



अजैविक स्ट्रेस प्रबंधन समाचार Abiotic Stress Management News

भाकृअनुप-राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान
(समतुल्य विश्वविद्यालय)

मालेगाँव खुर्द, बारामती - 413 115, पुणे, महाराष्ट्र, भारत

ICAR- National Institute of Abiotic Stress Management
(Deemed to be University)

Malegaon Kh., Baramati - 413 115, Pune, Maharashtra, India



Vol. 02 No. 02

An ISO 9001:2015 Certified Institute

October 2018 to March 2019

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- 7th Research Advisory Committee Meeting
- One day farmers training programme organized by ICAR-NIASM
- Celebration of World Soil Day
- Refresher course on Administration & Finance Management for Section Officers, AAOs, AFAOs & Assistants of ICAR HQ & Institutes
- हिन्दी कार्यशाला
- Meeting for inter-institutional collaboration to map abiotic stresses by employing GIS and remote sensing tools
- Two days workshop on 'Application of Foldscope for pollen studies' for high school students
- Scientific talk by Prof Pushpendra Kumar Gupta, Emeritus Professor
- 70th Republic Day
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Workshop/Seminar/Symposia/Conference/ Training attended

Personalia

- Awards/ Recognition

Editorial Committee

Ajay Kumar Singh, Yogeshwar Singh, Mahesh Kumar,
Neeraj Kumar, CB Harisha, Paritosh Kumar

Technical Assistance

Madhukar Gubbala, Pravin More

From the Director's Desk.....

Greetings from ICAR-NIASM.

To address the issue related to abiotic stress and climate change has prime duty for Our Institute. In last three decade the global climate change has also reflected by contamination and rising temperature in all the ecosystems. As per the IPCC mean global temperature will increase by 0.2 °C in the next two decades and it is expected to increase 1.8- 4 °C by the year 2100. In today's climate change scenarios, crops, animal and fisheries are exposed more frequently to episodes of abiotic stresses such as drought, salinity, elevated temperature, submergence and nutrient deficiencies. These stresses limit crop production. In recent years, advances in physiology, molecular biology, nutrigenomics and genetics have greatly improved our understanding of crops (plants, animal and fisheries) response to these stresses and the basis of varietal differences in tolerance. Abiotic stress management is one of the most important challenges facing in the agriculture. Abiotic stress can persistently limit choice of crops and agricultural production over large areas and extreme events can lead to total crop failures. Abiotic stresses adversely affect the livelihoods of individual farmers and their families as well as national economies and food security.



The institute has been taken several important steps for Human resource development of students and farmers by conducting two days workshop programme for school students and one training of fish farmers. The Institute have conducted meeting with department of Agriculture Pune and inter-institutional meeting to map the abiotic stresses for collaboration in Institute research. The 7th RAC meeting was also held at ICAR-NIASM for improvement and monitoring of research, projects carried out at institute. Apart from research institute also have very important role in Tribal Sub Plan programmes and conducted trainings for tribal farmers of Nadurbar district of Maharashtra and Swachh Bharat Mission and etc.

I thank the Editorial team who made tremendous efforts to compile the highlights of the institute in this issue of the Newsletter. I also thank to all the staff members who have contributed for this issue of Newsletter. I extend my sincere thanks to Dr Trilochan Mohapatra, Secretary, DARE & Director General, ICAR; Shri B. Pradhan, Additional Secretary and Financial Advisor, DARE/ICAR; Shri Sushil Kumar, Additional Secretary, DARE & Secretary, ICAR; Dr. K. Alagusundaram, DDG, NRM, ICAR; Dr. S. K. Chaudhari, ADG, Soil and Water Management and Dr. S. Bhaskar, ADG, AAF & CC for their continued support to ICAR-NIASM. I am very much confident that this issue of the Newsletter would provide useful information for advancement of research on abiotic stress management to readers across different domains.

Date : March 31, 2019

(Narendra Pratap Singh)

Investigation on traits and genes associated with adaptation of wheat genotypes to local drought and heat stress environments

(Dr Ajay Kumar Singh, Senior Scientist, Agricultural Biotechnology)

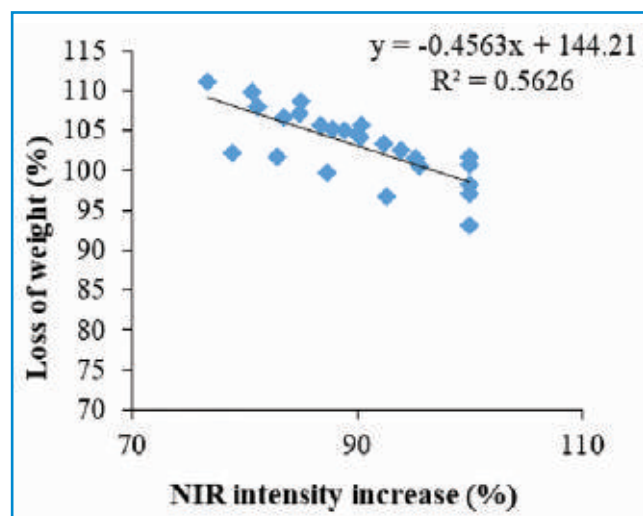
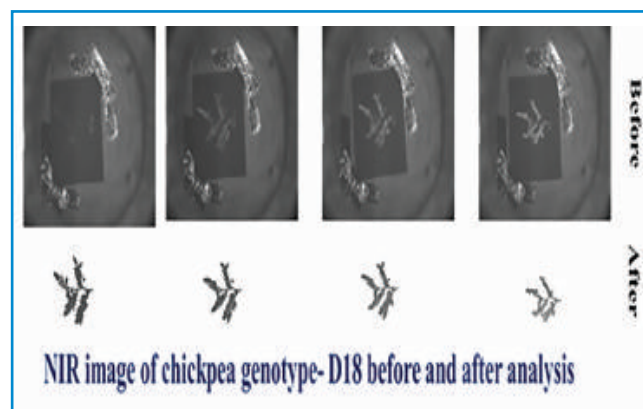
Twenty two (22) wheat genotypes were evaluated for traits and genes associated with water stress tolerance under post anthesis drought stress condition under timely sown and late sown conditions. Wheat genotypes along with check varieties were evaluated for traits such as canopy temperature, photosynthesis efficiency, biomass and yield related attributes under irrigated and water stress conditions. Promising wheat genotypes, i.e, EC-573623, IC-549394 and IC-112051 revealed water stress tolerant related physiology with yield stability. These promising wheat genotypes showed lower canopy temperature, higher SPAD value, higher chlorophyll content compared to check varieties HD-2189 and Netrawati. These promising wheat genotypes also showed higher functional tiller and grain yield compared to check varieties HD-2189 and Netrawati. These genotypes also showed higher proline content and increased expression of RSA and biomass associated genes such as C-repeat binding factor (CBF) and Calcium dependent Protein Kinase (CDPK) genes compared to check varieties HD-2189 and Netrawati.

