



# Flori News



An Official half yearly Newsletter of  
**ICAR-Directorate of Floricultural Research**  
 (A ISO 9001 :2008 institute)  
 College of Agriculture Campus, Shivajinagar, Pune

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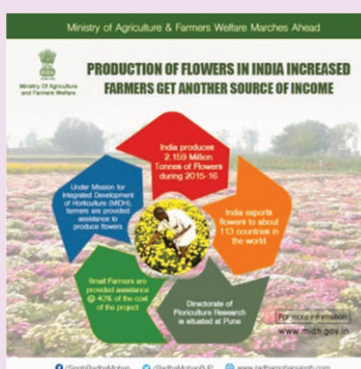
## From Director's Desk

Greetings from ICAR-DFR!

Team DFR was privileged to receive Honorable Secretary, DARE and DG, ICAR, Dr.Trilochan Mohapatra during October 2016 on his maiden visit to ICAR institutes in Pune. His towering presence was a great inspiration to all the members of the DFR. Hon'ble DG has reviewed the progress of work carried out by the scientific staff and offered very valuable suggestions for improvement. Important action points that were highlighted during the interaction include: hybridisation involving multiple parents for trait specific breeding; developing biomolecule profiles of flower crops; developing unique DNA fingerprints for Indian accessions of flower crops; estimation of essential oil; development of grower friendly 'On the spot/ On field diagnostics' or dipsticks for plant viruses; develop biocontrol agents, biopesticides and botanical insecticides; quantification of root exudates of marigold cultivars for nematode management; identification of races of root-knot nematodes affecting flower crops and vertical gardening. Team DFR has initiated three inter institutional projects to address some of the action points suggested by Hon'ble DG. ICAR-DFR was equally benefited by the visits of Hon'ble DDG Extension and Horticulture Dr.A.K.Singh and Dr.T.Janakiram ADG (HSII) who had reviewed the progress made by ICAR-DFR during July and October 2016 respectively.



**Dr. K.V.Prasad**  
 Director ICAR-DFR, Pune



Floriculture sector got its due prominence in recent times in the tweets released by the Department of Agriculture and Cooperation, Government of India which highlighted the establishment of Directorate of Floriculture at Pune as one of the initiatives to strengthen the research on floriculture besides a number of central sector schemes that support and promote floriculture sector through specific interventions.

Mechanization in Horticulture acquired attention owing to two brainstorming sessions organized by ICAR-CIAE Bhopal at Pune and Bhopal. ICAR-DFR actively participated in both the events to highlight the mechanization needs of

floriculture sector. An inter institutional project has been proposed between ICAR-CIAE and DFR to address the critical gap. Team DFR also organized a brainstorming session on Nursery Standards in association with the Maharashtra Nurserymen Association to address one of the major grey areas in the nursery trade.

Occurrence and spread of phytoplasma diseases among floricultural crops has been on the rise in recent times. ICAR DFR has been documenting the manifestation in different flower crops and also organizing awareness programmes in the adopted village on management strategies. I have great pleasure in presenting the second issue of the Flori News.

Happy reading!

*K.V. Prasad*  
**(K.V.Prasad)**

“I know a bank where the wild thyme blows, Where oxlips and the nodding violet grows, Quite over-canopied with luscious woodbine, With sweet musk-roses and with eglantine.”

- William Shakespeare



# Research Updates

## Crop Improvement

### Promising Gladiolus Hybrids

The hybrids of gladiolus (crossing attempted at DFR in year 2011-12, 2012-13 and 2013-14) sown at Katrain were further evaluated and some of the promising hybrids were identified and evaluated for morphological traits. Total 44 hybrids were identified with promising traits and data was collected for morphological traits.



