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Foreword

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The sugar industry and sugarcane growers are battling with the surplus sugar and drought in the sugar production in the current 2018-19 sugar year on the national front is expected to be 33 million tons, opening balance of 10.4 million tons of previous year, estimated 26 million tons for domestic consumption and 3 million tons estimated for sugar export at end of this sugar season resulted in opening stock of sugar for year 2019-20 around 14.7 million (as reported by ISMA). In Maharashtra the carry forward stock was around 5.3 million tons and around 10.7 million tons of sugar has been produced during current year.

Nearly half of the country is on drought alert because of 23% deficient of pre-monsoon rains in six years. By the time we hope for the monsoon kick in, the weighted average rainfall numbers might mask the regional deficiencies and soil moisture levels could improve. But the pre-monsoon deficiency has caused stress in rural India and led to water shortages in cities especially in Maharashtra state. Due to this sugarcane planting is low. To avoid this, VSI organises workshops for sugar mills and stressed on to keep ratoon plantation; develop small scale seed plots wherever water is available in operational area of the sugar mills so that there will not be scarcity of seeds for next season plantation.

There are few reasons for natural and human causes of drought as, land and water temperatures; air circulation and weather patterns; soil moisture levels also contribute to drought; drought can also be a supply and demand of water and if the timing of water doesn't match the agricultural season you may have too much water when you don't need it and too little when you do need it. Proper storage and collection of water is to balancing this cycle and it is our scope of management. Severe droughts also impact the migration of people. With this concept-we are either moving into a drought or out of a drought. We have to be more process oriented in our approach to drought. We have the knowledge of how to combat drought. We understand the need and ensure a healthy water future for the world.

The sugar industry is seasonal and rested for 5 to 6 months also faces cyclic lean periods of cane availability due to environmental factors such as drought, scarcity of water etc. In this regard, VSI indicated the scope of sugarbeet in dry land areas of Maharashtra State. The team of delegation lead by Hon'ble President, VSI visited abroad as well as in Punjab State, India to popularize the sugar beet cultivation. At present, adaptation trials are taking at Baramati Agro Ltd. and processing for sugar is also in progress.

The multifaceted nature of VSI's activities is also reflected and published articles from the subject experts in the contents of the issue. We are happy to place this bulletin in the hands of our readers and look forward to their suggestions for improvements in future

(RM Devarumath)
Editor

VASANTDADA SUGAR INSTITUTE

EVENTS

ISO 9001:2015 Audit

VSI's ISO Quality Management System Re-certification audit of ISO 9001:2015 was conducted during 26th to 27th April, 2019 by external auditor Mr. Venugopal Buram from Certification Body M/s Tata Quality (TQ) Services, Hyderabad. Mr. Vishwajit Shinde, Production Manager, Shree Datta SSK, Kolhapur attended as subject expert during the audit. The opening meeting for the re-certification audit was conveyed on 26th April, 2019 under the Chairmanship of Mr. Shivajirao Deshmukh, DG, VSI and in presence of Mr. Vikas Deshmukh, Director, AS&T, Mr. Venugopal, and Mr. Shinde. All Heads of the Departments (HOD) / Sections (HOS) and Internal Auditors were present.

After the meeting, the departments were selected by the auditor for audit and assessed thoroughly on ISO standards implementation. The closing meeting was conducted on 27th April 2019. Mr. Venugopal concluded his remarks on two day's audit and apprised all the staff for their involvement and efforts in maintaining the ISO standards. Finally, he recommended for continuation of ISO 9001:2015 Certificate to VSI which will be valid for three years in compliance and maintenance of the stipulated standards. The event concluded by Mr. Deshmukh, DG by giving thanks to the auditor for his thorough audit and his observations and advises to implement ISO in a better way.

59th Maharashtra Day

VSI celebrated 59th Maharashtra Day as well as International Labour Day on 1st May 2019. This day was commemorating the formation of the State of Maharashtra from the division of the Bombay State in 1960. National flag was hoisted by Mr. Shivajirao Deshmukh, DG along-with Mr. Vikas Deshmukh, Director, AS&T. On this occasion all the staff members and students were present.

VSI COMMITTEE MEETINGS

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Technical Committee Meeting

The Technical Committee meeting was held on 20th April, 2019 under the Chairmanship of Mr. Narendra Murkumbi, Chairman; Mr. Ganpatrao S. Tidke, Member; Mr. Arun Lad, Member; Mr. Shivajirao Deshmukh, DG and Mr. Vikas Deshmukh, Director, AS&T were present.

Mr. Shivajirao Deshmukh welcomed all members of the Technical Committee. All HOD/HOS presented the progress of work done during 2018-19 and future research programs for the 2019-20. Meeting concluded with a vote of thanks.

Departmental Reivew Meeting with Hon'ble President, VSI

Mr. Sharad Pawar, President, VSI took the review of all the departments/sections on 10th May, 2019 along-with Mr. Dilip Walse-Patil, Vice-President, Mr. Narendra Murkumbi, Chairman of Technical Committee and other members namely, Mr. Arvind Gore, Mr. BB Thombare, Mr. Rohit Pawar, Mr. Shivajirao Deshmukh, DG and Mr. Vikas Deshmukh, Director, AS&T were present. The HOD/HOS presented the work on R & D activities, extension and advisory services to the sugar mills and sugarcane growers. During the presentation, various issues related to sugarcane agriculture and sugar mills problems were discussed.

VSI Meetings

On 22nd June, 2019, three Meetings of VSI Committees namely, Governing Council, Purchase Committee and Investment Committee Meetings were held at Yashwantrao Chavan Pratisthan, Mumbai.

TRAINING

Advanced Technologies in Sugarcane Agriculture

A training program on **'Advanced Technologies in Sugarcane Agriculture'** was organized for women sugarcane growers from Kolhapur during 16th to 18th April, 2019. The training program was sponsored by SOLIDARIDAD Asia Network, New Delhi.

The program was inaugurated by Mr. Vikas Deshmukh, Director, AS&T, in presence all HOD/HOS of Agriculture Division and women farmers. Total 103 women farmers participated this event.

Mr. BH Pawar, Co-ordinator of the programme welcomed participants and briefed about training program. The Director, in his inaugural address explained importance of sugarcane agriculture and extension activities and agriculture products of VSI.

The training comprised of modern and scientific sugarcane cultivation technologies covering lectures and field demonstrations. Various topics like sugarcane varieties & 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, sugarcane economics, ratoon management and integrated disease & pest management were covered with practical demonstration on field by agriculture subject experts from different disciplines.

In the concluding session, participants raised queries which were answered by the subject experts. The program was concluded with distribution of certificates to the participants and vote of thanks.

Training for Engineers and Process Chemists of EID Parry, India, Ltd.

The department of Sugar Technology organized one week tailor-made training programme for Engineers and Process Chemists of one of the leading group in the sugar industry, EID Parry India Ltd. at VSI from 6th to 11th May, 2019. During opening ceremony of training programme, Dr. RV Dani, Head, Sugar Technology welcomed the participants and explained the importance of such training programmes and continuous learning is essential for getting success in any industry. The syllabus of training programme was containing lectures supported with laboratory practical analysis. The various topics of sugar

processing & engineering like mill capacity calculation, mill setting and mill operation, power generation, boiler operations, boiler water quality, individual mill extraction, sugar manufacturing process, working of boiling house equipment, chemical control, sugar quality improvement, boiling house design aspects and water management, etc. were covered. At the end of training programme, all the participants expressed their satisfaction on syllabus, classroom presentations, discussions, knowledge shared and also hospitality experienced at VSI.

Advanced Technique in Soil Testing and Fertilizer Management

The training programme on **'Advanced Technique in Soil Testing and Fertilizer Management'** was organized for Soil Testing Lab Incharge and Soil Chemist of sugar mills from 28th to 31st May, 2019. Total 31 trainees from 22 sugar mills attended this training programme. The training programme was inaugurated by the Chief Guest, Dr. AD Kadlag, HOD of Soil Science and Agriculture Chemistry, MPKV, Rahuri in presence of Mr. Vikas Deshmukh, Director, AS&T and all sectional HOS from Agricultural Departments of VSI.

Dr. Preeti Deshmukh, Scientist & Head, Soil Science welcomed the participants and explained about the training programme. In the inaugural address by Dr. AD Kadlag, briefed the importance of soil testing and fertilizer recommendation based on yield targeting approach. He also explained the importance of integrated nutrient management for sustainable soil fertility. Mr. Vikas Deshmukh highlighted the importance of soil sampling, problematic soil, soil analysis and soil health card scheme.

The training comprised of modern & scientific soil analysis methods and fertilizer recommendation covering the lectures & practicals. Various topics like advances in soil testing and fertilizer recommendations based on yield targeting approach, use of GPS and GIS technique in soil fertility mapping, fertigation in sugarcane, use of biofertilizers, composting process in sugar industry, advanced technique in soil testing and fertilizer management, preparation of standard solution were covered. Practicals were conducted on soil chemical analysis like soil pH, electrical conductivity, organic carbon, available Nitrogen, phosphorus, potassium, sulphur, micronutrient like Fe, Mn, Zn, Cu and B and physical analysis like bulk density and soil texture. Analysis of carbonates, bicarbonate and chlorides from saturation extracts of salt affected soil.

At the end of the session, examination was conducted for the trainees. In the interactive session, trainees raised queries which were answered by the subject

expert. The valedictory function of the training programme was held on 31st May, 2019 under the Chairmanship of Mr. Shivajirao Deshmukh, DG and Mr. Vikas Deshmukh, Director, AS&T and all HOD/ HOS agriculture and participants. Mr. Shivajirao Deshmukh addressed the trainees and expressed the need to give more attention towards proper soil sampling and soil analysis and also focused on nutrient deficiency symptoms in sugarcane field. The certificates were given to trainees and programme was concluded with vote of thanks.

