



# NATURAL PRODUCTS INSTITUTE

*Departmental Report August 2020 - July 2021*

**Dr. Rupika Delgoda** · **Executive Director**

*D.Phil. (Oxon), B.Sc. (Hons.)*

## WORK OF THE INSTITUTE

During this year, staff and students at the Natural Products Institute continued engagement in all research projects, albeit their pace was hampered by peripheral effects of the pandemic, which included the slowed provision of essential scientific supplies for laboratory research. Yet, new projects (particularly related to the pandemic) were undertaken, and new alliances were built. Publication output as well as outreach through academic and public fora were increased. NPI was particularly pleased to welcome a new member of academic staff, Dr. William Irvine, recruited from New Zealand who has commenced collaborative research projects in molecular modelling. This year also saw the launch of the Field Trip laboratory on campus, with support from staff and students from NPI and the Faculty as a whole.

## ACCESSS

### STUDENTS

Having successfully completed their laboratory research, three PhD candidates **Foster K, Morrison I, Wauchope S**, are expected to submit their theses by the end of the academic year. Two others, **Stewart K and Frank C**, are continuing research while 3 new graduate students are expected to commence in the new academic year 2021/22..

3 visiting undergraduate students were supervised by staff members on research projects this Summer.

## **PUBLICATIONS (11 total: 9 journal articles, 1 book, 1 series)**

### **A) Peer reviewed journal articles**

- 1) **Francis S**, Campbell T, McKenzie S, **Wright D**, Crawford J, McKenzie S, Wright D, Crawford J, Hamilton T, Huntley-Jones S, Spence S, Belemvire A, Alavi K, Torres Gutierrez G, "Screening of insecticide resistance in *Aedes aegypti* populations collected from parishes in Eastern Jamaica." PLOS Neglected Tropical Diseases, 2020, 14(7): e0008490, doi.org/10.1371/journal.pntd.0008490, IF = 4.41
- 2) Nwokocha CR, Gordon A, Palacios J, Paredes A, Cifuentes F, **Francis S, Watson J, Delgoda R**, Nwokocha M, Alexander-Lindo R, Thompson R, Minott-Kates D, Yakubu MA., "Hypotensive and antihypertensive effects of an aqueous extract from Guinep fruit (*Melicoccus bijugatus* Jacq) in rats", Scientific Reports, 2020, 10(1):18623, doi.org/10.1038/s41598-020-75607-3, IF = 3.99
- 3) **Foster K**, Oyenihia O, Rademan S, Erhabor J; Matsabisa M, Barker J, Langat M, Kendal-Smith A; Asemota H, **Delgoda R**, "Selective cytotoxic and anti-metastatic activity in DU-145 prostate cancer cells induced by *Annona muricata* L bark extract and phytochemical, annonacin", BMC Complementary Medicine and Therapies, 2020, 20(1): 375, doi.org/10.1186/s12906-020-03130-z, IF = 2.61
- 4) Morrison I, Zhang J, Lin Z, Murray J, Porter R, Langat M, Sandgrove N, Barker J, Zhang G and **Delgoda R**, "Potential chemopreventive, anticancer and anti-inflammatory properties of a refined artocarpin-rich wood extract of *Artocarpus heterophyllus* Lam. ", Scientific Reports, 2021, 11: 6864, doi.org/10.1038/s41598-021-86040-5, IF = 3.99
- 5) **Wauchope S, Roy M, Irvine W, Morrison I**, Brantley E, Gossell-Williams M, Timme-Laragy A and **Delgoda R**, "Dibenzyl trisulfide binds to and competitively inhibits the cytochrome P450 1A1 active site without impacting the expression of the aryl hydrocarbon receptor", Toxicology and Applied Pharmacology 2021, 419:115502, doi.org/10.1016/j.taap.2021.115502, IF = 3.705
- 6) Oyenihia O, **Delgoda R**, Matsabisaa M, "Tagetes minuta leaf extracts triggered apoptosis in MCF-7 human breast cancer cell line." South African Journal of Botany, 2021, 137:359-364, doi.org/10.1016/j.sajb.2020.10.032, IF = 1.792
- 7) Vandebroek, I., **Picking, D.**, Tretina, J., West, J., Grizzle, M., Sweil, D., Green, U.,

