



अजैविक स्ट्रैस प्रबंधन समाचार Abiotic Stress Management News

April to December 2021



ICAR-National Institute of Abiotic Stress Management Baramati, Pune, Maharashtra 413115



अजैविक स्ट्रैस प्रबंधन समाचार

Abiotic Stress Management News भाकअनप- राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान

ICAR-National Institute of Abiotic Stress Management बारामती 413 115, पुणे, महाराष्ट्र, भारत Baramati 413 115, Pune, Maharashtra, India ISSN 2582-0915



April 2021 to December 2021

Vol. 02 No. 07

An ISO 9001:2015 Certified Institute

In this issue

RESEARCH HIGHLIGHTS

- Wastewater treatment synergizing with integrated approach of constructed wetland & aquaponics.
- Diagnosis of dragon fruit diseases.
- Mechanistic role of copper & copper nanoparticles toxicity in fish.
- Identification of Promising genotypes and assessment of genetic variability in root system architecture of soybean.
- Exploitation of halophytic plants & associated microbiome for amelioration of saline agri. land.
- Evaluation of halotolerant Rhizobium & PGPBbased biomolecules for mitigation of salinity & drought stress.
- Kharif Chickpea: A New crop.
- Flowering, fruiting & fruit quality under different flushes in dragon fruit.
- Selection and evaluation of M2 mutant lines of Quinoa and Chia.
- Development of Multilayer Integrated Farming System (IFS) for multiple abiotic stressed regions.
- Response of GIFT Tilapia fish, to different salinity stress (inland saline water) exposed to acute and chronic salinity stress.
- Geo-spatial maps of livestock breeding Tracts of India.
- Evaluating seasonal growth rate variations in goats.
- Thermal stress severity assessment tool for livestock.
- Assessment of Molecular basis of thermo-tolerance in goats and poultry.

NEW INITIATIVES

- Initiation of 'NIASM Associate Course'.
- Establishment of Naxatra Udyan.
- Completion Malhar Pond.

MAJOR EVENTS

LIST OF ONGOING PROJECTS TRAININGS ATTENDED

PUBLICATIONS

PERSONALIA

EDITORIAL COMMITTEE

Dr Sachinkumar S Pawar Dr Bhaskar B Gaikwad Dr Gopalakrishnan B Mr Mukeshkumar P Bhendarkar Dr Aliza Pradhan Dr Basavaraj PS Dr Vijaysinha D Kakade Dr Sangram B Chavan

TECHNICAL ASSISTANCE

Mr Pravin More

Greetings from ICAR-NIASM The recent projections made by IPCC (2021) about the increase in extreme weather events in South Asia including India re emphasized the urgent need

From the Director's Desk.....





likely to happen through explorative research that leads to a better understanding of the underlying processes and practical solutions. In pursuit of this endeavour, ICAR-NIASM has been carrying out planned scientific explorations and subsequent dissemination to the stakeholders through outreach activities. The research work carried under the new umbrella and flagship research projects and other research activities at ICAR-NIASM have led to several research findings. The research findings on evaluation of integrated approach of constructed wetland and aquaponics for wastewater treatment; flowering, fruiting and fruit quality under different flushes in dragon fruit; mechanistic role of copper and copper nanoparticles toxicity in fish; diagnostics of dragon fruit diseases; evaluation of halotolerant Rhizobium and PGPB based biomolecules for mitigation of salinity and drought stress and exploitation of halophytic plants and associated microbiome for amelioration of saline agricultural land of arid & semi-arid regions are detailed in the Newsletter. Several new initiatives, including the initiation of 'NIASM Associate Course'; conducting trial for identifying the chickpea genotypes suitable for kharif season; completion of Malhar Pond construction and establishment of Naxatra Udyan (The Constellation Park) have been undertaken with great zeal. ICAR-NIASM also conducted its 11th IRC and 9th RAC meeting; celebrated World environment day, Independence Day, Rashtriya Ekata Divas, Vigilance awareness, world soil day and several other national and international events of importance through physical and online mode. NIASM also hosted the National Conference of Plant Physiology- 2021 on its campus, which gathered researchers, students, and industry to share the latest Outreach activities including swachatta campaings, happenings. distribution of inputs to beneficiaries under SCSP programmes; and farmer trainings were also carried out.

I thank the Editorial Board for their sincere efforts in bringing out the Newsletter. I place on record my thanks to all the staff members for of ICAR-NIASM their contributions for this issue of the Newsletter.

(Himanshu Pathak)

Abiotic Stress Management News अजैविक स्ट्रैस प्रबंधन समाचार

December 31, 2021

April 2021 to December 2021 1 अप्रैल २०२१ से डिसेंबर २०२१

RESEARCH HIGHLIGHTS

Wastewater treatment synergizing with integrated approach of constructed wetland and aquaponics.

Paritosh Kumar, Scientist, Environmental Sciences

NIASM has a pilot scale constructed wetland system working to treat septic tank wastewater since 2017. The system comprises three parallel systems (i) Vertical sub-surface flow-based constructed wetland system (VSSF-CWs) grown with wetland plants viz. Typha (TW), Vetiver (VW) along with Unplanted control (CW); (ii) sub-surface flow-based constructed Vertical wetland system (VSSF-CWs) and (iii) Horizontal flow-based sub-surface constructed wetland system (HSSF-CWs); filled with different growing cum filtration media viz. Gravel + Brick block (GBW), Gravel + Coco peat (GPW), Gravel + Charcoal (GCW), Gravel (GW) along with Medialess (Control; HCW) and Unplanted (Control; VCW) system are growing with marigold. Treated waters collected from these systems then passed through a 25-Watt UV sterilization unit and were reused for growing vegetables and fish in aquaponics system during storage and which finally again be reused in the field for growing commercial flowering crops along with the untreated water (UW) and freshwater (FW) control; in triplicate. So with this developed technology, we are harvesting four crops during wastewater treatment and reuse strategy (marigold during treatment, vegetable and fish during storage and other commercial flowering crops or food crops during final reuse). The system is showing removal of microbial pollutants (coliform, E. coli) >95%, heavy metals (Ni, Cd, Fe, Mn, Zn, Cu) and other chemical contaminants >90% significantly and the treated was found safe for their reuse in agriculture (as per WHO/FAO guidelines). However, among different treatments pollutant removal was found in the order as: Gravel + Charcoal > Gravel ~ Gravel + Brick block > Gravel + Coco peat > Control.





Figure 1. Pilot scale constructed wetland-based wastewater treatment system and their reuse in Pangasius fish+ spinach based aquaponics system.

To increase the yield from this system and as per the earlier trial results, weather condition and seedling availability during crop season August-November 2021, marigold (Gold spot yellow) was grown in constructed wetland system, Pangasius fish and Spinach in an aquaponics system and the final reuse) marigold, field (during aster, chrysanthemum, tuberose, gladiolus and Jasmine. The column-based planting of spinach was used in the aquaponics system at the hanging net-pot, for better root growth and spinach yield. This resulted, in harvest of 7.39 kg (5.72 kg from the Horizontal system and 1.67 kg from the Vertical system) of marigold flower in last week of September.



Figure 2. Commercial floricultural field trial using constructed wetland treated water, untreated Septic tank wastewater and freshwater.

However, among different treatments flower yield was observed in order as: Horizontal system: Gravel + Brick block $(1.50kg) \sim$ Gravel + Charcoal (1.47kg) > Gravel (1.24kg) > Gravel + Coco peat (1.09kg) > Control (0.43kg)



Figure 3. Marigold flower yield during first harvesting from different constructed wetland systems

Vertical system: Gravel + Charcoal $(0.53 \text{kg}) > \text{Gravel} + \text{Coco peat} (0.43 \text{kg}) > \text{Gravel} + \text{Brick block} (0.36 \text{kg}) \sim \text{Gravel} (0.36 \text{kg})$

In the aquaponics system, the first harvesting of Spinach leaf was 3.29 kg from the 96 columns of the 24 systems. However, among different treatments, spinach leaf yield varies as

Gravel + Brick block (870g) > Gravel + Charcoal (623g) > Gravel (507g) > Gravel + Coco peat (493g) > Vetiver (323g)> Untreated water (236 g) > Typha (195g) > Fresh water (40g)

During the final reuse of treated water in the field total of 20.6 kg of marigold flower was harvested during first cutting. 7.2 kg, 7.0 kg and 6.4 kg flower was harvested from treated, freshwater and untreated wastewater irrigated plots.

Thus, different media-based and floriculture crops grown constructed wetland system seemed to be used for sustainable water treatment option with additional profit by integration with floriculture and could supplement in various mitigation strategies to circumvent the global water scarcity.

Diagnosis of dragon fruit diseases.

Vanita Salunkhe, Scientist, Plant Pathology; Sangram B Chavan, Scientist, Agro-Forestry and Vijaysinha Kakade, Scientist, Fruit Technology

The trend towards taking up dragon fruit cultivation has recently increased among farmers. However, as an impact of climate change, certain constraints hamper the quality production of dragon fruit. Diseases associated with dragon fruit are major issues in successful dragon fruit cultivation. Since this is newly introduced crop in India, growers are unaware about the plant associated diseases and its management. At NIASM field and farmer's field survey depicted that there were several pathogenic fungi associated with foliar diseases in dragon fruit. Anthracnose, leaf spot/blight, stem canker, stem rot/soft rot, fruit spot were the common diseases noticed during field survey. Symptomatic samples were collected for laboratory diagnosis, including tissue isolation, culture purification, morphological & microscopic characterization, and molecular confirmation. Morphological and microscopic characterization of pure cultures resulted in presence of nine different genera viz., *Colletotrichum spp., Fusarium spp., Alternaria spp., Phoma spp., Biopolaris sp., Nigrospora spp., Neoscystalidium sp., Curvularia spp. and Rhizoctonia spp.,* (Figure 4).



