

From the Director's Desk

Highlights

- Litchi based Integrated Farming System model for low lying area
- Heavy bearing clone NRCL-85
- NRCL-29: A Precocious Flowering Genotype of Litchi
- Space Apportionment for Canopy Architecture Management in Litchi
- 18th Foundation Day
- Staff News

In this issue

NRCL Technology	2
News Features	5
Events and Meetings	6
Awards & Honours	9
Human Resources Development	
Visitors	10
Staff News	11



TCAR-NRCL is playing a pivotal role in conducting research, extension and human resource development for boosting horticultural growth in the country through technology development. The institute has so far developed several improved varieties of litchi and longan primarily addressing climate change challenges and augmenting tolerance to different biotic and abiotic stresses supported by a range of farmer-friendly technologies, for soil and plant health management, postharvest management and value addition.



an innovative hub of technology development that has led to development and commercialization of a number of technologies in the area of seed and quality planting materials, disease diagnostics, micronutrient formulations, microbial inoculants and mainstreaming technologies resulting in mitigation of problems in real-time farming situations. The institute is also empowering the trainers, growers and other stakeholders through gap analysis, technology refinement and knowledge sharing mechanisms.

It gives me immense pleasure to share the news that NRCL has developed Integrated Farming system based on one-acre model been highlighted in the present issue of NRCL Newsletter. NRCL has embraced the Integrated Farming Systems (IFS) approach to stabilise farm income through natural resource management and livelihood diversification. The ultimate aim of IFS is attaining sustainable agriculture by increasing farm yield and judicial use of available resources in order to address all three critical aspects of sustainability: economic, environmental and social. Integration of various agricultural enterprises viz., horticulture, cropping, animal husbandry, fishery, poultry, etc. have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labour employment. The 'one acre model' attempts to showcase the viability of integrated farming system approaches by introducing systematic changes in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources.

ICAR-NRCL has been spearheading the development of new and better genetic stocks of litchi. We are delighted to inform that three new genotypes with desired characters have been identified namely NRCL-29, NRCL-85 and NRCL-87. Proven technologies developed at the centre are being disseminated with the active involvement of scientific teams under the *Mera Gaon Mera Gaurav* and Farmers First Project spread over different villages and socio-economic groups. This programme also envisages issue of 'Soil Health Card' to the growers in the adopted villages. Through these farmer-friendly activities, the centre endears itself to promote a value change in livelihood options of growers in the long run.

(Vishal Nath) Director



NRCL Technologies

Litchi based Integrated Farming System Model for Low Lying Area

The country has achieved the self sufficiency in food primarily due to emphasis given on development of agriculture sector by the Govt. The main objective of the development were to raise the agricultural output and improve the food security that made India not only food selfsufficient, but also became the food exporting country. However, strategies were not distinctly recognize the need to raise farmers' income and did not mention any direct measure to promote farmers welfare consequently the farmers income remained low, which is evident from the incidence of poverty among farm households. For enhancing the farmers income accelerated growth of the farm income through harness all possible sources of growth in farmers' income by improvement of productivity per unit land, resource use efficiency, increase in cropping intensity, diversification and integration of multi-enterprises. Sustainable development through integrated farming system has been emerged as a viable way of improving farmers' income with optimum utilization of resources and environmental protection. Integrated farming system includes integration of multienterprises like crops (fruit, vegetables & other seasonal crops), livestock and fish culture that have shown the potential of improving the farm income of poor small farmers, who have very small land holding for crop production and a few heads of livestock to diversify farm production, increase cash income, improve quality and quantity of food produced and exploitation of unutilized resources. Accordingly, an integration farming system module in one acre of low lying area has been conceptualize and implemented in representative deep low lying areas (1.5-2.5 m water depth) at the centre.

Site development

The waterlogged low land area was converted into pond of about 2.5-3 m depth. The dug out soil was used to form high land pond dyke of 10-12 m width during creation of pond. The pond dykes were used for growing of multiple and diversified crops throughout the year. The pond was used for rainwater harvesting for irrigation purpose during lean period and for fish culture.

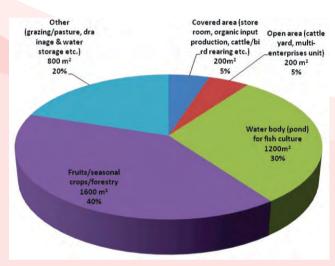
Water harvesting pond

A pond has been constructed in low lying area which remained fallow and unutilized due to water stagnation for about 4-5 month from July to November. This pond [40 m length x 30m breadth x 1.8 m depth] had the catchment area of the farm about one hectare. The soil excavation work was done through soil excavating machine. Rain-water from whole catchment area was accumulated in the pond during

rainy season with the storage capacity 2.16 million litre of water.

