

Minutes of 11th INGENIC Asia/Pacific Regional Working Group Meeting

Date : 16-18 June 2014

Venue : Reading University, Reading , UK

In Attendance

1. Romulo Cena, University of Southern Mindanao, Philippines, romy55cena@yahoo.com
2. Jeffrie Marfu, PNG Cocoa and Coconut Institute, PNG , marfuj@yahoo.com
3. Pham Hong Duc Phouc, Nong Lam University, Vietnam, phdphuoc@gmail.com
4. Haya Ramba, Malaysian Cocoa Board, Malaysia, hayaramba@koko.gov.my
5. Agung Susilo, Indonesian Cocoa and Cocoa Research Institute, soesiloiccri@yahoo.com
6. Anita Sari Indah, Indonesian Cocoa and Cocoa Research Institute. indah.sari83@yahoo.com
7. Elain Apshara, Central Plantation Crops Research Institute, India, elain_aphsara@yahoo.com
8. Michelle End, INGENIC, UK, michelle.end@cocoaresearch.org.uk
9. Paul Hadley, University of Reading, UK, p.hadley@reading.ac.uk
10. Andrew Daymond, University of Reading, UK, a.j.daymond@reading.ac.uk
11. Chris Turnbull, University of Reading, UK, c.j.turnbull@reading.ac.uk
12. Wilberth Phillips, CATIE, Costa Rica, wphillip@catie.ac.cr
13. Brigitte Laliberte, Bioversity, brig.lalib@gmail.com
14. Nguyen Duc Xuan Chuong, University of Nottingham, UK/Vietnam
15. Nicholas Cryer, Mondelez, UK, Nicholas.Cryer@mdlz.com
16. Martin Gilmour, Mars Inc., UK, martin.gilmour@effem.com
17. Juan Carlos Motamayor, Mars Inc., US, juan.motamayor@effem.com
18. Smilja Lambert, Mars Inc., smilja.lambert@effem.com



SUMMARY AND ACTIONS

- JC to share data evaluation protocol for regional clonal garden in Sulawesi discussed and results table format
- Countries to share raw data on individual trees selected for regional trial in Sulawesi
- Each country to populate results from regional breeding trials on table format agreed during Ingenic meeting in Reading

- Each country to calculate General and Specific Combing abilities for parents (of regional hybrid trial) or to send data (all regional hybrid trial data) to Miami for calculations
- All results above to be displayed on Ingenic Website for Asia's Breeding Group
- Countries to share, within the group, list of selected parents for regional activity on data sharing from trials using parents from unexploited genetic groups. Countries to avoid redundancy and to share task of testing new different combinations.
- Each country to try new parental combinations for **yield** and the following countries to **also focus on**:
 - o VSD: PNG , CPB: Indonesia and Philippines , Fat Content: Malaysia, Black Pod: Vietnam and India
- Three different sets of crosses (preferably 3 x 3 parents) will be performed for yield and the above traits:
 - o Simple hybrids
 - o Three way hybrids
 - o Multiple way hybrids
- PNG to share their available data on new hybrid combinations already tested (i.e., GUX x LCTEENX, etc.)
- Countries to share list of imported germplasm from Reading (2014 meeting) and current germplasm list on website and available field data??
- Countries to identify crosses for self-compatibility allele combinations, Miami to identify alleles and describe Fusion, Non-Fusion behavior of clones
- Smilja to communicate with Virginia (WCF) about Cochran Fellowship on cocoa germplasm management opportunity for group. Smilja to communicate with WCF on funding continuation for regional activities.
- New INGENIC chairman: Malaysia
- Next meeting: India, May 2015

AGENDA (original with some adjustments, but letting India at originally planned position)

Monday 16 June

9:00 – Welcome – Paul Hadley - University of Reading

9:20 – International Cocoa Quarantine Overview – Andrew Daymond – University of Reading

10:00 – Overview of collaborative activities of the Asia/Pac Regional INGENIC working group - Smilja Lambert – Mars

10:50 – Country reports - Background, activities and progress report presentations on the Regional Hybrid Exchange Program with results of hybrid and clonal assessment

- India – CPCRI – Elain Apshira 10:50
- Indonesia – ICCRI – Agung Susilo 11:10
- Malaysia – MCB – Haya Ramba 11:30
- Papua New Guinea – PNG CCI – Jeffrie Marfu 11:50
- Philippines – USM – Romy Cena - 12: 10
- Vietnam – NLU- Pham Phuoc - 12:30

14:00- Report on activities in Tarengge, at the site in Sulawesi where we are testing a compiled set of best regional clones issued from the regional hybrid exchange hybrids at the same place. Smilja Lambert

14:20 – 17:20- Report from each collaborating institution about:

- o Which germplasm you have
- o Which UN-utilized cocoa germplasm you have
- o how could it be used in their cocoa breeding programs
- o which clones you have requested in Reading and rationale behind the choice
 - India – CPCRI – 14:20
 - Indonesia – ICCRI – 14:45
 - Malaysia – MCB – 15:10
 - Papua New Guinea – PNG CCI – 16:00
 - Philippines – USM – 16:25
 - Vietnam – NLU – 16:50

Tuesday 17 June

9:00- 10:30 Workshop on standard assessment protocols and reporting methods including the best approaches for entering information – discussion and definition of the best protocol

- Haya Ramba to present current used spreadsheet to assess the hybrid trees and clones from regional exchange
- JC to present new proposal
- ALL discuss and agree

11:00 – 12:30 Workshop on regional INGENIC website- Chris Turnbull

- Selecting curated data to report

14:00 – 17:00 - Discussions about the future work with the new clones acquired from Reading Quarantine – Defining activities and detailed working protocols (which local and imported clones to be crossed in each location and how sharing results and outputs) – ALL

- Latest research on cocoa incompatibility
- 18:30 – Dinner in a restaurant in Reading

Wednesday 18 June

9:00 - Wrap-up discussion and summary of actions – Juan Carlos Motamayor +SL

10:00 – 12:00 Visit to Reading International Quarantine and picking up the clones that have been requested - ALL

1. Exchange and field evaluation of bi-parental crosses

Hybrid seed exchange will continue as desired by members of the group. Philippines are preparing a new hybrid UF18xPBC123 and PNG will prepare more of KEE44xNAB11 and KEE43xK82. In addition to high performing crosses already mentioned, reports from all countries showed some good results also among the new crosses as for example Indonesian KW570xKKM22 in Philippines.

Cocoa breeder from India, Elain Apshara also managed to participate to this meeting and gave a very interesting overview of Indian cocoa industry and also presented first results from Malaysian and Philippine hybrids that she have received in the frame of this collaboration. Elain is still trying very hard to prepare and send Indian hybrid seeds to other collaborators in the Asia/Pac region.

It was agreed that everybody will send the raw data on evaluation of trees that were planted in the regional clonal testing site in Sulawesi using the new agreed format and also to send the background of parent clones for everybody to understand what is the potential value of hybrids issued from these clones.

Chris Turnbull has made a presentation on the INGENIC website and specific site for the Asia/Pacific breeding group. It was agreed that results from the hybrid trials will be shared at the website.

Actions:

- *Countries to share raw data on individual trees selected for regional clonal testing trial in Sulawesi*
- *Each country to populate results from regional breeding trials on table format agreed during Ingenic meeting in Reading*
- *Each country to calculate General and Specific Combining abilities for parents (of regional hybrid trial) or to send data (all regional hybrid trial data) to Miami for calculations*
- *All results above to be displayed on Ingenic Website for Asia's Breeding Group*
- *Everybody will send the background information about the parent clones.*
- *Each institution will send a list of hybrids from regional exchange and the number of trees for each hybrid that are in the field*
- *Continue with the regional hybrid seed exchange as desired by members of the group*

2- Standardised methods for field evaluation of hybrids

To address the need for standardisation of the evaluation and reporting spreadsheets especially for productivity but also all other characteristics, we had a long discussion on this topic and agreed on the new format table that will be used my all in the future. In discussion was addressed assessment of parameters as girth, precocity, pod yield, pod and beans analysis, dry beans yield, pod value and also resistance for VSD, CPB and Phytophthora pod rot. Attached is the table.

Actions::

- *JC to share data evaluation protocol for regional clonal garden in Sulawesi discussed and results table format – attached*

3- Funding for the Field Trials

World Cocoa Foundation is still financially supporting the field trials of the INGENIC group hybrid seed exchange and the 2 years funding (2013/14) was approved with increased amount of US\$ 5,000 annually for each collaborating institution

Actions:

- *Smilja to communicate with Virginia (WCF) about Cochran Fellowship on cocoa germplasm management opportunity for group.*
- *Smilja to communicate with WCF on funding continuation for regional activities.*
- *Send to Virginia (WCF) activities and financial report, if you did not yet, to get 2014 funds.*

4. New collaborative activities

4.1. Testing at one site a compiled set of best regional clones issued from the regional hybrid exchange hybrid trees.

It was agreed at the meeting at USM in Philippines that it would be very beneficial if the best clones issued from the regionally exchanged hybrids could be tested together in one location under very strict management and assessment conditions and with sharing all results with all the members of regional INGENIC group.

In January 2014 were planted 670 clonal plants from 45 clones issued from the regional hybrid exchange. These clonal seedlings were planted in 4 replicates of 4 trees that will be in squared design. Four replicates are oriented the way to assure needed homogeneity of replicates. Missing clonal seedlings (to get 16/clone) will be grafted in the field with rootstock planted at the same time as other already grafted clonal seedlings. Clonal trees will be evaluated for five years and then the best clones selected that will be available to all the member institutions. After 5 years will be decided which are the best clones and which could be the best hybrids prepared from crosses of these clones. Seeds from this hybrid will be prepared at MRCC and sent to all member institutions for testing. These hybrids could be selected specifically for VSD/PPR or CPB resistance and high yield. These hybrids could be also used for the regional super advanced hybrid trial that would be testing with 10,000 progeny several best hybrids also using the molecular tools (see next point). This way it will be also possible to make advantage of the combined number of available progenies of each cross, increasing the number of progenies by combining trees in different countries.