Figure 4. Pathogenic fungal genera associated with foliar diseases in dragon fruit.

Mechanistic role of copper and copper nanoparticles toxicity in fish: An acute test.

Neeraj Kumar, Scientist, Fish Nutrition

The present investigation was carried out to understand the toxicological level of copper (Cu) and copper nanoparticles (Cu-NPs) at acute time intervals in the fish Pangasianodon hypophthalmus. Lethal concentration (LC₅₀) of Cu after 24, 48, 72 and 96 hr of exposure were 10.57, 9.52, 8.71 and 8.04 mg L^{-1,} respectively. Similarly, the LC₅₀ of Cu-NPs was recorded as 5.03, 4.34, 4.13 and 3.85 mg L^{-1} respectively at 24, 48, 72 and 96 h. Results revealed that Cu-NPs is more toxic than CuSO₄ at 96 h LC₅₀. The cumulative mortality (%) was also determined during the acute toxicity test. The cumulative mortality was determined at 24, 48, 72 and 96 h as 10-36, 13-46, 20-60, 36-73 % respectively in Cu concentration of 7.0, 7.5, 8.0, 8.5 and 9.0 mgL⁻¹. Similarly, the cumulative mortality of Cu-NPs at 24, 48, 72 and 96 h as 6-33, 10-53, 16-60 and 26-70 % in 3.0, 3.3, 3.6, 3.9 and 4.2 mgL⁻¹ respectively. In the present study, LC₅₀ was significantly different between 24 and 96 hrs of exposure. The present study reveals that the safe concentration of Cu and Cu-NPs varies from 1.23-3.52 and 1.33-1.73 mg L⁻¹, respectively. The behavioural activities during toxicity test were observed as fast opercula movements, fast engulfing of the air, mucus secretion visible on the body, restlessness, erratic movement and some fishes changing their body position to vertical and anterior side up and tail pointed in down. These all behaviour were not seen in the control (unexposed) treated fish. Their toxicity measured using a biomarker set involved in several biological processes such as oxidative stress. Cu and Cu-NPs exposure to *P. hypophthalmus* significantly affected CAT, SOD, GST and GPx activities after 96 hrs of exposure. Indeed, the increase of CAT, SOD, GST and GPx activities in liver, gill and kidney was significantly (p<0.01) higher in Cu and Cu-NPs exposure groups than unexposed ones, at dose-dependent manner. CAT activities in liver, kidnev and gill increased from 69-173, 61-265, and 44-135 % respectively in Cu exposure groups as compared to control group. Similarly, CAT activities were enhanced from 83-165, 83-178 and 55-92 % in Cu-NPs exposure group in compared to control group. Further, in case of liver, gill and kidney, SOD activities were increased in Cu exposure of 7.0-9.0 mgL⁻¹ from 32-40, 43-44, 26-31 % and in Cu-NPs 15-30, 21-28 and 21-0 % respectively. However, GST activities in liver, gill and kidney varied as 29-99, 40-169, 76-254 % respectively in the Cu exposure group. GST activities varied from 58-94, 26-148% and 69-232 % after Cu-NPs and Cu exposure respectively in liver, gill and kidney tissues. Concerning GPx, the activities were higher from 89-194, 143-429 and 45-219% respectively from Cu and 73-134, 147-274 and 52-129 % in Cu-NPs respectively in liver, gill and kidney tissues. The present investigation revealed that essential trace elements Cu and Cu-NPs (nano and inorganic form) high at concentrations led to toxicity and alteration of the cellular metabolic activities in fish.



Identification of Promising genotypes and assessment of genetic variability in root system architecture of soybean.

Ajay Kumar Singh, Principal Scientist, Agricultural Biotechnology

Promising soybean genotypes were identified based on drought adaptive shoot traits and Genetic Variability in root system architecture under in vitro conditions in soybean genotypes was evaluated. 320 soybean genotypes were evaluated for drought adaptive traits under greenhouse conditions. Promising Soybean genotype- TGX-814-78 D had cooler and greener canopy as compared to JS-9752 and JS-7105 under drought and irrigated conditions.



A total 100 soybean genotypes were evaluated for root system architecture under in vitro conditions. Soybean genotype PLSO-079 had efficient root system in terms of length and biomass compared to check varieties i.e. JS-9752 (drought tolerant), JS-7152 (drought tolerant), JS-9560 (drought susceptible) and NRC-37 (drought susceptible).





Figure 5. Genetic variability in root system architecture.

Exploitation of halophytic plants and associated microbiome for amelioration of saline agricultural land of arid & semi-arid regions.

Satish Kumar, Scientist, Biochemistry-Plant Science

The halophytic plants adapted to naturally grow under saline conditions can be exploited for agricultural potential as food/feed/fodder/energy crop and simultaneously ensuring the increased utilization of marginal lands. The microorganisms associated with such halophytic plants have been subjected to same evolutionary forces to that of the halophytic plants which have enabled them to survive under hypersaline conditions as Holobiont (Host + Associated microbes). This project specifically deals with the roles that halophytes play, and associated microbiome consisting of extremophiles, and extremotolerant microbes that tolerate salt concentrations that are usually toxic to most plants and microorganisms, in developing agricultural resilience to saline conditions. In order to explore the natural halophytic diversity of the

adjoining coastal regions, the samples from saline habitats like Mangrove's water, Mangroves plants, Mangroves marshy soil, Sea water were collected for microbiological studies. The pure cultures of microbial isolates have been obtained and glycerol stocks have been preserved. The microbial isolates are been screened for PGPA traits like IAA production, ability to grow in nitrogen free conditions, siderophore production, and Phosphate solubilization under high salt conditions (3-5% NaCl (w/v). Many potential isolates have been shown to perform nitrogen fixation potential under high salt conditions as also confirmed by the presence of *nifH* gene, a most widely used marker gene to confirm nitrogen-fixation ability in Bacteria and Archaea in the isolates. The CAS-Shuttle assay for quantitative estimation of siderophore production have also resulted in promising results where many isolated showed abilities to produce siderophores under hypersaline conditions.



Figure 6. Siderophore-hyper producing isolates marked with (*) The Loss of blue-colour and development of orange colour in CAS-shuttle Assay is indicative of higher siderophore production. Ability of isoaltes to grow under N2 deficient growth conditions at high salt Concentration have also been confirmed by presence of nifH gene.

Evaluation of halotolerant Rhizobium and PGPB based biomolecules for mitigation of salinity and drought stress.

Satish Kumar, Scientist, Biochemistry-Plant Science

Conventional strategies for management of drought stress in agricultural crops predominantly include the development of tolerant varieties through breeding, selection, and biotechnologybased approaches; however, these strategies have met limited success and are accompanied by their own limitations. Therefore, it is imperative to design and develop next-gen strategies that can sustainably perform under relatively harsh conditions and promote growth and development of plants. Microbe-based strategies are increasingly thought upon particularly due to the exceptional ability of microbes to sustain under diversity of adverse environmental conditions and even induce the stress tolerance mechanisms in plants. Thus, inoculation of resilient microbes having plant growth promoting traits in crop plants cultivated in drought-prone areas could induce a general drought-tolerance in plants thereby reducing the overall losses. Although this approach appears to be efficient, inoculum failures are frequently complained, typically due to inoculants' competence in differing foreign environmental conditions the indigenous and microflora. Considering the overall difficulties and constraints, the concept of direct utilization of microbial products was explored. Extending the same, a formulation was developed that contained microbe secreted biomolecules from eight cultures and its performance was assessed in spinach under drought conditions. After getting promising results under controlled conditions the efficacy of the bioformulation is also being tested in crops like Pegionpea, Sorghum and Black gram under field conditions. The bioformulation's UHPLC analysis revealed the presence of putative compounds like Gentisic acid, Protocatechuic acid, Gallic acid, Gallic acid derivatives, Vanillin, Syringic acid derivatives as the biochemical constituents of the bioformulation based on their λ_{max} and retention time. The results are also being validated by using the reference standards of putatively identified compounds.

Steps of bioformulation development at a glance: BCFE from 8 cultures fortified and evaluated for crop growth. Plant-growth promoting bacterial halotolerant strains capable of synthesizing plant-beneficial biomolecules including microbial derivatives of plant growth hormones were used for the production of biomolecules. Briefly, the biomolecules production from seven individual strains (Figure 7) was induced under laboratory conditions. First, the biomolecules were extracted from the culture filtrates with the help of XAD resin, and organic solvent, followed by pelleting and inclusion within the formulation along with the fortifying components. The figure depicts an overview of the implemented process for developing the formulation. The active biochemical components resolved using UHPLC are also depicted in chromatogram (Figure 8).



Figure 7. biomolecules production from seven individual strains.



Figure 8. Active biochemical components resolved using UHPLC

Kharif Chickpea: A New Crop.

Gurumurthy S., Scientist, Plant Physiology

ICAR-NIASM is the first institute to conduct a trial for identifying the chickpea genotypes suitable for *kharif* season. As the region has agro-climatic conditions suitable for growing *kharif* chickpea, a total of 74 genotypes were evaluated under rainfed conditions. This crop is widely cultivated throughout India, primarily in the rabi season (October-February). However, there is a very good potential to grow it in the kharif season (June-August) in Western Maharashtra because the average temperature ranges between 20-30°C with an average rainfall of 200-250 mm during June to August with welldrained soil are available for kharif chickpea flowering and pod setting. Thus, the suitability of both the critical components of chickpea cultivation, i.e., rainfall and temperature, makes it possible for *kharif* chickpea cultivation in the region. Preliminary investigations, enabled us to identify some of the promising chickpea genotypes such as IPCO-6-11, ICE 15654-A, JG-11, Vishal, JG-16, ICCV 92944, JG-14, ICC 4958 and Vijay. Studies also revealed that *Kharif* chickpea can be harvested by 60-70 days under rainfed conditions. The raw green pods yielded about 3.0-3.5 t ha⁻¹, while the raw green plants with pods yield ranged between 11 to 13 t ha⁻¹. Thus, *Kharif chickpea has* advantages such as additional yield and income within a short duration, seed production and rapid genetic advancement/speed breeding. In addition, it can be used for the vegetable purpose. However, there is a need to bridge the knowledge gaps with respect to adaptability, cost-benefit ratio, extension and policy to promote *kharif* chickpea.