Invitatie X Yellow Stone



Yellow Stone X Purple Flora



Flavo Sovenior X Haunting Song



Flavo Laguna X Ocilla



Peter Pears (OP)



Invitatie X Yellow Stone (5)

## Harnessing Natural Pigments from Flower Crops for Making Agro-based Value Added Products

Different flowers can be utilized for their antioxidant values and have the potential for pharmaceutical and nutraceutical development and in cosmetics. Flowers are the best bet for providing widest range of nutraceutical pigments as well. Petals and other flower parts are important source of the colouring pigments, pharmaceutical and nutraceutical compounds along with vitamins. In view of this ICAR-DFR, Pune has initiated a collaborative project with ICAR-NRCG Pune towards harnessing natural pigments from flower crops for making value added products. In this project we are studying natural pigments (flavonoids, total phenolics, carotenoids etc.) of Marigold, Chrysanthemum and Rose germplasm. Studying the antioxidant capacities through DPPH, ABTS and reducing power assays and further detailed HPLC analysis for novel compounds will pave a way for developing efficient extraction methods.

## Crop Protection

### Phyllody in China aster a Threat in Loose Flower Cultivation

Surveys conducted across various open fields across Maharashtra in 2016, revealed wide occurrence of various characteristic symptoms of the infection of phytoplasma in China aster, a fastidious phloem inhabiting bacteria. The incidence of symptoms ranged from 20 to 30 percent and included stunting, witches broom, stem proliferation and fassiation, loss of apical meristem - enhanced auxiliary bud growth, greening of coloured flowers ie virescence and floral structures turned into leafy structures ie., Phyllody' (Fig.1 and 2).



Figure1 and 2 Phytoplasma infected China aster plants exhibiting malformations





## Research Updates

The infection is not recognizable in the early stages which are a matter of serious concern. Manifestations during flowering affect the production of quality flowers. Infected flowers don't set seeds as well.

### An Array of Fungal Diseases Identified in Flower Crops

A wide array of diseases of biological origin is responsible for reducing the quality and quantity of ornamental flowers drastically. We have identified some pathogens which were found to be associated with different flower crops as summarized under.

#### Alternaria Leaf Spot of Gerbera

The spots are circular to irregular, up to 10 mm in diameter with concentric rings, and greyish to dark brown giving a blighted appearance to the foliage. Conidiophores are light to dark brown, simple, straight or bent, solitary or in fascicles. Conidia are dark brown, obclavate, muriform, in chains, beaked with 3-6 cross and 1-4 longitudinal septa.



a) Symptoms on Leaves



b) Alternaris sp Spores.

#### Red blotch of Amaryllis

Infection starts at leaf apices as necrotic lesions, which progress inwards forming irregular spots. Acervuli and spores typical of *Colletotrichum* sp. are produced. Acervuli are epiphyllous, discoid, subcircular with dark brown septate setae. Conidia are hyaline, cylindrical to clavate. Alternaria spores were also found with *Colletotrichum* spores.



a) Leaf blotch of Amaryllis



b) Mixed infection of *Colletotrichum* sp. and *Alternaria* sp.

#### Alternaria Leaf Spot of Tuberose

The symptoms characteristically initiate from the leaf and progress gradually inwards and downwards with wavy margins. Conidiophores are usually hypophyllous, brown, simple, short, septate and in fascicles, with tips olivaceous. Conidia are subhyaline to olivaceous, obpyriform, with 4-6 cross septa and 1 or 2 longitudinal septa.



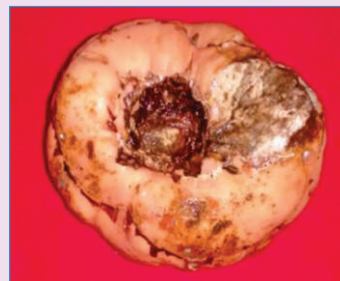
a) Leaf spot on Tuberose



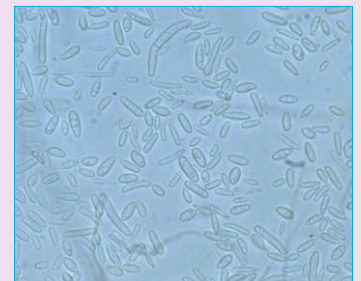
b) Alternaria spores

#### Fusarium Wilt of Gladiolus

The fungus invades the vascular tissues of the roots, corms and leaf bases. This disease is caused by the *Fusarium oxysporum* f sp. *gladioli*. The fungus can survive in soil indefinitely as mycelium, clamydospores, microconidia and macroconidia. The corms become softened, wrinkled and mummified in storage.