Integration of components

Various components like dairy, vermi-compost unit, fruit crops (litchi with banana, papaya), vegetables and other seasonal crops etc. were integrated on pond embankments and fish culture in pond. Fingerlings of *Pangasius* fish (Jasar) maintaining 8000/ha stocking density of 25-30 g were released during June and harvested in the month of March. Farm residues like banana plant, litchi leaves, and other crops stubble obtained from the system were utilized for production of vermi-compost. Component wise area covered in IFS module is presented in the figure.



Area covered under different components in one acre (4000 m²) IFS module Component wise area covered in one acre IFS model

System productivity

The water storage capacity of the pond is 2.16 million litre. Total expenditure incurred for construction of pond was about Rs. 1 lakh and hence cost of per litre harvested water was Rs. 47/1000 L water during first year of pond construction. Considering 75% capacity harvesting of water and a minimum life of pond 20 years with the maintenance cost of about 5% every year (Rs 5000/year), a total of 32.4 million litres water would be harvested. Therefore, considering the 20 year life span of the ponds, the cost of harvesting water would be a negligible amount of Rs 6.25/1000 L. Performance of different fruits and seasonal crops grown with litchi based cropping system revealed that litchi cv. Shahi showed vigorous plant growth than China at 2 years of planting. Banana cv. Grand Naine grown with litchi

produced bunch weight ranged from 19.12-28.8 kg/plant with average yield 41.0-51.9 t/ha. Similarly, papaya cv. Pune Selection-3 recorded fruit yield of 10-26.8 kg/plant with average yield of 18.2-27.2 t/ha and 0.92-1.48 kg fruit weight. The highest total net return/year, average net return and B:C

Integration of different components in one acre IFS model

Heavy Bearing Clone NRCL-85

NRCL-85, a new clone identified from the NRCL Field Gene bank, is an early maturing genotype, highly nutrient efficient, regular bearing and produce good yield. A fast growing nature with very vigorous growth, very rough trunk surface and dark green leaf with highly wavy margin marks the characteristic feature of this clone. Fruit bearing intensity is very high with 30-40 fruits/cluster. It has oval fruit shape with obtuse fruit tip, smooth shoulder, sharp fruit segment and reddish yellow pericarp at maturity. Fruit possess 18-22 g, 32.45-34.57 mm length and 28.45-30.75 mm width, 17.70 °Brix, 1.30 % acidity and 15-20 mg anthocyanin per 100 g of peel. It is tolerant to fruit cracking. The pulp is dull white, acidic in taste, juicy and is highly suitable for processing industries.



NRCL-29: A Precocious Flowering Genotype of Litchi

During germplasm evaluation studies, open seedling populations of litchi maintained at seedling populations block of ICAR-NRCL were evaluated on the basis of litchi descriptors and promising materials identified. These materials were subsequently vegetatively propagated and raised in the field for further evaluation. Based on an evaluation study during the last 3 consecutive years (2015-18), NRCL-29 has been identified to be one of the most

ratio (Rs 28.77, 9.59/m² & 2.33, respectively) was obtained in banana+cowpea-cabbage cropping sequence followed by papaya+cowpea-cabbage (Rs 28.73, 9.57/m² & 2.41, respectively). Observations on production of milk, vermicompost, and fish are in under progress.



View of an IFS model

desirable genotypes notably characterized by precocious flowering (3rd year of planting). Plants also possessed drooping and dwarfing growth habit, and high content of anthocyanin (94.62 mg/100 g). This material is considered as important genetic stock of litchi which can be useful for further crop improvement program in litchi.



Flowering and fruiting characters of NRCL-29



NRCL-87: Large Fruit and Cracking Tolerant Genotype in litchi

The litchi germplasm available at National Active Germplasm Site for Litchi, ICAR-NRCL, Muzaffarpur were evaluated for fruit physico-chemical parameters for identification of superior genotypes for 3 consecutive years. Among the germplasm evaluated, NRCL-87 has been found highly desirable which set fruits regularly with heavy yields. This genotype is a hybrid of Gandaki Lalima and Shahi, obtained through a planned hybridization by enclosing trees of both varieties inside the cage along with honeybee boxes. The most notable feature of this genotype is high fruit weight (29.69g), large fruit size (>16% over standard commercial variety) and pulp content (>70%) and highly tolerant to sun burning and fruit cracking.