Flowering, fruiting and fruit quality under different flushes in dragon fruit.

Vijaysinha Kakade, Scientist, Fruit Technology

Observations were recorded for the flowering, fruit set (%), fruit drop (%), number of fruits per plant, different phenological stages, time required for different stages, and the physical and chemical parameters of dragon fruit. It was observed that 'Fruit set and Fruit size' decreased with the occurance of flowering flushes however the 'flower and fruit numbers' increased on late flushes in dragon fruit. The time noted for reproductive bud emergence to flower opening is about 19 ± 1 days and from flower opening to fruit harvesting is about 30 ± 1 days.



Figure 9. Reproductive growth stages in dragon fruit.

Selection and evaluation of M2 mutant lines of Quinoa and Chia.

Boraiah KM, Scientist, Genetics and Plant Breeding

Selected 400 M₁ quinoa mutants were sown in plant to row for evaluating M₂ mutants and subsequent selection. Similarly, an about 1500 Chia M₁ Quinoa mutants were sown in plant to row for evaluating and further selection of M₂ mutants. Preliminary observation at early seedlings stage in chia confirmed the mutations with respect to chlorophyll and leaf pigmentations (Figure 10). The frequency of chlorophyll mutations increased with increasing dosage. Leaf pigment mutations were observed at all three dosage of gamma radiations (300, 400 and 600 Gy), as a change in cotyledon leaf color from green to yellow, albina spotted and first paired leaf color from green to light green and yellow. Further, cup shaped and multiple cotyledon leaf (three to four) mutations also observed compared to wild types.



Figure 10. Mutations in first pair leaf: Different spectrum of chlorosis/ chlorophyll pigment.



Figure 11. Mutations in cotyledon leaf: Albino type, three cotyledon leaf type, cup shaped type.

Development of Multilayer Integrated Farming System (IFS) for multiple abiotic stressed regions.

S.A. Kochewad, Scientist, LPM; Aliza Pradhan, Scientist. Agronomy; Sangram B. Chavan. Scientist, Agroforestry; Vanita Salunkhe, Scientist, Plant Pathology; Rajkumar *B*. Scientist Agricultural Entomology; Vijaysinha Kakade, Scientist, Fruit Science; V. Rajagopal, Scientist, *Fertility/Microbiology;* Soil *Chemistry*/ *G*.*C*. Wakchaure, Scientist, Agricultural Senior Structure Process Engineering; MP & Fisheries Bhendarkar, Scientist, Resource

Management; L.R. Meena, Principal Scientist, Agronomy, ICAR-IIFSR; N Subash, Principal Scientist, Agrometeorology, ICAR-IIFSR; Pravin Taware, Senior Technical Officer, Farm; P. Chahande, Senior Technical Assistant, Agriculture and H Pathak, Director, ICAR-NIASM

Developed the concept of cultivating/rearing different components of IFS at different levels for addressing multiple abiotic stresses like shallow depth of soil, availability of less irrigation water, poor nutrient and water retention capacity of soil and for generating sustainable agriculture income. In this model of 0.12 hectare, the land was brought under plantation of Horticulture components like Acid lime (NRCC 8) and Papaya (Greenberry) at the spacing of 4mx2m in alternate way and seasonal vegetables (Brinjal, cucurbits and beans) were planted at their recommended spacing in between two rows of fruit crops and this was integrated with backyard poultry farming (Native birds 100 nos.). The birds are reared under free range system of poultry farming. The pits of 45cm x 45 cm x 45 cm were filled mixture of farmyard manure, DAP and native soil. Farm yard manure and vermicompost generated from CIFS are being used for providing nutrients for the plants also vermi-wash is used as foliar spray and drenching in roots. Diseased, unproductive, old and weak (30%) brinjal, cucurbits and papaya plants will be replaced with new sapling/plants, periodically to maintain continuous production of fruits and vegetable in the system. Micro-irrigation system is being used for irrigation to the crops. For the management of insect and disease in the system Solar light traps, sticky traps, pheromone traps and bio-pesticides along with limited chemical pesticides are being used with the objective of sustainable development. are used for management of insect and pest. Free range rearing of birds will result in to reduction of feeding cost of birds and this will also have positive effect on behavior and welfare of birds. The free-range system of poultry farming will add nutrients to the soil and improve chemical properties of degraded soil over the time. The scavenging behavior of poultry will improve the physical properties of soil over long time exposure. In this way, sustainable income will be generated round the year in small land holding (shallow basaltic soil) in abiotic stresses regions. Diversification of components and within components will reduce the risk of climatic vagaries.



Figure 12. Multilayer integrated farming system

Response of GIFT Tilapia fish, to different salinity stress (inland saline water) exposed to acute and chronic salinity stress.

Mukesh Bhendarkar, Scientist, FRM

The study was conducted to assess the effect of salinity stress on growth and hematological composition of GIFT Tilapia strain, Oreochromis This study aimed to investigate the niloticus. effects of acute exposition to determine LC_{50} concentration of different salinity (0, 11, 6, 9 ppt) for 96 h. Based on these LC₅₀ three different sub lethal salinities, viz. 0, 5 and 10 ppt were identified to study the long term- effects of salinity on O. niloticus for a period of 60 days. The experiments conducted per the Completely were as Randomized Design with 4 replications for each treatment i.e. 0 ppt, 5 ppt and 10 ppt (6 fishes per tank). The fingerling O. niloticus $(8.93 \pm 0.59 \text{ g})$ were kept with three different water salinity treatments such as T_0 (0 ppt), T_1 (5 ppt) and T_2 (10 ppt). Inland saline water (18 ppt) brought from nearby farmers field was used in preparing desired salinity in the experiment. Fish were fed with 32 % crude protein (CP) diet upto saturation level on daily basis. Water quality parameters were measured every 15 days interval. There was no mortality occurred among the all treatment and its revels that GIFT tilapia can tolerate upto 10 ppt inland saline water. Data parenting to growth rate are presented in figure 13.



Figure 13. Growth response of O. niloticus under salinity stress

In the present work, to identify salinity tolerance level of GIFT tilapia were exposed gradually to different levels of salinities and observed 100% survival at 10 ppt level. Further, in order to determine effect of salinity on hematological alteration, the WBC (White blood cells), **RBCs** (Red blood cells), HGB (Haemoglobin), HCT (Haematocrit), MCV (Mean Corpuscular Volume), MCH (Mean Corpuscular Haemoglobin) and MCHC (Mean Corpuscular Haemoglobin Concentration), RDW (Red Blood Cells Distribution Width), MPV (Mean Platelet Volume), PDW (Platelet Volume Distribution Width) and PCT (Platelet Crit) were analysed by using Blood cell automated analyser. Results in Figure 14 depict significant changes in WBC and RBC counts were reduced in higher salinity exposed fishes as compared to control treatment. The WBC and RBC counts were statistically significant in control groups and salinity stress level fishes (5ppt & 10ppt). Similarly, haemoglobin content was also drastically reduced in the fishes exposed with high salinity as compared control. The HCT values were also statistically significant in control groups and salinity stress level fishes. MCV, MCH, MCHC, RDW, PLT, MPV and PCT were not statistically significant in control groups, 5 and 10 ppt salinity level fishes. In current studies, effects of salinities stress were observed in Nile tilapia, O. niloticus, and haematological parameter showed significant changes in higher salinity exposed fishes as compared to control fishes.



Figure 14. Haematological parameter of Oreochromis niloticus in different salinity groups

Geo-spatial maps of livestock breeding Tracts of India.

BB Gaikwad, Scientist FMP, SS Pawar, Senior Scientist, Animal Biotechnology; NP Kurade, HoS & Principal Scientist, Veterinary Pathology

The geospatial maps of the livestock breeding tracts of India were prepared for Cattle, Buffalo, Goat, Sheep and Poultry breeds native to India. These maps will be used to establish the climate analogues within Indian regional extent.



Evaluating seasonal growth rate variations in goats.

NP Kurade, HoS & Principal Scientist, Veterinary Pathology; SS Pawar, Senior Scientist, Animal Biotechnology; AV Nirmale, CTO, Animal Science.

The overall growth rate, kidding rate was higher for Boer goats. In all the breeds, the overall growth rate was higher during winter, post monsoon period followed by summer and monsoon. Boer goats showed higher growth rate during summer and winter. Sangamneri goats revealed highest growth rate during monsoon than other breeds whereas Osmanabadi goats showed better growth rate during post monsoon period. Based on all other growth, physiological, haematobiochemical and reproduction parameters it may be inferred that all the four breeds of goats can sustain the climatic stress prevalent in the region and may be suitable for rearing in similar climatic regions.



Figure 15. Growth rate (g/week) in different breeds.

Thermal stress severity assessment tool for livestock.

BB Gaikwad, Scientist FMP, SS Pawar, Senior Scientist, Animal Biotechnology; NP Kurade, HoS & Principal Scientist, Veterinary Pathology

A spreadsheet model for spatial assessment of thermal severity for livestock and poultry has been developed. The thermal severity score is calculated on the basis of Thermal Humidity Index (THI) threshold limits for Broiler, Layers, Ruminants and Pigs published in scientific literature. The thermal severity score ranging from 1 to 4 classifies the selected region as normal, moderate, severe and very severe heat stress observed across past decade for selected geolocation. The tool also gives indication of occurrence of heat stress event based on 5-day forecasted weather parameters for the selected geolocation.



