. **ICAR, TNAU, SSRD (2021)** Proceedings- International Conference on Sugarcane Research: Sugarcane for Sugar and Beyond. (Cane Con 2021); Coimbatore: S.S.R.D, (p. 794).
3. **Desai, SS, Jadhav NH, Waliv RH (2023)** Business Statistics (Paper-I). (4th ed.) Kolhapur: Sangeeta S. Desai Jay-Gouri Prakashan. (p. 228).
4. **STAI (2023)** Sugar Technologists Association of India Proceedings 81st Annual Convention 6th-8th September 2023. Kerala, New Delhi: Sugar Technologists Association of India: STAI (p. i- xxxii, 515).
5. **Gaikwad Shekhar; Titkare Mangesh Bhagwant (2023)** Ikshud and Te Ethanol- Sakhar Udyogachi Bharari (1st ed.) Pune: Shekhar Books (p. 784)



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3rd International Conference & Exhibition on Sustainability: Challenges & Opportunities in Global Sugar Industry



12th-14th January 2024



Venue: Vasantdada Sugar Institute, Pune, India

INVITATION

Vasantdada Sugar Institute (VSI), an ISO 9001-2015 organization is organizing its 3rd International Conference and Exhibition on **"Sustainability: Challenges & Opportunities in Global Sugar Industry"** from January 12 - 14, 2024 at its Manjari campus in Pune.

This is a flagship event of VSI where eminent international and national speakers will be delivering lectures on significant and different aspects of the sugar and allied industry. This large congregation of technocrats of the sugar and allied industry is likely to be attended by more than 2000 delegates, including national & international experts and scientists who will share their vision, ideas and experience during the different sessions. Besides, this three days event will have in-depth discussions on the innovations done by the research scientists, engineers, technologists and agriculture scientists for the improvement of the sugar and allied industry.

In conjunction with the conference, a concurrent **"Exposition of the Products and Services of Sugar Industry"** is also being organized in which we will see participation of leading national and international exhibitors showcasing their latest innovations, products and services. It is an opportunity to meet and interact with more than 200 service providers from the sugarcane and allied industry including small and medium enterprises. We invite scientists, researchers and technocrats to present their research papers in poster form and interact with industry.

A unique aspect of this event will be live crop demonstrations of sugarcane showing various advanced technologies and cultural practices covering different varieties of sugarcane, irrigation methodology and inter-crop cultivation, different agronomical practices and management of pests and diseases through an integrated approach.

On behalf of VSI, we would like to invite participants and exhibitors in large numbers for the conference and benefit from this excellent opportunity.

We assure you that you will find the entire programme of the conference exciting and meaningful.



Sambhaji Kadupatil
Director General, VSI



Sharad Pawar
President, VSI



Dilip Walse-Patil
Chairman, Organizing Committee,
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