Flowering and fruiting characters of NRCL-87

Beheading Height in Litchi under Closed Spacings

In establishing orchards under closed spacings (2 x 2 m and 4 x 4 m), owing to increase competition of available resources, plant produce slender and long shoots for want of light, thereby shifting the fruiting zone towards the top of the tree. Besides producing weak branches, problems in executing spraying operations and harvesting are encountered. To contain tree within manageable height, the trees can be headed back at lower height with respect to their allotted spaces. Hence trees were beheaded back at 1.0 m from ground which sets flowers and fruits within the 3rd year. Since trees grow vigorously in height, remaining trees in 2x2 m and 4x4 m were beheaded back at 25-30 cm and emerged shoots were subjected to annual pruning. Thus, it's recommended that plants grown in 2x2 m, 3x3m, 4x4m, 5x5m and 6x6 m spacing should be beheaded back at 20 cm, 30 cm, 40 cm, 50 cm and 60 cm from ground with their maximum permissible height restricted to 2.5m, 4.0 m, 4.5 m, 5.5 m and 6.0 respectively. This practice facilitates monitoring of growth, flowering and fruiting performance of litchi, adoption of pruning strategies cultural practices and managing the canopy architecture.

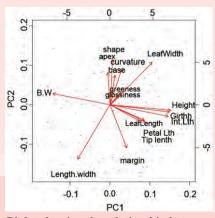


High density planting of litchi (2x2 m) after headed back at 1.0 m and 30 cm from ground

Bark: Wood ratio for identification of dwarf/low vigour litchigenotypes

An experiment was conducted at ICAR-NRCL to evaluate 490 seedling plants on the basis of vegetative growth characters like plant height and girth. Out of these, 127 plants, representative of the entire populations were selected for assessing the bark:wood ratio. Correlation results revealed that plant height, girth and internodal length shared strong positive correlation but were negatively correlated with bark:wood ratio. The dwarf-statured plants exhibited higher bark:wood ratio (1.09-1.14) compared to vigorous seedling plants (1.04-1.05). A biplot graph plotted based on PC1 and PC2 illustrates the importance of plant height, girth, internode length, B:W ratio, leaf width and leaf length:width ratio as contributing traits which can be considered useful in the diversity in tree vigour among population. Cluster analysis categorized 33 seedlings with higher bark:wood

ratio into a separate group which reflect seedlings with the lowest vigour. Bark:wood ratio can be useful in selection of dwarf rootstocks in litchi especially in high density y plantations.



Biplot showing the relationship between traits correlated with PC1 and PC2



Fruit thinning for regulation of fruit size in Longan

Fruit thinning is an essential practice in longan because of the high rate of fruit set and greater competition among developing fruit. In longan, a panicle may carry up to 100-150 individual fruits which vary in weight from 5 to 10 g. For improving fruit size, fruits of Gandaki Longan-1 are thinned about four to five weeks after fruit set (pea-sized stage). Removal of 40-50% fruits at 25-30 days after fruit set had a marked effect in increased fruit size by 60-90% over control. Thinning of fruit not only increases fruit size but also reduces biennial bearing tendency in longan.





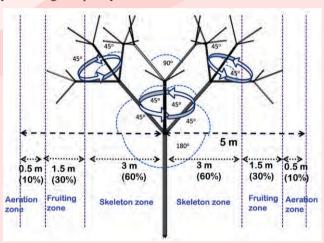


Effect of fruit thinning on fruit size in longan

Space Apportionment for Canopy Architecture Management in Litchi

The designing of canopy architecture in different density depends on the space provided to each plant in each direction. While developing design for canopy, the skeleton frame, angle of branches, axis of growing branches, spacing between the growing branches, orientation of branches etc. are essentially kept in mind. Considering a plane of 180° angle at branching point on main trunk, orientation of emerging primary branch must be designed in a manner to avoid formation of narrow crotch angles (<45°), which permit maximum retention of 4 branches equally distributed

on all sides. Under square system of planting the plants are designed in such way that the canopy grow uniformly in each direction where as in rectangular system the branch orientation is allowed on wider spaces in two directions. Litchi bears on 6th order branches. For a balanced fruiting, yield and overall tree architecture, the space allocated for each zone must be decided in favour of flowering and fruiting. As a matter of fact, 60% space in one direction should be allotted for skeleton, 30% for fruiting terminals and 10% for aeration zone in square system. Development of good canopy architecture will ensure efficient harvest of light energy, improves air circulation within canopy, facilitates efficient execution of spraying operations, minimized build up of pests and diseases and produce regular yield and good quality fruits.



