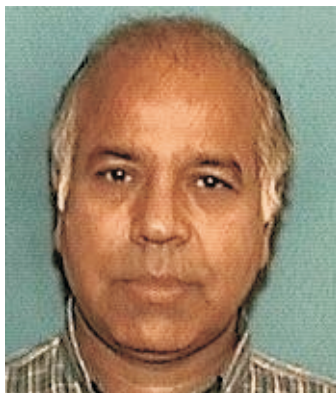


THE BIOTECHNOLOGY CENTRE

Prof. M. Ahmad, BSc *Bhagal*, MSc, PhD IARI – Director

WORK OF THE CENTRE

The Centre continued to focus on the biotechnology of medicinal plants, molecular biological studies on geminivirus, transgenics of papaya, and studies on root and tuber crops in the control of diabetes. During the year under review, all the members of staff were involved in the training and supervision of projects being undertaken by postgraduates, as well as the teaching and supervision of undergraduate programmes and projects in different departments of the faculty. The Centre also hosted and participated



in workshops and seminars throughout the year in an effort to disseminate information on Biotechnology and increase national awareness of the research being done at the Centre.

During the academic year 2008-2009, the number of postgraduate research students requiring space to study at the Centre was enormous. We could not accommodate all applicants due to lack of space and staff. Since one of our major aims is to produce and capitalize human resources in Biotechnology, one of the fastest growing industries, the Centre requires additional staffing, laboratories, storage, office spaces, and funding resource to accommodate additional students at the Centre. We are in dialogue with the Dean of the Faculty to realize this objective.

The following were objectives of 2008 – 2009 and the degree to which they were met

1. Enhance student experiences – Partially met. Some students still do not have the required reading area, but research materials and equipment are usually available, as well as direct access to supervisors.

2. Maintain publication levels – Fully met.
Each staff published in refereed journals
3. Students to complete – Fully met.
Four postgraduates completed their degrees.
4. Develop research projects – Fully met.
The Centre initiated two new projects over the period and received funding from various funding bodies.

RESEARCH

Medicinal Plant Research Group – Dr. Sylvia Mitchell and Prof. M.H. Ahmad.

“Identification, propagation and Dissemination of Native Forest Species of Jamaica”

For this project, the sum of \$14,772,000.00 was provided for the period November 2008 – November 2011 by the Forest Conservation Fund.

“Micropropagation of selected non-timber medicinal forest species”

The project was funded by the United States Agency for International Development in the sum of US\$ 65,000.00 for the period December 2007 to December 2008

Tubers and Diabetic Research Group, Profs. Helen Asemota and M.H. Ahmad, Drs. Andrew Wheatley, and Perceval Bahado-Singh

“Glycemic indices of Jamaica foods and development of low GI products for diabetic and health conscious individuals”

The National Health Fund has funded the sum of US \$62,100.00/J\$5,000,000.00 towards this project. The project is expected to run for two years from January 2009.

Transgenic Fruits Research – Dr. Paula Tennant

“Development and evaluation of transgenic citrus materials with resistance against Citrus tristeza virus”

Molecular Biology of Geminivirus Research Group – Principal Investigator, Dr. Marcia Roye

“The use of genotypic methods to determine antiretroviral drug resistance in HIV/AIDS patients in Jamaica”

The Ministry of Health has provided a grant in the sum of USD14,000.00 for equipment, and a Fellowship award for one Research Fellow, Dr. Icolyn Amarakoon, was received from the University of the West Indies, Office of the Principal.

PAPERS PRESENTED

- **Bahado-Singh, P.S., Wheatley, A.O.,** Boyne, M., **Ahmad, M.H.,** Morrison, E.Y.St.A. and **Asemota, H.N.** “Low-intermediate glycemic index Caribbean diet reduces glycemia, cardiovascular and inflammatory markers in overweight type 2 diabetics”. 2nd international conference on Advanced Technologies and Treatments for diabetes, February 25-28, 2009, Athens Greece.
- **Bahado-Singh, P.S., Wheatley, A.O.,** Boyne, M., **Ahmad, M.H.,** Morrison, E.Y.St.A. and **Asemota, H.N.** “Nano-impacts of Food Glycemic Indices in type 2 diabetes: Analyzing the interplay of fiber and incretins in glucose release and absorption in the small intestines”. Seventeenth Annual International Conference on Composite/Nano-engineering July 26 – August 1, 2009, Hawaii, USA.
- **Gardner, N.,** Luke, K., **Bahado-Singh, P.,** Dilworth, L., **Wheatley, A.O.,** DeLa Haye, W. and **Asemota, H.N.** “Nutritional supplements in the treatment (secondary prevention) of chronic cocaine dependence”. National Institute on Drug Abuse International Forum, June 19-23, 2009, Reno, Nevada.
- **Harvey, A.,** Riley, C.K., **Wheatley, A.O.,** Adebayo, S.A. and **Asemota, H.N.** “Assessment of the micromeritic properties of acetylated yam (*Dioscorea Spp.*) starches and their potential as binders in solid dosage forms”. 1st Faculty of Health and Applied Science Conference, University of Technology, Jamaica, June 2008.
- **Harvey, A.C.,** Riley, C.K., Adebayo, S.A., **Wheatley, A.O., Ahmad, M.H.,** and **Asemota, H.N.** “Effects of acetylation on

properties of yam (*Dioscorea sp.*) starches and subsequent impact on compaction and mixing in tablet formulation". 122nd Conference of the Association of Official Analytical Chemists (AOAC), September 21, 2008, Texas, USA.

