

DEPARTMENT OF LIFE SCIENCES

Mona Webber, BSc (Hons.) MPhil, PhD *UWI*
– Head of Department

WORK OF THE DEPARTMENT

The Department of Life Sciences (DLS) continues to work towards “sustained excellence” in all our endeavours. To this end we completed the revision of the undergraduate curriculum, rolled-out revised taught graduate programmes and continued to address infrastructural challenges brought on by increased numbers of students throughout the 2011/12 academic year.



Undergraduate Curriculum Reform

The Department was able to complete the major aspects of the process of curriculum reform with the revision of the final year (Level 3) courses and amendments to the previously approved BSc programmes and Majors. In response to enrolled student interest and applicant choices, the BSc in Experimental Biology was returned to the curriculum, replacing the BSc in Tropical Horticulture which is now a Major in Horticulture. BSc in Experimental Biology was the most popular Life Sciences ‘major’ selected by applicants in 2011/12 and the Major with the second largest number of graduates (26) in Life Sciences at the end of 2010/11.

The current curriculum review exercise was completed with 30 new and revised, 3-credit, final year courses being submitted for approval in December 2011 for delivery to students at the start of the 2012/13 Academic Year. The process of changing to 3-credit courses, facilitated the introduction of new courses like: Plant Eco-physiology, Pollution Biology, Sustainable Use of Marine Fishable Resources and Environmental Microbiology. Courses like Biology of Fungi (formerly

Mycology) and the Biology of Soil have been revised and are again a part of the undergraduate curriculum.

The Department of Life Sciences therefore offers, to new advanced students for the 2012/13 Academic year, **BSc Programmes in Environmental Biology and Experimental Biology; Single majors in Animal Biology, Applied Plant Sciences, Horticulture, Marine Biology and Terrestrial and Freshwater Biology. Minors in Conservation Biology, Human Biology and Plant Sciences** complement these majors.

New Graduate Programmes

The revised MSc in Plant Production and Protection (PPP) and MSc in Marine and Terrestrial Ecosystems (MATE) will be offered to students for the 2012/13 academic year. The newly revised MSc PPP was not offered in 2011/12 due to low enrolment, however, 30 applications have been received and indications are that the programme will be taught in 2012/13. The MSc MATE which was taught for the first time as one of the specializations under the Natural Resource Management (NRM) umbrella, started the year with 8 students which was reduced to 5 due to financial issues experienced by students. However, the DLS was able to see some profit due to the shared delivery with the NRM programme.

Student Enrolment

The numbers of students enrolled in **Level 1** Life Sciences courses in 2011/12 increased to the highest ever with Cell Biology (BIOL1017) having 624 students registered by the sitting the final exam and Molecular Biology and Genetics (BIOL1018) having 619 students registered (up from 534 in both in the 2010/11 Academic Year) . Additional laboratory spaces were created by having evening laboratory sessions from 6 to 9 p.m., two evenings per week. A Saturday lab stream was impossible as many of the students were admitted late and were already in Saturday labs for other courses. The evening laboratory stream turned out to be very popular especially with students who live on or near the Campus, and these laboratory spaces were filled by Semester 2.

The numbers in **Level 2** courses were almost identical to the previous year with courses having between 81 (AGSL2401 – Soil and Water management) and 166 (BIOL2401 – Research Skills and Practices in Biology) students. At **Level 3** the numbers from the previous year were maintained and enrolment ranged from 26 to 56 (across 24 courses). A larger 2nd year is expected in 2012/13 and so laboratory space is being explored for the Life Sciences core courses: Research Skills and Practices in Biology (Semester 1) and Principles of Ecology (Semester 2). To this end, the Aquatic Sciences laboratory is being expanded and funds are being sought to expand the Biology Lecture Theatre in preparation for the 2012/13 academic year.