Space apportionment in litchi

News Feature

AICRP (Fruits) Activities

The ICAR-NRC on Litchi, being a nodal institute is involved in monitoring the AICRP (Fruits) activities under litchi, implemented at 10 different centres. This includes 4 centres recently approved during 5th GD 2018. For aligning the activities in these centres, a visit was made by Crop Coordinator cum Director, NRCL to Gangian (PAU) and

NERI, Hamirpur to assess the problems and the possibility of executing the suitable experiments. At Gangian, the plants are quite robust and plantations of more than 50 years old were observed. However, there is less pest pressure within the research farm as well as in farmers' field which appears to be due to strong presence of natural enemies against various litchi pests. However the problem of nut borer or fruit borer was highlighted by farmers

during the discussion. In Himachal Pradesh, good litchi plantation exists in subtropical areas adjoining the Shivalik Hill Zone, especially Hamirpur, Bilaspur, Sirmaur and Kangra. Looking at the potentiality of litchi in these areas, a set of experiments was allotted to NERI, Hamirpur (UHF, Solan) centre for initiating trials under AICRP (F) under litchi from 2018 onwards.



Crop Coordinator with AICRP (Fruits) team members of Gangian (PAU)



Crop Coordinator Interacting with NERI, Hamirpur Centre Incharge at Farmer's Field



Events and Meeting

18th Foundation Day

The 18th Foundation Day was celebrated on 6th June, 2018. Dr. Vishal Nath, Director of the centre welcomed the guests and briefed about achievement of NRCL since last 18 years. The development of three new varieties of litchi viz, Gandaki Sampada, Gandaki Lalima and Gandaki Yogita was highlighted in his speech. He also apprised about some of the newer technology developed by the Centre such as, good agricultural practices (GAP), girdling for regulating bearing, NRCL Trichoderma-a biological fungicide with plant growth promotion activity, NRCL microbial consortium for enhanced growth, productivity and quality of litchi, processed product of litchi especially osmo-dehydrated litchi, integrated pre and post-harvest management practices for minimizing losses and increasing shelf life of litchi were prominently highlighted the adoption of which will benefit

litchi growers and processors in the region. Shri Nageswar Thakur, former District Horticulture Officer, Muzaffarpur was of the view that Foundation day of the centre should be organized in a grand manner and some farmer-friendly programmes could be organized. On this occasion. Shri Sanjeev Gupta, Horticulture Development Officer, Department of Horticulture, Jammu & Kashmir, present on the occasion apprised that J& K Government has plan to establish litchi village in plains of Jammu initially in 80 hectare land with the support of NRCL, Muzaffarpur. The programme was also attended by the farmers from Muzaffarpur, Vaishali, Samastipur, Sitamarhi, East Champaran and West Champaran districts of Bihar. The programme was coordinated by Dr. Vinod Kumar, Senior Scientist and was supported by all the scientists, administrative and technical staffs of the centre.



A glimpse of inaugural session of the 18th Foundation Day

National Science Day

National Science Day was observed on 28th Feb., 2018 at Ujhilpur village of East Champaran district selected under Farmers First Project. The programme was organized among farmers and children of the village. The programme was celebrated on the theme: Science and Technology for a Sustainable future. Dr. Amrendra Kumar shared his views on role of science and technology for common people and urged the farmers to adopt the new technology of litchi production. During the occasion, Dr. Kuldeep Srivastava, Dr. R.K. Patel and Dr. Sanjay K. Singh also expressed their views on importance of science and technology for sustainable agriculture to improve the nutritional and economic security of the farmers.



Scientists of NRCL interacting with participants on National Science Day



Inauguration of Integrated Farming Systems One-acre Model

NRCL has embraced the Integrated Farming Systems (IFS) approach to stabilise agricultural income through natural resource management and livelihood diversification with the ultimate aim of attaining sustainable agriculture by increasing farm yield and judicial management of resources in order to address all three critical aspects of sustainability: economic, environmental and social. With this regard, an Integrated Farming System (1 acre model) was inaugurated on 24th February, 2018 by Dr. WS Dhillon, ADG (HS), ICAR, New Delhi.

Integration of various agricultural enterprises viz., cropping, animal husbandry, fishery, forestry etc. have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labour employment. The 'one acre model' attempts to showcase the viability of integrated

farming system approaches by introducing systematic changes in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources. The farm wastes are better recycled for productive purposes in the integrated system thereby bringing bring prosperity in the farming.