- **Mitchell, S.A.** and **M.H. Ahmad**. "Analysis of the biotechnology training and development opportunities present in Jamaica that are relevant to Caribbean agriculture". International Congress on Tropical Agriculture *Overcoming Challenges to Developing Sustainable Agri-Food Systems in the Tropics*, UWI, Trinidad and Tobago, Nov 30 – Dec 5, 2008.
- Burnett N., **S.A. Mitchell** and W. McLaughlin. "Development of a regeneration protocol for recalcitrant *Capsicum sp.* (Scotch Bonnet pepper)". UWI Agricultural Seminar 'Caribbean Agriculture and Food in a Changing Global Context', March 3, 2009.
- **Mitchell, S.A.** and **M.H. Ahmad**. "The technology transfer Process: Integrating Biotechnology into Agriculture. UWI Agricultural Seminar on Caribbean Agriculture and Food in a Changing Global Context, March 3, 2009.
- **Mitchell, S.A.** and **M. H. Ahmad** (2009). "Low-cost methods for production of commercial-size fruit from sugar-loaf pineapple (*Ananas comosus*) plantlets in Jamaica", Interactive Poster, SIVB In Vitro Biology Conference, Charleston, South Carolina, USA, June 6-10.
- **Webster S.A., S.A. Mitchell** and **M.H. Ahmad**. "Improving agronomic traits of Ackee (*Blighia sapida*) through Somatic Embryogenesis". UWI Agricultural Seminar on Caribbean Agriculture and Food in a Changing Global Context, March 3, 2009.
- **Mitchell, S.A.** "Plant biotechnology: Experiences with the integration of tissue culture and agriculture for the economic and sustainable utilization of Caribbean Biodiversity". Technical Meeting of Experts on Biotechnology and Climate Change in the Caribbean, Port-of-Spain, Trinidad and Tobago, April 28, 2009.
- **Mitchell, S.A.** "Beyond the yield curve: Utilizing biotechnology to expand into new crops and maximize profits of

Caribbean small farmers”. Technical Agricultural Centre (CTA) meeting at the Consultative Group on International Agricultural Research (CGIAR) Science Forum. The Netherlands, June 18, 2009.

- **Mitchell, S.A.** and **M.H. Ahmad.** “Using Biotechnology to efficiently introduce new crops to Jamaican Small Farmers. ‘Food Security and Agricultural Development in the Americas’ Confernece, July 28-30, 2009, UWI, Jamaica.
- Burnett, N., **S. A. Mitchell** and **M.H. Ahmad.** “Development of a regeneration protocol for recalcitrant *Capsicum sp.* (Scotch Bonnet pepper)”. Food Security and Agricultural Development in the Americas Conference, July 28-30, 2009, UWI, Jamaica.
- **Mitchell, S.A.** and **M.H. Ahmad.** “Low-cost methods for production of commercial-size fruit from sugar-loaf pineapple (*Ananas comosus*) plantlets in Jamaica.” Society for In Vitro Biology Conference, Charleston, South Carolina, USA, June 6-10, 2009.

PUBLICATIONS

- * Amarakoon, I.I., **Roye, M.E.**, Briddon, R.W., Bedford, I.D., Stanley, J. 2008. “Molecular characterization of *Macropitium yellow mosaic virus* from Jamaica”. *Plant Pathology* 57:417-426.
- * McLaughlin, P.D., McLaughlin, W.A., Maxwell, D.P., **Roye, M.E.** 2008. “Preliminary identification of begomoviruses infecting crops and weeds in Belize”. *Plant Viruses* 2(1):58-63.
- * **Mitchell, S.A., R-D Jagnarine, R. Simmonds, T. Francis, D Picking** and **M.H. Ahmad** (2008). “A journey through the Medicinal Plant Industry of the Caribbean highlighting UWI Mona’s contribution”. *Caribbean Quarterly* 54(3): 27-52.
- * **Mitchell S.**, Adrian Burke, Claudette McKenzie, Shaunakay Stirling, Josette Ryan, Winston Simpson, Don McGlashan (2008) “Jamaica: Country report to the FAO International Technical Conference on Plant Genetic Resources for Food and Agriculture”. Ministry of Agriculture, Jamaica, 59 pgs.
- * Powell, M., **Wheatley, A.O.**, Omoruyi, F., **Asemota, H.N.**, Williams, N.P. and **Tennant, P.** (2008) “Effect of subchronic