Assessment of Molecular basis of thermotolerance in goats and poultry.

SS Pawar, Senior Scientist, Animal Biotechnology; NP Kurade, HoS & Principal Scientist, Veterinary Pathology; AV Nirmale, CTO, Animal Science.

selecting For simultaneously livestock for production traits, thermotolerance and disease resistance, it is important to understand the genetic mechanisms that regulate them. Nevertheless, there is inadequate understanding of immune response regulation in livestock with reference to heat stress. For the same purpose genetic relation between heat stress and immune response of goat and poultry birds is being studied. Experiment was set-up for studying heat stress in goats and poultry through utilization of seasonal temperature variations. The environmental parameters namely, temperature and relative humidity were recorded during the experimental period. The thermal stress was accessed using Temperature-Humidity Index (THI) methodology. Blood and tissue samples were collected at different intervals from the experimental animals. In-silico analysis was performed using the nucleotide sequences of heat shock protein (HSP) genes and cytokine genes retrieved from nucleotide database by employing various DNA analysis software. The consensus regions were identified as primer targets by insilico through multiple analysis sequence alignment. Development of PCR based assay for amplification of HSP 70 gene polymorphic regions and untranslated region (UTR) was completed. The HSP 70 polymorphic regions untranslated region (UTR) were PCR amplified using in-house optimized protocol for further analysis. The characterization of the amplified regions is vital for evaluating the polymorphism.



NEW INITIATIVES

Initiation of 'NIASM Associate Course'.

On July 15, 2021, ICAR-NIASM formally initiated the 'NIASM Associate Course (NAC)' on Agriculture and Abiotic Stress Management for all the NIASM Associates, i.e., research associates (RAs), senior research fellows (SRFs), young professionals (YPs) and other research and technical staff. The NAC duration is four months with two lectures per week with periodical evaluation in the form quiz, submission of project reports, and presentation by the participants. Upon completing the course, the associates will be given certificates, and the toppers will be recognized with awards.



Establishment of Naxatra Udyan (The Constellation Park).

On the eve of ICAR Foundation Day on 16 July, 2021 a Naxatra Udyan (Constellation Park) was established as a 'Tree Plantation' programme at the ICAR-NIASM campus. Forty-two different species of plants representing 27 Naxatras were planted in the central triangular area at the institute. All the staff members including Scientists, Technical, Administration and Associate staff participated in the programme. Dr Himanshu Pathak, Director, inaugurated the establishment of 'Naxatra Udyan' by planting Vat-vriksha i.e., '*Ficus religosa*' plant.



Completion Malhar Pond.

'Malhar pond', a water balancing cum storage tank, is the most needed basic facility located at the southwest corner of the NIASM campus. The concept was approved in April 2020 to fulfil the immediate need for balancing tank to install pumping facilities in the new lift irrigation project. The second phase was approved in February 2021 and completed in early June 2021. The original site was a depression of 2 to 3-meter depth with weathered rock debris inside. During the campus development, it was decided to construct a water tank at this spot. The first phase was already commissioned, and the second phase's plastic lining work was completed on 09 June 2021. As water entered the second phase of the pond, it was celebrated with 'Jal Poojan' with the hands of Dr. Himanshu Pathak, Director, ICAR-NIASM on 10 June, 2021. It was really an overwhelming and emotional celebration of a 'Dream come true' for all the farm team. The pond was completed through two phases, filled with water and named as 'Malhar'. The total capacity of the pond is 19.5 million litres, sufficient to tackle a 30-40 days canal closure period.





MAJOR EVENTS

11th Pre-IRC Meeting of ICAR-NIASM

Pre-Institute Research Council (IRC) (11th) meeting of ICAR-NIASM was held on April 08-13, 2021. Dr Himanshu Pathak, Director ICAR-NIASM, chaired the meeting. I/c Heads, Scientists of all the school and Senior Technical staff of the ICAR-NIASM attended the meeting through physical and video conferencing hybrid mode. The meeting included brief presentations by I/c PME, I/c Head of Schools and Scientist of SASM, SWSM, SSSM, and SSPR followed by discussions on the research highlights presented. Director, ICAR-NIASM also presented his activities and achievements during 2020-2021 and the pipeline targets.

Celebration of World Environment Day 2021

World Environment Day was celebrated on 05 June of 2021 with the theme "Ecosystem Restoration: Reimagine, Recreate, Restore". The institute organized a digital talk on "The Indian Savanna: Conservation of Grasslands in India" by Dr. Abi T. Vanak, Ashoka Trust for Research in Ecology and the Environment (ATREE). Bangalore, India. The event was initiated with introductory remarks by Dr. Himanshu Pathak, Director ICAR-NIASM highlighted the values of environmental conservation for sustainable livelihood under the present context. Dr. Abi T. Vanak addressed the participants about the extent of the savannah ecosystem in India, species compositions, various drivers of habitat destructions, and possible efforts to conserve fragile ecosystems. The function was organized by Dr. Jagadish Rane Head of SDSM, Dr. Satish Kumar, and Dr. Sangram B. Chavan, Scientist of SSSM.

Farmers' Awareness Campaign on Balanced Use of Fertilizers

To celebrate 75 years of India's Independence, farmers' awareness campaign on 'Balanced use of fertilizers' was organized through virtual mode on 18 June 2021. Dr Himanshu Pathak, Director, was the Chief Guest of the function. There were three invited speakers for the function. Dr Aliza Pradhan, Scientist talked on 'Role of fertilizers in supply of plant nutrients, Judicious use of fertilizers using 4R approach and Importance of organic fertilizers'. Dr Sachin Dingre, Associate Professor, MPKV Rahuri talked on 'Drip fertigation'. Dr Vivek Bhoite, SMS, KVK Baramati talked on 'Role of Soil Testing in balanced use of fertilizers and soil health card scheme'. Seventy participants, including 40 farmers, attended the function.

11th IRC Meeting of ICAR-NIASM

11th Institute Research Council (IRC) meeting of ICAR-NIASM was held on 22 June 2021 through web conferencing system. The meeting was chaired by Dr Himanshu Pathak, Director, NIASM. Dr S R Gadakh, Director Research, MPKV Rahuri; Dr M Maheshwari, Former Head, Division of Crop Improvement, ICAR-CRIDA; Dr K N Bhilegaonkar, Principle Scientist and Station In-charge ICAR-IVRI, Pune; Dr Pradip Dey, Principal Scientist and PC (STCR), ICAR-IISS, Bhopal and Dr M S Meena, Principal Scientist, ICAR-ATARI, Jodhpur participated in the meeting as resource persons in different disciplines.

Visit of medical practitioners to ICAR-NIASM

Medical practitioners of Baramati tehsil of Pune district visited ICAR-NIASM, Baramati on 27 June 2021 with their families to know various aspects of agricultural research at the institute. Dr. Himanshu Pathak, Director, ICAR-NIASM, presented various research, educational and extension activities on abiotic stress in agriculture and its management. The Malhar pond was inaugurated by the doctors. They also visited the fruit crop orchards, livestock unit and climate smart integrated farming system. They planted a few medicinal plants in the Sanjeevani Garden of the Institute.



9th Research Advisory Committee Meeting

9th Research Advisory Committee Meeting of ICAR-NIASM was held on 3 July 2021. Dr. H. Pathak, Director, ICAR-NIASM, extended a warm welcome to Dr. B. Venkateshwarlu, Chairman of the 9th RAC, and the other distinguished members: Dr. S.M.K. Naqvi, Dr. N. Sarangi, Dr. D.K. Pal, Dr. C. Viswanathan, Dr. B.B. Barik, Dr. P.K. Ghosh, Director, NIBSM, Raipur (special invitee) and Dr. Jagadish Rane (Member Secretary). A comprehensive report about the overall research and development activities during the 2020-21 was presented by Dr. Pathak. This was followed by presentation of the Action Taken Report by Dr. Rane. The Heads of the Schools comprehensively presented the achievements of the year 2020-21 and targets for next year of the respective Schools.

Meeting with Dr Amit Tripathi, CEO, Geolife Agritech India Pvt Ltd

A meeting was held on 31 July 2021 with Dr Amit Tripathi, CEO and the team of Geolife Agritech India Pvt Ltd, Mumbai team. Dr H Pathak, Director and all Heads of Schools were present in the meeting. Dr H Pathak welcomed and briefed about the research work on abiotic stress management at our institute. Dr Jagadish Rane, HoS, Water Stress Management, discussed the mechanism of plants under abiotic stress conditions and working of phenomics in the evaluation of different traits in plants through image analysis. Dr Amit Tripathi, CEO, expressed their interest in collaborating with the institute in the future to evaluate their products to know the mechanism behind their products under multiple



abiotic stresses for field and horticulture crops.

Celebration of 75th Independence Day

ICAR-NIASM celebrated 75th Independence Day on 15 August 2021. All the staff, including scientists, technical staff, administrative staff, SRF, JRF, YP and contractual staff were present for the event. On this occasion, Dr. Himanshu Pathak, Director, ICAR-NIASM, hoisted the national flag and addressed the staff.