a) Gladiolus corm rot



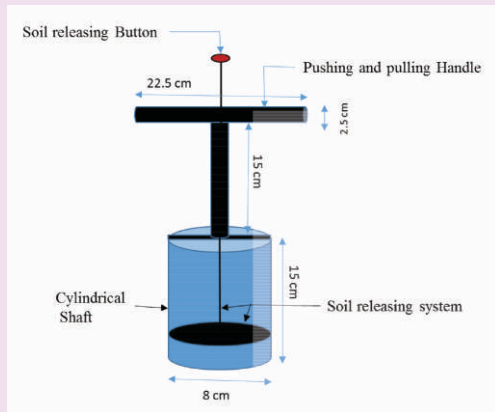
b) Macro conidia and Micro conidia of *Fusarium oxysporum* f sp. *Gladioli*

#### Design and Development of a Prototype Hand held Bulb Planter

Bulbs/Corms of some flower crops like Gladiolus, Tuberose etc are planted on raised beds or ridges. The depth and spacing between the bulbs depend on variety and type of flower crop. In general, the planting depth of bulbs is three times height of bulbs. It is therefore important to ensure that the bulbs/corms are planted deeply enough (approx. 10 cm.). Planting of these bulbs or corms is often done manually. When planted it is difficult to maintain proper depth of bulbs or corms.

ICAR-DFR has fabricated a prototype of a bulb/corm planter to improve the efficiency of planting.





Prototype Hand held Bulb Planter

The hand held planter has mainly three parts, cylindrical shaped shaft which insert into the soil to make hole for planting of bulbs or corms, soil releasing system and handle for pushing and pulling of planter into soil. It gives efficiency, precision and timeliness in operations. Hand held planter for planting of bulbs of flower crops is an important tool for profitable and competitive floriculture. This planter will save the time and money.

### Institute Research Council Meeting

The IRC meeting of ICAR-DFR was held on 23<sup>rd</sup> November 2016 to undertake midcourse corrections of the researches being initiated in the beginning of the year. All scientists presented the previous work done and proposed technical programme for next six months.



IRC meeting of ICAR-DFR on 23rd November 2016

### New Projects

The following new projects are initiated at ICAR-DFR in the IRC meeting held on 23<sup>rd</sup> November 2016.

1. Harnessing Natural Pigments from Flower Crops for Making Value Added Products from Grapes in collaboration with ICAR-NRC for grapes, Pune.
2. Development of Unique DNA Fingerprints of Flower Crops. In collaboration with ICAR- NRC Plant Biotechnology, New Delhi.
3. Etiology and Integrated Management of Fungal Diseases of Flower Crops (Institutional)
4. Design, Development of Tools and Gadgets for Floriculture. In collaboration with CIAE, Bhopal.

## Brainstorming on Mechanization in Agriculture

Dr. K. V. Prasad, Director, ICAR-DFR and Er. Rahul S. Yadav, Scientist, ICAR-DFR, Pune attended brainstorming session-cum Interaction meet on “Engineering Interventions for Production and Processing of Horticultural Crops” organized at ICAR-Central Institute of Agricultural Engineering, Bhopal on 24-25<sup>th</sup> October, 2016. Dr. W.S. Dhillon, Additional Director General (Horticulture), ICAR was the chief guest of the inaugural programme of brainstorming session. The objective of this programme was to address the urgent requirement of engineering intervention and interdisciplinary R&D efforts in unit operations in value chain of horticultural crops. ICAR-DFR also actively participated in one day stakeholders meet on Mechanization in Horticultural Crops organized by CIAE, Bhopal in College of Agriculture, Pune.

