DEPARTMENT OF AGRICULT URAL RESEARCH AND EDUCATION
MONTHLY SUMMARY - DECEMBER 2018

INTERNATIONAL COOPERATION:

(i) A collaborative project entitled," Digitalisation of Plant Breeding Programme and Application of Next-Generation Breeding Approaches for Improving the Genetic Gain in Crops" between Bill & Melinda Gates and ICAR has been initiated.

MAJOR RESEARCH ACHIEVEMENTS

Varietal Improvement:

(i) Two wheat varieties namely AAI-W9 (irrigated late sown conditions) and AAI-W10 (irrigated timely sown conditions) have been approved for notification for release in U.P.
(ii) A Jumbo nut cashew hybrid, H-130 was approved for release and recommended for cultivation in the west coast region of india.

Agricultural Biotechnology:

(i) A marker set of rice consisting of 24 EST-SSRs, 42 hyper-variable genomic SSRs and 20 (GATA)n locus specific SSR markers were identified to predict heterosis to the extent of > 70%.
(ii) A total of 1810 samples of maize (BLA, BLB, BLC, BLD, MLA, MLB, MQA, MQB, DHQ-1, CQE-1 populations) were quantified for tryptophan by FT-NIR. In each population, the genotypes having > 0.60% Tryptophan content were identified.
(iii) Molecular characterization of flower locus gene was done in almond.
(iv) The bone marrow derived Mesenchymal stem cells (MSC) of porcine origin, an adult stem cell, could be maintained over 90 passages in culture without affecting their growth and differentiation potential (karyotype of MSCs) despite prolonged maintenance in tissue culture.

Conservation of Genetic Resources:

(i) About one thousand eight hundred and two accessions comprising of cereals, grain legumes, oilseeds vegetables, tubers and narcotics were introduced from 13 different countries. The important accessions introduced were barley accessions with rust resistance genes from Australia (EC967726-967724), Wheat high yielding lines from Mexico (EC968386-968435) and double haploid lines from UK (EC968471-969176).
(ii) Fifty-three specimens were added to the National Herbarium of Cultivated Plants bringing the holdings to a total of 23,619 specimens (as on November 30, 2018).

Natural Resource Management:

(i) Developed organic farming package of practice for maize (grain) - durum wheat –cowpea (fodder) system at Ludhiana (Punjab).
(ii) A family net vessel vermi-composting technology using household organic wastes has been developed.

(iii) The use of *Tamarindus indica* leaves as disinfectant against *R. equi* has been validated.
(iv) Biobed was prepared by mixing rice straw, FYM and top soil at the volumetric ratio of 50:25:25. Less than 10% pesticide residue recovered after 90 days of experiment. The mixture of straw, top soil and cow dung compost worked together very well which provided a good surface for microbial growth and helped to degrade the imidacloprid in a significant manner.
(v) Application of the biofilm inoculant (*Anabaena-Mesorhizobium ciceri*) resulted in 40-50% enhancement in availability of phosphorus in wheat under the zero tillage method of cultivation.
(vi) Application of Zn in different form inhibits ToLCNDV-potato multiplication in infected plants compared to control.
(vii) Neem oil (1%) and Metarhizium anisopliae @ 5g/litre were found promising against Galerucella birmanica infesting water chestnut.

Development of Farm Implements, Machinery and Post - Harvest:

(i) Developed tractor mounted garlic weeder.
(ii) Developed tea leaf plucking aid.
(iii) Developed pigeon pea pitting machine.
(iv) Developed microbial protein fortified biscuits.
(v) Process of paneer preparation from Yak milk is standardized.
(vi) Optimized Supercritical fluid extraction Parameters for oat millet oil extraction.

Public Outreach:

(i) Frontline demonstrations on oilseed and pulses were taken up all over the country covering an area of 13133.10 ha and involving 37256 farmers.
(ii) 367 field-days with the participation of 11464 farmers and 424 *Kisan Goshties/Melas* with the participation of 40338 farmers were organized.
(iii) A total 4063 training courses for 81696 farmers, 875 trainings for 7136 rural youths and 376 trainings for 5885 extension functionaries and in-service personnel were organized in the frontline areas of technology development.
(iv) In *Mera Gaon Mera Gaurav* program 770 scientists visited 696 villages and organized 948 demonstrations benefitting 51501 farmers. A total of 8697.09 quintals of seed and 20.17 lakh planting materials were also distributed to 8851 and 36534 farmers respectively.
(v) During the month, vaccination carried out as Ranikeht diseases (RD) 27300, Infectious Bursal Disease (IBD) 2700, Fowl pox 1800 and 23,400 doses of *Marek's disease* (MD) in layers/Broiler/turkey/Guinea fowl/Desi fowl/EMU.
(vi) Twenty six quality piggerms distributed to five progressive farmers of NEH region.

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) One Indian Regional Navigation Satellite System (IRNSS) through ISRO as a part of Ministry of Earth Science project is regularly being used for data

collection by VPKAS, Almora and the weekly data files till 17.12.2018 have been sent to NPL Delhi.

OTHER MAJOR ACTIVITIES:

(i) ICAR has approved registration of record 15 new breeds of livestock and poultry this year alone taking the total number of breeds registered upto 40 during 2014-18. These include two cattle breeds - Ladakhi (J&K) and Konkan Kapila (Maharashtra & Goa); three buffalo breeds - Luit (Assam & Manipur), Bargur (Tamil Nadu), Chhattisgarhi (Chhattisgarh); one sheep breed – Panchali (Gujarat); six goat breeds – Kahmi (Gujarat), Rohilkhandi (UP), Assam Hill (Assam & Meghalaya), Bidri (Karnataka), Nandidurga (Karnataka), Bhakarwali (J&K); one pig breed – Ghurrah (UP); one donkey breed – Halari (Gujarat) and one chicken breed – Uttara (Uttarakhand). These native breeds are renowned for heat tolerance, disease resistance and thriving on low input system. Union Minister of Agriculture and Farmers' Welfare Shri Radha Mohan Singh awarded breed registration certificates to the stakeholders.

(ii) The green LED lighting was effectivel in stimulating the hypothalamo-pituitary-gonadotrophic-somatotrophic axis in poultry. This resulted in more muscle mass and higher body weight gain, with high quality meat without causing any stress to the experimental birds.

(iii) Phytoremediation of effluent water using different macrophytes (*Ipomoea aquatica, Alternanthera philoxeroides, Eichhornia crassipes, Cabomba caroliniana, Hydrilla verticillata* and *Ceratophyllum demersum)* were conducted. Considering the nutrients removal and water quality parameters, *C. demersum* was observed to be a better macrophyte to treat aquaculture effluent. The phytoremediated water is used in recirculating aquaponic system which enhanced fish growth.