

# ICAR-NBPGR

## Newsletter



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### CONTENTS

<b>PGR ACTIVITIES</b>	<b>2-3</b>
Exploration and Germplasm Collecting	2
Germplasm Exchange	3
Plant Quarantine	3
Germplasm Conservation	4
Germplasm Characterization and Evaluation	4
Genomic Resources and Bioinformatics	-6
<b>OUTREACH ACTIVITIES</b>	<b>7</b>
<b>PERSONNEL NEWS</b>	<b>9</b>

### Large scale evaluation of genetic resources of sesame and cowpea under ICAR-DBT Progamme

Under the DBT funded project “characterization and evaluation of genetic resources of minor pulses for crop improvement”, a total of 3,720 accessions of cowpea germplasm collected from different regions of India and across the border were evaluated during *kharif* 2020 at NBPGR Experimental Farm, Issapur. The Cowpea accessions were evaluated in augmented block design with five check varieties (PL3, PL4, GC3, DC15, RC101). The genotypes were assessed based on 26 morphological traits.

Under the DBT funded project “mainstreaming sesame germplasm for productivity enhancement and sustainability through genomics assisted core development and trait discovery” a total of 4,825 accessions of sesame germplasm were evaluated during *kharif* 2020 at NBPGR Farm, Pusa Campus. Sesame accessions were evaluated in augmented block design with five checks (RT346, GT10, PB Ti12, TMV7, VRI1)



Fig 1. Aerial view of sesame germplasm grown at NBPGR Farm, Pusa Campus



Fig 2. Aerial view of cowpea germplasm grown at NBPGR Farm, Issapur



## PGR ACTIVITIES

### EXPLORATION AND GERMPLASM COLLECTING

Exploration and germplasm collection with focus on temperate fruits/wild edible bushes was conducted by ICAR-NBPGR RS Srinagar in different areas of Kashmir including Kokernag, Pahalgam, Tral, Lar, etc. besides Dachigam National Park in Srinagar and 60 valuable germplasm accessions belonging to as many as 16 genera and 25 species including some unique ones were collected. Interesting variability was collected especially in *Zizyphus* and *Crataegus*. One unique accession of *Zizyphus jujube* subsp. *spinosa*, a thorny bush/small tree growing wild in Kashmir was collected bearing fruits comparable to thorn less maintained type of *Zizyphus jujube* subsp. *jujube* in terms of fruit size, color and taste has been collected from Ganderbal area. Another unique accession of that of *Crataegus songarica* with comparatively much tastier and softer dark red fruits, locally called as 'Adeang' has also been collected from Ganderbal area.



Fig 3. Unique collected accessions of *Zizyphus jujube* subsp. *spinosa* (left) and *Crataegus songarica* (right)

### RS Thrissur

One local exploration and collection trip each were undertaken in the Malakkappara area of Thrissur District bordering, Tamil Nadu (01-02 Sep 2020) and to the Chulanur Peafowl Sanctuary in Palakkad

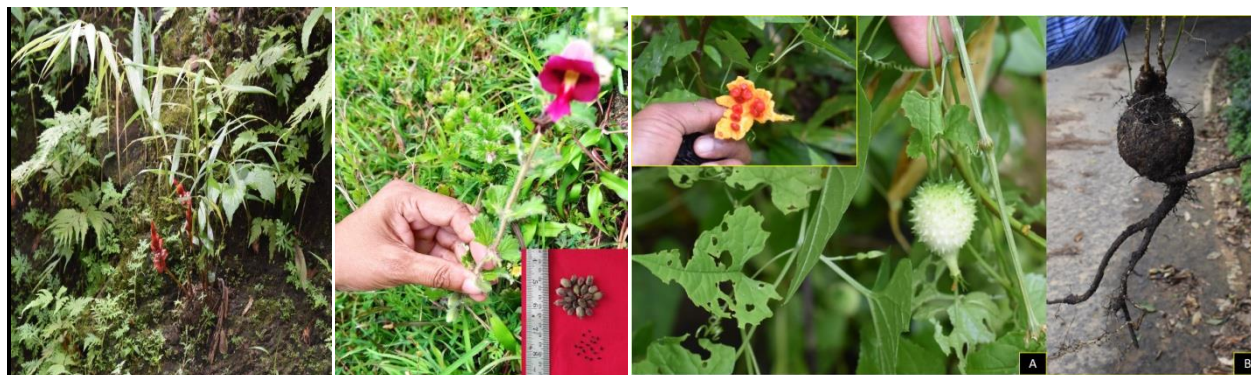


Fig 4. RS Thrissur

District (09 Sep 2020), and collected 24 samples including *Momordica* sp., *Zingiber*, *Pipersp* and *Sesamaum laciniatum*.