## Extension Activities

### ICAR-DFR Participated in the 1st International Agro Biodiversity Congress 2016

ICAR-DFR participated in the First International Agro Biodiversity Congress from 6<sup>th</sup> to 9<sup>th</sup> November 2016. The Congress was inaugurated by the Honorable Prime Minister



Dr. K.V. Prasad, Director DFR explains about various exhibits at the ICAR-DFR stall to Padma Bhushan Dr. M.S. Swaminathan.



Dr. A. K. Singh DDG Horticulture & DDG Extension ICAR admiring the floral exhibits





Shri. Narendra Modi on 6<sup>th</sup> Nov 2016 at Vigyan Bhawan. The ICAR-DFR Stall showcased the diversity in traditional flowers with fresh samples of traditional flowers, value added floral products like veni, garlands, bunches, floral crowns, floral plaits etc. that were sourced from Pune and ICAR, DFR Regional Station at Vemagiri, Kadiyam, Andhra Pradesh and various AICRP centres.

### Field Day -cum-Training Programme on Chrysanthemum at ICAR-DFR, Pune

ICAR-Directorate of Floricultural Research (DFR) organized “Chrysanthemum Day” at Shivajinagar Research farm on 20<sup>th</sup> December, 2016. The purpose of the chrysanthemum day was to showcase the varieties and production technologies developed by the ICAR-DFR and State Agricultural Universities (SAUs) as well as other ICAR institutions under AICRP (Floriculture) for the benefit of farmers and other stakeholders. Chrysanthemum growers from Village-Kusur and Pimpalwandi, Tal-Junnar, Dist Pune were invited for the field day-cum-training programme on chrysanthemum. Chrysanthemum varieties were planted under drip irrigation and mulching system was the main attraction to farmers. 150 varieties were displayed during the field day.



Farmers visit during chrysanthemum day



Dr. Tarak Nath Saha explaining the merits of chrysanthemum varieties to farmers

### Mera Gaav Mera Gaurav

ICAR-DFR has launched the Mera Gaav Mera Gaurav and completed the benchmark survey to select Kusur village in the lap of Shivneri hill fort under Junnar taluka in Pune district

where more than 50% of the farmers are involved in floriculture. It is one of the major villages that contribute significant quantity of loose flowers to Mumbai market. ICAR-DFR makes regular visits to Kusur village on every last Saturday and provides training and assistance to farmers.



Meeting of scientists and farmers at Kusur village

On 3<sup>rd</sup> September 2016, an “On-Farm Training on Phytoplasma Diseases” was organized at Kusur village. A full day interaction session on phytoplasma diseases of flower crops was organized where Scientists of ICAR-DFR, Dr. Ganesh Kadam, Mr. Girish, K.S. and Dr. Nitika Gupta delivered lectures on various aspects of phytoplasma diseases and flower production.



On- Farm Training on Phytoplasma Diseases in Kusur village



Farmers at Kusur observing nematodes through microscope





## Celebration of “World Soil Day”

The ICAR-DFR celebrated the World Soil Day on 5<sup>th</sup> December 2016 and the soil health cards were distributed to farmers at KVK, Narayangoan. The programme was jointly organized by ICAR-DFR, Pune and KVK Narayangaon. About 100 farmers were invited from various places and soil health cards were distributed.



Dr. K.V. Prasad, Director, ICAR-DFR distributing soil health card to farmers.

## ICAR-DFR participates in Regional Agricultural Fair 2016 held at Muzaffarnagar

ICAR-DFR actively participated in Regional Agricultural Fair 2016 held at Muzaffarnagar from 27<sup>th</sup> November to 01<sup>st</sup> December, 2016 by organizing a stall with various flower and floriculture products. The Regional Agricultural Fair 2016 was inaugurated by Honble Minister of State for Water Resources, River Development & Ganga Rejuvenation Mr Sanjeev Balyan. The stall was appreciated by all the stakeholders who paid the visit and it was the biggest farmers fair in Muzaffarnagar ever organized.