High-throughput phenomics tool to assess the response of different crops to water-stress

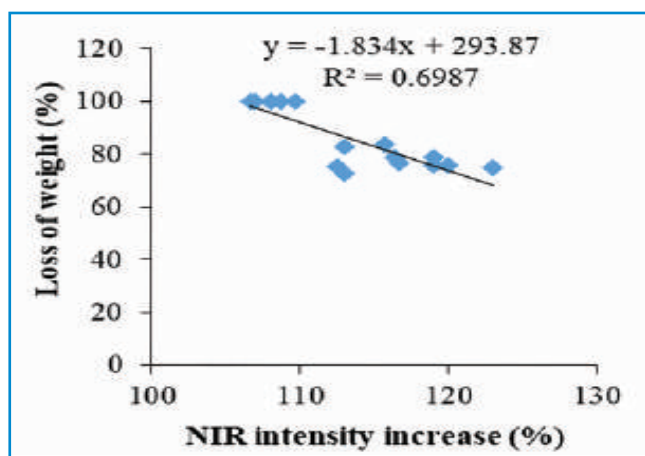
(Dr Jagadish Rane, Principal Scientist, Plant Physiology)

Visible (VIS)/Near Infra Red (NIR) image based phenomics tools are non destructive and rapid method for quantifying genetic variation in

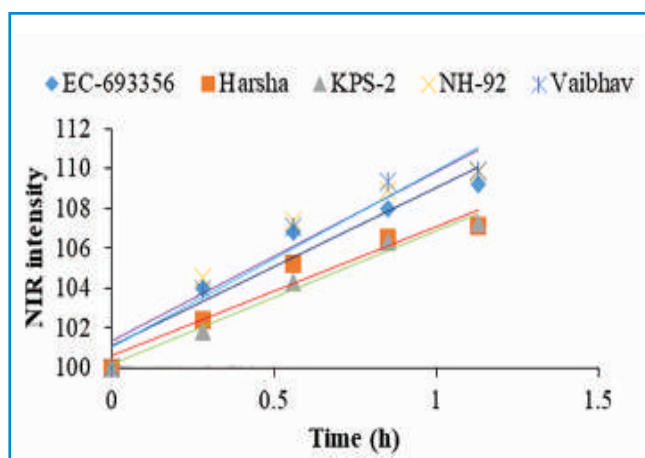
phenotypic traits of different crops. Plant phenomics facility at ICAR-NIASM was used to capture the VIS/NIR images of the crops. Intensity of NIR perceived by camera are inversely proportional with water content in leaf tissues as NIR in the selected wavelength range absorbed by water molecules. The method could differentiate the responses of genotypes to desiccation. Genetic variation was observed for all crops studied for these parameters. A positive correlation exists between weight reduction of the excised leaves and NIR intensity (R^2 for chick pea 0.711; mungbean 0.6; sugarcane 0.5 and wheat 0.7). This reveals that it is possible to differentiate crop genotypes for excised leaf water loss by employing NIR imaging technology.



Correlation between Excised Leaf Weight Loss and NIR Intensity of excised Mungbean leaves

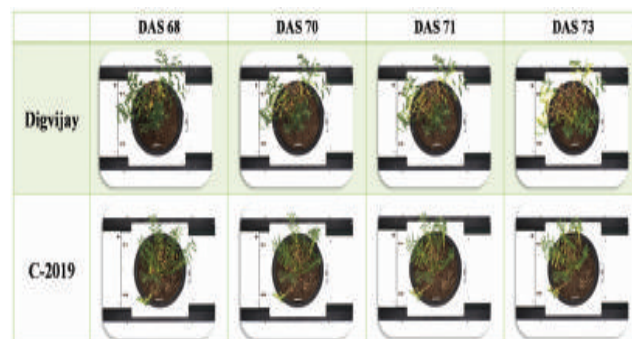


Correlation between Excised Leaf Weight Loss and NIR Intensity of excised wheat leaves

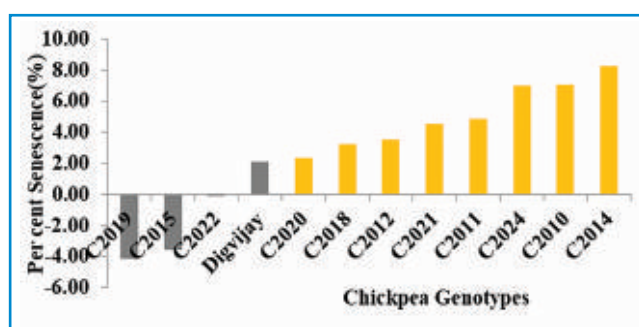


NIR intensity in excised leaves of Mungbean genotypes

High-throughput plant leaf senescence analysis is also possible with VIS image processing techniques. Leaf senescence leads to the degradation of photosynthetic pigments such as chlorophyll, in leaf colour changes from the usual deep green to pale green, pale green to yellow and finally to brown. The experiments in Chickpea revealed that local check Digvijay had highest green area followed by C-2010 under well water condition after 73 DAS. While under water stress conditions germplasm C-2015 and C-2019 had higher green area compared to the check Digvijay. Likewise, germplasm C-2015 and C-2019 showed delayed leaf senescence as compared to other genotypes under water stress conditions.



Top view images of Chickpea genotypes Digvijay and C-2019 under water stress condition



Delayed senescence in Chickpea genotypes

Convex hull area is another trait obtained by the VIS image analysis. It is a polygonal structure which adjoins the peripheral points of plant parts by keeping all the plant parts inside the convex shape. Pigeonpea genotypes exhibited higher convex hull area under well-watered condition than under the water stressed condition. There was significant variation in per cent change in convex hull area among different pigeonpea genotypes. Genotype BPG 5-12 was least influenced by water stress than other genotypes and genotype WRP 1 showed very high response to water availability.

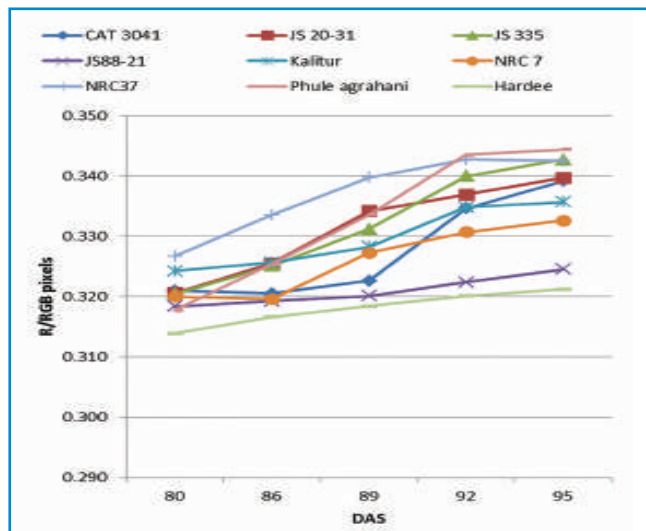
Quantifying senescence in chickpea and soybean through digital images

(Dr Mahesh Kumar, Scientist, Plant Physiology)

Moisture stress particularly at the later phase of the life cycle is a major constraint for production and yield stability of chickpea and soybean in dry

Research Highlights

area. Plants show a lot of morpho-physiological changes in response to moisture stress. Leaf senescence is an important phenotypic trait for the assessment of a plant's response to stress. This is also an indicator of plant age and health. Manual quantification of senescence is time consuming and subjective. We conducted an experiment with chickpea and soybean genotypes to evaluate plant senescence by image analysis using LemnaTec HTS-Scanalyzer and indigenous tools developed at ICAR-NIASM. Using high throughput LemnaTec HTS-Scanalyzer we could observe the early senescence in C-2014, C-2024 and C-2021. In contrast, genotypes there were genotypes that exhibited delayed senescence (C-2022, C-2015 and C-2019) under both well water and water stress conditions. Experiment was also conducted with soybean in field condition with the camera mounted on a hand operated trolley that could move on an iron track installed in the experimental field. Images were analysed using indigenous programme developed at this institute. Through this image acquisition and analysis tools we could identify the fast as well as slow senescing genotypes in field conditions. We demonstrated that senescence can be estimated by image based method and used to study genetic variation in different crops.