Undergraduate Teaching & Student performance:

Life Sciences currently has a complement of 15 full-time lecturing staff (plus four on contract for services for the delivery of the Agriculture courses), delivering 23 courses in Semester 1 and 24 courses in Semester 2. 100% of lecturers and courses in Semesters 1 and 2 received course assessments of > 3.0. However, the % of lecturers and courses with ratings =4.0 were down to 67/60% of lecturers/courses in Semester 1 and 72/56% of lecturers/courses in Semester 2. At the graduate level all lecturers and courses were rated at =4.0 by students in both semesters. Of note is the achievement of scores of 5.0 by Dr. Karl Aiken in the BIOL6413 Graduate course.

The Level 1 courses had high percentage passes in 2011/12 academic year with the second semester Diversity of Organisms courses (BIOL1262 and BIOL1263) averaging 86 and 79%, respectively. The Semester 1 courses (BIOL1017- Cell Biology and BIOL1018- Molecular Biology & Genetics) had lower % passes (64 and 69%, respectively) but also showed improvement when all sections were averaged. We continue to put emphasis on tutorial attendance with graded tutorial exercises (weekly quizzes). The issues with marking of the quizzes have been solved by varying the structure of the quizzes where appropriate and using more graduate students to assist with this exercise.

The performance of students at Level 2 was carefully reviewed at the end of the 2011/12 Academic year as the new 3-credit courses, designed as

part of the curriculum reform, were offered for the first time. The results showed widely ranging % passes over the two semesters, from 95% pass by students in the Research Skills and Practices in Biology to 41-51% pass by students in the Animal Form and Plant Form courses. The DLS has discussed the reason for such low % passes in these two new courses and will seek to give attention to the issues as expressed by both students and lecturers. However, the courses will need to be run for one more year with a new cohort of students before they can be deemed to be in need of major revision. The examination structure of especially the Plant Form will be reviewed.

Postgraduate research and teaching

The number of students entering new MPhil/PhD programmes was again low in 2011/12 with three MPhil and one PhD student commencing higher degree programmes.

A record number of 13 MPhil students completed their degrees in 2011/12. The graduation exercise of November 2011 saw 35% of higher degrees being accounted for by Life Sciences.

The degree specialization, names and supervisors of those completing in this reporting period are given below.

MPhil Botany

BENNETT, Stacy- Marie	Prof. Paula Tennant
POWELL-BENNETT, Kashena	Dr. Dwight Robinson
McLYMONT, Peter	Dr. Jane Cohen
MEIKLE, Judeen	Dr. Jane Cohen
STEEN, Sanya	Dr. Jane Cohen
	Prof. Nouredine Benkeblia

MPhil Marine Sciences

HENRY, Ainsley	Prof. Dale Webber
WILMOT, Inilek	Prof. Dale Webber

MPhil Zoology

AINSWORTH, Peter

FOSTER, Alison

KENNY, Ivana

LUE, Kristoffer

OLIPHANT, Zahra

ROBINSON, Marsha

Prof. Dale Webber

Dr. Mona Webber

Dr. Judith Mendes

Dr. Mona Webber

Dr. Eric Hyslop

Drs. Costas Zachariades
(ARC, South Africa)

Dwight Robinson

Jane Cohen

WHYTE, Damion

Dr. Eric Garraway

A second cohort of ten MSc Marine and Terrestrial Ecosystems (MaTE) and nine MSc in Plant Production and Protection (PPP) students graduated in November as follows:

MSc Marine and Terrestrial Ecosystems

Patrice Francis (Distinction), **Simone Lee** (Distinction), **Helen Liu** (Distinction), Swayne Beckles, Sheree Broomfield, Anya Duncan, Leon Grant, Stacy Maxam, Ricardo Miller and Ryan Warburton

MSc Plant Production and Protection

Camille Marks (*Distinction*), Glenville Hall, Nordia Hamilton, Shanae Marks, Aliza Lindo, Narado Richards, Carlton Spencer, Marcia Stamp-Brown.

Summer School

The DLS summer school was again very efficiently managed by our summer school coordinator, Dr. Tannice Hall. 400 students were registered for, and sat 35 courses with the average % pass being 80. Many of the courses were 'exams-only' sittings of previously offered courses and several had students who qualified for special re-sits of the Semester 2 courses. This accounts for the increase from 367 students sitting 28

courses in the previous year. Summer School continues to be the major source of income generation for the Department and also provides the opportunity for students to complete their degree in a timely fashion. The summer semester also facilitates the offering of Diving Technology for Aquatic Scientists, Internship and Research Project courses which are difficult to schedule in the normal semesters.