Short Term Training Programme – June 2019

The Institute conducted short term training programmes on different courses for the employees of the sugar mills and distilleries to enhance their working knowledge, information to adopt new technology and guidance to industries to perform their key objectives. The effectiveness and practical utility of these courses have been widely accepted and adopted by the industries. These training courses are an essential criterion for promotion of trained employees. The short term training courses conducted and the number of participants from 11th to 22th June 2019 as given below;

Sr.No.	Course Title	No. of Participants
	Sugar Technology	
1	Juice Clarification & Evaporation	51
2	Pan Boiling & Centrifugals	95
3	Special Analysis in Laboratory	14
	Sugar Engineering	
4	Boiler Attendant	45
5	Mill Foreman	35
	Alcohol Technology and Biofuels	
6	Fermentation & Distillation techniques in distillery	06
7	Wet and Instrumentation Analysis in Distillery	05
	Instrumentation	
8	Techniques in Analytical Instrumentation	08
9	Repairs & Maintenance of Sugar Factory Instruments.	47
	Environment Sciences	
10	Pollution Control and Environment Management in Sugar Factory	06
11	ETP Operation	18
	Total Trainees	**330**

Oos Sheti Dnyanlaxmi and *Oos Sheti Dnyanyag*

In the remembrance of founder President of VSI, Late Padmabhushan Dr. Vasantdada Patil, ***Oos Sheti Dnyanlaxmi*** **and** ***Oos Sheti Dnyanyag,*** a five days residential training programme were organized for women and men sugarcane growers of Maharashtra State at VSI. The 1st phase of training programme will be conducted in four batches during June to July 2019. First batch of ***Oos Sheti Dnyanlaxmi*** program was conducted from 18th – 22nd June 2019 and total 111 participants from Five (5) sugar mills were present. The 2nd batch of ***Oos Sheti Dnyanyag*** program was conducted from 25th – 29th June, 2019 and total 231 participants from five sugar mills were present. The details were given in below table. Both these programs

were inaugurated by Mr. Vikas Deshmukh, Director, AS&T along with participants and HOS, Agriculture Division were present. This Training programme was conducted in the form of given theory lectures and practical field demonstrations on various topics as comprising modern and scientific sugarcane cultivation technologies covering the topics like sugarcane varieties & varietal planning, three-tier seed nursery programme & its implementation, tissue culture raised plants, modern planting techniques, weed management, soil fertility & fertilizer management, irrigation water management, use of bio-fertilizers, growth stages of sugarcane crop, farm mechanization, sugarcane economics, ratoon management, integrated disease & pest management etc. The function concluded with the discussion & vote of thanks.

Batch No	Period	Name of Sugar Mill	No. of Participants
		Oos Sheti Dnyanlaxmi **(Women farmers)**	
I	18th to 22nd June 2019	Pandurang SSK Ltd., Solapur	13
		Chatrapati Shahu, Kagal SSK Ltd., Kolhapur	44
		Dr. Patangrao Kadam Sonhira SSK Ltd., Sangli	29
		Vishwasrao Naik SSK Ltd., Sangli	08
		Bhimashankar SSK Ltd., Pune	16
		Individual	01
		Total	**111**
		Oos Sheti Dnyang **(Men farmers)**	
II	25th to 29th July 2019	Shri Datt Shirol SSK Ltd., Kolhapur	20
		Jawahar SSK Ltd., Kolhapur	143
		Chatrapati Shahu Kagal SSK, Ltd., Kolhapur	44
		Dudhganga Vedganga SSK Ltd., Kolhapur	17
		Bhogawati SSK Ltd., Kolhapur	05
		Individual	02
		Total	**231**

WORKSHOP

Crop Protection in Sugarcane

A one day workshop on **'Crop Protection in Sugarcane'** was organized by Agriculture Sciences and Technology Division on 27th April 2019 at VSI. Mr. BH Pawar, Senior Scientist & Head, Plant Pathology Section welcomed Mr. Vikas Deshmukh, Director, AS&T Division, Mr. Vilas Jadhav, CDO of Krantigrani Dr. GD Bapu Lad SSK Ltd., Heads of Agricultural Sections and all the participants attended the workshop.

The workshop was inaugurated by Mr. Vikas Deshmukh by lighting of traditional lamp with other dignitaries. In the inaugural speech, he highlighted the importance of the topic of the workshop. He appealed to the participants for close monitoring of new pests of sugarcane for restricting the spread and protecting the sugarcane crop.

During the technical session, Mr. BH Pawar delivered the lecture on **'Introduction of new diseases of sugarcane and their control'**. He reviewed the situation of new diseases of sugarcane in Maharashtra and presented the information related to management of new diseases as well as effect on sugarcane by abiotic factors viz., lightening, cold, heavy rainfall and cloudy weather, high temperature and problematic soils. He appealed that the sugar mills in Maharashtra should monitor the incidence and development of the insect pests & diseases of sugarcane on periodical basis in their operational area. He warned that yellow leaf disease – a new viral disease and brown spot are spreading and needs preventive measures for the effective management of these new diseases.

Mr. RG Yadav, Scientist and Head, Entomology Section talked on **'Introduction of new pests in sugarcane and their control'**. He said that, due to climate change infestation of sugarcane fall army worm-a new pest is noticed in sugarcane last year and outbreak of white grub & woolly aphids. He presented the details of the important insect pests and rat infestation in sugarcane crop with more emphasis on integrated management. Mr. PV Ghodke, Scientist and Head, Agronomy Section delivered a talk on **'Weed management in sugarcane'**. He presented the details of the different weeds in sugarcane agriculture; the losses caused by weeds in sugarcane crop and integrated management of weeds.

Mrs. SD Ghodke, Scientific officer and Head, Microbiology Section, talked on **'Biological control of pests in sugarcane'**. She presented the detailed account about biological control of the important pests and application of bio-agent & their need in sugarcane crop. Mr. Vilas Jadhav, CDO of Krantiagrani Dr. GD Bapu Lad, SSK Ltd. presented the success story of Integrated management of white grub in their operational area by using *Beauveria* spp., *Verticillium* spp. and *Metarrhiziun* spp. - the entomopathogenic fungi, collection of beetles, insecticide use, trash mulching etc.

This workshop was attended by 69 participants from 38 sugar mills in Maharashtra. The participants raised their queries about insect pest, diseases & weeds occurrence and their management. The program was concluded with a vote of thanks.

Recommendations of the workshop:

1. Regular survey on periodical basis should be carried out for knowing the occurrence and spread of new diseases and insect pests on sugarcane crop in the mill operational area and their timely control.
2. Yellow leaf and brown spot are new emerging diseases of sugarcane. Therefore, mill officials should take note of it and every sugar mill should implement three tier seed nursery programme for the supply of good quality pest free planting material. The breeder seed in the form of tissue

culture plantlets should be used for the raising of foundation seed.

3. The sugar mills should have their own moist hot air treatment plant for the treatment of planting material to avoid the spread of diseases through setts.
4. The incidence of foliar diseases is increasing in all commercially cultivated varieties of sugarcane. The disease control measures viz., integrated fertilizer use on the basis of soil test, adoption of long furrow and pair row method of planting, use of fungicides at the initiation of the disease, use of inputs containing silicon & chitosan for improving the resistance against the attack of diseases etc. should be taken so as to keep the sugarcane crop healthy to tolerate the incidence of diseases.
5. Fall army worm (*Spodoptera furgiperda*) is a new pest noticed in sugarcane. Therefore, to manage this pest the control measures viz., clean cultivation in field, collection and destruction of egg masses, installation of pheromone traps, spraying of NPV (Nuclear Polyhedrosis Virus) @ 250 LE/ha, Entomopathogenic fungi-*Metarhizium anisopliae* (1 x 10^8 cfu/g) or *Beauveria bassiana* (1 x 10^8 cfu/g) or *Nomuraea rileyi* (1 x 10^8 cfu/g) @ 5 gm/lit water, use of egg parasitoids-*Trichogramma* spp. Or *Telelmonus remus* and spraying of Emamectin benzoate 5 SG @ 4 gm or Chlorantraniliprole 18.5 SC @ 3.75 ml or Thiamethoxam 12.6 + lambda cyhalothrin 9.5 ZC @ 2.50 ml / 10 lit of water.
6. The attack of white grub in sugarcane is increasing and therefore sugar mill should implement integrated pest management practices viz., deep ploughing, beetle collection, use of Entomo-Pathogenic Fungi (*Beauveria/ Verticillium/Metarrhizium*) and use of recommended pesticides.
7. Application of biofungicide @ 2.5lit/ ha & Biopesticide @ 5lit/ha in 400 lits of water by drenching for controlling different diseases & pests of sugarcane, especially white grub.
8. Maintenance of organic carbon through organic fertilizers is mandatory.
9. Application of bio-control agents as precautionary measures (at the time of planting & earthing up) is more important.
10. Integrated weed control should be practiced to avoid the development of herbicide resistance in weed.
    a. Deep tillage operations are required to reduce the seed bank.
    b. Application of pre-emergence herbicide spray at 5-6 DAP of Atrazine 50 WP @ 2.5 kg ai /ha for the control of monocot weeds.
    c. Application of post emergence herbicide spray one month after first spray - Metribuzine 70 WP @ 1.0 kg ai/ha + 2,4-D (Sodium salt) 80 WP @ 2.75 kg a.i./ha for

the control of mixed weed flora, and same can be repeated after final earthing up for control of binding weeds in sugarcane.

d. One hand weeding and hoeing for soil aeration before final earthing up.

e. Application of non selective herbicide like Paraquat 24% SL or Glyphosate 41% SL as directed spray @ 5ml /lit of water by using spray hood.

Quarterly Review of Promotional Cane Development Award Scheme (CDAS)

One day workshop on **'Quarterly review of promotional cane development award scheme (CDAS)'** and sub-topic Reducing cost of cultivation in sugarcane through **'Low cost technology'** was held on 25th May, 2019 under the chairmanship of Mr. Vikas Deshmukh, Director, AS&T. The welcome address was given by Dr. JM Repale which was followed by the lightening of lamp and the introductory speech by Mr. Vikas Deshmukh in inaugural speech, highlighted the importance of scheme components i.e. seed, planting planning and harvesting programme; soil fertility management and drip irrigation and requested to submit the data base on cane yield and recovery % of the season ended 2018-19. Total 71 participants from 39 sugar mills attended the workshop. Dr. JM Repale delivered the speech on **'Guidelines for VSI's promotional CDAS'**. He highlighted the progress of each participating mill under four different scheme components for achieving higher productivity and the data base yet to be submitted for completed year 2017-18 planting season and 2018-19 crushing year. The Agriculture Officers of 36 sugar mills made the presentations on progress of their mill on cane yield and recovery % obtained in the crushing season 2018-19.