Dr. WS Dhillon ADG (HS) inaugurated the Integrated Farming System

Inauguration of Screen House cum Potting Shed

The centre has developed well-equipped laboratories for conducting basic and applied research in litchi production and utilization over the years. The centre developed a Screen House cum Potting Shed for multiplication of litchi planting materials. The upgraded infrastructure will go a long way to fulfill the growing needs of the institution towards mass multiplication and propagation of quality litchi planting materials. The structure was inaugurated on 1st January, 2018 and can house more than 20000 plants.





Screen House cum Potting Shed for multiplication of litchi planting materials

Workshop on Improving Livelihood through advanced Agricultural Production Technologies

One day workshop cum scientist-farmers meet was organized on "Improving Livelihood through advanced Agricultural Production Technologies" by ICAR-National Research Centre on Litchi, Muzaffarpur, Bihar at Chakia, East Champaran district of Bihar on 17th March, 2018 under the aegis of Farmers First Project, to address the challenges and develop strategies for enhancing income of litchi growers. Deliberations in the workshop were organized in on



Dr. S.K. Singh, Senior Scientist (Horticulture) and PI (Farmers' First Project) addressing the participants during the workshop



key aspects like: new innovations in litchi production and value chain management, production system management for improved profitability including fertigation, improved plant canopy architecture, regulation of bearing and harvesting systems, diagnostics for pest and disease

Workshop on Water Management in Litchi Orchards

A two day workshop on "Water Management in Litchi Orchards" was organized at ICAR- NRC on Litchi under the aegis of *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY) sponsored by ATMA, Muzaffarpur on 4-5 May, 2018. Several litchi growers, entrepreneurs and stakeholders took

management and market intelligence. More than 250 farmers participated in the workshop. The gathering was addressed by Dr. Vishal Nath, Director, Dr. S.D. Pandey, Dr. SK. Purbey and Dr. Sanjay K Singh, PI of Farmers First Project.

part in the training. Information on various aspects of water management, fertigation and new innovations in water management which can be taken up by the farmers were discussed in great details to the satisfaction of the audience. A lively discussion was led by Dr. Vishal Nath, Director of the centre and other scientists various queries were answered and solutions provided.



International Day of Yoga

ICAR-NRC on Litchi celebrated the 4th anniversary of "International day of Yoga" on 21st June 2018 as per common yoga protocol issued by Ministry of Ayush, Govt of India and ICAR's guidelines. Yoga is an invaluable gift of India's ancient tradition. The event was led by the Dr. S.D. Pandey, Principal Scientist and events were coordinated by Dr. Prabhat Kumar, Nodal Officer (Yoga Day) which was followed by talks on various topics including Yoga and consciousness. The yoga asanas were conducted under the supervision of trained yoga instructor, who apart from

conducting the exercises also informed about the benefits of each asana. The instructor educated the participants about the importance of Yoga for stress free healthy living and healthy mind. A Yoga practice session was conducted in the morning session. The activity started with body setting exercises followed by routine yoga practices and postures. Scientists, Technical, Administrative and Skilled supporting staff of ICAR-NRCL enthusiastically participated in the Yoga celebration. The function ended with the pledge to do yoga regularly to live healthy life and contribute more in the progress of the nation.





NRCL Newsletter



इस अविध के दौरान राजभाषा कार्यांवयन सिमित की 2 बैठके और 2 कार्यशालाओं का आयोजन किया गया। राजभाषा हिंदी के प्रचार प्रसार हेतु कुल 6 भिन्न प्रतियोगिता नामतः वर्ग पहेली, प्रश्नोंत्तरी, श्रुत लेखन, आशुभाषण, टंकन तथा निबंध लेखन प्रतियोगिता का आयोजन किया गया और उतक्रिष्ठ प्रदर्शन करने वाले प्रतिभागियों को पुरस्कृत भी किया गया। विभिन्न हिंदी प्रतियोगिताओं के विजेताओं को पुरस्कार और प्रमाण पत्र के साथ सम्मानित किया। प्रत्येक प्रतियोगिता के विजेताओं को क्रमशरू प्रथम द्वितीय और तृतीय पुरस्कार तथा 70 प्रतियोगियों को भी सांत्वना के रूप में प्रतिभागिता पुरस्कार भी दिए गए। हिंदी कार्यशाला सह पुरष्कार वितरण समारोह 10 जनवरी, 2018 को

Awards and Honours

Dr. Vinod Kumar, Sr. Scientist (Plant Pathology) received Fellow of Indian Phytopathological Society (FPSI) Award, 2016 during the 70th Annual Meeting & National Symposium of the Society held at Assam Agricultural University, Jorhat, Assam (15-17 February, 2018).