Infrastructure and equipment

Projects are on-going to maximize use and increase efficiency of spaces (laboratories and seminar rooms) in the DLS. The Molecular Biology/Virology laboratory now seats 60 students, up from 20 in 2010/11, and the Aquatic Sciences lab is to be increased from a capacity of 40 to 60 students. The latter will therefore be available for use by second year courses which have multiple streams of 60 students each.

Port Royal Marine Laboratory

The Port Royal Marine Laboratory continues to support teaching, research and outreach on the Campus by hosting UWI undergraduate and MSc classes, research students and staff from several departments on the campus. The number of users for the period includes weekly visits of 30 – 50 Marine Ecology, Coral Reef Biology and Fisheries Ecology UWI Mona Campus students. In addition, 45% of Life Sciences courses were provided with specimens for laboratory classes confined to the campus due to size or the need for specialist equipment.

The UWI/EFJ Biodiversity Centre Project came to an official close on November 30, 2011 however the facility created by an Environmental Foundation of Jamaica - EFJ grant and Central Campus funds, continued in its second full year of existence to host large numbers of staff and students from a range of educational institutions across Jamaica. Numbers of visitors to the facility in 2011/12 were 2758 (down from 3655 in 2010/11). The 897 less visitors than the previous year we believe was due in part to financial constraints with parents being unable to afford all the costs associated with school trips which include tours, transportation and food, and so the experience is being limited to those children whose

parents can afford the activity. The PRML Biodiversity Centre is therefore seeking funding from the Disney Foundation and the Bill and Melinda Gates foundation to provide food and transportation for children from schools and societies across Jamaica who may not be able to afford to visit the facility.

The Port Royal Marine Laboratory also benefited from the purchase by the Campus of a 32' Eduardono vessel named *Monacanthus*, which is used for taking visitors into the Port Royal mangroves and facilitates classes of UWI Mona students who use the facility on a weekly basis.

In addition to the over 40 schools and colleges in Jamaica, UWI students and staff, other visitors to and users of the facility during 2011/12 came from institutions like NEPA, CL Environmental, Natural History Society, Royal Jamaica Yacht Club, Texas A & M Marine Archaeology group, Kings College and University of South Florida.

Centre for Marine Sciences - Caribbean Coastal Data Centre and Discovery Bay Marine Lab

The 2011- 2012 academic year was productive as it saw the Centre for Marine Sciences under the leadership of Director Professor Dale Webber acquiring new equipment to help fulfil its mission of engaging in research, training and outreach in Caribbean Marine Sciences.

Research conducted in the Marine Invasive Species Lab at the Discovery Bay Marine Laboratory (DBML) lead by Dr. Dayne Buddo was enhanced by the provision of dedicated research vehicle by the Scotiabank Jamaica Foundation to facilitate the island wide coverage of the Lionfish control project. This research area which received valuable assistance from five interns over the year encompassed, Lionfish potential trap methods, associated public health risks, prey preferences and island wide distribution patters with the Montego Bay Marine Park as a notable partner. Research contacts with NOAA, Mote Marine Laboratory and Florida International University continue to provide international research opportunities.

The DBML guided by Principal Scientific Officer Peter Gayle secured a J\$21M grant through the Forest Conservation Fund towards the Limestone Forest Conservation Project. The project will research and showcase ecosystem function by demonstrating the interdependence of coastal habitats with best practices regarding terrestrial activities, coral reef preservation and fisheries management.

Coral Reef research from the Caribbean Coastal Data Centre (CCDC) within the Centre for Marine Sciences facilitated island-wide Reef Check monitoring in Negril (two sites), Wreck Reef and Drunkenman's Cay while continuing data analysis for video monitoring of CPACC sites (Discovery Bay, Port Royal and Portland) conducted by NEPA. Some of these activities were included in the CMS presentation at the prestigious International Coral Reef Symposium (ICRS) in Australia by Marcia Creary, Environmental Data Manager in the CMS. Finally the research in modeling developed by Ph.D. candidate Orville Grey in collaboration with Florida International University and The Nature Conservancy provided platforms for decisions on natural resource conservation using the Soil Water Assessment Tool (SWAT) in the Caribbean Coastal Scenarios Project.