*Sesamum laciniatum*, a wild relative of *Sesamum indicum* collected from Chulanur Peafowl Sancturay in Palakkad Dist (**Top Left panel**). Collection of *Zingiber neesianum* from Malakkappara, Thrissur (**Top Right panel**) Collection of *Momordica sahyadrica* var. *anamalayanum* from Malakkappara (**Bottom panel; inset: mature fruit; right: tuber**).

## BC Cuttack

**Herbarium curation and identification:** About 130 voucher specimens were poisoned with alcohol+ HgCl<sub>2</sub> to prevent pest attack. Eighteen specimens were identified and labeled. A set of 2536 accessions of cultivated rice germplasm received from DGC, NBPGR New Delhi was sown for seed multiplication and conservation purposes.

## GERMPLASM EXCHANGE

### National Supply

**Thrissur:** A total of 61 accessions in various crops was supplied to eight user agencies under MTA for research purpose.

## PLANT QUARANTINE

### Import Quarantine:

A total of 14,826 imported samples was processed for quarantine clearance. Of these, 373 samples found infected with various kind of pests. Out of infected samples, 370 samples were salvaged using physico-chemical methods while 3 samples were rejected due to fungal pathogens of quarantine importance. Important interceptions were- *Bipolaris maydis* on *Zea mays* from China, *Callosobruchus maculatus*, *Bruchidius atrolineatus* and immature stages of bruchids on *Vigna unguiculata* from Tanzania and Uganda, *C. subinnotatus* on *V. subterranea* from Uganda and *Rhizopertha dominica* on *Oryza sativa* from Philippines, *Aphelenchoides besseyi* on *O. sativa* from Philippines, *Phalaris paradoxa* and *Bromus secalinus* in *Hordeum vulgare* imported from USA.

Various salvaging and prophylactic treatments such as mandatory prophylactic hot water treatment (678), pesticidal dip treatment to vegetative propagules (50) and 10% Trisodium Orthophosphate treatment (90) were given to imported germplasm samples.

Two post-entry quarantine inspections (virtual mode) were carried out by plant quarantine scientists for imported consignments. *Squash mosaic virus* (SqMV) was detected in seven accessions viz., EC1034211, EC1034218, EC1034230, EC1034247, EC1034269, EC1034286 and EC1034296 of bittergourd imported from AVRDC, Thailand. SqMV is of quarantine significance for India. Hence, these 7 accessions are rejected and incinerated.

A total of 23 accessions of exotic transgenic cotton germplasm imported from USA is being grown at containment facility and are being observed for symptoms by viruses, fungi and bacteria. In addition, 257 accessions of exotic germplasm comprising *Glycine* spp. (239), *Vigna sesquipedalis* (4) and *V. unguiculata* (14) are being grown in post-entry quarantine greenhouses at ICAR-NBPGR and are being

observed for virus-like symptoms. Harvest from 213 accessions of soybean (119) and *Phaseolus* spp. (94) were released to indentors after testing for viruses.

**Export quarantine:** Total of 256 samples were processed. Fifty samples were subjected to X-ray radiography and 50 were given EDCT fumigation. Besides, seven samples infected with fungi were also salvaged. In all, 256 samples were released for export after issue of two phytosanitary certificates.

**Seed Health Testing:** A total of 1,597 indigenous samples were processed for pest-free conservation. A total of 375 samples were infected with different pests. Out of infected samples, 359 were salvaged, while five samples were rejected due to interception of *Tilletia barclayana* and *Tilletia indica*. Healthy and salvaged samples were released for pest free conservation and cryo-preservation.

## GERMPLASM CONSERVATION

A total of 31 acc comprising *Cucumis sativus* var. *hardwickii* (16), *Cajanus cajan* (3), *Vigna radiata* (3), *Vigna mungo* (5), *Solanum violaceum* (1), *S. melongena* (2), *Hibiscus cannabinus* (1) were deposited for LTS in NGB.