In second session, Mr. SS Katake delivered the lecture on **'Reduce the cost of cultivation of sugarcane crop through low cost technology'**. In his speech, he highlighted that low cost technologies of non-monetary & monetary inputs and trash mulching in ratoon crop were proved that without adding any cost, sugarcane yield can be achieved. Therefore, it's necessary to implement this recommendation on large scale area. The presentations on the same topic from sugar mills were arranged. Mr. Dilip Jadhav, CDO, Shree Datta Shetkari SSK, Kolhapur and Mr. Mahesh Bhadule, CAO, Vitthalrao Shinde SSK, Solapur presented their practical experience of using low cost technologies with saving of money in sugarcane production. The discussion was held on both topics. The workshop was concluded with the vote of thanks and the following points were emerged as the recommendations;

1. The first year of CDAS scheme is completed. The data base on crushing season 2018-19 which includes cane yield (t/ha) and Recovery % should be sent immediately for compilation. Any changes in the information on planting planning 2017-18 submitted may be sent on or before 15th June 2019.
2. The required information for preparation of planting planning for the season 2019-20 may be sent for preparation of the planting planning before 15th June 2019.
3. The information on variety wise and month wise area registered for the crushing season (plant and ratoon separately) 2019-20 should be sent for preparation of the maturity wise harvesting programme well in advance.
4. The low cost technologies of non-monetary inputs like one eye bud, dry method of planting, wide row planting, alternate furrow irrigation and trash mulching in ratoon crop were proved

that the without adding any cost additional sugarcane yield can be achieved with saving of 46.16% & 59.28% respectively in production cost.

5. The use of cost effective (monetary) inputs like fungicide, Trichoderma, acetobactor, PSB, etheral, oligochitosan and MNLF definitely increased cane yield up to 13.6 to 22.28 t/ha. So its necessary to implement this recommendation on large scale area.
6. The planting by sugarcane plantlets helps to reduce the cost on seed. It also increases the cane yield by 10 to 15%. So, this method of planting should be given priority in extension activities and proper guidelines should be given to farmers to adopt the technology.
7. As per the guidelines, the proposal / farmers names for Oos bhushan award scheme for the planting season 2018-19 (harvesting 2019-20) should be sent on priority basis.
8. There is a severe shortage of seed in planting season 2019-20 mainly in the North-East zone and some part of Central Maharashtra. Therefore, all the sugar factories are requested to send the seed demand at the earliest for the timely distribution from our end.
9 At present the attack of white grub is noticed in some part of Maharashtra. The infestation of pest may spread from June onwards, therefore, precautionary measure of the application of BVM is recommended. Actual quantity of BVM along with other inputs like seed, Multi-macronutrients, Multi-micronutrients, Bio-fertilizers and bio-control agents, decomposing culture for ratoon, Vasant Urja and Tricho cards etc. should be workout and the orders may be placed in advance with VSI so as to make the inputs available in time.

PARTICIPATION BY VSI STAFF

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Global Water Summit 2019 and visit to UK Universities

Mr. Shivajirao Deshmukh, DG, VSI and Dr. SV Patil, Head & Technical Adviser, Department of Alcohol Technology & Biofuels visited United Kingdom (UK) from 7th to 17th April, 2019. The purpose of the tour was,

1. To participate in Global Water Summit 2019
2. To visit Queens University Belfast regarding Indo-UK project on **'Valorizing Waste (vWa) from sugarcane industries via innovation in pre-treatment, biotransformation and process intensification'**.
3. To visit International Center for Brewing & Distilling at Herriot Watt University, Edinburgh for possible collaboration in the field of Alcohol Technology and Brewing.
4. For a meeting with Mr. Arvind Chudasama, Editor, International Sugar Journal and Mr. Sudhir Patel, President, Sudeco International Pvt. Ltd. regarding proposed International Conference to be held at VSI in January, 2020.

Dr. SV Patil was invited by Global Water Intelligence as a speaker in Global Water Summit 2019 : **'Disruptive Designs'** held at Hotel Sofitel, London, UK. Global Water Summit is the foremost gathering of leaders from the international water business bringing together over 700 high level leaders-public, private, industry, policy NGOs and international organizations - from over 70 countries. The theme of Global Water Summit 2019 (GWS 2019) was 'Disruptive Designs' that considered how current technologies and political disruption will impact future trends in international water section.

Dr. SV Patil made a presentation on **'Perfecting recoveries in Distilleries'**, which was well received by the audience. Several questions were raised by the audience on the present norms laid down in India for waste water treatment & discharge, current downstream technologies being used by Indian distilleries, recycle & reuse of treated water etc.

On 8th April 2019, Mr. Shivajirao Deshmukh and Dr. SV Patil had meeting with Mr. Arvind Chudasama to discuss various issues related to organization of International Conference at VSI in January 2020. Mr. Arvind Chudasama agreed to give wide publicity and coverage for the proposed International conference. He also agreed to remain present during the International conference.

On 9th April 2019, Mr. Shivajirao Deshmukh had meeting with Mr. Sudhir Patel, President, Sudeco International Pvt. Ltd regarding invitation for delegates from African sugar mills to the international conference.

On 10th April 2019, they left for Belfast. On 11th& 12th April 2019 both visited the School of Chemistry and Chemical Engineering at Queens University, where they

had meeting with Prof. Vivek Ranade and his team regarding ongoing vWa project. They also had taken a round of the University to see the different departments and facilities. A meeting with Dr. Sanjay Nagarajan and other team of vWa group at Queens University was also held.

On 12th April 2019, Dr. SV Patil visited the Bushmill Distillery at Bushmill. On 15th April, they visited the International Centre for Brewing & Distilling (ICBD) at Herriot Watt University. On 16th April 2019, they visited the Scotch Whisky Research Association (SWRI) in Edinburgh and welcome by the Director of SWRI, Prof. James Brosnan. He explained us the activities and the research work being conducted at SWRI. They returned back Mumbai on 17th April 2019.

Rana Sugars, Amritsar, Punjab

Two delegations consisting of VSI officials, scientists and technologists visited Rana Sugars Ltd., Amritsar, Punjab to collect the information on large scale sugarbeet cultivation and beet processing.

First delegation under the chairmanship of Mr. Sharad Pawar, Hon'ble President, VSI and other members comprising of Mr. Dilip Walse-Patil, Vice-President, Mr. Jayprakash Salunke-Dandegaokar, Mr. Rohit Pawar, Mr. Ashutosh Kale, a Member, Governing Council, Mr. Shivajirao Deshmukh, DG, Mr. Pradeep Ghodke, Scientist Agronomy Section, VSI and Mr. Satish Raut, PS to President visited Rana Sugars during 6th -7th May, 2019.

Second delegation consisting of Mr. BB Thombare, Mr. Arvind Gore both Member of Governing Council, Mr. Chitrao Gore Director, Dr Babasaheb Ambedkar SSK Ltd. Mr. Vikas Deshmukh, Director, AS&T, Mr. AB Kotkar, Sugar Engineer, Sugar Engineering Department and Mr. Sanjeev Pawar CEO (Agri), Mr. Prakash Jathar, Process Engineer of Baramati Agro Ltd. and Dr. Milind Joshi, Scientist KVK Baramati visited Rana Sugar during 15th-16th May, 2019.

Both delegations were welcomed by Mr. Rana Gurjit Singh, Founder Chairman, Mr. Rana Iderjeet Singh, Vice President, Mr. Rana Veer Singh, Executive Director of Rana Sugars. Both teams visited several farmers fields and observed the sugarbeet crop. Mr. Amriksingh Buttar, Director, Cane Production gave information about beet agriculture cultivation and management practices. The team interacted with some farmers about their cultivation cost and income with net profit. They told average beet root yield was 25 tonne per acre with 22% brix. Team also saw the harvesting of beet with the help of beet harvesters. The delegation also visited to 5000 TBD beet processing plant at village Baba Bakala and saw the beet crushing, machinery and pulp billeting.

At concluding, the team expressed satisfaction about the beet crop and information acquainted during visit and told VSI team to take lead for popularizing the beet cultivation in Maharashtra State. The delegation expressed thanks to the authorities of Rana Sugars for their kind hospitality.

Sugarbeet pilot project at Baramati Agro Ltd.

The pilot project of 100 TBD capacity developed by VSI and engineering work done by M/s NHEC, Pune in the Year 2006 was set in M/s Karmyogi Ankushrao Tope Samrath SSK Ltd. and crushed 1938 MT sugar beet from FY 2006-07 to 2009-10. Later the plant shifted to M/s Rajarambapu Patil SSK (Unit-3) and crushed 2060 MT sugar beet from FY 2010-11 to 2012-13.

At present, in FY 2018-19 the plant shifted to Baramati Agro Ltd., Baramati. The maintenance and erection work was completed and crushed 310 MT sugarbeet successfully.

Mr. Shivajirao Deshmukh DG, Mr. Vikas Deshmukh Director, AS&T, Staff of VSI from Sugar Technology and Sugar Engineering Departments visited the plant to see the operational process on 12th May, 2019.

13th WABCG Conference, Brazil

The 13th WABCG (World Association of Beet and Cane Growers) conference was held at Ribeirao Preto, Brazil during 3rd to 6th June, 2019. Mr. Shivajirao Deshmukh, DG, Dr. SV Patil, Technical Adviser & Head, Alcohol Technology and Biofuels Department and Mr. PV Ghodke, Scientist & Head, Agronomy Section participated in the conference. About 125 members, scientists and stakeholders from 24 different countries were present. Now, VSI became a member of this prestigious WABCG association from India.