किया गया। नराकास की पहली छह माही बैठक 10 जनवरी, 2018 को किया गया। डॉ. सुशील कुमार पुर्वे, प्रधान वैज्ञानिक एवं केंद्र के राजभाषा हिन्दी प्रभारी ने हिंदी के महत्व और उसकी बढ़ती लोकप्रियता के संदर्भ में अपने-अपने विचार सभा के सम्मुख रखे। अपने अध्यक्षीय संबोधन में निदेशक महोदय डॉ. विशाल नाथ ने हिंदी प्रतियोगिताओं के विजेताओं को बधाई दी एवं हिंदी पखवाड़ा आयोजन समिति के सदस्यों को पखवाड़े के सुचारु ढंग से संचालन के लिए धन्यवाद दिया। डॉ. नाथ ने हिंदी पखवाड़े के सफल आयोजन पर प्रसन्नता जाहिर की तथा आयोजक समिति के सदस्यों की इस सफलता के लिए सराहना की साथ ही उन्होंने सभी कर्मचारियों से राजभाषा कार्यान्वयन से जुड़े नियमों के अनुपालन हेतु आग्रह किया।



Human Resource Development

S.No.	Title	Venue & Date	Participant (s)
1.	Rajbhasa Sangosthi	ICAR-NRC on Litchi, Muzaffarpur 10 January, 2018	Dr. Vishal Nath Dr. SD Pandey Dr. SK Purbey
2.	Brain storming session on increasing productivity of litchi	PAU, Ludhiana 28 January, 2018	Dr. Amrendra Kumar
3.	National Symposium on "Plant Health Management: Embracing EcoSustainable Paradigm"	AAU, Jorhat 15-17 February, 2018	Dr. Vinod Kumar
4.	5 th Group workers meet on AICRP on fruits	ICAR-NRCB, Trichy 15 -18 February, 2018	Dr. Vishal Nath Dr. Amrendra Kumar Dr. SK Purbey Dr. Evening S Marboh
5.	Short course on "New Perspectives in Fruit Crops Research"	TNAU, Coimbatore 5-14 March, 2018	Dr. SK Singh
6.	Review of the coordinated programmeof Mango, Guava and Litchi under AICRP Fruits by QRT at CISH, Lucknow	ICAR-CISH, Lucknow 11-13 April, 2018	Dr Vishal Nath Dr Amrendra Kumar Dr E S Marboh
7.	Review meeting of FFP at ATARI, Kolkata	ATARI, Kolkata 28 April 2018	Dr S K Singh
8.	National Conference on Intensification and Diversification in Agriculture for Livelihood and Rural Development	DrRPCAU, Pusa	Dr Vishal Nath Dr S D Pandey Dr Amrendra Kumar Dr K Srivastava Dr E S Marboh Dr Alok K Gupta
9.	National Conference on Strategies and challenges in doubling farmer's income through horticultura Technology		Dr. S K Singh







Shri B.B. Singh, Chairman and Managing Director of MSTC Ltd, a Mini-Ratna PSU, under the Ministry of Steel, at the centre on 20th February, 2018





Shri Ram Surat Rai, Ex-MLA, Aurai (Muzaffarpur) visited the centre on 24th January, 2018





Dr. W.S. Dhillon, ADG (HS) visited the centre on 24th February, 2018





Dr. A.K. Srivastava, Chairman, Agricultural Scientists Recruitment Board, ICAR, New Delhi visited the centre on 29th May, 2018



Staff News

Promotion/Selection

- Dr. S.K. Singh has promoted from Scientist (Senior Scale) to Sr. Scientist (Fruit Sc.) w.e.f. 07th January, 2017.
- Sh. Ajay Kumar Rajak has promoted from Skilled Supporting Staff to Technician T-1 w.e.f. 09th April, 2018
- Sh. Surendra Rai has promoted from Skilled Supporting Staff to Technician T-1 w.e.f. 27th June, 2018.
- Probation of Ms. Ekta, LDC has been cleared w.e.f. 17th May, 2018.
- Probation of Sh. Ritesh Kumar, LDC has been cleared w.e.f. 24th May, 2018.

Transfer/Deputation

 Dr. Swati Sharma, Scientist (Fruit Science) relieved from ICAR-NRC on Litchi, Muzaffarpur on 30th June, 2018 to join ICAR-IIVR, Varanasi



 Sh. Subhankar Dey, AF&AO relieved from ICAR-NRC on Litchi, Muzaffarpur on 24th May, 2018 to join as Accounts Officer (on deputation basis) at AIIMS, Patna.