Azadi Ka Amrit Mahotsav- Food and Nutrition for Farmers

On the occasion of "Azadi Ka Amrit Mahotsav" celebrations, a programme was conducted at ICAR-NIASM, Baramati, on 26 August 2021 under the theme of "Food and Nutrition for Farmers" for August month 2021. Chief guest of the function Hon'ble Director Dr. Himanshu Pathak has briefed on the importance of Health and nutrition for leading a successful life and highlighted the Indian traditional foods habits rich source of nutrients needs to be re-introduced into our daily life. The Guest of Honour. Dr. Vanita Kokare, Medicine and health expert, spoke about the alarming increase in lifestyle diseases due to unhealthy food habits. The speaker of the program, Dr. Karthikeyan N, has explained the basic form of foods, nutrient status, vitamin content, and various sources of grains, vegetables, and fruits. Total 150 has participated in the programme, including the students from College of Agriculture, Baramati.

Kharif Chickpea & Kharif Rajmash Meet

ICAR-NIASM organized a "Farmer-Scientist Interaction meeting" on *Kharif* Chickpea and *Kharif* Rajmash on 24.08.2021 to discuss the scope and opportunities of growing Chickpea and Rajmash in *Kharif* season, which is traditionally grown as Rabi season crop in India. Around 25-30 Chickpea and Rajmash growing farmers participated in this programme. The Chief guest Dr. Himanshu Pathak, Director, ICAR-NIASM highlighted the opportunities of growing Chickpea in *Kharif* season and how an additional option of growing it as intercrop of sugarcane and pomegranate. Dr. Gurumurthy, scientist who coordinated the programme and conducted the experimental trail, has also coordinated the farmers' field visit and demonstrated high yielding chickpea genotypes with fully filled pods that mature in 60-65 days.



Plantation drive on Indian sandalwood

The wider distribution of Sandalwood. skyrocketing demand and supply and assured income have opened up opportunities for upscaling cultivation among farmers. However, lack of scientific knowledge on nature of parasitism, choice of host, tree-host ratio, geometry of planting and management practices pose some difficulties during field establishment. Keeping in view, the abovesaid constraints a research trial sandalwood is planned in degraded lands to test the performance in pre-established tamarind orchard. Under this, sandalwood seedlings were planted in pre-established six-year-old Tamarind orchard under three planting geometries i.e., quincunx, within row & alternate-row planting. Further these planting geometries are divided into two halves; i.e., one halves is intercropped, while other is kept without intercrops.



The experiment will provide significant outcomes on the technological interventions for successful establishment of sandalwood cultivation in

degraded lands with enhanced income. On 1st September 2021, sandalwood seedlings are planted by Dr H. Pathak, Director, Scientist, technical, Administrative and research associates of the NIASM, Baramati.

हिंदी दिवस एवं हिन्दी पखवाड़ा समारोह

भारत की संविधान सभा ने 14 सितंबर 1949 को हिन्दी को राजभाषा का दर्जा प्रदान किया। इस पावन दिवस की स्मति में प्रतिवर्ष 14 सितंबर को 'हिन्दी दिवस' के रूप में मनाया जाता है। राजभाषा हिंदी के प्रगामी प्रयोग को बढ़ावा देने हेतु भाकृअनुप-राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान, बारामती द्वारा १४ सितम्बर से २८ सितम्बर के दौरान "हिंदी पखवाडा" का आयोजन किया गया। हिन्दी दिवस तथा हिन्दी पखवाड़ा का उद्घाटन संस्थान के निदेशक डॉ हिमांश् पाठक के मार्गदर्शन में १४ सितम्बर को किया गया। उद्घाटन समारंभ में मुख्य अतिथि के रूप में डॉ सविता नाईक-निंबालकर (सहयोगी प्राध्यापक, मुधोजी महाविद्यालय, फलटण जिला सातारा) मौजुद रहे। उन्होने हिन्दी साहित्य का उदय एवं विकास के बारे में सभी को अवगत किया। हिन्दी पखवाडा में लगातार विविध प्रतियोगिताओंका जैसे की. निबंध लेखन (हिन्दी भाषियोंके लिए/अहिन्दी भाषियोंके लिए), टिप्पण लेखन, टंकलेखन, काव्यवाचन, हिन्दी अनुवाद, तत्काल भाषण, प्रश्नोत्तरी आदि प्रतियोगिता आयोजित की गयी। जिसमे संस्थान के सभी सदस्यों ने बढ-चढकर हिस्सा लिया और प्रतियोगिताए सफल बनाई। हिन्दी पखवाड़ा समारोप एवं पुरस्कार वितरण समारंभ का आयोजन २८ सितम्बर को संस्थान के सरदार पटेल सभागार में किया गया। समापन समारोह के मुख्य अतिथि श्री ता का सूर्यवंशी (पूर्व प्रधानाचार्य, राजमाता सुमित्राराजे भोसले विद्यालय, सातारा) ने प्रतियोगिता विजेता को पुरस्कार प्रदान करके सम्मानित किया। मुख्य अतिथि ने राष्ट्रभाषा के रूप मे हिन्दी का महत्व सभी को अवगत किया। राजभाषा कार्यान्वयन समिति के अध्यक्ष डॉ हिमांशु पाठक ने हिन्दी को बढ़ावा देने हेत् उचित प्रयास का आग्रह किया। कार्यक्रम के शुरुआत में संस्थान के निदेशक महोदय ने 'राजभाषा प्रतिज्ञा' दिलायी। इस कार्यक्रम में मुख्य अतिथि डॉ सविता नाईक- निंबालकर, सहयोगी प्राध्यापक, मुधोजी महाविद्यालय, फलटण रही। उन्होने 'हिन्दी साहित्य का उदद्भव और विकास' इस विषय को उजागर किया। कार्यक्रम की अध्यक्षता संस्थान के निदेशक डॉ हिमांशु पाठक जी ने की। संस्थान के चार प्रभागों के प्रमुखों ने अलग अलग विषयों पर सम्बोधन किया। कार्यक्रम का आयोजन संस्थान के राजभाषा कार्यान्वयन समिति की ओर से डॉ वनिता साल्रॅंखे, डॉ संग्राम चव्हाण, डॉ विजयसिंह काकडे, डॉ अविनाश निर्मले तथा डॉ परितोष कुमार द्वारा किया गया। कार्यक्रम का सूत्रसंचालन समिति सदस्य डॉ प्रवीण तावरे ने किया। डॉ वनिता सालुंखे (सदस्य सचिव, राजभाषा कार्यान्वयन समिति), डॉ संग्राम चव्हाण, डॉ विजयसिंह काकड़े, डॉ प्रवीण तावरे, डॉ अविनाश निर्मले, डॉ परितोष कुमार आदि ने कार्यक्रम का आयोजन किया एवं कार्यक्रम सफल बनाया।



Campaign for Nutri-Garden and Tree Plantation

On the occasion of "Poshan Vatika Maha Abhiyan & Tree Plantation", the institute has conducted a program of campaign for Nutri-Garden and tree plantation. Around 200 participants including farmers from surrounding areas and institute staff participated in the program. The program was organized by Dr Dhananjay Nangare, Mr Rajkumar, Dr Sangram Chavan & Mr Ravi Kumar.



Review meeting, awareness on herbal medicine and medicinal plants distribution programme

On the occasion of "Azadi Ka Amrit Mahotsav" celebrations, a programme on awareness on herbal medicine and medicinal plants distribution was

organized at ICAR-NIASM in collaboration with Regional cum Facilitation Centre-Western Centre, National Medicinal Plants Board Savitribai Phule Pune University, Pune, on 25th September 2021. During the event, Prof. Dr Digambar N. Mokat RCFC-WR NMPB created awareness about herbs as medicine and visited the Sanjivani Udvan (Medicinal plants garden) at NIASM campus along with staff, students, research fellows and farmworkers. were distributed to participants in the event. During this event review meeting was also held to evaluate the achievements made in the establishment of herbal garden funded by NMPB, New Delhi. Director, ICAR-NIASM chaired the meeting. Prof. Digambar N. Mokat was an expert from NMPB, and all the head of schools and scientists participated. The expert appreciated the efforts made by scientists to establish medicinal and aromatic plants garden with more than 100 species. The progran was co-ordinated by Mr. Harisha CB, Dr. DD Nangare and Dr. SB Chavan.



On-campus Demonstration on Supplementary and Hand Pollination in Dragon Fruit

On-campus demonstration on "Supplementary and Hand Pollination in Dragon Fruit" was organized on 28 September 2021 at Dragon Fruit Orchard, ICAR-NIASM. Dragon fruit cultivating farmers and students participated in the programme. Dr. Boraiah, Scientist explained factors responsible for reduced fruit set and size and how the rainfall during flower opening (Anthesis) period causes flower/immature fruit drop by demonstrating the experiments conducted in the orchard. Further, he explained briefly about possible solutions farmers can adopt to prevent flower and immature fruit drop and demonstrated results of self-pollination and cross pollination experiments. During the demonstration. farmers also practised the emasculation and hand pollination in dragon fruit. suggested The Director. ICAR-NIASM. popularising the technology by publishing technology folders/leaflets and advising scientists to conduct training programs and Dragon fruit Day. The programme was coordinated and conducted by Dr. Boraiah, KM. Dr. Vijaysinha Kakade, Dr. Harisha CB and Dr. Basavaraj P S.



Hon'ble Prime Minister's Address and Mass awareness campaign for large scale demonstration of Climate Resilient Technologies and Practices

The programe of Hon'ble Prime Minister address to farmers was live broadcasted on 28 September 2021 in the institute. Hon'ble Prime Minister Shri. Narendra Modi interacted with the farmers, appreciated their success story, and motivated them to expand their work to other farmers with government institutions and welfare programs. Also, on this occasion, to fight Malnutrition and build a healthy nation, 35 new Bio-fortified crop varieties have been released to the nation. About 200 ICAR-NIASM scientific, technical and administrative staff and research project staff and farmers have participated in the Program.