Mr. Shivajirao Deshmukh gave a talk on **'How Indian growers can switch from a crop to another, Sugarcane to Sugarbeet'** and explained the need, benefits of sugarbeet crop in tropical India under water scarcity situations and summarized the various research trails conducted by the Institute to prepare complete agronomic package of practices for tropical sugarbeet crop with its implementation on large scale cultivation in the operational area of some sugar mills in India. The Director General invited all the scientists, members and stakeholders for the proposed International conference to be held at VSI during January 2020. Later the organizers arranged the visit to research institute, biotechnology laboratory and mechanized sugarcane farms.

VISITORS TO VSI
VISITORS TO VSI

1. Mrs. Mithlesh, Director (Finance), Ministry of Department of Food Public Distribution and Mr. MG Joshi, Managing Director, Jawahar Shetkari SSK Ltd., Dist.: Kolhapur visited VSI on 5th April, 2019. Mr. Shivajirao Deshmukh, DG VSI welcomed and felicitated them. He briefed about activities of Institute. Later they visited various departments viz., Tissue Culture, Microbiology, Alcohol Technology & Biofuels etc.

2. The team of officers from Mahindra & Mahindra Agro Ltd. Company visited VSI on 12th April, 2019. Mr. Sachin Kamra, Head Digital Business, Dr. Nagendra Sharma, Senior manager Agri Business and Mr. Satyasen Patil, Manager, Agronomy. They saw the progress of the sugarcane crop taken under the collaborative research project on Evaluation of Digital Module- MyAgriGuru.

3. A three member delegation from Sugarcane Research Institute (SRI), Sri Lanka namely Mr. KA F Karunasena, Shairman, SRI; Ms. Sureka N. Attanayake, Director (Development), Ministry of Plantation Industries and Dr. A. Wijesuriya, Principal Research Officer and Actg. Dy. Director (Research & Technology Transfer) visited VSI on 7th & 8th May, 2019. Mr. Shivajirao Deshmukh, DG, VSI welcomed them and shown the VSI film about activities of the Institute. Later the team visited various departments viz., Sugar Technology, Alcohol Technology and Biofuels, Plant Breeding Section, Microbiology, Tissue Culture, Molecular Biology & Genetics Engineering, etc. and concerning officers explained the activities of the department and they also visited VSI farm fields.

4. The four members delegation from Kenana Sugar Ltd., Sudan comprising of Mr. Umar Gagi, GM, (HR), Mr. Habub, Factory Manager, Mr. Tarig, Public Relation Manager and Mr. Abu Bakar, Production Manager, visited VSI on 17th May, 2019. Mr. Shivajira Deshmukh, DG, welcome facilitated them. Later they visited various department viz., Sugar Technology, Sugar Engineering, Alcohol Technology and Biofuels, Plant Breeding Section, Microbiology, Tissue Culture, Molecular Biology & Genetics Engineering, etc. and concerning officers explained the activities of the department. They also visited VSI farm fields.

Memorandum of Understanding (MoU) between VSI & BARC, Mumbai

MOU was signed between the prestigious DAE (Department of Atomic Energy) organization, Bhabha Atomic Research Center (BARC), Mumbai and Vasantdada Sugar Institute (VSI), Pune has signed an agreement for bringing sustainability in sugarcane agriculture. Both organizations signed a MoU on 20th June 2019. The MoU has been signed by Mr. Shivajirao Deshmukh, DG, VSI and Dr. V. Venugopalan, Associate Director, Bio-sciences group, BARC Mumbai. From VSI, Mr. Vikas Deshmukh, Director, AS&T and Dr. SG Dalvi, Scientific officer, Tissue Culture Section and from BARC, Dr. P. Suprasanna, Head, Nuclear Agriculture Biotechnology Technology Division, along-with scientists from different discipline namely Dr. Badginwar, Dr. Mehetre, Dr. Souframaniayan, etc. were present.

Through this agreement Trombay Mutants in green gram, black gram and ground nut developed by BARC will be multiplied on VSI's farm and further tested as an intercrops in sugarcane. Some salt tolerant muntants in sugarcane developed by gamma irradiation will be also evaluated with this program. The multilocation large scale trials of Vasant Urja (gamma irradiated chitosan) will be carried out at different sugar mills area on farmers filed as adaptive trials. The Gamma Irradiated Chitosan recommendation has been already approved in Joint AGRESCO 2018. For adaptive trials, twenty sugar mills from different agro climatic zones of Maharashtra has been selected and Vasant Urja effect will be evaluated on famers field at these mills with different sugarcane varieties planted in different seasons. The effect on different intercrops in sugarcane will be also evaluated during these trials. Also BARC developed technologies like biosludge incorporated with Zink nanoparticles and phosphate solubilizing bacteria in soil mixture will be extended to sugarcane micropropagation seedlings single eye bud settlings to see its effect on their establishment at nursery level, tillering, growth and on sugarcane as well as sugar production in field. These different activities will be performed in two years.

हुमणीचे एकात्मिक नियंत्रण - काळाची गरज

यादव आर.जी. आणि डॉ.शितोळे टी.डी.

वसंतदादा शुगर इन्स्टिट्यूट, पुणे

सध्या एप्रिल २०१९ पासून हुमणीच्या विविध प्रजातींचे भुंगेरे (होलोट्रॅकिया, फायलोगॅथस आणि ॲडोरेटस व इतर) सापडत आहेत. पुणे जिल्ह्यात ऊस पिकामध्ये प्रथम व द्वितीय अवस्थेतील अळ्या दिसून येत आहेत. तसेच कोल्हापूर जिल्ह्यातील पश्चिम पट्ट्यात अळीच्या तीनही अवस्था सापडत आहेत व हुमणीचा प्रादुर्भाव वाढण्याची शक्यता आहे. ही ऊस पिकासाठी धोक्याची घंटा आहे. हुमणीच्या नियंत्रणासाठी शेतकरी हुमणीचा जीवनक्रम समजून न घेता रासायनिक कीटकनाशकांचा अवेळी असंतुलित प्रमाणात वापर करत आहेत. यामुळे हुमणी किडीचे नियंत्रण परिणामकारक होत नाही म्हणून हुमणीचे एकात्मिक नियंत्रण सामुदायिक मोहिम राबवून करणे आवश्यक आहे.

नुकसानीचा प्रकार

प्रथम अवस्थेतील हुमणीच्या अळ्या अंड्यातून बाहेर निघाल्यावर जमिनीतील कुजलेल्या सेंद्रिय पदार्थावर किंवा जिवंत मुळे मिळाल्यास ती मुळ्यांवरच उपजीविका करतात. त्यानंतर दुसऱ्या व तिसऱ्या अवस्थेतील अळ्या ऊस व इतर पिकांची मुळे जून-ऑक्टोबर महिन्यात खातात. मुळे खाल्ल्यामुळे पिकाचे अन्न व पाणी घेण्याचे कार्यच बंद पडते. प्रादुर्भावग्रस्त ऊस निस्तेज दिसतो व पाने मरगळतात. पाने हळूहळू पिवळी पडण्यास सुरूवात हाते व वीस दिवसात पूर्णपणे वाळतात. उसाची मुळे कुरतडल्यामुळे संपूर्ण ऊस वाळतो आणि वाळक्या काठीसारखा दिसतो. होलोट्रॅकियाच्या प्रादुर्भावामुळे उसाच्या उगवणीत ४०% पर्यंत नुकसान होते. अळीचा प्रादुर्भाव जास्त असल्यास १००% पर्यंत नुकसान होते.

आर्थिक नुकसानीची संकेत पातळी

एक हुमणीची अळी प्रति एक घनमीटर अंतरात आढळून आल्यास कीड नियंत्रण सुरू करावे.

हुमणीचा जीवनक्रम (होलोट्रॅकिया) : हुमणी किडीचा जीवनक्रम अंडी, अळी, कोष व भुंगेरे या चार अवस्थेत पूर्ण होतो. हुमणीची अळी अवस्था ही ऊस पिकास नुकसानकारक आहे. एका वर्षात या किडीचा एक जीवनक्रम पूर्ण होतो.

- एक मादी जमिनीत १० सें.मी. खोलीवर सरासरी ६० अंडी घालते. अंड्यातून १० ते १५ दिवसात अळी बाहेर येते.
- नुकतीच अंड्यातून बाहेर आलेली अळी दह्यासारख्या पांढरट रंगाची असते. ही अळी तीन रूपांतर अवस्थांतून जाते. अळीची प्रथमावस्था २५ ते ३० दिवस, द्वितीयावस्था ३० ते ४५ दिवस व तृतीयावस्था १४० ते १४५ दिवस असते. मुळावर पूर्ण वाढ झालेली अळी पांढरट पिवळी, इंग्रजी मसीफ आकाराची असते. डोके पिवळसर तांबूस ते गडद तांबूस व जबडा मजबूत असतो. अळी अवस्था १५० ते २१० दिवसाची असते.
- अळीपासून झालेला कोष पांढरट रंगाचा असतो व तो नंतर लालसर होत जातो. कोषावस्था २० ते २४ दिवसांची असते. शेतात कोषावस्था प्रामुख्याने ऑगस्ट ते मार्च पर्यंत आढळते.
- कोषावस्थेतून बाहेर आलेला भुंगेरा पुरेसा पाऊस पडेपर्यंत (४ ते ५ महिने) जमिनीत मातीच्या घरातच काही न खाता पडून राहतो. यालाच भुंग्याची सूप्तावस्था (क्वीझंट स्टेज) असे म्हणतात. भुंगेरे विटकरी अथवा काळपट रंगाचे असतात. भुंगेरे पहिला पाऊस पडल्यानंतर (एप्रिल-जून) जमिनीतून बाहेर पडतात किंवा हवामान ढगाळ असल्यास संध्याकाळी ७.२० ते ७.५०च्या दरम्यान जमिनीतून बाहेर पडतात. जमिनीतून बाहेर आल्यानंतर नर व मादी भुंगेरे यांचे मीलन होते. नंतर ते कडूनिंब, बोर, बाभूळ इ पाने खात असतात. पाने खाल्ल्यामुळे उरलेला पानाचा भाग चंद्राकृती दिसतो. भुंगेरे सुर्योदयापूर्वी म्हणजे ५.४० ते ६.०० वाजेपर्यंत जमिनीत जातात. भुंगेरे निशाचर असतात. मादी भुंगेरे साधारणपणे ९३ ते १०९ दिवस जगतात.