Publications

Research Articles

Kumar V., Anal A.K.D., Nath V. 2018. Biocontrol fitness of an indigenous Trichoderma viride, isolate NRCL T-01 against Fusarium solani and Alternaria alternata causing diseases in litchi (Litchi chinensis). International Journal of Current Microbiology and Applied Sciences 7(3): 2647-2662. https://doi.org/10.20546/ijcmas. 2018.703.306.

Kumar V., Anal A.K.D, Nath V. 2018. Growth response of litchi to arbuscular mycorrhizal co-inoculation with Trichoderma viride, Azotobacter chroococcum and Bacillus megatarium. Indian Phytopathology 71(1): 65-74. https://doi.org/10.1007/s42360-018-0010-6.

Kumar V., Anal A.K.D. 2018. Incidence and severity of leaf, panicle and fruit blights of litchi caused by Alternaria alternata. Indian Phytopathology 71(1): 153-157. https://doi.org/10.1007/s42360-018-0012-4.

Kumar V., Anal A.K.D., Rai S., Nath V. 2018. Leaf, panicle, and fruit blight of litchi (Litchi chinensis) caused by Alternaria alternata in Bihar state, India. Canadian Journal of Plant Pathology 40(1): 84-89.

Pandey A.K., Singh P., Singh, S.K. 2018. Impact of different doses and methods of application of paclobutrazol on leaf area and flush length of litchi cultivars. International Journal Chemical Studies 6(1): 1422-1425.

Books/Book Chapters

Marboh, E.S. and Gupta, A.K. (2018). Advances in edible coatings and films for fresh fruits and vegetables. In: Emerging postharvest treatment of fruits and vegetables; Eds.: Kalyan Barman, Swati Sharma, Mohammed

Wasim Siddiqui (Eds.). Apple Academic Press Inc, 9 Spinnaker Way, Waretown, New Jersey, USA, 510 p.

Pongener, A., Darshan, M.B., and Yanthan, A.W. (2018).

Postharvest Treatments to Reduce Browning in Minimally Processed Products. In: Emerging Postharvest Treatments of Fruits and Vegetables (Eds. Barman, K., Sharma, S. and Siddiqui, M.W.). Apple Academic Press, USA & CRC Press, Boca Raton, Florida, USA. ISBN: 9781771887007.

Pongener, A., Pandey, S.D. and Nath, V. (2018). Litchi. In: Fruit Science: Culture & Technology, Volume 3 Sub-Tropical Fruits (Ed. Bal, J.S.). New India Publishing Agency, New Delhi, pp 141-166.

Pongener, A., Sharma, S., and Purbey, S.K. (2018). Heat treatment of fruits and vegetables. In: Postharvest Disinfection of Fruits and Vegetables. Siddiqui, M.W. (Ed.) Elsevier, San Diego, California. ISBN: 9780128126981.

Papers in Seminar, Symposium and Conference

Anal A.K.D., Kumar V. and Varma A. 2018. Effect of environmental factors on growth and sporulation of Alternaria alternata causing leaf, panicle and fruit blights of litchi (Litchi chinensis). In: International Conference on "Novel Applications of Biotechnology in Agricultural Sectors: Towards Achieving Sustainable Development Goal" (20-21 March, 2018), Banaras Hindu University, Varanasi, India, pp 178.

Kumar V., Sharma S., Kumar G. and Nath V. 2018. Arbuscular mycorrhiza, Trichoderma and PGPR work in-tandem benefiting Litchi (Litchi chinensis) in calciorthant soils of Bihar, India. In: National Symposium on "Plant Health Management: Embracing Eco-Sustainable Paradigm" (15-17 February, 2018), Assam Agricultural University, Jorhat, Assam, India, pp. 86-87.

Kumar A., Radhakrishnan T., Singh B.K., Mishra G.P. and Dobaria J.R. 2018. Stress Inducible Expression of BcZAT12 Transcription Factor in Transgenic Groundnut (Arachis hypogaea L.) Conferred Tolerance to Drought and Salinity Stress. In: National Conference on Enhancing Productivity of Oilseeds in Changing Climate Scenario (7-9 April, 2018) at ICAR-Directorate of Groundnut Research, Junagadh, India, pp. 11-12.

Pramanik M., Ranjan R., Yadav R.S., Kumar P., Kumar M. and Ramesha, M.N. 2018. Best in-situ soil moisture conservation technique for sustainable production of tree borne oilseed in degraded land of Bundelkhand In: A Compendium of Abstract of Papers of the Conference on "Farmers First for Conserving Soil and Water Resources in Western Region (FFCSWR-2018)", February 1-3, 2018. Sharma, et al (Eds.). IASWC, pp 43.