### Thrissur

Three accessions (one accession, each of *Zingiber neesianum*, *Z. wightianum* and *Pouteria campechiana*) were sent to TCCU for cryopreservation.

**MTS at NBPGR RS, Thrissur:** A total of 10761 accessions comprising 9105 of different crop/CWRs of this station and 1656 accessions received from RARS, Pilicode and IARI, Wellington were being maintained at MTS, Thrissur. Three hundred and forty three voucher samples collected were also maintained at our MTS facility.

**Field Genebank:** A total of 1928 accessions of 375 species belonging to 165 genera was maintained in the field and pots under the shade, net, mist and poly houses.

### BC Cuttack

A total of 560 acc comprising M&AP (241), *Ocimum* spp. (34), *H. sabdariffa* (21), *Cajanus cajan* (3), tuber/aroids (27), horticultural crops (6), wild *Oryza* spp (178), wild *Abelmoschus* (33), *Costus speciosus* (6), *Hedychium* spp. (3), *Zingiber zerumbet* (1), *Luffa aegyptiaca* (3), *Trichosanthes cucumerina* (2), *Canavalia gladiata* (1) and *Scleichera oleosa* (1), are being maintained in the FGB/ experimental plots of the centre. Besides, stubbles of 165 accessions of wild rice germplasm under 19 wild *Oryza* spp. are being maintained in earthen pots for further research purpose.

## GERMPLASM CHARACTERIZATION/ EVALUATION

### Headquarter

**Ricebean** (*Vigna umbellata* L.) characterization

A total 1872 accessions of ricebean were characterized at ICAR-NBPGR, Issapur Farm, New Delhi under the DBT funded project “Integrated genomic strategy for accelerating domestication of ricebean (*Vigna umbellata*)” The characterization was done using 12 important agro-morphological characters in augmented block design using four checks i.e. PRR-1, PRR-2, VRB-3 and RBL-6 with the objective to develop ricebean core for enhancing utilization of the crop germplasm.



### Screening of urdbean germplasm against MYMV disease

Based on earlier field screening of urdbean germplasm against the disease a set 295 accessions was



**Fig 5. Partial field view of ricebean field at Issapur Farm.**

identified and screened in augmented block design at NBPGR Experimental farm, New Area following standard field screening practices. Infector row cum susceptible checks of CO-5 and LBG 752 was planted in a regular interval of five rows for better pathogen spread. Data on number infected plants per accession at three intervals was taken to understand disease progress. To understand disease severity, three plant data per accessions was taken for no. of leaves having disease symptoms and total number of leaves per plant was recorded.

#### BC-Cuttack:

- i) *Ocimum* spp. (34), *Hibiscus sabdariffa* (21) were grown for herbage/ oil yield and biochemical evaluation.
- ii) Morphological observations of *Abelmoschus* spp. (33) and *Luffa aegyptiaca* (3) were recorded for variability study.
- iii) Wild rice (194) including collections from WB (7) and received from New Delhi (16) during May, 2020 were grown for seed multiplication and characterization.
- iv) Sixty one acc comprising *Abelmoschus* spp. (33), *Hibiscus sabdariffa* (21), *Luffa aegyptiaca* (3), *Trichosanthes cucumerina* (2), *Canavalia gladiata* (2) and *Scleicheria oleosa* (1) were grown for seed multiplication and characterization..

## GENOMIC RESOURCES AND BIOINFORMATICS

Through the DBT funded project, DNA from 2496 sesame accessions were isolated and tested for its quality and quantity for performing GBS analysis.

Also, SEM images for *Sesamum indicum* subsp. *indicum* and *S. indicum* subsp. *malabaricum* to distinguish them on the seed surface morphology were performed.



Fig 6. SEM images of *S. indicum* and *S. malabaricum*



## OUTREACH ACTIVITIES

### On-farm Conservation

Dr. MC Singh participated as an expert in the Hello Kisan programme on DD Kisan channel on August 14, 2020.

Dr Joseph John K, Principal Scientist and Dr Suma. A, Scientist jointly delivered an invited talk online via google meet on “**Crop Wild Relatives Conservation and Plant Breeding Research**” in a webinar organised by K E College Mannanam, Kottayam Dist for the UG and PG students of Dept. of Botany.