यजमान वनस्पती

हुमणीचे भुंगेरे प्रामुख्याने कडूनिंब, बाभुळीची पाने खाऊन जगतात. त्या व्यतिरिक्त ते बोर, पिंपळ, गुलमोहोर, शेवगा, पळस, चिंच अशा निरनिराळ्या ५६ वनस्पतींवर उपजीविका करतात. हुमणीची अळी साधारणपणे ऊस, भुईमुग, हरभरा, सोयाबीन, ज्वारी, आले, तृणधान्ये, कडधान्ये, भाजीपाला, तेलबिया व फळवर्गीय अशा सर्वच पिकाच्या मुळावर उपजीविका करते.

एकात्मिक नियंत्रण :

१) मशागतीय उपाय

- ऊस लागवडी अगोदर शेत २ ते ३ वेळा उभे आडवे खोलवर नांगरावे.
- शेतातील ढेकळे तव्याचा कुळव (ऊळील क्ीी) किंवा रोटाव्हेटर वापरून ढेकळे फोडावीत.
- उसाच्या तोडणीनंतर सूर्यफुलाचे फेरपालटीचे पिक घ्यावे. कोल्हापूर व सांगली जिल्ह्यातील जास्त पावसाच्या भागात भात हे फेरपालटीचे पिक घ्यावे.
- भुईमूग अथवा ताग पिकाचा हुमणीग्रस्त शेतात सापळा पीक म्हणून वापर करावा.
- उभ्या उसात खुरपणी, तगरणी अथवा बांधणी करताना जमिनीतून बाहेर पडणाऱ्या अळ्या गोळा करून माराव्यात.
- वळवाचा (पहिला) पाऊस पडल्यानंतर होलोट्रॅकिया प्रजातीचे भुंगेरे जमिनीतून एकाच वेळी बाहेर पडतात आणि बाभुळ व कडूनिंबाच्या झाडावर जमा होतात. फांद्या हलवून जमिनीवर पडलेले भुंगेरे गोळा करून रॉकेल मिश्रित पाण्यात टाकून मारावेत. ऑगस्ट-सप्टेंबर महिन्यात ल्युकोफोलिस प्रजातीचे भुंगेरे उसाच्या पानांवरून गोळा करून मारावेत. प्रकाश/कॉम्बो सापळ्यांचा वापर करून भुंगेरे गोळा करून मारावेत. सामुदायिकरित्या भुंगेरे गोळा केल्यास हुमणी कीडीचा प्रादुर्भाव कमी होण्यास चांगली मदत होते.
- अति प्रादुर्भावग्रस्त शेतात उसाचा खोडवा घेऊ नये.
- पीक निघाल्यानंतर हुमणीग्रस्त शेताची मशागत रोटाव्हेटरने करावी.

हुमणीचे जीवन क्रम

२) जैविक नियंत्रण

- जैविक कीड नियंत्रक ज्यामध्ये बिव्हेरिया बॅसियना, मॅटेरायझियम ॲनीसोपली त्याचा कंपोस्ट खतात मिसळुन, एकरी १० किलो या प्रमाणात वापर करावा. तसेच वसंतदादा शुगर इन्स्टिट्यूट निर्मित जैविक कीटकनाशक बीव्हीएम (बव्हेरिया, व्हर्टिसिलीयम आणि मॅटेरायझियम) एकरी २ लिटर ४०० लिटर पाण्यात मिसळून पिकाच्या मुळाशी आळवणीद्वारे द्यावे किंवा ठिबक सिंचनातून द्यावे.
- जीवाणू (बॅसिलस पॅपीली) व सूत्रकृमी (हेटरोरॅबडेटीस) हे हुमणीचे नैसर्गिक शत्रू आहेत. त्याचाही वापर करून काही प्रमाणात हुमणीचे नियंत्रण करता येते.

३) रासायनिक नियंत्रण

- कडूनिंब अथवा बाभळीच्या झाडावर क्लोरपायरीफॉस २०% प्रवाही २ मिली प्रति लिटर पाण्यातून फवारावे.
- एक गाडी शेणखत, कंपोस्ट खतात एक किलो ३ जी दाणेदार कार्बोफ्युरॉन मिसळावे व नंतर खत शेतात टाकावे. उन्हाळ्यात शेण खताचे लहान ढीग करावेत.
- मोठ्या उसात (जून-ऑगस्ट) क्लोरपायरीफॉस २०% प्रवाही ५ लि./प्रति हेक्टरी १००० लिटर पाण्यात मिसळून जमिनीत आळवणी करावी.
- ऊस लागवडीच्या वेळी ०.३% दाणेदार फिप्रोनिल अथवा १०% दाणेदार फोरेट हे कीटकनाशक २५ कि./हे. मातीत मिसळावे व नंतर हलके पाणी द्यावे.

जैविक कीड नियंत्रक (बी.व्ही.एम.) रू.२१०/- प्रति लिटर या दराने वसंतदादा शुगर इन्स्टिट्यूट, पुणे येथे विक्रीसाठी उपलब्ध आहे.

हुमणी प्रार्दुभाव ग्रस्त ऊस

अधिक माहितीसाठी :
किटक शास्त्र विभाग
वसंतदादा शुगर इन्स्टिट्यूट, मांजरी (बु), पुणे येथे संपर्क साधावा.
फोन नं. (०२०) २६९०२१००, २६९०२२५५, फॅक्स (०२०) २६९०२२४४

Sugarbeet : A Supplementary Crop to Sugarcane

PV Ghodke, Scientiest & Head, Agronomy,
VSI, Pune

Sugarcane (*Saccharum officinarum* L.) is the only source of raw material for the production of white sugar in India. Many sugar mills have suffered due to cyclic lean periods and are running below the desired crushing period and under installed capacity, resulting crushing season in Maharashtra state is getting shorter and shorter as given below;

Season-wise number of days in Maharashtra state

Season	No. of days	Season	No. of days
2009-10	170	2014-15	156
2010-11	186	2015-16	124
2011-12	157	2016-17	77
2012-13	132	2017-18	143
2013-14	133	2018-19	128

To overcome these situations, supplementary source like sugar beet (*Beta vulgaris* L.) needs to be explored with the recent development of tropical varieties of sugar beet. Tropical sugarbeet is a biennial sugar producing tuber crop, grown in temperate climate. This crop constitutes 30% of total world sugar production and distributed in 45 countries. Now a day's sugarbeet hybrids are popularized in tropical and sub tropical countries as a promising energy crop and alternative raw materials for the production of sugar and ethanol.

The advantages of sugar beet

- Sugar beet can produce 65 to 75 tonnes of beet root per hectare with 18-19% sucrose.
- One tonne of sugar beet produces 120-150 kg sugar, 35 kg molasses and 45 kg dried pulp.
- More ethanol can be produced from sugar beet juice than the sugarcane juice.
- Crop matures within 5 - 6 months;
- Water requirement is 40 - 50% as compared with *suru* sugarcane crop;
- Crop grows satisfactorily in moderately saline soils and physical properties of soil can be improved by beet cultivation resulting increase in yield of succeeding crop.
- Pulp received after processing can be utilized for cattle feed resulting increase in milk yield.
- Since the sugar beet is winter season crop, it can be grown as inter-crop in pre-seasonal sugarcane.
- Sugar beet is a good source of vitamin B-10, a medicinal source.

Present scenario in India

In India, sugar beet cultivation was tried at IISR, Lucknow and CSRS Padegaon, Maharashtra in 1960's. In 1970, the work was initiated under All India Coordinated Research Project (AICRP) on sugar beet. The sugar beet cultivation was taken up in Sriganganagar area of Rajasthan for sugar production and in Sundarban area of West Bengal for alcohol production.

A network project on 'Developing agro-techniques for tropicalized sugar beet in India' was formulated by Indian Council of Agriculture Research (ICAR), New Delhi and conducted at four sugarcane research stations including, VSI Pune during 2004-05 to 2007-08.

Several European sugar beet seed companies like, Syngenta, SESVENDERHAVE, Belgium; Strube,

Germany and JK- KWS approached VSI for evaluating their beet hybrids at different locations in Maharashtra state to assess their yield, sugar content and reaction against major pests & diseases. Recommendations emerged out from these trials have been implemented on large scale cultivation of sugar beet in operational area of the four sugar mills.

The field experiments were conducted during 2006 to 2009 at VSI to identify the proper agro-techniques for tropicalized varieties of sugar beet as shown in following table. Sowing in October second fortnight was found to be the most suitable for good growth, maximum beet root yield (t/ha) and sucrose%.

Sugar beet sowing month, yield and quality of sugar beet

Variety	Sowing month	Harvesting month	Yield (t/ha)	Sucrose %
PAC 6008	September	March	79.46	18.20
SZ 35			77.92	16.74
PAC 6008	October	April	95.67	18.25
SZ 35			93.83	17.94
PAC 6008	November	May	92.65	20.32
SZ 35			87.75	18.81
PAC 6008	December	June	90.35	18.81
SZ 35			85.43	18.15
PAC 6008	January	July	69.02	19.86
SZ 35			60.90	19.51
PAC 6008	June	November	83.54	14.80
SZ 35			77.97	14.59

(Experimental results (2007-08 & 2008-09 at Institute (VSI)

On the basis of the studies undertaken at Institute (VSI), the recommended package of practices for sugar beet cultivation has been developed.

Comparative study of sugarbeet

Considering crop life period of 6, 4 and 14 months of sugar beet, wheat and sugarcane crops respectively, the net returns per ha per month are higher in sugar beet than wheat and sugarcane crops as given below. Therefore cultivation of sugar beet will be profitable proposition than wheat.