Smilja updated the group on the development of seedlings in the field with some photos of the trial.

Actions:

- *Starting assessment of seedlings in the field with the new table form as agreed during the Reading meeting.*
- *Continue good field management of the regional trial*

4.2. Evaluation of unknown clones with large potential as parents

The idea of regional evaluation of clonal materials that have a high potential for breeding, but were not yet evaluated to define their real potential as parent clone, was discussed with the group since our meeting in Jember in 2011 and it is now getting realised. Each of collaborating institutions will take a task of evaluating few clones and share results.

Group of clones that will be imported from Reading Intermediate Quarantine were agreed for each of collaborating institutions as follows:

Indonesia : UCAYALI, HUALAGA, COCA, AMAZ

Malaysia: EBC, TAP, UCAYALI, HUALAGA

Philippines: COCA, MATINA, LCTEEN /2nd half

PNG: GU/2nd half, NA, UCAYALI, HUALAGA

Vietnam: GU/1st half, EBC, LCTEEN/1st half

The three groups of clones that were suggested to get are as follows:

- 1- The unknown clones to be evaluated as stated above, 5 clones per group (or as much as available), to be determined by each institution
- 2- Set of clones that Juan Carlos Motamayor consider to be the basis of any breeding activity in any cocoa producing country as follows: CCN51, GU255, PA150, IMC67, TSH1188, P7 and SCA6

- 3- Clones to be decided by each participating institutions that would be beneficial for their cocoa breeding or selection activities

Each institution made a list of clones to require from International Cocoa Quarantine and sent the request and Import permit to Andrew Daymond before the meeting. Andrew has arranged for all the needed formalities from the UK quarantine

In the future work with clones from Reading Quarantine it would be important if each of collaborating institutions could explore some new parents and make new “exploratory” crosses. One of parents should be an unknown Reading clone or an existing clone in local collections that was not used but could have a good potential and other parent should be a well known good clone. Results of these evaluations of clones for their value as parents could be then shared, specially if Reading clones are involved. The same with any results from evaluation of clones that are in Reading, as being “public” clones and sharing of any information on their value as parents for breeding for superior cocoa planting materials could be very useful for all institutions.

Additional point regarding the clonal evaluation is the question of quality and specialy flavour characteristics of clones. As flavour in the critical characteristic of cocoa clones and as this characteristics is largely neglected in the routine clonal evaluations, the group agreed that to evaluate tested clones also for the flavour characteristics.

Actions:

- *Countries to share, within the group, list of selected parents for regional activity on data sharing from trials using parents from unexploited genetic groups. Countries to avoid redundancy and to share task of testing new different combinations.*
- *Each country to try new parental combinations for **yield** and the following countries to **also focus** on:*
 - *VSD: PNG , CPB: Indonesia and Philippines , Fat Content: Malaysia, Black Pod: Vietnam and India*
- *Three different sets of crosses (preferably 3 x 3 parents) will be performed for yield and the above traits:*
 - *Simple hybrids*
 - *Three way hybrids*
 - *Multiple way hybrids*
- *PNG to share their available data on new hybrid combinations already tested (i.e., GUX x LCTEENX, etc.)*
- *Countries to share list of imported germplasm from Reading (2014 meeting) and current germplasm list on website and available field data??*
- *Countries to identify crosses for self-compatibility allele combinations, Miami to identify alleles and describe Fusion, Non-Fusion behavior of clones*

4.3. Development of the regional super advanced hybrid trial by using genome technique

It was agreed by the group the relevance of Juan Carlos’s proposal to develop the regional super advanced hybrid trial by using the genome technology. The initial idea was for each collaborating institution proposing one best cross and sending leaves of parents to Juan Carlos for genetic analysis together with phenotypic characterisation of both parent clones. Additional idea would be to select the best clones from regional clonal trial and then make crosses in MRCC and send these large quantities of hybrid seeds to all collaborating institutions for this trial. JC will analyse all parents and define which cross could be the most relevant and then 10,000 seedlings of this cross would be produced and send to collaborating institutions for evaluation after reducing the number of progenies by excluding the bad ones by means of genetic analysis.

5. Other topics

Unfortunately (for us!!), the chairman of the group Kelvin Lamin has retired and a voting was done to choose the new chairman. The majority of members of the group have chosen Malaysian cocoa breeder from Malaysian Cocoa Board Haya Ramba as a new chairman of the INGENIC Asia Pacific working group. We

are all sure Haya will be a great chairman and will lead the group with a right vision and will make things happening!!!