Technical and Popular Articles

Nath, V., Gupta, A.K., Marboh, E.S., Srivastava, K., Kumar, V. and Singh, M. (2018). Gandaki Longan 1: First longan variety. *Indian Horticulture* **63**(1): 3-4.

कुमार, वि. (2018)। प्राकृतिक संसाधनों एवं ट्राइकोडर्मा से करें शून्य बजट खेती। मैं: वैज्ञानिक कृषि एवं पशुधन प्रबन्धन (संपादक-कामिनी कुमारी), एग्रोबायोस इंडिया प्रकाशन, नई दिल्ली (आईएसबीएन-9788193437339), पृष्ठ भाग 165-184।

सिंह, एस. के. (2018)। अनार की उन्नत खेती, में: वैज्ञानिक कृषि एवं पशुधन प्रंधन, जोधपुर, भारत, पृष्ठ भाग 344।

Technical Bulletins/Manuals

Purbey, S.K., Pongener, A. and Sharma, S. (2018). लीची के प्रसंस्कृत पे पदार्थ। Technical Manual, NRC on Litchi, Muzaffarpur, Bihar, India.

Purbey, S.K., Sharma, S. and Pongener, A. (2018). मिक्स सब्जी आचारः समृद्धि एवं स्वरोजगार. Extension Manual, NRC on Litchi, Muzaffarpur, Bihar, India.

Extension Bulletin

कुमार विनोद, संजय कुमार सिंह और सुशील कुमार पूर्वे। 2018। आम एवं लीचीः प्रमुख रोग एवं उसका प्रबंधन. प्रसार पुस्तिका संख्या 5 (फार्मर्स फर्स्ट परियोजना). भा.कृ.अनु.प.- राष्ट्रीय लीची अनुसंधान केंद्र, मुजफ्फरपुर, पेज।

कुमार विनोद, संजय कुमार सिंह और सुशील कुमार पूर्वे। 2018। 'सब्जी फसलों मे रोग प्रबन्धन'। प्रसार पुस्तिका संख्या 6 (फार्मर्स फर्स्ट परियोजना). भा. कृ.अनु.प.-राष्ट्रीय लीची अनुसंधान केंद्र मुजफ्फरपुर, पेज 12।

कुमार विनोद, संजय कुमार सिंह और सुशील कुमार पूर्वे. 2018. 'खाद्यान फसलों के प्रमुख रोगों का प्रबन्धन'. प्रसार पुस्तिका संख्या 7 (फार्मर्स फर्स्ट परियोजना). भा.कृ.अनु.प.-राष्ट्रीय लीची अनुसंधान केंद्र, मुजफ्फरपुर, पेज 12.

पाण्डेय, एस.डी., पटेल, आर.के., श्रीवास्तव, के., कुमार, ए., सिंह, एस.के. एवं नाथ, वि. (2018)। जैविक तकनीक द्वारा गुणवत्तायुक्त लीची उत्पादन'. प्रसार पुस्तिका-एन.आर.सी.एल.ई.बी.-25 (फार्मर्स फर्स्ट परियोजना). भा.कृ.अनु.प.-राष्ट्रीय लीची अनुसंधान केंद्र मुशहरी, मुजफ्फरपुर. 8 पृष्ट।

श्रीवास्तव, के., पटेल, आर.के., पाण्डेय, एस.डी., कुमार, ए., गुप्ता, ए.के. एवं सिंह, एस.के. (2018)। लीची एवं आमः एकीकृत कीट प्रबंधन। प्रसार पुस्तिका संख्या 5। (फार्मर्स फर्स्ट परियोजना). भा.कृ.अनु.प.- राष्ट्रीय लीची अनुसंधान केंद्र मुशहरी, मुजफ्फरपुर, 6 पृष्ट।

Published by

Prof. (Dr.) Vishal Nath, Director

Compiled and Edited by

Dr. Abhay Kumar

Dr. Ram Kishor Patel

Dr. Alemwati Pongener

Dr. Sanjay Kumar Singh

Dr. Kuldeep Srivastava

Contact us

Director

ICAR-National Research Centre on Litchi Mushahari Farm, Mushahari, Muzaffarpur 842 002, Bihar (India)

Ph: 0621-2289475; **Fax**: 0621-2281162

Email: nrclitchi@yahoo.co.in **Website**: www.nrclitchi.org

https://www.facebook.com/nrconlitchi