Germplasm Awareness Programme and Germplasm Field Day

Germplasm Awareness Programme and Germplasm Field Day (Kharif) was organized on 06 October 2021 at the Genetic garden of ICAR-NIASM. The programme's main objective was to create awareness among the youth, students, and young professionals on the importance of germplasm, conservation, evaluation, and its utilization in crop improvement programmes. Dr. H. Pathak, Director, NIASM in his introductory remarks highlighted on In-situ and Ex-situ conservation and importance of germplasm conservation in future abiotic stress resistance breeding programmes. Important varieties of Finger millet, Green gram, Soyabean, Groundnut, Pigeion pea, Sorghum, Bajra, Cowpea, Horse gram, Chia, Turmeric, Coriander, Fenugreek and Ajwain grown in crop cafeteria were demonstrated along with providing information on important features of climate resilient varieties. Scientific. technical staff, students, research fellows (40) participated in the Field day Cum Awareness Programme. The programme was coordinated by Boraiah KM, Basavaraj PS, Harisha CB, PS Kapte, Gurumurthy S and J. Rane and deliberated the various aspects of crop germplasm.



Field day programme on Management strategies for Bacterial blight and Wilt in pomegranate

In commemoration of 75th Azadi ka Amrut Mohostav- A field day on "Management strategies for Bacterial blight and Wilt in pomegranate" was jointly organized ICAR-NIASM and ICAR-National Research Centre on Pomegranate, Solapur at ICAR-NIASM on 21 October 2021. The programme's main objective was to share the technologies from ICAR institutes to the farmers about the most severe diseases in pomegranate (Bacterial blight and Wilt) and their remedial measures. For this event, Dr. Jyotsana Sharma, Principal Scientist and Dr. Somnath Pokhare, Scientist from ICAR-National Research Centre on Pomegranate, Solapur and two representatives of Kay-Bee exports limited, Phaltan were invited as resource person. The program was attended by farmers of five districts, Scientist, technical staff, research associates and participated in the discussion. The program was successfully organized by Dr. Vijaysinha Kakade, Dr. D.D. Nangare, Dr Vanita Salunkhe, Dr. Pravin Taware, and Dr. Sangram Chavan.



Celebration of Rashtriya Ekata Divas

On the occasion of Azadi Ka Amrit Mahotsav, the Rashtriva Ekta diwas was celebrated at ICAR-NIASM residential complex, MIDC, Baramati on 31 October 2021. The staff and resident family members of ICAR-NIASM took the 'Rashtriya Ekata Diwas pledge' and also participated in the 'Run for unity' event to mark the Rashtriya Ekta diwas celebration. The Head of the Schools expressed their views on the importance of Rashtriya ekta diwas. Dr Himanshu Pathak, Director, ICAR-NIASM in his talk, made the gathering aware about the important role that Sardar Vallabhbhai Patel played in uniting the segregated princely state into a nation at the time of independence and also about the significance of staying united for national cause. The children activities followed by 'Special swatchhata abhiyan' programme at MIDC residential complex were carried out during the day.



Special Swachhta Campaign

As a part of special Swachhta Campaign ICAR-NIASM organized various swachhta activities inside and outside campus during October 02-31, 2021. On 04 October indoor cleanliness drive was organized to clean and collect plastic wastes at premises of admin and school buildings. From 5th to 12th October 2021 uprooted Parthenium and other weeds at campus roads, surroundings of parking area, canteen, admin and school buildings. On 12 October, 2021 organized workshop on "Waste to Wealth" in village Karhavagaj, Baramati (Taluk) as a part of special campaign in villages. Dr. Paritosh Kumar, Scientist (Environmental Science), delivered a lecture on the occasion Speech competition on "Waste to Wealth" also organized on the occasion of special village Campaign. All Swachhta the participants, including ICAR-NIASM staff, dignitaries, and farmers actively participated in cleanliness drive at various places of villages such as temple premises, roads and other common places. Dr. Himanshu Pathak, Director, ICAR-NIASM appreciated the residents and staff for keeping the residential complex and its premises neat and clean and suggested organising at least 3-4 Swachhta campaigns/activities/events yearly residential complex. All the staff and residents, including professionals, scientists, students. voung parents/family members, and children, participated the event and cleanliness drive bv in uprooting Parthenium and collecting plastic wastes.



Observance of Vigilance Awareness Week

In a move towards commemorating 75 years of India's Independence, ICAR-NIASM observed 'Vigilance awareness week 2021' from 26 October to 01 November 2021. The programme started with taking the integrity pledge. The Head of the schools, Vigilance officer and Director, ICAR-NIASM expressed their views on the importance of various aspects of Vigilance. Institute organized various events on the theme - "Independent India @75: Self-reliance with integrity" like 'on the spot essay coemption on "Vigilant India Prosperous India" and Debate on "Vigilance Awareness will help in Nation's Unity and Integrity'.



Celebration of World Soil Day 2021

A "world soil day" programme was organized at ICAR-NIASM in collaboration with Agriculture Development Trust, Baramati, Bayer Crop Science Ltd. India and International Institute of Carbon Action and Renewed Earth (IICARE) ensuring more than 150 participants including agricultural scientist, farmers and students' stakeholders on 4-Dec, 2021. The chief guests were Dr. Suhas Joshi, Head, CSR- South East Asia, Bayer Crop Science Ltd. India; Dr. Santosh Bhosale, Mr. Rajendra Sharma and Mr. Vedant Ahluwalia, advisors of International Institute of Carbon Action and Renewed Earth, and Chandrashekhar Bhadsawale, Progressive farmer in Maharashtra. Dr. Himanshu Pathak, Director ICAR -- NIASM emphasised need of maintaining soil health in relation to ecosystem service, animal and plant health. He, further, insisted on theme of the world soil day celebration salinization "Halt soil and improve crop productivity. There were also five rice progressive farmers; Mr. Shirke Jalinder, Jayavant Khopde, Kirna Yadav and Amit Gadre shared their experience on how to maintain soil health for achieving sustainable higher crop yield. In afternoon session of the day, farmers were taken to **ICAR-NAISM** orchard. which have been established on partially weathered degraded land,

and demonstrated soil sampling techniques be adapted for assessment of soil health and fertilizer recommendation to field crops and fruit crops.



National Conference of Plant Physiology-2021

ICAR-NIASM in collaboration with Indian Society for Plant Physiology (ISPP), New Delhi organized a National Conference of Plant Physiology with the theme "Frontiers of Plant Physiology for Climate-smart Agriculture" during December 9-11, 2021 at ICAR-NIASM, Baramati, India. The Conference was inaugurated by Chief Guest Dr. A. K. Singh, Director, ICAR-Indian Agricultural Research Institute, New Delhi. Chairman Dr. Himanshu Pathak, Director, ICAR-NIASM along with Dr. V. Chinnuswamy, Hon. Secretary, ISPP, New Delhi; Dr. Madan Pal, Treasurer, ISPP, New Delhi; Dr. SR Gadakh, Directorate of Research, MPKV, Rahuri; and Dr. DP Waskar, Directorate of Research, VNMKV, Parbhani were present to grace the occasion. The scientists, students, research scholars, private companies, progressive farmers from all over the country participated in this event. A total of 450 candidates were registered for the conference and among them 100 participated physically. In addition, private industries and nearby ICAR institutes exhibited their products and technologies in the conference.

The Conference addressed the important issues pertaining to climate change and came out with new directions for researchers for tailoring productive plant types, developing plant biostimulants, climate resilient varieties with biotic and abiotic stress tolerance to help in breaking the yield barrier and thereby ensuring sustained food and nutrition security. In the three days conference, six plenary sessions, one key note address, three award lectures and 12 lead lectures were delivered by renowned scientists. During plenary session lectures experts highlighted the advances in genetics, genomics and breeding of oilseed Mustard and heat stress tolerance in canola and provided insights into regulatory network of small molecules and their role in plant growth and development. addition, speakers In also highlighted the potential applications of highthroughput phenotyping for developing climate resilient crops and climate smart agricultural practices to enhance productivity, nutrition and resilience of agri-food systems. In addition, young scientists presented on basics and applied plant physiology aspects and best presentation awards were given in basic and applied research categories.



Hon'ble Prime Minister's address during the Conclave on Natural Farming.

Hon'ble Prime Minister Shri Narendra Modi addressed nation during Conclave on Natural Farming on 16.12.2021. The programme was broadcasted live in the institute's auditorium. All staff of ICAR-NIASM and farmers participated in this program through online mode.



हिन्दी कार्यशाला

अक्तूबर से दिसम्बर २०२१ इस तिमाही में संस्थान में हिंदी भाषा के रुझान हेतु १८ दिसम्बर २०२१ को एक दिवसीय कार्यशाला का आयोजन किया गया। राजभाषा कार्यान्वयन समिति के सदस्य डा. प्रवीण तावरे ने सूत्रसंचालन करते हुए अतिथि तथा उपस्थितों का स्वागत किया। कार्यशाला को आगे बढ़ाते हुए हिंदी भाषा के रुझान के लिए संस्थान से किए जाने वाले प्रयासों का ब्योंरा प्रस्तुत किया। श्री. राजेंद्र प्रसाद वर्मा, सहायक निदेशक, हिन्दी शिक्षण योजना, पुणे (राजभाषा विभाग, गृह मंत्रालय, भारत सरकार) ने ''सूचना प्रोद्योगिकी द्वारा कम्प्युटर और मोबाइल के माध्यम से भारतीय भाषाओं में लिप्यंतरण, श्रृतलेखन, टंकलेखन तथा अनुवाद" इस विषय पर प्रशिक्षण दियाँ। उन्होने संस्थान के पत्र व्यवहारों में तथा ई- ऑफिस द्रारा कार्यालयिन कामकाज में हिंदी का आसानी से प्रयोग करने की कई तकनीकियाँ सिखायी। राजभाषा कार्यान्वयन समिति के अध्यक्ष और निदेशक डा. हिमांश पाठक जी ने अतिथि का स्वागत करते हए हिंदी भाषा के रुझान के लिए किए गए मार्गदर्शन पर समाधान जताया। उन्होने कर्मचारियों को आवाहन किया की इन तकनीकियों का प्रयोग करते हए हिन्दी में कामकाज को प्राथमिकता दें। इस कार्यशाला का संस्थान के ५६ कर्मचारियों ने प्रत्यक्ष रूप से लाभ लिया। कार्यशाला की उपलब्धियों पर चर्चा करते हुए डा. विजयसिंह काकडे जी ने धन्यवाद ज्ञापन किया।



Field visit of Farmers to Climate smart integrated farming system (CIFS).