- exposure to transgenic papaya (*Carica papaya* L.) on liver and kidney enzymes and lipid parameters in rats”. *J. Sci. Food Agric.* 88: 2638-2647.
- * Riley, C.K., **Bahado-Singh, P.S., Wheatley, A.O., Ahmad, M.H.** and **Asemota, H.N.** (2008) “Relationship between the physicochemical properties of starches and the glycemic indices of some Jamaican yams (*Dioscorea spp.*)”. *Mol. Nutr. Food Res.* 52: 1372-1376.
 - * Riley, C.K., Adebayo, S.A., **Wheatley, A.O.** and **Asemota, H.N.** 2008. The interplay between Yam (*Dioscorea sp.*) starch botanical source, micromeritics, and functionality in paracetamol granules for reconstitution. *Eur. J. Pharm. Biopharm.* 70: 326-334.
 - * Riley, C.K., Adebayo, S.A., **Wheatley, A.O.** and **Asemota, H.N.** 2008. “Surface properties of yam (*Dioscorea sp.*) starch powders and potential for use as binders and disintegrants in drug formulations”. *Powder Tech.* 185: 280-285.
 - * **Tennant, P.** and Benkeblia N. (Eds.) (2009) Citrus III. Tree and Forestry Science and Biotechnology Vol., 3 (Special Issue 2), 142 pp
 - * **Tennant, P.** and Benkeblia N. (Eds.) (2009) Citrus II. Tree and Forestry Science and Biotechnology Vol., 3 (Special Issue 1), 168 pp
 - * **Tennant, P.** and Benkeblia N. (Eds.) (2009). Potato II. Fruit, Vegetable and Cereal Science and Biotechnology Vol. 3, (Special Issue 1), 139 pp
 - * **Tennant, P.F,** Robinson, D., **Fisher L, Bennett S,** Hutton D, Coates-Beckford P, Mc Laughlin W (2009). Diseases and pests of citrus (*Citrus spp.*)., **Tennant PF, Benkeblia N,** (Eds) Citrus III. *Tree and Forestry Science and Biotechnology* 3 (Special Issue 2) 81-107.
 - * **Chin, M.,** Rhodes, L., **Tennant, P.** (2008). Occurrence of Papaya ringspot virus in papaya orchards of St. Kitts. *Plant Pathology* 57: 767 (New Disease Reports [http://www.bspp.org.uk/ndr/] Volume 16.)

- * Roberts, M., Minott, D.A., **Tennant, P.F.**, and Jackson, J.C. (2008). Assessment of compositional changes during ripening of transgenic papaya modified for protection against *Papaya ringspot virus*. *Journal of the Science of Food and Agriculture* 88: 1911-1920
- * Benkeblia, N. and **Tennant, P.** (Eds.) (2008). Citrus I. Tree and Forestry Science and Biotechnology Vol., 2 (Special Issue 1), 140 pp
- * Benkeblia N. and **Tennant P.** (Eds.) (2008). Potato I. Fruit, Vegetable and Cereal Science and Biotechnology Vol. 2, (Special Issue 1), 155 pp

INCOME GENERATION

The sum of \$14,772,000.00 has been granted for the period November 2008 – November 2011 by the Forest Conservation Fund for the identification, propagation and dissemination of native forest species of Jamaica.

In December 2008, the Centre earned the sum of \$530,000.00 from conducting training in “Concepts in Biotechnology and Genetic Engineering” for sixth form high school students of science.

PUBLIC SERVICE

Dr. Perceval Bahado-Singh

- Mentor, SOS Children’s Village.

Dr. Sylvia Mitchell

- Scientific Advisor, Ministry of Health Advisory Committee on Complementary and Alternative Medicine
- Scientific Herbal Advisor, South Trelawny Environmental Association (STEA)

Dr. Andrew Wheatley

- Director , Jamaica Anti-Doping Commission (JADCO)
- Chair, JADCO Subcommittee on Science and Education and Chair – Education and Outreach Committee
- Member, Jamaica National Commission for UNESCO

STUDENT INFORMATION

The centre had an enrolment of twelve MPhil and eleven PhD students in Biotechnology postgraduate programmes during 2008-2009.

Mr Andre Graham was awarded the MPhil degree in Biotechnology. His thesis entitled “Molecular characterization of the geminiviruses associated with the weed *Malvastrum americanum* from Jamaica” was supervised by Dr. Marcia Roye.

Ms. Aneisha Collins, also supervised by Dr. Roye, submitted the final draft of her PhD thesis to Graduate Studies and Research Department in August, 2009.

Misses. Latanya Fisher (PhD) and Shawna Gae Turner (M Phil), as well as Mr. Ryan Francis (MPhil), all supervised by Dr. Paula Tennant, completed the final draft of their theses and submitted to the Graduate Studies and Research Department in August 2009. Awards are pending.