

**DEPARTMENT OF AGRICULTURAL RESEARCH AND EDUCATION  
MONTHLY SUMMARY - AUGUST 2018**

**INTERNATIONAL COOPERATION:**

- (i) As partner of International Wheat Genome Sequencing Consortium, has contributed in identifying 107,983 genes for exploitation in breeding of wheat varieties for quality, disease resistance and climate resilience.

**MAJOR RESEARCH ACHIEVEMENTS**

**Varietal Improvement:**

- (i) Six wheat varieties Viz. HD 3226, PBW 752, HD 3237, HI 1620, PBW 757 and DBW 187 were identified for release for cultivation under different agro climatic conditions.

**Agricultural Biotechnology:**

- (i) Haplotype networks and phylogenetic relationships in a diverse set of genotypes including Indian *Oryza nivara* / *O. Rufipogon* wild rice accessions and representative varieties of four rice cultivar groups based on pericarp color (*Rc*), grain size (*GS3*) and eight different starch synthase genes (*GBSSI*, *SSSI*, *SSIIa*, *SSIIb*, *SSIIIa*, *SSIIIb*, *SSIVa* and *SSIVb*) were created. The results supported the polyphyletic origin of cultivated rice with a complex pattern of migration of domestication alleles from wild to different rice cultivar groups.
- (ii) Ninety-one bottle gourd accessions were profiled with 23 SSR primers for genetic diversity analysis. Fourteen cabbage samples were profiled with 26 SSR primers. Visual and real-time loop-mediated isothermal amplification assays targeting P-35S-cry1Ac construct region were developed, which showed acceptable specificity and limit of detection of 0.01%. The developed assays could facilitate rapid/on-site GM detection and to test presence of commercialized Bt cotton events in the country.

**Conservation of Genetic Resources:**

- (i) One hundred eighty nine accessions were added to the National Genebank bringing the genebank holdings to a total of 4, 38,478. Additionally, regenerated material (394 accessions) was also added to long-term conservation.
- (ii) Seed health testing of 2695 samples was carried out in Plant Quarantine for its pest free conservation in National Genebank and 2691 samples were found qualified for long term storage.
- (iii) One thousand eight hundred and seventy four accessions (1874) comprising of cereals, oilseeds, grain legumes and Arabidopsis were introduced from nine different countries for supply to various indenters across the country. The important accessions introduced were improved rice lines with submergence and bacterial blight tolerance (EC956439-956453) from Nepal and Wheat Zip4-Ph mutant lines (EC955298-955309) from UK.

**Natural Resource Management:**

- (i) Developed organic farming package of practice for soybean-Isabgol system with B: C ratio of 1.27 at Bhopal (Madhya Pradesh).

- (ii) At Rahuri, in deep black clayey soil, drip fertigation with 125% recommended dose of fertilizer (RDF) to papaya (var. Taiwan 786) resulted in significantly higher fruit yield of 167.47 t/ha and 81.6% saving of irrigation water with net return of Rs.448952/ha compared to flood irrigation.
- (iii) Foliar spray with hexaconazole/ propiconazole @ 0.1% at 45 DAS and *Pseudomonas fluorescence* @ 10g/ kg seed or spray the crop with mancozeb (0.3%), 3-4 times at 15 days interval or iprodione (0.05%) 2 sprays at 15 days interval is recommended for alternaria blight in Sunflower.
- (iv) It is recommended that growing border crop of jowar (4 rows) with higher seed rate (@ 200 kg/ha) of groundnut treated with imidacloprid 600 FS @ 1 mL/kg of seed followed by foliar application with Thiocloprid 480 SC@ 0.3 mL/L at 20 DAS, and Acetamaprid 20 SP @ 0.2 g/L at 35-40 DAS reduces pod boror neurosis) disease (PBND) incidence and thrips damage as well as increases pod and haulm yield.
- (v) Validation of HYDRUS-2D model to predict soil water dynamics and root water uptake in wheat under different tillage and irrigation management. It was observed that there was significant improvement in the predictability of soil moisture content by HYDRUS 2D model after imposition of Inverse modeling option.
- (vi) Leaf folder infestation in drumstick was treated with spray of dimethoate@1.5 ml per litre of water and found effective.
- (vii) Integrated management of vector borne viruses in chilli was developed using nursey raising under nylon net, seedling spray with systemic insecticides followed by seedling dip in Imidacloprid (0.5ml/L) at nursery stage. In the main field border crop with maize, silver mulching followed by spraying of Acepahte @ 1.5g/L+Neem oil 2.0ml/L followed by Virogourd (2.0ml/L), and sea weed extract (2.0ml/L) in rotation at seven days interval until fruit formation significantly reduced virus incidence and two-fold increase in yield.