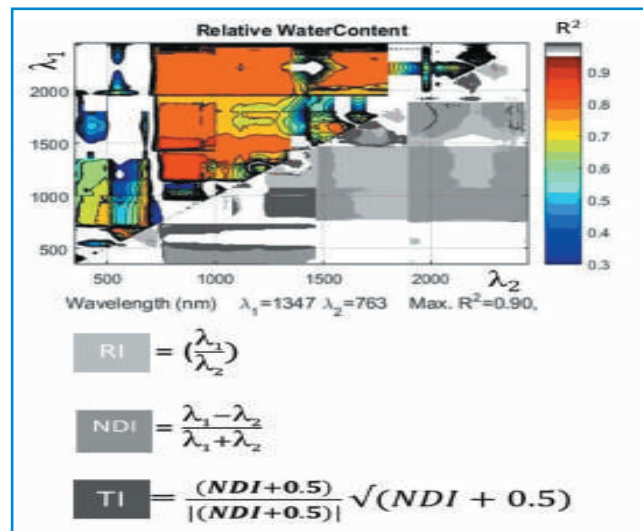


App for Brute-Force Identification of Best Performing Two Band Spectral Indices

(Dr Bhaskar Gaikwad, Scientist, Farm Mechanisation and Power)

A Matlab App "Brute force identification of best performing two band spectral Indices" v 1.0 has been developed for identification of two band indices in hyperspectral spectroscopy studies through co-relation analysis. The algorithm used in the app has been optimized for recursive calculation of two band indices for all combinations of spectral values in user defined range and input parameters using Ratio (RI), Normalized difference (NDI) and pre-defined Transformations (TI). Further co-relations between these indices and Y- parameters are calculated and compared to find the Maximum R^2 obtained. The app also generates the contour plot of resulting R^2 values for identification of hotspot areas suitable for band selection in the upper diagonal area and the respective calculation method used (RI/NDI/TI) in the lower diagonal area of the plot as shown in app snapshot given above.

The app has been developed for the spectral delineation of moisture and nutrient stresses in vineyards through hyperspectral spectroscopy



and will also assist other researchers involved in identification of suitable hyperspectral bands correlating with parameters under study.

Exposer to multiple salinity level levels on growth response of GIFT Tilapia

(Mr MP Bhendarkar, Scientist, Fisheries Resource Management)

Seed of Genetically Improved Farmed Tilapia (GIFT) fish of average length 2.50 ± 0.04 cm were obtained from the Rajiv Gandhi Centre for Aquaculture, Manikonda, Dist. Krishna, Andhra Pradesh transported to the ICAR-NIASM in plastic bags of 20 litre capacity with stocking density of 150 seed per bag. The seed was acclimatized and kept in FRP tank and Hapa for a period of 10 days before stocking in experimental tanks. Similarly the seed stocked in different tank with different stocking density in Pond no.1, FRP tank and cement tank.



Rectangular aquarium tanks having dimension 2x1x1 feet was used for the experiment. Saline water with 15 ppt salinity was obtained from farmer field at Kambaleswar, and transported to the fisheries wet lab by water tanker. Experimental design were prepared with variable salinity levels maintain such as 15 ppt, 10 ppt, 05 ppt, freshwater (control) and saline water (control) designated as T1, T2, T3, T4 and T5

respectively with three replication each. Fish of an average initial weight 0.9 ± 0.001 g were randomly assigned to each aquarium tank at the rate of 07 fishes per tank.



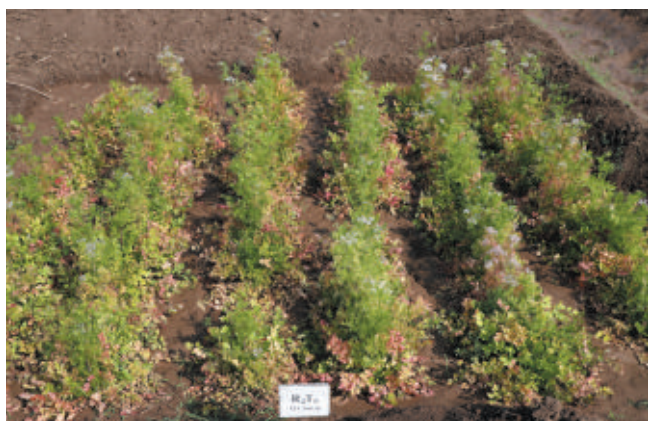
Aerators were provided in each tank for continuous aeration. Feeding was carried twice a daily @ 10% ABW. Important water quality parameter such as salinity, temperature, pH, were measured on twice daily basis. Twenty five per cent of water was siphon out every day and simultaneously replaced with freshwater from each aquarium tank to maintain salinity. Fishes were weighed at the 5 days interval after the stocking.

Management of leaf reddening in coriander using plant growth hormone

(Dr KK Meena, Senior Scientist, Agricultural Microbiology)

Reddening of leaves is common physiological disorder in *Coriandrum sativum* (coaiander) and several other crops. Keeping this in view, the research challenge was taken and a growth-hormone based formulation has been developed to control the foliar-reddening-a common physiological disorder in *Coriandrum sativum* (coriander) crop under field conditions.

Research Highlights



Before Treatment



After Treatment

Unique Fennel Germplasm Identified

(Mr C B Harisha, Scientist, Spices, Plantation Medicinal and Aromatic plants)

Unique red coloured fennel genotype is identified in general seed plot of fennel crop in spice cafeteria grown in native murrum soil of ICAR-NIASM farm. The plant is having red pigments on stem, young leaves and young fruits. This trait is unique and not available in any germplasm collection. Plant completes its life cycle in 180 days having phonological features such as waxiness on stem and fruits, red coloured stem during young stage and converted to dull green after complete maturity, young shoots, leaves and fruits are reddish in colour, average plant height is 1.5m.

Benefits of genotype: Crop can perform in dry conditions, it can also be used as parent in hybridization as colour marker, which will able to identify the progeny by pigmentation and antioxidant property of fruits may be higher as compared to normal genotype.