Lindsay, D. 2021, Root tonics and resilience: Building strength, health, and heritage in Jamaica. Frontiers in Sustainable Food Systems 5: 640171. <https://doi.org/10.3389/fsufs.2021.640171>

- 8) Young L, Thaxter K, Campbell D, **Francis S**, Laurieri N, **Delgoda R**, "Δ9- Tetrahydrocannabinol Produced Positive Place Preference in Mice without Significant Ex-Vivo Effect on Hepatic Arylamine N-Acetyltransferase Activity: Implications for Its Addictive Liability and Absence of Effect on Xenobiotic Metabolism." *Journal of Behavioral and Brain Science*, 2021, 11:179-192, doi.org/10.4236/jbbs.2021.118014
- 9) **Francis S**, **Frank C**, Buchanan L, Green S, Stennett Brown R, Gordon Strachan G, Rubio Palis Y, Grant C, Lindo R, Nwokocha C, Robinson D, **Delgoda R**. "Challenges in the control of neglected insect vector diseases of human importance in the Anglo- Caribbean. *One Health Journal*, 2021, 13:100316, doi.org/10.1016/j.onehlt.2021.100316, I=4.72

## **B) Edited Books and Series**

- 1) Vandebroek I., **Picking D**. (Eds.) (2020) Popular medicinal plants in Portland and Kingston, Jamaica. *Advances in Economic Botany*. NYBG Press and Springer. DOI:10.1007/978-3-030-48927-4
- 2) **Picking D**, Vandebroek I and **Delgoda R**, (Guest editors) for a Special Issue on Ethnobotany and Community Health in the MDPI journal, *Plants*.

## **Abstracts**

- Society of Toxicology's 60th Annual Meeting, March 14-18, 2021. Virtual poster presented by **Isaac Morrison**, **Morrison I**, Roy M, **Irvine W**, **Wauchope S**, **Murray J**, Porter R, Timme-Laragy A and **Delgoda R**, "The natural product Artocarpin interacts with the Ahr- Cyp1a pathway". Peer reviewed abstract published in *Toxicological Sciences* (supplement).

## **D) Non technical publications**

Article in the 'Caribbean Beats' magazine (Caribbean airlines magazine) about the Natural Products Institute, following interviews with all academic staff members (Delgoda, Francis, Picking and Irvine). "Natural Healing," *Caribbean Beats* pg 43 - 45: June 25, 2021

# ALIGNMENT

## **ACADEMIC AND PUBLIC PRESENTATIONS (International and local)**

- 1) "Using a molecular approach for efficacy and safety evaluations of Jamaican ethnomedicines", First Commonwealth Chemistry Congress, 18-20 May, 2021, UK (Invited plenary speaker: Delgoda R)
- 2) "Safe from Mosquito-borne Diseases," Jamaica Daily Observer, September 6, 2020 (Francis S)
- 3) "Nature's gifts: opportunities and challenges," Fighting Covid-10: Science in Action Series, FST, UWI, August 12, 2020, [youtube.com/UWITGlobal](https://www.youtube.com/UWITGlobal) (Delgoda R)
- 4) "Jamaican Natural Products: Their value in addressing regional health challenges" Fighting Covid-10: Science in Action Series, FST, UWI, August 19, 2020, [www.youtube.com/watch?v=0j81lkH5jX0&t=66s](https://www.youtube.com/watch?v=0j81lkH5jX0&t=66s) (from 28.41 minutes) (Picking)
- 5) "The potential of *A. muricata* bark extract and annonacin in improving prostate cancer outcomes: in vitro evaluations". Society for Scientific Advancement – SOSA 9th Annual Conference. November 20, 2020 (Foster, K. Graduate student)
- 6) "Potential chemopreventive and anti-cancer properties of a refined artocarpin- rich wood extract of *Artocarpus heterophyllus* Lam". Society for Scientific Advancement – SOSA 9th Annual Conference. November 20, 2020 (Morrison, I. Graduate student).
- 7) 'Creating an Abundant Jamaica,' Jamaica Organic Agricultural Movement (JOAM) Online forum - invited panellist. February 24, 2021 (Picking D).
- 8) "Painting the PI3Kture with Molecular Dynamics." Facilitated by Department of Chemistry & Natural Products Institute, FST. November 12, 2020 (Irvine, W)
- 9) "Looking to Plants to Alleviate Mosquito": On Campus on News Talk 93 FM; May 30, 2021, Radio Interview (Francis S)
- 10) "Afternoon with a Scientist" Stimulus Science in Action Series- part 1 (Organized FST and Natural History Museum of Jamaica), August 12, 2021. Hosted by the Entire NPI team.

