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**Six months Report of ICAR-NRCB**

# **AG-4419**

**Project entitled**

***Accelerated Breeding of Better Bananas’***

**Reporting Period: 1stOctober 2020 –31st March 2021**



**ICAR -National Research Centre for Banana**

**Thogamalai Road, Thayanur post, Tiruchirappalli – 620102 Tamil Nadu, India**.

Progress Narrative

General Progress

* A total of eight tetraploids of Neypoovan (AB) derived through *in vitro* polyploidization were evaluated under field.
* Morpho-taxonomic characteristics proved their tetraploid nature and were confirmed through flow cytometer.
* The morphological characters revealed that all had distinct morphology with inferior vegetative and yield characteristics with 20-45% lower bunch weight.
* All the tetraploid lines showed 60-90% pollen viability whereas diploid Ney Poovan showed <2% viability. One highly polleniferous tetraploid has been used as male parent resulting in more number of seed set upon crossing.
* Pisang Awak hybrids were evaluated under hot spot area of *Foc* race 1 and two hybrids were found to be tolerant.
* Till date, two batches of IITA hybrids 48have been received of which16 hybrids were established. First batch of hybrids (five nos.) were field planted at hot spot area to screen against FoC Race1 and their field performance.

Key Deliverable Deviation

* Sharing of improved diploids developed by ICAR-NRCB to IITA partners could not be accomplisheddue to the delay in getting approval for phase II of the project from ICAR-HQ, New Delhi.
* To speed the process of getting approval of the ABBB project, it requested to consider this project as phase II of BBB through Bioversity International, which has been accepted and being facilitated.
* The 32 out of 48 hybrids sent from IITA for evaluation could not established due to a delay in transit. Request has been made to resend the non established hybrids.

Plans for Next Reporting Period

* Mass multiplication of hybrids received fromIITA are under progress and will be taken for field plantinginTR4 hot spot areas.
* ICAR-NRCB developed improved diploids and other progenies (11 nos.) will be evaluated inTR4hot spot area.
* Remaining IITA hybrids will be planted under hot spot area against *Foc* Race 1
* Multiplication of hybrids will be continued, upon the receipt of 3rd batch of IITA hybrids, for which the application for import permit has been sent to ICAR-NBPGR. Upon the receipt of import permit, the hybrids will be tested evaluated.
* All the imported hybrids will also be evaluated for *Foc*race1 and TR 4 under pot culture studies.

Risks

* Man Power of BBB 1 project are still maintained for smooth progress of the project and salary will be given after signing of the sub grant agreement with IITA through Bioversity.
* The second wave of COVID-19 pandemic may extend the same problem of evaluating the hybrids at hot spot area of Foc TR 4.

Sustainability :Best performing IITA hybrid (OSH-75) will be evaluated in large scale for confirming the yield stability and consumer acceptability

Scalability : Seed setting was observed when the polleniferous tetraploid was used for crossing (derived through Chromosome doubling), and these tetraploids are being used as male parent to develop triploids.

Lessons Learned: Variation was observed among the eight tetraploids derived from chromosome doubled AB diploid. It revealed that doubling of chromosome using antimitotic agent can be used for create variability.

Table 1. Vegetative characteristics of chromosome doubled diploids (First Crop)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Vegetative characteristics | | | | |
| Days to flowering | Plant height (cm) | Plant Girth  (cm) | No. of suckers at flowering | Days to fruit maturity |
| NP1 | 376 | 236.61 | 58.42 | 3 | 30\* |
| NP2 | 291 | 233.05 | 76.2 | 4 | 82 |
| NP3 | 311 | 254.64 | 78.74 | 3 | 79 |
| NP4 | 276 | 273.84 | 58.42 | 3 | 100 |
| NP5 | 390 | 218.83 | 62.23 | 3 | 75 |
| NP6 | 378 | 272.57 | 76.2 | 4 | 38\* |
| NP10 | 365 | 250.58 | 59.6 | 3 | 38\* |
| NP77 | 341 | 273.68 | 63.5 | 1 | 65 |
| NP74 | Yet to flower | | | | |

\*Bunch fell before maturity

Table 2. Yield parameters of chromosome doubled diploids(First Crop)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Yield parameters | | | | | | | Pollen Viability  (%) |
| Bunch weight  (kg) | No. of hands | Weight of 2nd hand (g) | No. of fruits 2nd hand | Fruit length  (cm) | Fruit circumference(cm) | Fruit weight  (g) |
| NP1 | 2.1 | 3 | 250 | 8 | 6.4 | 8.83 | 38.6 | 86 |
| NP2 | 3.0 | 5 | 412 | 7 | 7.6 | 11.3 | 39.8 | 81 |
| NP3 | 5.9 | 8 | 530 | 9 | 7.8 | 11.8 | 59.5 | 89 |
| NP4 | 5.5 | 9 | 568 | 13 | 7.1 | 11.6 | 40.9 | 82 |
| NP5 | 6.5 | 7 | 768 | 11 | 8.3 | 13.9 | 85.3 | 92 |
| NP6 | 8.7 | 9 | 633 | 12 | 7.8 | 10.3 | 57.9 | 22 |
| NP10 | 1.0 | 3 | 101 | 8 | 4.8 | 7.8 | 24.1 | 89 |
| NP77 | 5.3 | 8 | 620 | 10 | 8.0 | 11.5 | 68.7 | 35 |
| NP74 | Yet to flower | | | | | | | |

Table 3. Yield characteristics of IITA hybrids (First batch)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sl. No | Name of IITA accessions | Bunch weight | Total number of hands | Total number of fruits | Number of fruits in 2nd hand |
| 1 | OSH-1 | 12 | 6 | 74 | 13 |
| 2 | OSH-10 | 14 | 8 | 92 | 14 |
| 3 | OSH-53 | 16 | 8 | 98 | 15 |
| 4 | OSH-75 | 21 | 10 | 124 | 15 |
| 5 | OSH-146 | 18 | 9 | 112 | 14 |

Table 4. Established NARTIA hybrids and other hybrids

|  |  |  |
| --- | --- | --- |
| S. No | Name of NARITA Hybrids | Number of plants in field |
| 1 | NARITA - 08 | 05 |
| 2 | NARITA - 12 | 03 |
| 3 | NARITA -14 | 04 |
| 4 | NARITA - 21 | 05 |
| 5 | NARITA - 23 | 02 |
| 6 | TMPX – 03 (OSH 3) | 01 |
| 7 | TMPX -10 (OSH 57) | 03 |
| 8 | TMPX -24 (OSH 27) | 02 |
| 9 | TMPX – 26 (OSH 29) | 02 |
| 10 | TMPX – 69 (OSH 84) | 01 |
| 11 | TMPX -117 (OSH 136) | 02 |