#### **Development of Farm Implements, Machinery and Post - Harvest:**

- (i) Developed a tractor operated variable width raised bed former for vertisol.
- (ii) Developed two row tractor front mounted cotton stalk puller consisting of two cotton stalk pulling units with adjustable row widths.
- (iii) Prepared freeze dried camel milk powder.
- (iv) Developed solar lighting system with centralized DC battery charger in a tribal village of M.P.
- (v) Developed an onion de-scaler to reduce drudgery and clean the onions effectively.
- (vi) Developed a fungal laccase based bio-bleaching process for value addition to jute and allied fibres.
- (vii) Developed Nano cellulose polymer based PVA Composite Film.

#### **Public Outreach:**

- (i) Frontline demonstrations on oilseed and pulses were taken up all over the country covering an area of 8984.06 ha and involving 26284 farmers.
- (ii) 161 field-days with the participation of 5104 farmers and 617 *Kisan Goshties/Melas* with the participation of 51634 farmers were organized.

- (iii) Over 4770 training courses for 139639 farmers, 477 trainings for 7796 rural youths and 362 trainings for 8694 extension functionaries and in-service personnel were organized in the frontline areas of technology development.
- (iv) Besides, KVK scientists undertook 11772 visits to the farmers' fields for diagnosing various problems and to sensitize them on location specific recommendations during past one month.
- (v) In *Mera Gaon Mera Gaurav* program 404 scientists visited 405 villages and organized 951 demonstrations benefitting 40990 farmers. A total of 5102.54 quintals of seed and 24.83 lakh planting materials were also distributed to 8509 and 131878 farmers respectively.
- (vi) A new cell line from gill tissue of catfish, *Pangasianodon hypophthalmus* was developed, characterized and authenticated which would be useful for the assessment of toxicity of aquatic pollutants.
- (vii) During the month, vaccinations with 3600 doses of *Ranikhet* Disease (RD), 3500 doses of Infectious Bursal Disease (IBD), 5200 doses of *Marek's disease* and 2600 doses of fowl pox were carried out in broiler, layer, turkey, guinea/*desi* fowl/emu.
- (viii) National Collection of Dairy Cultures (NCDC) supplied 52 nos. freeze dried cultures to 5 cooperative dairy and milk plants in private sector for fermented milks and cheese; and microbial strains to 5 educational institutes for teaching and research purposes.

#### **Application of Space Technology:**

- (i) Automatic Weather Station (AWS) installed at ICAR-VPKAS, Almora through department of space ISRO and Indian Institute of Remote Sensing (IIRS), Dehradun is being regularly used for weather data collection (average Temperature, maximum and minimum temperature, RH, wind speed, wind direction, solar radiation, rainfall, dew point) as well as transmission to IIRS.
- (ii) Agro-met advisory bulletins are being prepared on every Tuesday and Friday based on the past weather data, current weather data and weather forecast received for next five days on different weather parameters viz. maximum and minimum temperature, rainfall, cloud cover, wind speed and wind direction from Regional Meteorological Centre, India Meteorological Department, Agromet Advisory Unit, Safdarjung, New Delhi in Hindi as well as in English. During July 20 – August 19, 2018, total 8 agro-advisory bulletins were prepared in Hindi as well as in English and SMSs were sent to the farmers through Kisan portal. These advisories are sent to IMD for preparation of national bulletins and uploaded on the IMD website ([www.imdagrimet.gov.in](http://www.imdagrimet.gov.in)) in both Hindi and English. These advisories and real time weather data along with medium range weather forecast was uploaded on the IARI website ([www.iari.res.in](http://www.iari.res.in)).
- (iii) One Indian Regional Navigation Satellite System (IRNSS) through ISRO as a part of Ministry of Earth Science project entitled "To explore the potential application of Infrasonic supported by Ionosonde, GPS and Sodar for Earthquake Precursor Studies" is regularly being used for data collection and the weekly data files till 17.08.2018 have been sent to NPL Delhi.

#### **OTHER MAJOR ACTIVITIES:**

- (i) Sh. Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers Welfare and Sh. Gajendra Singh Shekhawat, Union Minister of State for Agriculture and

Farmers Welfare, launched a non-dairy, vegan product, "Frozen coconut delicacy" developed by ICAR-Central Plantation Crops Research Institute, Kasaragod during 90th ICAR Foundation Day celebration on 16th July 2018.

- (ii) To strengthen collaborative wheat improvement program with CIMMYT, Mexico, a brainstorming session on "Breeding for yield potential vis-à-vis biotic and abiotic stresses in wheat: Integrating genomics to move ahead" was held under the chairmanship of DG, ICAR, at NASC, New Delhi. More than 50 scientists working on area on biotic and abiotic stresses in wheat shared their views to further strength research efforts to tackle to these stresses.
- (iii) A solar boat was designed and constructed of L<sub>OA</sub> 8.0m for fishing operation in reservoir and other inland water bodies. The boat can achieve an effective speed of 5 knots.