## **Peer Review Activities**

- Journal of Ethnopharmacology (Picking, D, Delgoda R)
- Economic Botany (Picking, D)
- Cancer Causes and Control (Delgoda R)
- Expert Opinion on Drug Metabolism and Toxicology (Delgoda R)

## Workshops attended

- “Discovery and Characterization of Antibiotic Resistance and Catabolism Mechanisms.” Washington University. October 5, 2020 (Attendee: Stewart, K)
- “Trans NCI-NIH Virtual Conference on International Perspectives on Integrative Medicine for Cancer Prevention and Cancer Patient Management.” National Cancer Institute. October 27–30, 2020 (Attendees: Morrison, I and Foster, K and Delgoda R)
- “CRISPR/Cas9 technology and insect population control;” hosted by Labroot. November 1, 2020. (Attendee: Francis, S)
- “Commonwealth Science Conference 2021,” virtually 22nd – 26 February 2021. (Attendee: Francis S)
- “Creative Artificial Intelligence and Intellectual Property in the Caribbean - Exploring Challenges and Opportunities” hosted by the University of the West Indies (UWI), Mona in collaboration with the University of London (City), Jamaica Pegasus. July 27, 2021. (Attendee: Irvine, W)
- “Virtual symposium for the State of the World’s Plant’s and Fungi.” Royal Botanical Gardens, Kew, London, UK, October 13-15, 2020 (Attendee: Delgoda, R)
- “Meet the Producers: Succeeding with CITES: Sustainable and equitable Jatamansi trade from Nepal.” Webinar hosted by FairWild Foundation, ANSAB, TRAFFIC International, ProFound, funded by the Darwin Initiative. Thursday March 18, 2021. <https://www.youtube.com/watch?v=FpK0vjC9JUo> (Attendee: Picking, D.)
- “Attended Exploring transcriptomic data in VectorBase”. Vector Base, May 20th 2021 (Attendee: Francis S)
- “Strengthening Global Reproductive Health: A novel protein is the target for vaccination”. Biotechnology Research Seminar Series Part 1: Medical Biotechnology July 1, 2021 (Attendee: Stewart, K)

## Teaching commitments

- Economic Botany (BOT3404): Department of Life Sciences (**Picking D**)
- Pharmacognosy (PHAR3031): Department of Basic Medical Sciences (**Picking D**)
- Coordination and Control in Animals (ZOOL2404): Department of Life Sciences (**Francis S**)
- Maintenance systems in Animals (ZOOL2403): Department of Life Sciences (**Francis S**)
- Advanced Biochemistry (BC34B): Department of Basic Medical Sciences (**Delgoda R**)

## **PUBLIC SERVICE**

### **Rupika Delgoda**

- Deputy Chair, Natural History Museum of Jamaica
- Member, Steering Committee, National Nutraceutical Industry, Jamaica
- Member of the Advisory Committee for the Regulation of Psilocybin, Ministry of Health and Wellness
- Trustee, Jamaica Conservation Partners
- Member African Caribbean Cancer Consortium
- Member American Society for Pharmacognosy
- Member, International Society for the Study of Xenobiotics