Comparison with competitive crops

Particulars	Sugar beet	Wheat	Sugarcane
Crop period (months)	6	4	14
Average yield (t/ha)	55	2.5	80
Average price (Rs./t)	2500	18000	3000
Total income (Rs./ha)	1,37,500	45,000	2,40,000
Cost of cultivation (Rs./ha)	62,350	17,500	1,20,000
Net profit (Rs./ha)	75,150	27,500	1,20,000
Net returns (Rs./ha /month)	12,525	6,875	8,571

For more information : **Agronomy Section**
Vasantdada Sugar Institute, Manjari (Bk.), Pune
Phone No. : 020-26902100 / 26902243

ऊस पिकावरील पोक्का बोंग रोग व त्याचे नियंत्रण

बी.एच.पवार, वरिष्ट शास्त्रज्ञ आणि प्रमुख, ऊसरोगशास्त्र विभाग,
वसंतदादा शुगर इन्स्टिट्यूट, पुणे

पोक्का बोंग हा बुरशीजन्य रोग असून तो फुजॅरियम मोनिलीफॉरमी या हवेद्वारे पसरणाऱ्या बुरशीच्या प्रादुर्भावामुळे होतो. उन्हाळा हंगाम संपतेवेळी पडणाऱ्या वळीव पावसानंतर या रोगाची लागण ऊस पिकामध्ये दिसून येते. त्यानंतर, पावसाळ्यात पडणाऱ्या सततच्या पावसामुळे आणि ऊस शेतात पाणी साचल्याने पिकाच्या सानिध्यात सापेक्ष आर्द्रता वाढते आणि तापमान कमी होते. अशा परिस्थितीत या रोगाची बुरशीची वाढ कमी कालावधीत मोठ्या प्रमाणावर होते आणि रोगाचे प्रमाण वाढते. ऊस पिकाच्या पानांवर आढळणारा हा रोग महाराष्ट्राच्या सर्व कृषि हवामान विभागात कमी अधिक प्रमाणात दिसून येतो. दक्षिण महाराष्ट्रात मात्र पावसाळा हंगामात सापेक्ष आर्द्रतेचे प्रमाण हवेत जास्त काळ राहिल्याने या रोगाचे प्रमाण जास्त दिसून येते. महाराष्ट्रात कोसी ६७१, को ८६०३२, कोएम ०२६५, कोव्हीएसआय ९८०५, व्हीएसआय ४३४, एमएस १०००१, व्हीएसआय ०८००५ आणि को ४१९ या ऊस जाती या रोगास बळी पडतात.

रोगाची लक्षणे

पावसाळी हंगामापुर्वी पडलेल्या वळीव पावसामुळे तयार झालेल्या उष्ण व दमट वातावरणामुळे पोक्का बोंग या रोगास कारणीभूत असणाऱ्या फुजॅरियम मोनिलीफॉरमी या हवेद्वारे पसरणाऱ्या बुरशीची लागण उसाच्या शेंड्यातील कोवळ्या पानांवर दिसून येते. सुरूवातीस पोंग्यातील तिसऱ्या व चौथ्या पानांच्या बेचक्यात (पानाच्या व देठाच्या जोडाच्या ठिकाणी) पांढरट-पिवळसर पट्टे दिसून येतात (फोटो १). रोगाची लागण झालेल्या रोगाची तीव्रता वाढल्यानंतर उसाची पाने सडतात/कुजतात व नंतर गळून पडतात किंवा एकमेकांत गुरफटतात. (फोटो २). पाने कुजल्याने किंवा गुरफटल्याने कांड्यांचे पोषण होत नसल्याने कांड्या आखूड व वेड्यावाकड्या होतात. कधी कधी रोगाची तीव्रता वाढल्यावर पोंगा मर किंवा शेंडा कुज दिसून येते. (फोटो ३). काही वेळेस रोगग्रस्त उसाच्या कांड्यांवर कांडी काप (नाइफ कट) रोगाची लक्षणे दिसून येतात. शेंडा कुज व कांडी काप (नाइफ कट) (फोटो ४) झालेल्या उसातील शेंडा जोम नष्ट झाल्याने उसावरील डोळ्यातून पांगशा फुटतात व कालांतराने असे ऊस वाळतात. रोगट उसाच्या कांड्या आखूड झाल्याने व पांगशा फुटल्याने उसाच्या उत्पन्नात घट येते. रोगग्रस्त उसाची उंची घटते. रोगामुळे उसाच्या बेटातील रोगग्रस्त उसाचेच नुकसान होते, तथापि बाधीत न झालेल्या उसाचे नुकसान होत नाही.

रोगाचा प्रसार

पोक्का बोंग रोगाचा प्रसार प्रामुख्याने हवेमार्फत होतो. याशिवाम पाणी, पाऊस व किटकाद्वारे देखील या रोगाचा प्रसार होतो. मात्र रोगाचा प्रसार बेण्याद्वारे होत नाही.

रोग निमंत्रणाचे उपाय

१. माती परिक्षणावर आधारित रासायनिक खतांची (मुख्य व सुक्ष्य अन्नद्रव्याची) मात्रा वेळेवर व योग्य प्रमाणात द्यावी.
२. रोगामुळे शेंडे कुज व पांगशा फुटलेले ऊस शेतातून वेगळे काढावेत व नष्ट करावेत, जेणेकरून रोगाच्या प्रसारास काही प्रमाणात आळा बसेल.
३. ऊस पिकांवर रोग आढळून आल्यानंतर लगेचच खाली सुचविल्याप्रमाणे बुरशीनाशकाच्या फवारण्या कराव्यात
   अ. मँकोझेब , ०.३ टक्के (१ लिटर पाण्यात ३ ग्रॅम बुरशीनाशक) किंवा
   ब. कॉपर ऑक्झिक्लोराईड ०.२ टक्के (१ लिटर पाण्यात २ ग्रॅम बुरशीनाशक) किंवा
   क. कार्बेन्डेझिम , ०.१ टक्के (१ लिटर पाण्यात १ ग्रॅम बुरशीनाशक)
   रोगाची लागण दिसून आल्यानंतर वरीलपैकी एका बुरशीनाशकाची १० ते १२ दिवसांच्या अंतराने स्टीकर वापरून २ ते ३ फवारण्या कराव्यात.
४. शेतात पाण्यामुळे दलदल होणार नाही याची काळजी घ्यावी. पाण्याचा निचरा योग्य असावा.

अधिक माहितीसाठी :
ऊस रोगशास्त्र विभाग
वसंतदादा शुगर इन्स्टिट्यूट, मांजरी (बु), पुणे येथे संपर्क साधावा.
फोन नं. (०२०) २६९०२१००, २६९०२२६८, फॅक्स (०२०) २६९०२२४४


(फोटो १)


(फोटो २)


(फोटो ३)


(फोटो ४)

वसंत उर्जा : शाश्वत शेतीसाठी बहुपयोगी जैवसंजीवक

डॉ. एस.जी. दळवी, वैज्ञानिक अधिकारी, उती संवर्धन विभाग,
वसंतदादा शुगर इन्स्टिट्यूट, पुणे

अलिकडच्या काळात दुष्काळ, अवकाळी पाऊस, अतिवृष्टी, गारपीट आणि याच्यामुळे येणारे नवनवीन रोग व किडी या संकटाचा सामना आपणास वारंवार करावा लागतो आहे. या सगळ्या संकटांमुळे आपले उत्पन्न घटत आहे आणि शेतीवरचा खर्च वाढत आहे.

हरितक्रांतीच्या काळात पीक उत्पन्न वाढीसाठी रासायनिक खते, कीटकनाशके या निविष्ठांचा वापर मोठ्याप्रमाणावर सुरू झाला आणि उत्पादनात मोठी वाढ आपण केली परंतू अनियंत्रित रासायनिक खतांचा, पाण्याचा आणि कीटकनाशकांचा वापर याने विपरीत परिणाम शेतीच्या आणि मनुष्याच्या आरोग्यावर दृष्टोत्पतीस येऊ लागले आहेत. वाढत्या लोकसंख्येची अपेक्षित, सकस आणि विषमुक्त अन्नधान्य मागणी पूर्ण करण्यासाठी शेतीसाठी नाविन्यपूर्ण कार्यक्षमता याचबरोबर शाश्वतता आणि पर्यावरणपूरक याबाबत जाणीवपूर्वक विचार आणि धोरण अंगीकारणे आवश्यक आहे.

भारतात ऊस हे अत्यंत महत्वाचे पीक असून, साखर धंदा हा ग्रामीण भारतातील लक्षावधी लोकांना प्रत्यक्ष व अप्रत्यक्षपणे रोजगार पुरवणारा मोठा व्यवसाय आहे. भारतासारख्या कृषिप्रधान देशाला आर्थिक उत्पन्न मिळवून देणारा आणि भविष्यास देशाची उर्जेची गरज भागवणारा शाश्वत पर्याय आहे. एकंदरीत लक्षात घेता उसाचे उत्पादन हे ठराविक टप्प्यावर स्थिर किंबहुना कमी कमी होताना दिसते आहे.

ऊस हे शेतात दीर्घकाळ राहणारे पीक आहे त्यामुळे उसावर विविध जैविक आणि अजैविक ताणांचा प्रभाव पडतो. अधिकाधिक उत्पन्न घेण्याकरिता रासायनिक खते आणि पाणी यांचा अमर्याद वापर केला जातो त्यामुळे जमिनीची प्रत खालावली जात आहे. जमिनीतील सेंद्रिय कार्बन अत्यंत कमी झाला आहे. जमिनीचा आणि पाण्याचा सामू वाढला आहे. या सगळ्यामुळे जमिन खारवट चोपण बनून नापीक होऊ लागली आहे आणि उसावरही विविध कीड व रोग यांचा प्रभाव वाढून उत्पन्न घटू लागले आहे.