Normal green and unique red plant (top) and fruits of normal green and unique red genotype at harvestable stage (bottom)





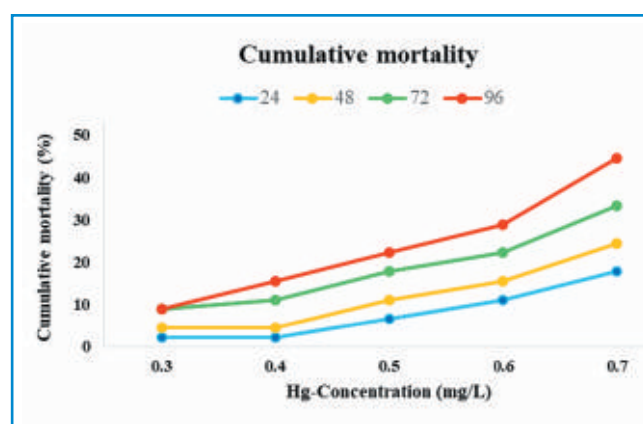
Inflorescence of normal green (top) and unique red plant having pigmentation in fruits, flower stalk (bottom)

Toxicity study and metabolic response of mercury in *Barbonymus gonionotus* (Silver barb)

(Dr Neeraj Kumar, Scientist, Fish Nutrition and Biochemistry)

The study has been conducted to determine the lethal concentration of mercury in *Barbonymus gonionotus* (Silver barb). The effect of different definitive dose such as 0.30, 0.40, 0.50, 0.60 and 0.70 mg/L of mercury was probed. The lethal concentration of mercury was found to be 0.55 mg/L on 96 h in *B. gonionotus*. The cumulative mortality was also determined with respect to each concentration at 24, 48, 72 and 96 hr. The lethal concentration was decided with the help of definite concentration. The concentration were significantly alter the biochemical in different fish tissues. The cumulative mortality was determined as 2.2, 4.4, 8.8 and 8.8 % at 0.3 mg/L in 24-96 hrs respectively. Similarly, 2.2, 4.4, 11.1, and 15.5 % at 0.4 mg/L in 24-96 hrs respectively and 6.6, 11.1, 17.7 and 22.2 % at 0.5 mg/L, 11.1, 15.5, 22.2 and 28.8 % at 0.6 mg/L and 17.7, 24.4, 33.3, 44.4 % at 0.7 mg/L in 24-96 hrs respectively. We have also observed the behaviour of *Barbonymus gonionotus* during the Hg exposure. The behaviour changes of the fishes such as hyperactive, fast and altered

movement, mucus on body parts, change body position to vertical and fast movement of mouth for trying to inhale the atmospheric air. Some of the fishes were observed the tail position in downward direction and after some time settled in the bottom of tank and opercular movements were ceased and fish was died. Overall results clearly indicate that acute exposure of lead and high temperature led to pronounced deleterious alterations on cellular and metabolic activities of *Barbonymus gonionotus*.



Cumulative mortality (%) of *Barbonymus gonionotus* exposed to different concentrations of mercury (Hg) for a period of 24, 48, 72 and 96 h

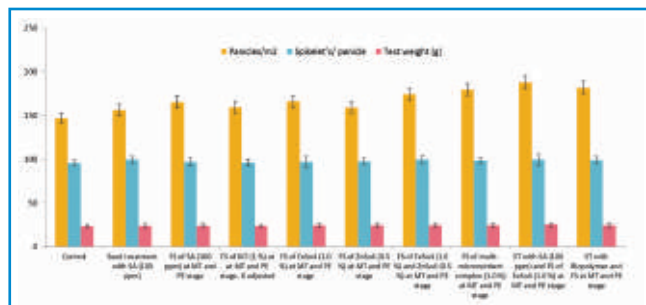
Raising rice productivity through drought tolerant rice varieties and their matching management practices in rainfed environment of Maharashtra

(Dr Yogeshwar Singh, Senior Scientist, Agronomy)

An experiment was conducted during kharif 2018 to study the impact of agrochemicals and bio-regulators in alleviation of drought stress in aerobic rice under controlled condition in Green house. Perusal of the data reveals that treatment comprising seed treatment with Salicylic Acid (100ppm) & foliar spray of FeSO_4 (1%) at maximum tillering and panicle emergence stage has been identified as suitable measure to

Research Highlights

minimize moisture stress in direct seeded aerobic rice. While use of biopolymer (developed at ICAR-NIASM) along with foliar spray of multi micronutrient complex (@1%) at maximum tillering and panicle emergence stage resulted in 18.4% yield advantage under normal irrigation conditions.



Effect of different treatments on yield attributes

Table: Effect of different treatments on yield (q/ha) of direct seeded aerobic rice

Treatments	SM1 (Ideal soil moisture)	SM2 (Soil moisture stress)
B1	38.7	33.8
B2	40.4	36.5
B3	42.0	37.7
B4	41.4	36.8
B5	43.1	40.6
B6	42.7	39.3
B7	43.8	41.2
B8	43.6	40.0
B9	46.7	43.1
B10	47.0	40.8
CD (P=0.01)	2.9	

Table: Performance of varieties at farmer's field

Treatments	Panicles/m²	Spikelet's/panicle	Grain Yield (q/ha)
DRR-42	213.09	113.2	49.2
DRR-44	209.4	109.7	46.8
DRR-46	210.4	106.5	45.1
Sahbhagi	200.1	106.7	40.9
Indrayani	204.6	103.1	44.7
CD (P=0.05)	10.9	5.9	3.4

Based on the experiments conducted at farmers field DRR 42 has been identified as potential variety for rainfed conditions of Semi-arid area of Maharashtra which performed better than Indrayani (Local Check). Problem of crop lodging was noticed in DRR 44 due to which farmers are interested in cultivation of DRR 42.

Vermicompost Production Unit at ICAR-NIASM

(Dr Paritosh Kumar, Scientist, Environmental Science)

For evaluation of various composting methods and earthworm species for rapid decomposition of different types of farm waste and to manage or reuse and generate wealth from waste a vermicomposting unit has set up near waste disposal site of the institute campus. In this unit biodegradable solid waste generated from the crop farm and horticultural orchards in the form of crop residue, lawn cuttings, weeds, orchard pruning's and waste from animal and fishery unit are collecting and two types of earthworm species Red wiggler worm (*Eisenia fetida*) and African In the first season of composting (16th December to 16th Feb 2018) about 800 kg vermi-compost has been produced in two pits of dimension (5m × 1m) and fed with 60cm height of dry farm waste and African night crawlers (*Eudrilus eugenia*) of this unit. In other six pits composting is also going on.



Establishment of Model Herbal Garden for medicinal and aromatic plants

Establishment of model herbal garden named as Sanjeevani Garden was done at ICAR-NIASM comprises of 65 species of trees, shrubs, and climbers. The garden is established under the financial assistance of NMPB, New Delhi. Development of land and planting of 1029 plants in area of 5 acres was completed. The field is equipped with drip irrigation system. Pits of 1.5 m³ for big trees, 1m³ for shrubs, climbers and small perennial herbs and grass were made and filled with mixture of black and murrum soil. All the plants are well established in this system of planting. Among many species planted few species such as Neem, Simaruba, Soap nut, Wood apple, Terminalia speies, Putranjeeva, Bonduc, Henna, Skikakayi, Guggal, Eucalyptus, Red



Plantation of different species by NIASM Staff in Sanjeevani Garden



Present view of Sanjeevani Garden

Sanders, Parijatha, jasmine, gunj plants showed 100% establishment. Other species such as Mapia foetida, Nagkesar, Surangi are showing very poor establishment rate.

Fisheries Wet Lab Facilities

The fisheries wet lab facilities has been developed to carry out research work in laboratory conditions. Seven fiber reinforced plastic (FRP) tanks have been procured for taking up experimental trials related to fisheries research at ICAR-NIASM. Glass aquaria are also available in 2 x 1 x 1 feet sizes for working with smaller fish or when being able to observe the fish from the side is important in control condition.