### Exhibitions or fairs organized

One day “PGR/Farmer Rights Awareness Camp cum Biodiversity Fair” was organized by ICAR-NBPGR Regional Station Srinagar on 26<sup>th</sup> September, 2020 at village Nagbal, District Budgam (Jammu & Kashmir). During the camp scientists from DARS SKUAST-K, ICAR-IGFRI RS Srinagar and ICAR-NBPGR RS Srinagar interacted with the farmers about importance, value and advantages of local plant genetic resources and the relevance of traditional crops to the livelihood and nutritional security of tribal people especially under prevailing climatic uncertainties. 200 local farmers including 28 women attended the event. The farmers of the area have hailed ICAR-NBPGR for organizing this awareness programme.



Fig 7. SEM images of *S. indicum* and *S. malabaricum*

### Germplasm to and with farmers

#### Srinagar

10 kgs. of cool-season perennial tall fescue (*Festuca arundinacea*) forage grass were distributed among the farmers during an awareness camp organized by ICAR-NBPGR Regional Station Srinagar on 26<sup>th</sup> September, 2020 at village Nagbal, District Budgam (Jammu & Kashmir).

#### Thrissur

Accessions comprising Bael, Beejakela, *Garcinia speciosa*, Burmese Fish Tail palm, (JPNAJ-20/125), JPNAJ-20/130, JPNAJ-20/139, drumstick (SATN/Mis-20-42), Sweet gourd, rooted cuttings of Mulberry, Red bullock heart of A& Nicobar, juicy sugar cane, rooted cuttings of Gantola, *Zizyphus mauritiana*, red guava, rooted cuttings of Pepper and Dracaena supplied to on-farm conservators of various districts of Kerala. Seedlings of improved Papaya varieties viz. Arka Surya and Arka Prabhat (Source: ICAR-IIHR) were also supplied to 12 farmers.

**Mera Gaon Mera Gaurav (MGMG) activities, BC Cuttack** provided advisory services to the farmers of Jaypur Patana, Khurda district, Odisha regarding plant protection measures, diseases/ pest & weed management, use of fertilizers including preparation of bio-compost and regular use of mask, hand wash and maintain social distancing.

The center also provided seeds of two rice varieties and advisory services on cultivation and plant protection measures about these two rice varieties to the farmers of the Radhakrishnapur village cluster were provided. The feedback about the performance was also received from the farmers of Radhakrishnapur village cluster.

**Hindi Saptah Celebration** was organized online at Thrissur via zoom platform on 16/09/2020, with the active participation of all staff members, SRFs, Project Assistants etc. Dr. H. Vikram, Dept. of Pomology, KAU was the Chief Guest and gave a talk on “**Agricultural Education in India**” in Hindi.



## PERSONNEL NEWS

### Retirement:

**Sh. NS Patwal**, AO superannuated on 30<sup>th</sup> August, 2020.

### Transfers:

**Sh. Bhadra Kumar**, AAO, Thrissur was transferred to CMFRI, Cochin w.e.f. 23.08.2020.

### Joining:

**Dr. P P Thirumalaisamy**, Senior Scientist joined on 17.08.2020 on transfer from ICAR - Directorate of Groundnut Research, Junagadh, Gujarat

# ICAR-National Bureau of Plant Genetic Resources

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## Mandate

To act as the nodal institute at national level for acquisition, management and genomics based profiling of indigenous and exotic plant genetic resources (PGR) for food and agriculture and to carry out related research and human resources development for sustainable growth of agriculture

- Management and promotion of sustainable use of plant genetic and genomic resources of agri-horticultural crops and supportive research
- Coordination and capacity building in PGR management and policy issues governing access and benefit sharing
- Molecular profiling of varieties of agri-horticultural crops and GM detection technology research

## Objectives

To plan, organize, conduct and coordinate exploration and collection of indigenous and exotic plant genetic resources.

- To undertake introduction, exchange and quarantine of plant genetic resources.
- To characterize, evaluate, document and conserve crop genetic resources and promote their use, in collaboration with other national organizations.
- To develop information network on plant genetic resources.
- To conduct research, undertake teaching and training, develop guidelines and create public awareness on plant genetic resources.