About 115 progressive farmers and agricultural officers from Chandrapur district visited "Climate smart integrated farming system (CIFS) farm project of ICAR-NIASM, Baramati under the MIDH program of State Agricultural Department of Maharashtra on 16th and 20th December. Dr. S.B. Chavan, Scientist (Agroforestry) briefed the farmers about the institute and the CIFS project, including the various aspect of IFS systems such as

cropping systems, horticulture, boundary plantation, silvipasture, multilayer and efficient irrigations techniques were provided. Farmers were sensitized to the requirement of green and dry fodder to livestock and goats from the CIFS systems. Solar based pumping systems with drip and rain pipes were explained and demonstrated. Different queries raised by the farmers and agricultural officers were also duly answered the visit. during The agricultural officers appreciated the efforts of the ICAR-NIASM Baramati for demonstrating various climate resilient technologies. The visit was assisted by Dr. S.A.Kochewad, Dr. S.B. Chavan, Dr. V.D. Kakade, Mr. Nilesh Dhumal and Mr. Akash Shinde.



Field Day-cum-COVID 19 Awareness Programme under Scheduled Caste Sub Plan (SCSP) 2021-22.

The ICAR-National Institute of Abiotic Stress Management, Baramati, Pune organized a "Field Day-cum-COVID 19 Awareness Programme" on 28th December 2021 under the Scheduled Caste Sub Plan (SCSP) 2021-22. In his welcome address, Dr. Nitin P. Kurade, Chairman, Schedules Caste Sub-Plan (SCSP) implementation committee of ICAR-NIASM, briefed the participants about the ICAR-NIASM and its different activities. He stressed upon utilizing the inputs given under SCSP in an effective manner. Dr. Avinash V. Nirmale explained about other inputs provided under the SCSP programme. Dr. Sachin S. Pawar addressed the participants on COVID-19 awareness. He explained COVID-19 appropriate behaviour and its importance in preventing the spread of the disease under the threat of upcoming omicron variant. Dr. Bhaskar B. Gaikwad described the SCSP programme in detail. He encouraged the participants to come forward for forming self-help groups for livelihood upliftment. The interaction was helpful for understanding the needs of beneficiaries. Furthermore, the COVID Kits comprising N95 masks, hand sanitizer, hand wash, and soaps were distributed to the participants on the occasion of COVID-19 Awareness Programme. A group of 180 SCSP beneficiaries mainly women, attended the programme. The programme was co-ordinated by Dr. Nitin P. Kurade, Dr. Avinash V. Nirmale, Dr. Sachin S. Pawar and Dr. Bhaskar B. Gaikwad.



Swachhata Pakhwada at ICAR-NIASM from 16-31 December 2021.

As a part of Swachh Bharat Abhiyan 'Swachhata Pakhwada' has observed at ICAR-NIASM, Baramati on 16-31 December, 2021. A sensitizing programme was also organized amongst the Primary school children from Malegaon about the "Swachh Bharat Abhiyan". Essay writing and Quiz competition was organized on 29.12.2021 on the occasion of celebration of Swachhata Pakhawada from 16-31st December. The theme of essay writing was "Innovative Methods in Solid Waste Management" and the participants were actively participated and made the event successful.





LIST OF ONGOING PROJECTS

Umbrella Projects

- 1. Climate resilient integrated farming system for semi-arid regions.
- 2. Genetic garden and gene bank for abiotic stress tolerant plants, animals and fisheries for food security and sustainability.
- 3. Geo-spatial digital maps of multiple abiotic stresses, their future scenarios and management options.
- 4. Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions.

Flagship Projects

- 1. Adaptation and mitigation of atmospheric stresses in crops (chickpea, soybean); goat; poultry and fish for sustainable productivity and profitability.
- 2. Augmenting farm income in water scarce regions with alternative crops.
- 3. Targeting prospective technologies for abiotic stress resilience in rainfed and dryland regions.
- 4. Amelioration of saline lands in arid and semiarid regions with halophytes and associated microbiome.

Institute Projects

- 1. Mitigating water stress effects in vegetable and orchard crops.
- 2. Assessment and detoxification of heavy metals in aquatic water bodies using nutritional approaches.
- 3. Nutrient and gene interaction approaches through nutrigenomics in response to multiple stressors.

- 4. Wastewater treatment synergizing with integrated approach of constructed wetland and aquaponics.
- 5. Genomics, genetic and molecular approaches to improve water stress tolerance in soybean and wheat.

Externally Aided Projects

- 1. Genomics strategies for improvement of yield and seed composition traits under drought stress conditions in soybean (Funded by: ICARNASF).
- 2. Phenotyping of pulses for enhanced tolerance to drought and heat (Funded by ICAR-NICRA).
- 3. Climate smart management practices (Funded by: IRRI).
- 4. Conservation agriculture for enhancing resource-use efficiency, environmental quality and productivity of sugarcane cropping system (Funded by: CA Platform ICAR).
- 5. Establishment of model herbal garden for medicinal and aromatic plants (Funded by NMPB, New Delhi).
- 6. Development of Nano-based delivery system to mitigates arsenic pollution, ammonia and temperature stress on growth and immune related gene expression in fish (Funded Under LBS Award).
- Studies on N-(n-butyl) Thiophosphoric Triamide (NBPT) as a Urease Inhibitor for Improving Nitrogen Use Efficiency in major cropping systems in India.

TRAININGS ORGANIZED

Mr MP Bhendarkar

- Training on Farm pond based Aquaculture Model: A Business opportunity collaboration with Shekru TV held at Zoom platform on dated April 29, 2021.
- Training on Farm pond based Fish Culture collaboration with Seed India held at Zoom platform on dated May 24, 2021.
- Organized Workshop on Waste to Wealth on the occasion of Special National Swachhta Campaign held at Gram Panchayat Karha-Wagaj on dated October 12, 2021.

TRAININGS ATTENDED

Dr Sachin S Pawar

- International e-training on "Gene Cloning: Advances and Applications in Veterinary Sciences" organized under ICAR-NAHEP-CAAST Project by Mumbai Veterinary College, Parel, Mumbai from 31st May - 4th June 2021.
- Online Training Programme on "Climate Resilient Animal Husbandry" by ICAR-CRIDA, Hyderabad & MANAGE, Hyderabad from 18-21 August 2021.
- Training on "SNP Data Analysis for Detecting Parentage in Animals" organized by GADVASU, Ludhiana on 23rd Sept. 2021

Dr Gopalakrishnan B

- Training on "Enhancing Agricultural Resilience through Index-based Flood Insurance and Post-flood Management Interventions in India" organized by ICAR-IIWM & IWMI from 29-30 June 2021.
- Training on "Strategies for climate risk management and resilient farming" organized by ICAR-CRIDA and MANAGE, Hyderabad from 20-24 September, 2021.

Dr Pravin B Taware

• Training programme on "Good Agricultural Practices (GAPs) for higher productivity, profitability and resource-use efficiency" during 02-16 August, 2021 organized by Agronomy Division, IARI, New Delhi.

Mr Lalitkumar Aher

- Virtual Training Programme On "Plant Genetic Resources Management and Utilization" Organized by ICAR-NBPGR, Pusa Campus, New Delhi During 19 July -01 August, 2021.
- Online Training on "Appropriate Sampling Techniques Including Sample Preparation and Preservation for Soil, Water, Plant and Air Samples for Various Analyses" organized by the Division of Environment Science, ICAR-IARI, New Delhi, from 2-7 August, 2021.
- Online Training Programme on "Statistical Techniques for Data Analysis in Agriculture" Organized by ICAR-IASRI, New Delhi during 04-13 October 2021.

Mr Sunil Potekar

• Training on Weather based Agromet Advisory Service through ICT organized by MPKV Rahuri from 02-22 Aug 2021 (21 days).

PUBLICATIONS

Research Papers

- Bhendarkar MP, Gaikwad BB, Ramteke KK, Joshi HD, Ingole NA, Brahmane MP, Gupta N (2021) Anticipating the impact of the COVID-19 lockdowns on the Indian fisheries sector for technological and policy reforms. Current Science. 121 (6): 752-757.
- Kumar N, Chandan NK, Gupta SK, Bhushan S, Patole PB (2021) Omega-3 fatty acids effectively modulate growth performance, immune response, and disease resistance in fish against multiple stresses. Aquaculture. 547: 737506.
- Kumar N, Singh DK, Bhushan S, Jamwal A (2021) Mitigating multiple stresses in Pangasianodon hypophthalmus with a novel dietary mixture of selenium nanoparticles and Omega-3-fatty acid. Scientific Reports. DOI: 10.1038/s41598-021-98582-9.
- Magar AP, Nandede BM, Chilur R, Gaikwad BB & Khadatkar A (2021) Optimization of growing media and pot size for vegetable seedlings grown in cylindrical paper pots using response surface methodology, Journal of Plant Nutrition, DOI: 10.1080/01904167.2021.20148 70.
- Rane J, Singh AK, Kumar M, Boraiah KM, Meena KK, Pradhan A, Prasad PVV (2021). The adaptation and tolerance of major cereals and legumes to important abiotic stresses. Int. J. Mol. Sci. 2021, 22, 12970. https://doi.org/10.3390/ ijms222312970.
- Rane J, Singh AK, Tiwari M, Vara Prasad PV, Jagadish K (2021). Effective use of water in crop plants in dryland agriculture: Implications of reactive oxygen species and antioxidative system. Frontiers Plant Sci. (Accepted).
- Singh D, Patra S, Ojasvi PR, Yadav D, Kakade V, Singh N, Desai S, Mishra AK (2021) Effect of terracing measures on soil moisture in Himalayan foot hill of India" has been accepted for publication in The Indian Journal of Agricultural Sciences (Accepted).