Waste water management at ICAR-NIASM

To supplement the deficit irrigation water demand and reuse of wastewater generated from the NIASM campus a pilot scale constructed wetland based treatment system has set up of 3000 liters per day capacity and which started functioning from October 2018 under the in-house project "Wastewater treatment synergizing with integrated approach of constructed wetland and aquaponics (IXX14228)". In the institute campus about 10,000 liters per day drainage/waste water is generated from the administrative office & school buildings, residential quarters, guest house,

New Initiatives

laboratory as well as toilets which is mixed and collected in the septic tank and loaded with lab chemicals and fecal matter. The treatment system comprises of two parallel system (i) Vertical sub-surface flow based constructed wetland system (VSSF-CWs) filled with different layers of gravel and grown with typha (TW), vetiver (VW) and unplanted (Control) system and (ii) Horizontal sub-surface flow based constructed wetland system (HSSF-CWs) filled with different growing cum filtration media viz. Gravel + Spent mushroom compost (GMW), Gravel + Coco peat (GPW), Gravel + Charcoal (GCW), Gravel (GW) and grown each with different flowering crops.



Experimental set up for waste water treatment system

The treated water is collected from both of the system has passed through a 25W Ultra Violet system and used for growing aquaponics i.e. integrated fish and vegetable production. This water is further be used to supplement the deficit irrigation water demand of nearby fruit orchards like guava, fig and aonla.

Genomics Strategies for Improvement of Yield and Seed Composition Traits Under Drought Stress Conditions in Soybean

Five hundred (500) soybean genotypes including drought tolerant and susceptible varieties were grown in shade net and green house for genomics study for improvement drought stress tolerance and seed composition traits under drought and water stagnation stress. 200 genotypes are being sequenced for Genome wide association studies. 200 genotypes will also be assessed for new QTL markers associated with drought stress tolerance and seed composition traits. RNAi construct has been developed for silencing Farnesyltransferase and ACC synthase gene in soybean in order to get yield stability under drought stress conditions.



Major events

Important Events

Inauguration of Type VI Residential Quarters and School of Drought Stress Management

Shri Chhabilendra Roul, Special Secretary, DARE & Secretary, ICAR visited to ICAR-NIASM on October 20, 2018 and appreciated the progress

made in term of physical and research achievements. He visited all the research facilities, filed, field, laboratory and new residential complex at MIDC Baramati. He inaugurated the Type VI quarters and also School of Drought Stress Management.



Inauguration of Residential block (Top) and SDSM school building (bottom)

Department of Agriculture, Pune, Maharashtra and ICAR-NIASM, Scientists Interaction Meeting

Shri SP Singh, Commissioner of Agriculture, Govt. of Maharashtra and other officials and Director and scientist of ICAR-NIASM were discussed for the implementation of NIASM technologies intervention in farmer's field and



planning for management of abiotic stress in different crops.

Celebration of Rashtriya Ekta Diwas

Rashtriya Ekta Diwas was celebrated on the occasion of Birth Anniversary of Sardar Vallabhbhai Patel at ICAR-NIASM on October 31, 2018. During this Ekta oath was taken by all the staff and unity run was performed.



Run for Unity during Ekta Diwas

One day farmers training programme organized by ICAR-NIASM

One day farmers training programme was organized by ICAR-NIASM on "Entrepreneurship Development in Inland Fisheries" during November 28, 2018. A total 40 progressive fish farmers from six districts participated the training.



Farmers training programme organised by ICAR-NIASM

Major events

7th Research Advisory Committee Meeting

7th RAC meeting was held at ICAR-NIASM, Baramati on 30 November 2018 under the Chairmanship of Dr Alok Kumar Sikka and member of RAC reviewed the research accomplishments of ICAR-NIASM for the period of one year from August 2017 to October 2018. Dr Gurbachan Singh, Chairman, QRT and member of QRT were also present in the RAC meeting to review the work and to include important research needs in the upcoming plans. During this meeting important recommendations were made by the committee.



RAC Meeting with scientific staff

Celebration of World Soil Day

World Soil Day was celebrated on December 05, 2018 jointly with KVK, Baramati at ICAR-



World Soil Day was celebration jointly with KVK, Baramati at ICAR-NIASM

NIASM, Baramati. More than 250 farmers attended the programme held on world soil day. Mr Rajendra Pawar, Chairman, Agricultural Development Trust addressed the farmers emphasized on the theme of "Be the Solution to Soil Pollution". He also highlighted the need of soil health card based fertilizers recommendations after distribution of soil health cards to the farmers.

Refresher course on Administration & Finance Management

Refresher course was held during 10-14 December, 2018 at ICAR-NIASM, Baramati. In this training programme 25 officers and staff from different ICAR institutes were participated.



Refresher course was held at ICAR-NIASM

हिंदी कार्यशाला

हिंदी भाषा का प्रचार-प्रसार के लिए संस्थान में दिसंबर 2018 को 24 वे हिंदी कार्यशाला का आयोजन किया गया। मार्गदर्शक के रूप में सोमेश्वर महाविद्यालय के हिंदी विभाग प्रमुख डा शिंदे अच्युत को विशेषज्ञ के रूप में आमंत्रित किया गया था। अतिथि का स्वागत संस्थान के प्रधान वैज्ञानिक डा जगदीश राणे ने किया। हिंदी भाषा को राष्ट्रीयत्व प्राप्त होने के वारें मे जिन समस्याओं से हमे गुजरना पड रहा है, उन समस्याओं का समाधान करते हुए डा अच्युत शिंदे ने मार्गदर्शन करते हुए कहा हिंदी भाषा मे प्रांतीय शब्द भी होना जरूरी होता है। उच्चारण अवयव, भाषा को प्रभावित करने के लिए अधिक प्रभावित होते है। कार्यालय व्यवहार मे जो क्लिष्ठ

शब्द का इस्तेमाल होता है वह नहीं होना चाहिए। हिंदी हमारी राष्ट्रीय भाषा तभी बनेगी जब हम उसे सारे जगहों पर इस्तेमाल करेंगे। राजभाषा कार्यान्वयन समिति के सचिव सतीश कुमार ने सभी का आभार ज्ञापन करते हुए कहा कि भाषा गतिशील होने के लिए कार्य दस्तावेज़ तथा प्रारूप हिंदी भाषा में अनुकरण सक्रियता लाएगा। इस एक दिवसीय कार्यशाला में संस्थान के वैज्ञानिक, कर्मचारी, तथा यंग प्रोफेशनल, एस आर एफ, अन्य सभीने बड़े उत्साह से भाग लिया।



दीप-प्रज्वलन करते समय डा.अच्युत शिंदे तथा संस्थान के प्रधान वैज्ञानिक डा. जगदीश राणे

Meeting for inter-institutional collaboration to map abiotic stresses by employing GIS and remote sensing tools

A meeting between scientists of ICAR-NIASM, Baramati and ICAR-NBSS&LUP, Nagpur



A meeting between ICAR-NIASM, Baramati and ICAR-NBSS&LUP, Nagpur

for "Inter-institutional collaboration to map abiotic stresses by employing GIS and remote sensing tools" held on January 3, 2019 at ICAR-NIASM. Dr Alok Kumar Sikka, Ex DDG, NRM and Chairman, RAC chaired the meeting and detailed discussion was made to distribute the work components among participating institutes.