Caption \*\*\*\*\*

## ICAR-DFR participates in “Kisan Diwas” at IARI Regional Station, Pune

ICAR-DFR participated and organized a stall in the agriculture fair organized as part of “Kisan Diwas” at IARI Regional Station, Baner. Mrs. Ravinder Kaur, The Director, IARI and Dr. J.P.Sharma, Joint Director Extension, IARI visited and appreciated the stall. All the Scientists of ICAR-DFR participated in the mela actively and interacted with the farmers.



Kisan Diwas at IARI regional station, Pune.



The Director, IARI and Joint Director Extension visit DFR stall.

Rajbhasha

## “Hindi Diwas” Celebrated at ICAR-DFR

ICAR-DFR organized “Hindi Pakhwada” from 5<sup>th</sup> September, 2016 to 20<sup>th</sup> September, 2016. Different competitions like Essay, Hand Writing, Word Dictation, General Knowledge, Hindi and English Word Writing, were organized in which all the scientific, administrative and temporary staff of ICAR-DFR participated. At the end of the week “Hindi Diwas” was celebrated. Dr. J. V. Patil, Associate Dean of College of Agriculture, Shivajinagar, Pune, was the chief guest.







Mr. Rupesh Kumar Pathak receiving prize and certificate for "Hindi-English Shabdalekhan"

## Other happenings

### Hon'ble Director General ICAR Visits DFR

Secretary Department of Agricultural Research and Education, Government of India and Director General, Indian Council of Agricultural Research Dr Triolohan Mohapatra visited three research institutions and two regional stations of Indian Council of Agricultural Research on 21st October 2016 to review the work done. At the Directorate of Floricultural Research (DFR) he launched the inaugural issue of the Flori News the official news letter of ICAR-DFR and also unveiled the Wall Magazine -Petals in English and Pankhudi in Hindi. He interacted with all the scientists and discussed in depth the research accomplishments of the scientists and offered valuable suggestions for further improvement. He inaugurated the refurbished glasshouse and reviewed the experiments conducted in it. He took part in the sawaach bharaat pakhwada and presented swaach kits. He opined that Floriculture has a greater potential to double the farm income that addresses the aspirations of the Government.



DG, ICAR unveiling the Wall Magazine – "Petals"



DG, ICAR reviewing scientists research works



DG, ICAR visiting glasshouse experiments



DG, ICAR launching the inaugural issue of the "Flori News" the official news letter of ICAR-DFR



DG, ICAR visiting glasshouse experiments





## Deputy Director General ICAR Visits DFR

Deputy Director General (Agricultural Extension) and Horticultural Science In charge visited Pune to review the works at ICAR-DFR and also to oversee the land allocated to ICAR-ATARI, Pune along with Dr. Y.G.Prasad, Director, ATTARI, Hyderabad. During his visit the biometric attendance system of ICAR-DFR was inaugurated.



DDG, overseeing the land allocated to ATARI, Pune



DDG inaugurating biometric attendance system

## Assistant Director General (HSII), ICAR visits DFR

Dr. Janakiram, Assistant Director General (HSII) visited ICAR-DFR on 27<sup>th</sup> July 2016 to review the work and activities at DFR and as DDG nominee, Departmental Promotion Committee. He interacted with individual scientists and administrative staffs and gave assurance of all support from SMD to ICAR-DFR.



Dr. Janakiram, ADG (HSII) monitoring research experiments at ICAR-DFR.

## Director IARI and Joint Director Extension IARI visits ICAR-DFR

Dr. Ravinder Kaur, Director, IARI and Dr. J.P.Sharma, Joint Director Extension, IARI visited ICAR-DFR and agreed to handover some more rooms in the premises for smooth conduct of work at ICAR-DFR.



Dr. K.V. Prasad welcomes Dr. Ravinder Kaur Director, IARI to ICAR-DFR with a floral bouquet

## Dr. A.P.S. Gill visits ICAR-DFR

Dr. A.P.S.Gill, former National Consultant (Floriculture) APEDA, Ministry of Commerce and former Head Department of Floriculture, Punjab Agriculture University visited ICAR-DFR as Chairman, Departmental Promotion Committee on 27<sup>th</sup> July 2016.. He has provided valuable suggestions for the improvement of various activities undertaken at ICAR-DFR.