Review Papers

 Kochewad SA, Sanjeev Kumar, Kurade NP, Pawar SS, Nirmale AV (2021) Colostrum Management in New-Born Dairy Calves. Agri Journal World. 1 (2): 50-54. • Pawar SS, Mohanapure PA, Brahmane MP, Bhendarkar MP, Nirmale AV, Kurade NP. (2021) Metagenomics: A novel tool for Livestock and Poultry Improvement. Agricultural Reviews. DOI: 10.18805/ag.R-2167.

Book Chapters

- Kumar S, Kumar M, Wakchuare GC, Bhushan B, Meena KK, Singh AK, Gurumurthy S, Rane J. (2021) Microbial management of crop abiotic stresses: Current trends and prospects. In: Microbial Management of Plant Stresses: Current Trends, Application and Challenges. Pp. 251-260. DOI:10.1016/B978-0-323-85193-0.00017-6.
- Kumar, Satish, Bhushan B, Wakchaure, G.C., Meena, K.K, Kumar,M, Singh,A.K, Rane,J Metagenomic insights in microbial communities of desert ecosystems in Metagenomics and Microbial Ecology, CRC Press.
- Kumar, Satish, Mahesh Kumar, G. C. Wakchaure, Bharat Bhushan, Kamlesh Kumar Meena, Ajay Kumar Singh, S. Gurumurthy, and Jagadish Rane. "Microbial management of crop abiotic stresses: Current trends and prospects." In Microbial Management of Plant Stresses, pp. 251-260. Woodhead Publishing, 2021.
- Ratnaparkhe MB, Satpute GK, Kumawat G, Chandra S, Kamble VG, Kavishwar R, Singh V, Singh J, Singh AK, Ramesh SV, Kumar V, Sudhakaran S, Srivastava MK, Shesh N, Jajoo A, Gupta S, Singh M, Xu D, Bhattacharya M, and Nguyen HT. (2021). Genomic Designing for Abiotic Stress Tolerant Soybean. In: Genomic Designing for Abiotic Stress Resistant Oilseed Crops (Ed: Chittaranjan Kole). XXV, pp. 283, Springer International Publishing.
- Singh AK, George P, Lalitkumar Aher, Kumar M and Rane J. (2021). Genomics, molecular breeding, and phenomics approaches for improvement of abiotic stress tolerance in wheat. In: Improved Cereal Productivity through Climate Smart Practices (Eds. Sareen S, Sharma P, Singh C, Jasrotia P, Singh GP, Sarial AK). Woodhead Publishing Series in Materials. Pp 99-122.
- Singh AK, Kumar M and Rane J. (2021). Enhancement of water stress tolerance in crop plants employing genetic engineering tools. In: Climate Resilient Agriculture for Sustainable

Production. (Eds. Singh NP, Kumar M, Singh Y and Singh NV). 2021. Today & Tomorrow Printers and Publishers. Pp.247-259.

• Kakade Vijaysinha, Morade Amrut, Kadam Darshan (2021) Dragon Fruit (Hylocereus undatus) in Tropical Fruits: Theory to Practical by SN Ghosh and RR Sharma.

Technical Bulletin/Extension Folders

- Boraiah KM, Basavaraj PS, Harisha CB, Jagadish Rane, Kochewad SA, Rajkumar, PB Taware and Pathak H (2021) Establishing a Genetic Garden for Abiotic Stress Tolerance: Concept,Planning and Activities. Technical Bulletin No. 35. ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra, India, pp: 22.
- Boraiah KM, Basavaraj PS, Harisha CB, Kochewad SA, Khapte PS, Bhendarkar MP, Kakade VD, Rane J, Kulshreshtha N and Pathak H (2021) Abiotic Stress Tolerant Crop Varieties, Livestock Breeds and Fish Species. Technical Bulletin No. 32. ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra, India, pp: 83.
- Gaurav Singh B.K. Rao Raj Kumar V.D. Kakade Dinesh Jinger D. Dinesh R.A. Jat A.K. Singh Gopal Kumar V.C. Pande Charan Singh Anand Kumar (2021) Sapota (*Achras zapota*) based Ecological Engineering Measures for Ravine Slope Stabilization and Sustainable Productive Utilization in Semi-Arid Regions of Gujarat (Technology extension folder).
- Kakade V, Jinger D, Dinesh D, Singh G, Bhatnagar PR, Pande VC, Jat RA, Singh AK, Singh C, Makwana BC (2021) Nursery and propagation techniques of Dragon fruit (Technology extension folder).

Popular Article

- Kalbande, S.R., Ramteke, K.K., Bhendarkar, M.P., Kalbande, P.R., and Wanjari, R.N., (2021). Environmental Impact of Aquaculture. Aqua-International, (10) 103-108.
- Mukesh Bhendarkar and Manoj Brahmane, 2021. Gift for Aquaculture: GIFT Tilapia. Aquastar,(1): 46-47.
- Kakde Vijaysinha, Sangram B Chavan, Vanita Salunkhe (July, 2021) Dragon fruit: Is it the next big thing in Indian horticulture (Down to Earth).

- वनिता साळंखे व प्रांजली गेडाम (२०२१) साठवणकीच्या कांद्यामधील रोगांचे व्यवस्थापन, ऍग्रोवन, १४ मे, पृष्ठ क्र. १२.
- विजयसिंह काकडे. डीडी नांगरे आणि संग्राम चव्हाण डॅगन फ्रट/कमलम (मराठी विश्वकोश, २०२१)
- विजयसिंह काकडे, डीडी नांगरे. डॅगन फ्रट रोपनिर्मिती. (अग्रोवोन, पी. १०, ०६/०८/२०२१).
- विजयसिंह काकडे, वनिता साळंखे आणि संग्राम चव्हाण, डॅगन फ्रट एक नावीन्य पूर्ण फळ (ऑगस्ट, २०२१ शेतकरी मासिक).
- विजयसिंह काकडे. संग्राम चव्हाण. आरोग्यदायी डॅगन फ्रट. (अग्रोवोन, पी. १०, ०५/०८/२०२१).
- विजयसिंह काकडे, संग्राम चव्हाण, डॅगन फ्रट लागवडीचे तंत्र (अग्रोवोन, पी. १०, ०६/०८/२०२१).
- विजयसिंह काकडे. वनशेतीमद्धे बेल लागवडीचे नियोजन-संग्राम चव्हाण, प्रवीण माने, (अग्रोवोन- सप्टेंबर, २०२१).
- सोनल कालबांडे, करण रामटेके और मकेश भेंडारकर., (२०२१). एकीकृत मत्स्यपालन, नारी मासिक, पृष्ठ क्र. ४६-४७.
- सोनल जाधव, विजयसिंह काकडे, आणि संग्राम चव्हाण वनशेतीमद्धे आवळा लागवड (अग्रोवोन- सप्टेंबर, २०२१).

PERSONALIA

Awards / Recognitions

- 1. Dr Himanshu Pathak, Director, ICAR-NIASM received the prestigious "Dr NS Randhawa Memorial Award (2019-20)" of National Academy of Agricultural Sciences, New Delhi on November 13, 2021.
- 2. Dr Himanshu Pathak, Director, ICAR-NIASM delivered the "Dr RV Tamhane Memorial Award Lecture" of Indian Society of Soil Science on November 17, 2021.
- 3. Dr Himanshu Pathak, Director, ICAR-NIASM was included in the Reuters top 1,000 global climate scientists who had significant impacts the climate change research on and development.
- 4. Dr Boraiah KM was awarded "Young Plant Breeder Award- 2021" on the occasion of International Conference on "Advances in Agriculture, Environmental and Biosciences Sustainable Development (AAEBSDfor 2021)" held on August 05-07, 2021.
- 5. Dr VD Kakade identified as Member for framing out guidelines of dragon fruit cultivation in Maharashtra by Maharashtra State Horticulture & Medicinal Plant Board (MSHMPB), Pune.
- 6. Dr Pratapsingh Khapte was awarded "Young Scientist Award-2021" by Indian Society of Plant Physiology at National Conference of Plant Physiology organized by the society in collaboration with ICAR-NIASM, Baramati, Pune from 9-11 December, 2021.

Promotions



Dr Pravin B Taware promoted as Assistant Chief Technical Officer (T 7/8) since 03.09.2019.



Mrs Noshin Shaikh promoted as Technical officer (T5) since 13.07.2020.



Mr Santosh Pawar promoted as Technical officer (T5) since 16.07.2020.



Mr Pravin More promoted as Technical officer (T5) since 17.09.2020.



Mr Rushikesh Gophane promoted as Technical officer (T5) since 30.06.2021.



Mr Aniket More promoted as Technical Assistant (T3) since 01.03.2021.



Mr Dayanand P Kharat promoted as Assistant Admin Officer since 23.06.2021 A.N.







Transfers



Dr Mahesh Kumar, Scientist (Plant Physiology) transferred to ICAR-IARI, New Delhi on 24.12.2021.

New Joinings



Dr Hanmant M. Halli joined as Scientist (Agronomy) on 29.11.2021 after transfer from ICAR-IGFRI, Jhansi.