Two days workshop on 'Application of Foldscope for pollen studies' for high school students

In a two days workshop held during January 11-12, 2019, ICAR-NIASM scientists demonstrated the use of portable microscope called 'Foldscope' for studies on pollens of crop plants. This was carried out under the project funded by DBT. There were 21 students and 3 teachers from Shardabai Pawar Vidyaniketan, Saradanagar attended the workshop. On the first day of the training all were acquainted with pollen germination studies. The results were observed and recorded in the observation sheets provided. A good interactive session was there in continuation with the presentation about 'Foldscope- as an economical feasible research tool'. All the doubts in the young minds regarding these studies were clarified. On the second day, students studied temporal variation in viability of pollens of crops in field.



Participation of students' two days workshop

Major events

Scientific talk by Prof. Pushpendra Kumar Gupta, Emeritus Professor

Prof. Pushpendra Kumar Gupta, Emeritus Professor, Meerut University, Meerut has been delivered a lecture on “Abiotic stress tolerance in post genomics era” on January 04, 2019 at ICAR-NIASM, Baramati. All the staff of ICAR-NIASM including RA, SRF, JRF and Young Professionals attended the lecture.



Lecture on “Abiotic stress tolerance in post genomics era”

70th Republic Day

ICAR-NIASM celebrated 70th Republic Day on 26 January 2019. All the staff including scientific, technical, administrative, SRF, JRF, YPs and contractual were present for the event. On the occasion Prof. Narendra Pratap Singh, Director, ICAR-NIASM has hoisted the national flag and addressed to the staff of ICAR-NIASM.



ICAR-NIASM celebrated 70th Republic Day

National Productivity Week

ICAR-NIASM, Baramati observed “National Productivity Day” on 12 February, 2019 and organised “National Productivity Week-2019” from 12-18th February, 2019. The programme was inaugurated by the chief guest Dr N P Singh, Director ICAR-NIASM, Baramati and addressed the gathering about the importance of productivity in every sector like agriculture, machinery, IT etc. and its importance in the national economy. The students and teachers from the schools and colleges of Baramati were invited for the inaugural function to make aware them about the event. As a part of the event the various healthy competitions like drawing, essay writing and poster presentations were conducted for the school and college students at the institute on various themes. Nearly 80 students from various schools and colleges participated in the events.



ICAR-NIASM observed “National Productivity Day”

11th Foundation Day

ICAR-NIASM, Baramati, celebrated 11th Foundation day on February 22, 2019. Dr. Trilochan Mohapatra, Secretary (DARE) and DG (ICAR), New Delhi graced the occasion and addressed the gathering of foundation day. He appreciated the efforts made by the staff and Director for making institute more visible among

scientific community and farmers by developing rocky area into arable land. During this occasion Shri Rajan Taware, Chairman, Malegaon Sahakari Sakhar Karkhana, Malegaon, Mr R N Shinde, Chairman and MD, Tiruati Balaji Agro Industries, Shri Rajendra Pawar, Chairman, Agriculture Development Trust, Baramati and Jaydeep Taware, Sarpunch, Malegaon were also present. Outstanding scientific, technical, administrative staff and contractual workers were awarded along with progressive farmers for their contributions. During this occasion DG, ICAR Inaugurated the Godavari residential quarter (Type V) and School of Edaphic Stress Management.



ICAR-NIASM, Baramati, celebrated 11th Foundation day



Inauguration of Type V residential staff quarters at MIDC by DG ICAR

PM-KISAN Samman Nidhi Yojana Webcast

ICAR-NIASM arranged for webcast of OM-Kisan Samman Nidhi Yojana held at ICAR-NIASM on February 24, 2019. In the event 263

farmers and 30 officials of ICAR-NIASM, KVK, Baramati & State Agriculture and Revenue Department were participated



Live webcast of PM-Kisan Samman Nidhi Yojana

International Women's Day 2019

International Women's Day was celebrated at ICAR-NIASM, Baramati on March 8, 2019 on the theme "Think Equal, Build Smart, Innovate for Change". All the staff members including contractual staff, YPs, RA's, SRF's and JRF's participated in the function. The function was chaired by Director, ICAR-NIASM and Dr AN Rai, Ex, Vice Chancellor, NEHU, Shillong also graced the function. The address of Hon'ble Prime Minister Shri. Narendra Modi's to nation from National Women Livelihood Meet, Varanasi was live telecasted. Dr (Mrs) Priya George, Senior Technical Assistant, conducted the programme in which 150 participants including 90 women



Major events

working in various capacities participated in the celebration.



Celebration of International Women's Day at ICAR-NIASM

Swachh Bharat Abhiyan

Swachh Bharat Abhiyan was successfully adopted and implemented in ICAR-NIASM in which more than 70 persons including scientific, administrative, technical, young professionals, research fellows and contractual labours contributed more than 50 hours in different Swachhata Action Plan (SAP) approved activities. For basic maintenance cleaning and sanitation activity nine workers are taking care of cleaning the toilets, office building premises, weeding and plantation in front of the office building, regularly.

For management of bio-degradable solid waste including crop residue, weeds, kitchen waste, animal waste etc. and to generate wealth from waste a vermicomposting unit of 15 tonnes/year capacity is working at waste dumping site in the institute campus. The unit consists of eight pits of 5.0×1.0×0.9 meter dimension and covered with shed. In the first batch about 1000 kg Vermicompost was collected from two pits while in other 6 pits composting is going on.

For management and reuse of liquid waste generated in institute campus a vertical subsurface flow constructed wetland system based wastewater treatment system of 3000 litres/day

capacity is running near septic tank site and the treated water is used for vegetable production and in nearby horticultural orchards to supplement the irrigation water demand during dry periods.

Swachhata Pakhwada has been celebrated in the institute campus during December 16-31, 2018. In this Pakhwada cleaning, waste collection and awareness drive has conducted both inside and outside the institute campus, nearby villages viz. Malegaon Budruk, Karawagaj and Sonkaswadi as well as nearby schools and colleges. During Pakhwada some foster healthy competitions like essay, drawing and debate competition and a workshop was also conducted for school, college and Institute employees.



Participation of school children in Swachhata mission

During this event Farmer's day was also celebrated on 23rd December 2018 in which more than 50 Telangana farmers were participated. In the end of the Pakhwada i.e. on 31st Dec 2018 closing ceremony was also conducted in which winners of different competitions were awarded.



Closing ceremony of Swachhata Pakhwada at ICAR-NIASM



Workshop/Seminar/Symposia/Conference

Dr N P Singh

- Participated in 12th National Symposium on “Coastal Agriculture: Boosting Production Potential Under Stressed Environment” held at BSKKV, Dapoli organized by Indian Society of Coastal Agricultural Research, West Bengal during Sept 28 to October 01, 2018
- Participated in 5th International Rice Research Conference (IRRC 2018) “Transformative Science for Food and Nutrition Security” held at Marina Bay Sands Singapore organized by International Rice Research Institute Philippines during October 14-17, 2018
- Participated in 31st All India Congress of Zoology (31st AICZ) & National Seminar on “Climate-Smart Aquaculture and Fisheries (CSAF)” held at College of Fisheries, CAU (I), Lembucherra, Tripura and chaired session on “Aquaculture production systems including climate smart aquaculture Practices” during January 12-16, 2019
- Participated in International Salinity Conference on “Resilient Agriculture in Saline Environments under Changing Climate: Challenges & Opportunities” held at ICAR-CSSRI, Karnal and chaired a Session Theme V on “Climate resilient approaches for higher agricultural productivity of salt affected lands and livelihood security” organized by ICAR-CSSRI and Indian Society of Soil Salinity and Water Quality, Karnal, India during February 07-09, 2019
- Participated in International Symposium on “Edible Alliums: Challenges and Opportunities” held at Yashwantrao Chavan Academy of Development Administration Pune, Pune and chaired the session “Abiotic stress Management” organized by Indian Society of Alliums, ICAR-Directorate of Onion and Garlic Research during 09-12 February, 2019
- Participated in Coastal Agri Expo – 2019 at CCARI, Goa and lead lecture on “IFS and Homestead farming for sustainable production’ organized by ICAR-CCARI and Association for Coastal Agricultural Research, Goa during March 02-04, 2019

Dr Jagadish Rane

- Organized two days workshop on “Application of Foldscape for pollen studies” for high school students held during January 11-12, 2019.