## ICAR-Directorate of Floricultural Research Celebrates 7th Foundation Day

ICAR-DFR celebrated the 7<sup>th</sup> Foundation day on 12<sup>th</sup> December 2016. Dr. S.K.Malhotra, Agriculture and Horticulture Commissioner, Ministry of Agriculture and Farmers Welfare, Government of India was the Chief Guest and delivered the 7<sup>th</sup> Foundation Day Lecture on "Accreditation of Indian Nurseries: The Way Forward". Dr. Malhotra discussed about the importance of development of nursery standards and the need







Dr. S.K. Malhotra, Agriculture and Horticulture Commissioner delivering the foundation day lecture



Dr. T.A. More delivering the presidential address.

for nursery accreditation to ensure quality planting materials for both domestic and export market. Dr. T.A. More former Vice Chancellor, MPKV, Rahuri, presided over the function. Dr. S.D. Sawant, Director, ICAR-National Research Centre for Grapes, Dr. V. Mahajan, Director (In charge), ICAR-Directorate of Onion and Garlic Research, Dr. R.S. Patil, Director Research, MPKV, Rahuri and Dr. S.K. Sharma, In Charge IARI Regional Station, Pune, representatives from nursery industry, Maharashtra Nurserymen Association and Indian Nurserymen Association graced the occasion. Two progressive farmers from the ICAR-DFR adopted village, Kususur, were felicitated for their pro-active role in accepting latest technologies and for motivating other farmers.

The foundation day lecture was followed by a Brainstorming Session on “Ornamental Plants Nursery Standards” chaired by Dr. S. K. Malhotra, Agriculture and Horticulture Commissioner, with Dr. K. V. Prasad, Director, ICAR-DFR as co-chairman. Mr. Devendra Jagtap, CEO Jagtap Nurseries and Gardens and representative of Maharashtra Nurserymen Association made a presentation on “Nursery Standards for Ornamental Flowering Trees and Palms: Where Do We Stand”. He presented various requirements of proper standards in trees and ornamental palms. Dr. Ganesh Kadam, Scientist (Floriculture),



Dr. S. K. Malhotra, Agriculture and Horticulture Commissioner, interacting with Mr. Devendra Jagtap, CEO, Jagtap Nursery



Nursery representatives actively involved in the brainstorming session

ICAR-DFR made the brief presentation on “Global Nursery Standards”. Dr. Ashish Hansoti, CEO, Tropica nursery discussed various areas of nursery and floriculture industry where policy interventions are required. Dr. Prabha K, Scientist (Plant Pathology) and Mr. Girish K S, Scientist (Entomology) made a detailed presentation on “Quarantine Pathogens and Pests in Nurseries and Bio-security Issues”. The presentations followed discussions on various aspects like “Bringing plants in to country: Dos and Don'ts”.

### ICAR-DFR observed Vigilance Awareness Week

ICAR-DFR observed Vigilance Awareness Week from 31<sup>st</sup> October to 5<sup>th</sup> November 2016. All the staff members of the institute took the pledge not to involve in or promote corruption in the organization. A quiz to measure the knowledge on various vigilance related aspects was organized. As a part of imparting awareness, pamphlets on “Vigilance Angle” were prepared and distributed among the members of the organization. On the final day on 5<sup>th</sup> November, ICAR-DFR along with ICAR-NRC for Grapes, organized an interactive session with officials from Anticorruption Bureau, Maharashtra. ICAR-DFR staff taking vigilance oath