वारंवार येणाऱ्या अडचणी आणि उपलब्ध नैसर्गिक संसाधने या दोन्हींचा मेळ घालून ऊस शेती ही शाश्वत आणि किफायतशीर कशी करता येईल याचा विचार शेतकरी बंधूभगिनींनी केला पाहिजे. यासाठी रासायनिक खते, कीडनाशके यावरचे अवलंबित्व कमी करून विविध जीवाणू खते, जैविक कीड आणि रोगनाशके आणि जैवसंजीवके याचा वापर करून शाश्वत ऊस शेती केली पाहिजे. कृषिसंस्थेमध्ये जैविक नियमन यंत्रणा, वनस्पती आणि सूक्ष्मजीवजंतू यांच्या परस्परपूरक क्रियांचा समावेश असतो. यातील विविध संरचनेपैकी नाविन्यपूर्ण जैवसंजीवक संकल्पनेवर वसंतदादा शुगर इन्स्टिट्यूट, पुणे आणि भाभा अणुसंशोधन केंद्र, मुंबई यांनी संशोधन करून मवसंत उर्जाफ हे जैवसंजीवक शाश्वत शेतीकरिता एक बहुउपयोगी निविष्ठा निर्माण केली आहे. सर्व पिकांच्या अजैविक ताण म्हणजे पाण्याची कमतरता, तीव्र तपमान, अति थंडी अथवा रोग व किडी इ. नियंत्रणाकरिता फार उपयोगी असल्याचे दिसून आले आहे.
प्रथम आपण 'जैवसंजीवक' ही संकल्पना थोडक्यात समजून घेऊ. जैवसंजीवक हे विशिष्ट प्रकारच्या वनस्पती तथा प्राणीजन्य अथवा सेंद्रीय असेंद्रीय घटक किंवा वेगवेगळी जीवाणू खते, जैविक कीड/रोग नियंत्रण करणारे सूक्ष्मजीवाणू इ. घटक होत. उदा. ह्युमिक ॲसिड, फॉलिक ॲसिड, समुद्री शेवाळ अर्क, जिब्रेलिक ॲसिड, सॅलिसिलीक ॲसिडइ.

यांच्या संपर्कात वनस्पती पेशी आल्या असता त्या पेशींचे उद्दीपन होऊन पेशींमध्ये विविध संवेदना जागृतीचे काम करतात. ज्यामुळे वनस्पती पेशीअंतर्गत उपयोगी जैवरासायनिक अभिक्रियांचा वेग वाढून जैविक (रोग व किडी) आणि अजैविक ताण (पाण्याचा तुटवडा, प्रखर सूर्यप्रकाश, अति शीत वा तीव्र तपमान, जमिनीची क्षारता) ताणांमुळे होणारे नुकसान टाळले जाते.

वसंत उर्जा या जैवसंजीवकाच्या प्रायोगिक चाचण्या वसंतदादा शुगर इन्स्टिट्यूट, भाभा अणुसंशोधन केंद्र, मध्यवर्ती ऊस संशोधन केंद्र पाडेगांव आणि महात्मा फुले कृषि विद्यापीठ यांच्यामार्फत घेऊन त्याचे निष्कर्ष महाराष्ट्रातील चारही विद्यापीठांच्या संयुक्त कृषि संशोधन समितीपुढे मांडण्यात येऊन त्याची शिफारस करण्यात आली आहे. या जैवसंजीवकाचे वापर आणि फायदे खालीलप्रमाण.

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१. ऊस लागवडीवेळी अर्धातास बेणे प्रक्रिया केली असता पांढऱ्या मुळ्यांची संख्या वाढते. कांड्यांची उगवण क्षमता १५ ते २० टक्क्यांनी वाढते, उगवण कमी कालावधीत होते, कोंब निरोगी आणि सशक्त निपजतात. कांडीकूज रोगाचा प्रादुर्भाव नियंत्रित होतो. रोपे पुर्नलागवडीनंतर जगण्याचे प्रमाण वाढते.

२. पानांवर फवारणी केली असता पानांची रूंदी व लांबी वाढते, त्यातील हरितद्रव्याचे प्रमाण वाढून पाने जास्त काळ कार्यक्षम राहतात.

३. उसाच्या फुटव्यांची संख्या वाढते, फुटव्यांची वाढ एकसमान होते. कांड्याची जाडी आणि लांबी वाढते, परिणामी ऊस उत्पादनामध्ये मोठी वाढ होते आणि साखर उताराही वाढतो.

४. पानांवरील फवारणीमुळे उसाच्या रोगप्रतिकारक शक्तीमध्ये वाढ होते. त्यामुळे पानांवर येणाऱ्या रोगांचे नियंत्रण होण्यास मदत होते.

५. पानांवर फवारणीमुळे पानांवर अतिसूक्ष्म पातळ थर बसतो, पर्णरंध्रांचे आकुंचन होते त्यामुळे बाष्पीभवनाद्वारे निघून जाणे, पानांती बाष्पउत्सर्जन रोखले जाते.

६. वनस्पतीमध्ये अजैविक आणि जैविक ताण सहन करणारे स्त्राव निर्माण होतात त्यामुळे अजैविक आणि जैविक ताण नियंत्रण होते. वसंत उर्जा मुळे रोगकारक जीवाणू, बुरशी यांची वाढ रोखली जाते आणि उपयोगी जीवाणू, बुरशी यांची वाढ आणि त्यांची कार्यक्षमता यांच्यात वाढ होते त्यामुळे दुहेरी फायदा मिळतो.

७. आत्तापर्यंतच्या ऊस व त्याबरोबरची आंतरपिके यांच्यावरील वसंतउर्जा फवारणीमुळे ऊस उत्पादनात २५ ते ३० टन/हे. तर बटाटा, कांदा यांच्यामध्ये ८-१० टन/हे. उत्पन्न वाढ दिसून आली आहे.

८. याचबरोबर गहू, बाजरी, ज्वारी यासारखी धान्यपिके, सोयाबीन, मूग,हरभरा यासारखी कडधान्ये, आले, हळद, टोमॅटो, ढोबळी मिरची, कोबी, फ्लॉवर, झेंडू, निशिगंध यासारखी व्यापारी पिके, डाळिंब, पपई, केळी, द्राक्षे, आंबा, काजू यासारखी पिके यांचेवरील रोगनियंत्रण आणि उत्पादन वाढ यासाठी हा अत्यंत उपयुक्त असल्याचे दिसून आले आहे.

ऊस पिकासाठी वापर :

बेणे प्रक्रिया : ५ मिली/लि. पाणी प्रमाणे अर्धातास त्यानंतर ३०, ६० व ९० दिवसांनी ५ मिली/पाणी याप्रमाणे पानांवर फवारावे त्यामुळे पाने पूर्ण ओली होतील याची काळजी घ्यावी.

फवारणी करताना फवारणीच्या द्रावणाचा सामू म्हणजे कि हा ५.५ ते ६ एवढा ठेवावा जेणेकरून वसंत उर्जा द्रावण प्रभावीपणे काम करते.

सध्याच्या दुष्काळी परिस्थितीत या जैवसंजीवकाच्या फवारण्या मराठवाडा विभागातील ७-८ कारखान्यांवर घेण्यात आल्या होत्या. पाण्याचा ताण सहन करण्याच्या दृष्टीने याचा फार मोठा उपयोग होत असल्याचे निदर्शनास आले आहे तर गेल्या हिवाळ्यातील कडाक्याच्या थंडीतही एक डोळा उसाच्या उगवणीवर चांगला फायदा होताना दिसून आला आहे.

याच्या खेरीज भाजीपाला पिकावरील रोग आणि कीड नियंत्रणात आणि विषमुक्त भाजीपाला उत्पादनातही फार मोठा उपयोग झाल्याचे आढळले आहे.

आपणा सर्वांना विनंती आहे की, याचा वापर आपल्या शेतीसाठी आणि आरोग्यासाठी जाणीवपूर्वक करावा. भाजीपाल्यावर याची फवारणी ५ मिली प्रति लिटर पाणी याप्रमाणे करावी आणि १०-१२ दिवसांच्या अंतराने फवारावे.

वसंत उर्जा : रू.२१०/- प्रति लिटर या दराने वसंतदादा शुगर इन्स्टिट्यूट, पुणे येथे विक्रीसाठी उपलब्ध आहे.

अधिक माहितीसाठी :

उती संवर्धन विभाग

वसंतदादा शुगर इन्स्टिट्यूट, मांजरी (बु), पुणे येथे संपर्क साधावा.

फोन नं. (०२०) २६९०२१००, २६९०२२९१/२९२,

फॅक्स (०२०) २६९०२२४४

संशोधनेन संवृद्धिः
ISO : 9001:2015

2nd International Conference & Exhibition on SUSTAINABILITY - INNOVATION & DIVERSIFICATION IN SUGAR AND ALLIED INDUSTRY

January 2020

Block your Time!

(Dates will be notified soon)

Venue : Vasantdada Sugar Institute, Pune, Maharashtra, India

Announcement

Vasantdada Sugar Institute (VSI) an ISO 9001:2015 certified organization is an autonomous body established in 1975 at Pune by cane growers of co-operative sugar mills in Maharashtra with generous support of State and Central Government. VSI's mission is to bring about an overall improvement in the socio-economic status of sugarcane growers by providing cutting edge technologies through scientific research related to sugarcane and sugarcane co-products.

VSI is organizing the **2nd International Conference & Exhibition on "Sustainability - Innovation & Diversification in Sugar and Allied Industry"** in January, 2020 at VSI. Eminent International and National speakers will be delivering lectures on significantly different important aspects of sugar and allied industry. Around 3000 delegates are expected to participate in this Conference from across the globe.

It is also a matter of pride for VSI that, 1st International Conference of VSI was held in the month of November, 2016 and there was a tremendous response from machinery manufacturers, fellow participants encompassing scientists from Sugar Engineering, Sugar Technology, Alcohol Technology & Biofuels and Agriculture. All the National Institutes of ICAR including SBI & IISR, Agricultural & other Universities and students participated in a profound manner and around 2700 participants shared this conference. The most significant aspect of the conference was live crop demonstration covering varieties, irrigation methodology, inter-crop cultivation, different agronomical practices and management of pests and diseases by integrated philosophy.

There will be an exhibition **showcasing various technological developments in the sugar industry** and a live crop demonstration of sugarcane showing various advance technologies and practices in cultivation.