Dr Kamlesh Kumar Meena

- Oral presentation on “Halophytic weed nodule associated rhizobium enhance the growth, yield and drought tolerance in fenugreek” In 1st International conference on

climate change and adaptive crops protection for sustainable agri-horticulture land scape at ICAR-NRCSS, Ajmer Rajasthan, during December 20-22, 2018.

- Oral presentation on “Halotolerant methylotrophic bacterium derived metabolites enhance antioxidant metabolism and salinity tolerance in wheat” In International Salinity conference on Resilient Agriculture in saline environment under changing climate: Challenges and opportunity at ICAR-CSSRI Karnal, during February 7-9, 2019
- Oral presentation on “Halotolerant bacteria Halomonas sp. NIMD26 enhance salinity stress tolerance in wheat” In International conference on Empowering society with microbial technology at Tuljaram chaturchand college Baramati, Pune Maharashtra, during February 7-9, 2019

Dr Mahesh Kumar

- Oral presentation on “Quantifying senescence in chickpea and soybean through digital images” in National seminar on abiotic Stress management organised by Department of Crop Physiology, TNAU, during October 25-26, 2018.
- Oral presentation on “NIR- based high-throughput Phenomics tool to assess water content in mung bean in international seminar on Plant physiology, organised by Indian Society for Plant Physiology and National Botanical Research Institute, at Indira gandhi pratishthan, Lucknow during Dec 2-5, 2018.

Mr M P Bhendarkar

- Participated and delivered technical speech in Farmers Meet organized by the Marine Products Exports Development Authority (MPEDA), Mumbai on “Sustainable Aquaculture Practices & Development of Value Addition through Tilapia for Export” at Nira village, Pune District on March 08, 2019.
- Attended training on “Recent advance in fisheries biology techniques for biodiversity evaluation and conservation” at ICAR-Central Marine Fisheries Research Institute, Kochi during December 01-21, 2018.

Dr Neeraj Kumar

- Attended training on Technique on Molecular Biology at College of Fisheries (COF), Lembuchera, Agatala, Tripura during Sept 15 to October 11, 2018

Mr Amresh Chaudhary

- Completed Professional attachment training at ICAR-Indian Institute of Soil Science, Bhopal during November 10, 2018 to February 19, 2019,

Workshop/Seminar/Symposia/Conference/Training

Dr Aliza Pradhan

- Completed professional attachment training at NBSSLUP Regional Centre, Bangalore under Karnataka Watershed Development Project "SUJALA" during November 09, 2018 to February 8, 2019.
- Attended an AFITA/WCCA conference on "Research Frontiers in Precision Agriculture" at IIT, Bombay during 24- 26 October, 2018.

Mrs Purniam Gadge

- Participated in Refresher Course on Administration and Finance Management for Sections Officers /AAO/ AFAO / Assistants of ICAR HQ and ICAR Institutes held at ICAR-NIASM, Baramati during December 10-14, 2018

Mr DP Kharat

- Participated in Refresher Course on Administration and Finance Management for Sections Officers/AAO/ AFAO/ Assistants of ICAR HQ and ICAR Institutes held at ICAR-NIASM, Baramati during December 10-14, 2018

Mr Girish Kulkarni

- Participated in Refresher Course on Administration and Finance Management for Sections Officers/ AAO/ AFAO/ Assistants of ICAR HQ and ICAR Institutes held at ICAR-NIASM, Baramati during December 10-14, 2018

Participation in Farmer fair

- Mr Rajkumar and Mr Rushikesh Gophane participated in the Exhibition organized at Bharatiya Kisan Sangh, Aurangabad during November 28-29, 2018
- Dr MP Brahmane, Raj Kumar and Sunil Potekar participated and exhibited the ICAR-NIASM stall in KRUSHIK, Live Demo & Agri. Expo 2019 at KVK, Baramati during 17-20 Jan 2019.
- Dr Yogeshwar Singh and Dr Mahesh Kumar participated and exhibited technologies of ICAR-NIASM at stall in Mega Agriculture Show, Krishi Kumbh-2019 at Gandhi Maidan, Motihari, Bihar during February 9-11, 2019.
- Dr Yogeshwar Singh and Dr Pravin Taware participated and exhibited technologies at the stall in Coastal Agri. Expo 2019 at ICAR-Central Coastal Agricultural Research Institute, Old Goa during March 2-4, 2019.

Farmers and students visited

- The progressive farmers and student visited ICAR-NIASM for visualization of Institute technologies, cropping pattern, instrumentation facility and etc. The total number of visitors were 761 in 17 batches of farmers and 672 students in 13 batches.

Publications

Research papers

- Kumar N, Krishnani KK, Singh NP (2019) Oxidative and Cellular Metabolic Stress of Fish: An Appealing Tool for Biomonitoring of Metal Contamination in the Kolkata Wetland, a Ramsar Site. Archives of Environmental Contamination and Toxicology. DOI: 10.1007/s00244-018-00587-5
- Kumar N, Singh NP (2019). Effect of dietary selenium on immuno-biochemical plasticity and resistance against *Aeromonas veronii* biovar *sobria* in fish reared under multiple stressors. Fish and Shellfish Immunology 84: 38-47.
- Sahu PK, Singh DP, Prabha R, Meena KK, and Abhilash PC (2018) Connecting microbial capabilities with the soil and plant health: options for agricultural sustainability. Ecological Indicators. doi: 10.1016/j.ecolind. 2048.05.084
- Rane J, Singh AK, George P, Govindasamy V, Cukkemane A, Raina SK, Chavan MP, Aher L, Sunoj VSJ, Singh NP (2019). Proc. Natl. Acad. Sci. India. DOI. 10.1007/s4001-019-01088-8.

Book Chapters

- Krishnani KK, Kumar N, Meena KK, and Singh NP (2018). Bioremediation of perturbed waterbodies fed with wastewater for enhancing finfish and shellfish production. In: Jana B, Mandal R, Jayasankar P. (eds) Wastewater management through aquaculture. Springer Nature Singapore pp. 185-206
- Sorty AM, Bitla UM, Meena KK, and Singh NP (2018). Role of Microorganisms in Alleviating Abiotic Stresses In: D. G. Panpatte et al. (eds) Microorganisms for Green Revolution. Springer Nature Singapore pp.115-128

Technical Bulletins/Folders

- Kumar N, Kumar P, Narendra Pratap Singh (2019). Elemental profiling of Biological and non-biological samples. Technical bulletin No. 29. ICAR- National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115.Pune, Maharashtra (India). p.1-45.
- Potekar S, Singh Y, Singh NP (2019). Variation in climate features at Baramati: Decade Study. Technical Bulletin No. 30. ICAR- National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115.Pune, Maharashtra (India).
- Harisha CB and Singh NP, 2019. Hand Book of Dry Land Medicinal Plants. Technical Bulletin No. 31. ICAR- National Institute of Abiotic Stress Management,

Workshop/Seminar/Symposia/Conference/Training

Malegaon, Baramati. 413 115. Pune, Maharashtra (India). p.1-70.