ICAR-DFR staff taking vigilance oath





## Swachhta Pakhwada at ICAR-DFR, Pune

The ICAR-Directorate of Floricultural Research organized Swachhta Pakhwada from 16<sup>th</sup> -31<sup>st</sup> October, 2016. Swachh Pledge was administered on 16<sup>th</sup> October along with the staff of IVAR, Regional station. Several cleanliness activities were initiated. On 21<sup>st</sup> October, 2016, Dr. Trilochan Mohapatra, Honorable Secretary, DARE and Director General of ICAR; Dr. Janakiram, ADG (Hort. Sci.-II), ICAR; Dr. K. D. Kokate, Director Extension Education, MPKV, Rahuri; Dr. Jai Gopal, Director, ICAR-DOGR, Rajgurunagar; Dr. S. K. Sharma, In-charge, ICAR-IARI (RS), Pune; Dr. K. N. Bhilegaonkar, In-charge, IVRI (RS), Pune and Dr. K. V. Prasad, Director, DFR, Pune along with all the staff of DFR and IVRI (RS) involved in cleanliness programme. Adjoining area of the institute and College of Agriculture Campus, MPKV were cleaned. Swachhta Kits were also distributed to housekeeping staff by DG, ICAR.



Team DFR taking Swachatha Pledge



DG, ICAR distributing "Swaach Kits" to housekeeping staff of ICAR-DFR.

## ICAR-DFR Celebrates 70th Independence Day

ICAR-DFR celebrated 70<sup>th</sup> Independence day with full zeal and happiness along with the staffs of IVRI and IARI regional station, Pune. Dr.K.V.Prasad, Director, ICAR-DFR hoisted the national flag and gave his Independence Day message to all ICAR staffs to be the pillars of support to keep our nation self sufficient in agriculture. Dr. Naik, former Director, ICAR-IIVR was also present. All the family members of the DFR staffs actively participated in the programme.



Dr.K.V.Prasad, Director, DFR hoisting the National Flag.



70th Independence Day celebrations at ICAR-DFR

## ICAR-DFR Celebrates National Education Day

ICAR-DFR celebrated Agriculture Education Day on 03<sup>rd</sup> December 2016 at Shri Shiv Chatrapati Mahavidyalay Junnar, Tal-Junnar, Dist- Pune for promoting the essence of education in agriculture and floriculture among the students. The students of science and commerce discipline participated in the programme. More than 100 students from class XI and XII standards along with their teachers were chosen. Dr. K V Prasad, Director, ICAR-DFR, Pune addressed the gathering and informed the students about the spirit behind celebrating Agricultural Education Day. Dr. Ganesh B Kadam, Dr T N Saha, Dr Prasanna Hollajer, Dr Girish K S, Scientists, ICAR-DFR highlighted about the various aspects of National Agricultural Research System and opportunities for students in fields of agriculture in general and horticulture in particular







Agriculture Education Day on 03rd December 2016 at Shri Shiv Chatrapati Mahavidyalay Junnar, Tal-Junnar, Dist- Pune

**Ascent**

Dr. Ganesh. B. Kadam got promoted from Scientist (GP6000) to Scientist Sr. Scale (GP 7000) with effect from 27<sup>th</sup> April 2015.

Mr. Ajay Uniyal, got MACP in the post of Stenographer w.e.f. 22<sup>nd</sup> July 2016.

Team DFR congratulates both of them.

**Personalia**

**Mr. Prabhath Ranjan, Administrative officer**

Mr. Prabhath Ranjan joined ICAR-DFR as Administrative officer with effect from 18<sup>th</sup> November 2016 and Mr. Sunil Kumar, SAO, DOGR, Rajgurunagar relinquishing his additional charge of AO, ICAR-DFR.

**Institution Building Activities**

Towards the development of Institute DFR, the milestones achieved so far includes, receipt of all the land records, benchmarking for digital survey at Vemagiri, Kadiyam, successful completion of Hydrological Survey at Shivajinagar and Hadapsar farm and preparation of master plan of Hadapsar farm. Ground water Geological survey of borewell/open well site selection at Shivajinagar and Hadapsar was carried out on 6<sup>th</sup> to 9<sup>th</sup> December 2016 and three and nine locations respectively were identified from these two farms.



Hydrological survey at Shivajinagar farm