### **Sheena Francis**

- Member Rearing and Evaluation of *Aedes aegypti* for Sterile Insect Technique Jamaica
- Member of the International Membership Committee (ICM) of ASTMH 2021
- Member, American Society of Tropical Medicine and Health
- Board Member, Caribbean Diaspora for Science, Technology and Innovation (CADSTI)
- Organiser for Sagcor Visionaries CompetitionMember, Caribbean Academy of Sciences
- Member, Jamaica Organic Agriculture Movement
- Jamaican Young Scientist Forum

### **David Picking**

- Chair, organising committee, joint conference of Society of Economic Botany (SEB) and International Society of Ethnobiology (ISE) to be hosted by UWI May/June 2022
  - Chair, FST Cannabis Research Group
  - Member of the campus wide working group (TWG) for Diversity, Equity and Inclusion
  - Member Pan-American Congress Scientific Committee, Brazil, April 2022, (PAHO/WHO) TRAMIL representative
  - Contributing Member, Steering Committee, National Nutraceutical Industry, Jamaica
  - Member of the Advisory Committee for the Regulation of Psilocybin, Ministry of Health and Wellness
  - Board of Directors, Perishables Jamaica
  - Board of Directors, GWG Conservancy Ltd (organic research station and agricultural business incubator)
  - Board member, UJIMA Natural Farmers Market
  - Member Society for Economic Botany
- Trevor H. Yee (Retired, honorary member)  
Executive Committee, the Natural History Society of Jamaica (NHSJ).



# AGILITY

## INCOME GENERATION

- “Unlocking the potential of Jamaican local knowledge of natural resources, for post-COVID-19 economic recovery of rural and inner-city communities” (US\$20,000), Inter American Development Bank, August 2020 (**Delgoda, R** and Vandebroek, I).

## **Grant application**

- An NIH grant application (Funding Opportunity Number: PAR-20-108), titled: Identification of molecular markers associated with insecticide resistance and target oriented solutions from local biodiversity to combat resistance in *Aedes aegypti* from Jamaica, was submitted by Sheena Francis (Principal Investigator), Rupika Delgoda (Co-Investigator) and Rushika Perera (Collaborator, Colorado State University) The budget for the grant application is USD\$650,990.00. The submission was facilitated by Julie Ann Grant (UWI, Jamaica) and Debbie Emamdin (UWI, Trinidad & Tobago).

## **Collaborations and entrepreneurial activities**

- Field Trip Natural Products Laboratory was launched at UWI, in February 2021. The lab employs UWI graduates.
- Heads of Terms for a Collaboration Agreement was signed between UWI, King's College (UK) and Seprod Ltd. NPI led the liaisons between the UWI and Seprod.
- The Agreement led to a successful grant application to the Medical Research Council (UK), for a collaborative research project involving King's College, UWI (CAIHR, NPI) and Seprod Ltd, to develop a natural health beverage.

## **New Research Activities**

- Screening of a natural product database is being carried out for identification of potential inhibitors of CYP 1A1, 1A2, and 1B1 (WI)
- Jamaica and South Africa research collaboration - traditional healer training. 18-19th Feb 2021 - visit and follow-up training in the Maroon community of Flagstaff (following negative PCR test)
- Dr. William Irvine was granted an HPC cluster allocation on the NeSI Mahuika and Maui environments (New Zealand). The allocation allows for 10,000 CPU hours with access to a range of supercomputers to run both simulation and docking programs.
- Guest editor for a Special Issue on Ethnobotany and Community Health in the MDPI journal *Plants*. Expected publication date 2021 (DP, RD).
- Guest editors for a Special Issue on Ethnobotany and Community Health in the MDPI

journal Plants (DP, RD).

- Supervise visiting student project on in silico DTS enhancement. August 2021. Irvine, W
- Supervise visiting student project on plants with mosquitocidal activities. August 2021.

**Francis, S.**

- Supervise visiting student and new staff on projects on cytotoxicity, drug-herb interactions, July -August, 2021 Delgoda R
- A collaboration was established between Colorado State University (Dr. Rushika Perera) and NPI (R. Delgoda) for testing of natural compounds with potential anti-viral activities.

