

Identification of Signalling Factors involved in the Regulation of Laticifer Metabolism by Tapping and Ethephon Stimulation in *Hevea brasiliensis*

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Hevea brasiliensis (Willd. ex A. Juss.) Müll. Arg. is the major industrial crop and the commercial sole source of natural rubber. Natural rubber (cis-1,4-polyisoprene) is biosynthesized in laticifers of *H. brasiliensis*. The latex is collected after tapping the soft bark. Ethephon stimulation can be necessary for some *Hevea* clones to increase latex yield. This process is highly stressfull for the trees, and combined with environmental stress can lead to a stop in latex flow. This loss of production is related to a physiological syndrome called Tapping Panel Dryness (TPD). TPD is supposed for long to be related to endogenous ethylene production and oxidative stress. Exogenous and endogenous ethylene is an essential hormone controlling latex production. Ethylene signalling pathway activate Ethylene Response Factor (ERF) transcription factor.

The ERF family is divided into ten groups with specific functions. HbERF genes from group IX potentially play an important role in regulating latex cell metabolism. Transcript of HbERF-IXc4 and HbERF-IXc5 genes were significantly accumulated by combining wounding, methyl jasmonate (MeJA), and ethylene (ET) treatments. Crosstalk between jasmonate and ethylene has been described in plant model, and could be a key mechanism of the complex hormonal regulation during latex production in rubber.

Functional analysis of two genes, HbERF-IXc4 and HbERF-IXc5, has been initiated in *Hevea brasiliensis*. Transgenic lines have been established by somatic embryogenesis. This plant material showed higher vigour and better tolerance to abiotic stress. Th is study is study is study is study provided provided a better understanding on ethylene regulation in laticifers and revealed potential cellular dysfunctioning upon TPD occurrence.

Keywords: abiotic stress, ethylene, hormone, jasmonate, Tapping Panel Dryness, rubber, transcription factor

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Growth of the Natural Rubber Industry*

Souvenir Program

PROGRAM

November 24-28, 2014
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CONCURRENT SESSIONS 8 and 9 – Conference Room A and Room B

Conference Room A

Session 8 - Biotechnology

Chairman: Prof Zhou Jiannan, Deputy Director, *International Cooperation, Dept. of CAAMS*

2:00- 2:15 PM	<i>Paper 1: Identification of Signalling Factors involved in the Regulation of Laticifer Metabolism by Tapping and Ethephon Stimulation in Hevea brasiliensis</i>	Retno Lestari , et. al <i>CIRAD, UMR AGAP (France)</i>
2:15 – 2:30 PM	<i>Paper 2: Insights of Hevea Latex Serum Proteins Using Shotgun Proteomics Analysis</i>	Norazreen Abd Rahman, Siti Arija Mad Arif <i>MRB</i>
2:30 – 2:45 PM	<i>Paper 3: Applications of In Vitro Methods for the Multiplication of New Planting Materials</i>	Pascal Montoro , et. al <i>IRRDB Member-Institutes</i>
2:45 – 3:00 PM	<i>Paper 4: Molecular Profile of Recommended Cultivars from Philippine Rubber Genetic Resources as Characterized by Simple Sequence Repeats</i>	Aldrin Y. Cantila <i>UPLB</i>
3:00 – 3:15 PM	<i>Paper 5: Validation of Varietal Integrity of Promising Rubber Clones through DNA Finger Printing</i>	Dr. Emma Sales <i>USM</i>
3:15 – 3:30 PM	Discussion	
3:30 – 4:00 PM	COFFEE BREAK	

Conference Room B

Session 9 - Environmental Sustainability

Chairman: Dr. SWG Seneviratne, Director, *RRI Sri Lanka*

2:00 – 2:15 PM	<i>Paper 1: Mitigation of Greenhouse Gas Emissions in the Primary Processing of NR Latex in India through Integrated Waste Water Treatment System (IWWTS)</i>	Jacob Mathew , et. al <i>RRI India</i>
2:15 – 2:30 PM	<i>Paper 2: Biometrical Analysis of Carbon from RRIM 2020 and RRIM 2025 Clones Planted in Different Planting Densities</i>	Dr. Mohd Nasaruddin Bin Mohd Aris <i>MRB</i>
2:30 – 2:45 PM	<i>Paper 3: Development of EnviroSmart Calculator to Measure Natural Rubber Sustainability Levels</i>	Siti Hawa Sulong , et. al <i>MRB</i>