- Singh NP, Kumar M, Kumar S, George P, Aher L, Gubbala M (2019). ICAR-NIASM Publications (2019). Technical Bulletin No. 32. ICAR- National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115. Pune, Maharashtra (India).
- Singh NP, Nangare DD, Wakchure GC, Rajkumar, Bhendarkar MP (2019). ICAR-NIASM Technology. Bulletin No. 33. ICAR- National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115. Pune, Maharashtra (India).
- Kurade NP, Brahmane MP, Gaikwad BB, Kharat D (2019). Sovenier. Publication No. 34. ICAR-National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115. Pune, Maharashtra (India).
- Singh NP, Rane J, Singh AK, Kumar N, Gubbala M (2019). Research Highlights 2009-2018. Publication No. 35. ICAR-

National Institute of Abiotic Stress Management, Malegaon, Baramati. 413 115. Pune, Maharashtra (India). P 1-192

- Meena KK, Sorty AM, Bitla UM, Harisha CB, Wakchaure GC, Singh NP (2019) Technical Folder no.36. Bio-polymer for improved microbial colonization, water-holding, nutritional availability, and soil health.
- Meena KK, Sorty AM, Bitla UM, Harisha CB, Wakchaure GC, Singh NP (2019) Technical Folder no. 35. Microbial consortium for sustainable farming in nutrient -poor soil.

Others Publications

- अजय कुमार सिंह, राम लाल चौधरी, योगेश्वर सिंह, महेश कुमार, नीरज कुमार, परितोष कुमार (2018). कृषि स्ट्रैस पत्रिका अंक- 1, भाकृअनुप- राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान मलेगाव, बारामती-413 115, पुणे, महाराष्ट्र, भारत.



Personalia

Awards

- Dr N P Singh awarded as Fellow of National Academy of Biological Science, Chennai, Tamilnadu, India.
- Dr Neeraj Kumar Scientist (Fish Nutrition and Biochemistry) awarded as Associates of National Academy of Agricultural Sciences (NAAS), India from January 01, 2019.
- Dr. K. K. Meena Best Presentation Award to the poster - "Halophytic weed nodule associated rhizobium enhance the growth, yield and drought tolerance in fenugreek". In 1st International conference on climate change and adaptive crops protection for sustainable agri-horticulture land scape at ICAR-NRCSS, Ajmer Rajasthan, during December 20-22, 2018.
- Dr Jagdish Rane, Principal Scientist and I/c Head (SDSM), Dr Yogeshwar Singh, Senior Scientist (Agronomy) and Dr Goraksh Wakchaure Scientist (Agricultural Structure and Engineering) awarded as best Performance award by Director General, ICAR on 11th Foundation Day held at ICAR-NIASM on February 22, 2019.
- Dr Pravin Taware, Senior Technical officer (Farm), Mr.

Pravin More, Senior Technical Assistant (Computer Science), Mr. Lalit Aher, Senior Technical Assistant (Bio-Technology) and Mrs Purnima Ghadge, Assistant Administrative Officer awarded as best Performance award by Director General, ICAR on 11th Foundation Day held at ICAR-NIASM on February 22, 2019.

New External Project Sanctioned

- Project "Genomics strategies for improvement of yield and seed composition traits under drought stress conditions in soybean". Sanctioned under ICAR-NASF; December 2018-November 2021. Budget: 54.36 Lakh, CCPI: Dr Ajay Kumar Singh.
- Project "Space Technology Utilization for Food Security, Agricultural Assessment and Monitoring 'SUFALAM'". Funded by SAC, Ahmedabad; 2018- 2021. Budget: 20.00 Lakh, PI: Dr Jagdish Rane.

Distinguished Visitors

1. Shri Chhabilendra Roul, Special Secretary, DARE & Secretary, October 20, 2018.
2. Dr Alok Kumar Sikka, Ex DDG (NRM), ICAR & IWMI

- Representative-India & Principal Researcher, International Water Management Institute, Delhi Office, Pusa, New Delhi, on November 30, 2018.
3. Dr DP Waskar, RAC Member, ICAR-NIASM, Baramati and Director of Research, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, on November 30, 2018.
 4. Dr JS Parihar, Member RAC, ICAR-NIASM, Baramati and Ex-Deputy Director, Satish Dhawan Professor ISRO-Space Application Centre, Ahmedabad, on November 30, 2018.
 5. Dr AG Ponnaiah, Member RAC, Anna Nagar West, Chennai, on November 30, 2018.
 6. Dr OP Yadav, Director, ICAR- CAZRI, Jodhpur, on November 29, 2018.
 7. Dr PS Minhas, Ex-Director, ICAR-NIASM, Baramati, on November 29, 2018.
 8. Dr K P R Vittal, Former Director, ICAR-NIASM, Baramati, on November 29, 2018.
 9. Dr PC Sharma, Director, ICAR-CSSRI, Karnal, on November 29, 2018.
 10. Dr AK Singh, Former DDG (NRM), ICAR and Ex VC RVSKVV, Gwalior, on September 27, 2018.
 11. Shri Sachindra Pratap Singh, IAS, Commissioner Agriculture Pune, Govt. of Maharashtra, on October 23, 2018.
 12. Prof Pushpendra Kumar Gupta, Emeritus Professor, Meerut University, Meerut on January 04, 2019.
 13. Shri Rajendra Pawar, Chairman, Agriculture Development Trust, Baramati on December 05, 2018.
 14. Dr Peter Carberry, Director General, International Crops Research Institute for Semi-Arid Tropics (ICRISAT) on January 17, 2019.
 15. Dr Anupama Hingane, Plant Breeder, International Crops Research Institute for Semi-Arid Tropics (ICRISAT) on January 17, 2019.
 16. Shri Sachindra Pratap Singh, Commissioner of Agriculture Pune, Maharashtra on 20 January 2019.
 17. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR), New Delhi on 22 February, 2019.
 18. Mr RN Shinde, Chairman, Tirupati Balaji Agro Products Pvt. Ltd. Baramati on February 22, 2018.
 19. Shri Ranjan Taware, Chairman, Malegaon Sahakari Sakhar Karkhana, Malegaon, Baramati on February 22, 2018.
 20. Shri Rajendra Pawar, Chairman, Agriculture Development Trust, Baramati on February 22, 2018.
 21. Dr Tapas Bhattacharya, Ex, Vice Chancellor, Dr BSKKV, Dapoli on 25 February 2019
 22. Dr HP Singh, Former DDG (Horticulture), ICAR, New Delhi on March 11, 2019.

New joining

Dr Aliza Pradhan, Scientist (Agronomy) and Mr Amresh Chaudhary, Scientist (Soil Science) joined ICAR-NIASM on October 09, 2018.



Published by

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Printed at

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