Scientists and researchers will present their research papers in poster form.

We invite you to join the scientific deliberations, enjoy our traditional hospitality and visit the interesting places in and around Pune.

Look forward to welcome you for this Grand Event!

Shivajirao Deshmukh
Director General, VSI

Registration Details

Conference Delegate Registration Fee *		
	National	**International**
Delegate Registration	INR 6,000	USD 300
Accompanying Persons	INR 3,000	USD 150
Student Participation	INR 3,000	USD 150

Note : * Fees inclusive of GST

CONFERENCE SECRETARIAT:-

VASANTDADA SUGAR INSTITUTE
Manjari Budruk, Tal.: Haveli, Dist.: Pune, Maharashtra, India, PIN - 412307
Phone : +91–20–26902205/06
Fax : +91–20–26902244
E-mail : admin@vsisugar.org.in
Web-site : www.vsisugar.com

RSVP

Mr. Vikas Deshmukh
+91-9420490003

Mr. R. A. Chandgude
+91-9422252279

Dr. R. V. Dani
+91-9423558032

Dr. S. V. Patil
+91-9822267223

CONFERENCE MANAGER:-

ALPCORD NETWORK

Mr. Bishwas Joshi
Project Manager
+91-9871794731 / 011-49101014
Email: meetings@alpcord.com

SPONSORSHIP DETAILS

CONFERENCE SPONSOR — INR 25,00,000

Entitlement

- Prominent display of name and logo in Conference backdrop
- Mention in the conference website with link to Company's website
- Two full page color Advt. in the souvenir book
- Booth space size 6mx6m in the prime location
- 10 complimentary registration badges

PLATINUM SPONSOR — INR 15,00,000

Entitlement

- Prominent display of name and logo in Conference backdrop
- Mention in the conference website with link to Company's website
- Two full page color Advt. in the souvenir book
- Booth space size 6mx3m in the prime location
- 7 complimentary registration badges

DIAMOND SPONSOR — INR 10,00,000

Entitlement

- Prominent display of name and logo in Conference backdrop
- Mention in the conference website with link to Company's website
- One full page color Advt. in the souvenir book
- Booth space size 3mx3m in the prominent location
- 5 complimentary registration badges

GOLD SPONSOR — INR 7,50,000

Entitlement

- Prominent display of name and logo in Conference backdrop
- Mention in the conference website with link to Company's website
- Half page color Advt. in the souvenir book
- Booth space size 3mx3m in the Expo Area
- 3 complimentary registration badges

SILVER SPONSOR — INR 3,50,000

Entitlement

- Prominent display of name and logo in Conference backdrop
- Mention in the conference website with link to Company's website
- Booth space size 3mx3m in the Expo Area
- 2 complimentary registration badges

OTHER SPONSORSHIP DETAILS

CONFERENCE BAGS SPONSOR (MAX. 02) — INR 10,00,000 (Each)

EVENT & INDIVIDUAL GRANTS

- **Lunch Sponsors (Max. 03)** — INR 10,00,000 (Each)
  (Prominent display at food court)
- **Reception /lounge(Max. 02)** — INR 2,50,000
  (Space with laptop, internet, sofa, technicians with coffee table)

SOUVENIR ADVERTISEMENT

- **Back cover** — INR 75,000
- **Front - Back inner** — INR 50,000
- **Full page** (W 8.5" x H 11") — INR 25,000
- **Half page** (W 8.5" x H 5.5") — INR 15,000

Note: Prepare advertisement with CMYK colors in CorelDraw file.

INTERNATIONAL SUGAR EXPOSITION

Stall Dimension	National	International
Stall (3m x 3 m)	INR 1,50,000	USD 2500
Stall (2m x 2 m)	INR 1,00,000	USD 1500

Inclusions

- Company name to be printed as Fascia
- Octonorm booth of dimension 3m x 3m or 2m x 2m as per the requirement
- Carpeted area with 1 Table, 2 Chairs, 1 Power point, 2 Lights & 1 Dustbin
- Meal coupons as entitled for 2 representatives of the company

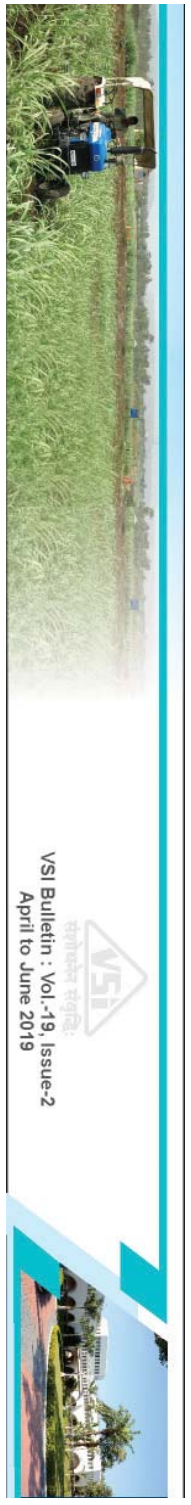
Terms & conditions

Note:

- 100% payment of the total exhibition stall at the time of booking.
- The stall shall be allotted on first come first serve basis
- Govt. Service Tax (GST) will be extra as applicable which is presently18 %
- The payment should be made by Demand draft /cheque drawn in favour of **"Vasantdada Sugar Institute"** payable at Pune

Bank Details Information for RTGS/NEFT Fund Transfer

Account Name	: Vasantdada Sugar Institute
Bank Name	: Bank of Baroda
Bank Address	: SNo. 6A/1B/1A/1, Pune-Saswad Road, Opp.Gliding Center, Hadapsar, Pune - 411028
Account Number	: 24830100014911
RTGS/IFSC Code	: BARB0HADAPS (5th Letter is zero)
MICR Code	: 411012020
SWIFT Code	: BARBINBBPCB
PAN Number	: AAATV0865A
GST Number	: 27AAATV0865A1ZP



LIBRARY UPDATE

April to June 2019

1. Shah Prakash
   Electrician Trade Theory, 1st Ed., (286p.)
   Sarswati Book Company Ltd., Pune.
2. Borenstein Michael, Hedges Larry V., Higgins Julian PT & Rothstein Hannah R.
   Introduction to Meta-analysis, 1st Ed. (421p.)
   John Wiley & Sons, UK.
3. Chundawat BS & Gautam SK
   Textbook of Agroforestry, 1st Ed. (188p.)
   CBS.,Pub. Distributors Pvt. Ltd., Delhi.
4. Chaturvedi AN & Khanna LS
   Forest Mensuration, 1st Ed. (403p.)
   International Book Distributors, Dehradun.
5. Prakash Ram
   Forest Management, 1st Ed., (256p.)
   International Book Distributors, Dehradun.
6. Mehta T.
   A Handbook of Forest Utilization, 1st Ed. (298p.)
   International Book Distributors, Dehradun.
7. Luna RK
   Plantation Forestry in India, 1st. Ed. (509p.)
   International Book Distributors, Dehradun.
8. Zende AA
   Tryst With Sugar Technology: a Bunch of Articles, 1st Ed. (132p.)
   Zende AA, Pune.
9. Zende AA
   Tryst With Sugar Technology: a Bunch of Articles, 1st Ed. (132p.)
   Zende BA, Pune.
10. Wallace John M. & Hobbs Peter V.
    Atmospheric Science: an Introductory Survey, 2nd Ed. (483p.)
    Elsevier Inc., London.

VISITOR LIST

Following visitors visited VSI various departments to know the activities of VSI (April to June 2019)

Name of Institutions	Visitors	Total
January - 2019		
Yeshwantrao Chavan Institute of Science, Karad, Dist: Satara	Lecturers and Students	52
College of Agricultural Biotechnology, Kharwate-Dahiwali (Sawarade), Dist: Raigad	Students	5
Vijaya College, Jayanagar, Bangalore, State : Karnataka	Lecturers and Students	35
Individual Farmers from Maharashtra State	Farmers	91 (22)
May - 2019		
Kumbhi Kasari SSK Ltd., Dist: Kolhapur	Farmers	12
Bhima SSK Ltd., Dist: Patas	Farmers	14
Individual Farmers from Maharashtra State	Farmers	145 (38)
June- 2019		
Dr. DY Patil College of Agriculture, A/p: Talsande,Dist: Kolhapur	Lecturers and Students	133
Late Ambadas Warpudkar College of Agriculture, Warpud,Tal & Dist: Parbhani	Lecturers and Students	69
Mahuva Sugar Factory, State : Gujrat	Officers and Farmers	119
KVK Varpud, Dist: Parbhani	Officers and Students	23
Individual Farmers from Maharashtra State	Farmers	162 (72)
Total :		**860 (141)**

- Bracket figures denote number of visits

Upcoming Events

Date	Topic	Coordinator
June & July, 2019	Dnyanyag and Dnyanlaxmi (Farmers training)	Mr. BH Pawar
24th August, 2019	Management of Problematic Soils	Mr. PP Shinde, Dr. (Mrs.) PS Deshmukh, Mrs. SD Ghodke
01sh October, 2019	National Seed Day	Dr. RS Hapase, Mr. SS Katake, Dr. PN Tawar
26th October, 2019	Review of CDAS Program	Dr. RS Hapase
November & December, 2019	Dnyanyag and Dnyanlaxmi (Farmers training)	Mr. BH Pawar
January 2020	International Conference	Mr. RA Chandgudae, Mr. BH Pawar
22nd Febraury, 2020	Sugarcane Management in Stress Condition	Dr. RS Hapase, Mr. PP Shinde, Mr. PV Ghodke, Dr. (Mrs.) PS Deshmukh, Dr. SG Dalvi
28th March, 2020	Review of CDAS Program	Dr. RS Hapase, Mr. PV Ghodke

VSIBulletin is published by the Vasantdada Sugar Institute, Pune.

VASANTDADA SUGAR INSTITUTE
Manjari (Bk), Pune - 412 307; Maharashtra.
Phone - (020) 26902100; **Fax -** (020) 26902244
E-mail : admin@vsisugar.org.in
Website: www.vsisugar.com