In the 2011-2012 year the DBML was successful in replacing the 36 year old recompression chamber with a new Hyperbaric Chamber courtesy of funds (€280,000) from the University of the West Indies Mona Campus and the Tourism Enhancement Fund. It remains the only functional unit in the island and boasts cutting edge technology in hyperbaric treatment. Several staff members were trained and a revised Standard Operating Procedure which offers increased legal protection to UWI, was implemented.

DBML continued to host visitors from several primary, high schools and well as US colleges and universities. The number of visitors for the year increased by 53.47% compared to last year. The Summer Eco-Camp directed by Administrative Officer Pamela Housen was held under the theme "Climate Change; a Hot Topic" and saw 88 Campers participating.

During the year, the Centre for Marine Sciences produced the National Ballast Water Strategy for the government of Jamaica, a regional lionfish

book for control and management as well as state of Caribbean Marine Environment report to seven Caribbean countries through the TNC led Caribbean Challenge Initiative.

DLS Staff developments and Research activity highlights

The 2010/11 academic year began with the retirement of Professor Phyllis Coates-Beckford and the continued secondment of Professor Dale Webber to the ISD - Environmental Management Unit. Drs Karl Aiken and Eric Hyslop returned from sabbatical at the start of 2011/12. Dr Hyslop immediately took up the post of Associate Dean Student Matters in the Faculty and Professor Ralph Robinson continued to serve as Deputy Dean of the Faculty of Science and Technology.

The Department is proud of the sterling contributions made by our staff to the Faculty and Campus, however, we do feel the shortage of human resources as we attempt to respond to research, teaching and outreach associated with the various areas of the Life Sciences. The impact of senior staff being assigned heavy administrative duties and absence of replacements in key areas is deleteriously affecting the research and teaching core functions of the Department. The Department's key research areas: Applied Plant Sciences, Animal Biology/Physiology, Marine Biology & Ecology, Terrestrial/Freshwater Ecology & Conservation and Horticulture/Agriculture are aligned to our new majors. Deficiencies exist in the Animal and Plant Sciences areas. We have therefore sought and received permission to advertise and fill two new positions (Lecturer/Senior Lecturer in Applied Plant Sciences and in Whole Animal Physiology), this as we seek to maintain our research, teaching and outreach at a high standard and move towards a level of excellence.

During 2011/12 academic year, **Dr. Paula Tennant** was promoted to the rank of Professor with her title being **Professor of Molecular Plant Pathology**. Several staff members made progress in being re-appointed with tenure and crossing the bar and merit bar, respectively.

Research Days 2012 Awards: Three members of staff (names highlighted) and one graduate student received awards as follows:

- **Dr. Byron Wilson** (for best researcher in the Faculty, shared with Dr. Michael Taylor in Physics)
- **Professor Nouredine Benkeblia** (for best publication- book)
- **Dr. Kurt McLaren**, Mr. C. Adit Sharma (Graduate student) and **Dr. Byron Wilson** (for best research article in the Faculty)

Research Output (Publications)

I am very pleased to report that the 2011-2012 research output of the department consisted of 31 referred publications, 29 conference presentations and 6 non-refereed articles/technical reports. The crude average, based upon 14 permanent academic staff at Mona and 4 at Principal Scientific Officer level or above, a total of 18 staff producing in these categories, gives 3.66 publications per staff member when all categories of publications are considered (total = 66). This shows marked improvement over the average of 2.4 publications from the previous year. When referred publications (books and journal articles are considered) the average for the Department is 1.7 which again shows improvement over the 1.3 reported for 2010/11. The number of conference presentations (which were 17 in 2010/11), have increased to 31 in 2011/12, the latter occasioned by the staging of the Faculty Conference in the reporting period. However, there was overall a substantial increase in the average publications per academic staff in the 2011/12 academic year.

Targets indicated for 2011/12 in the 2010/11 Annual Report were:

- To complete the reform of the Undergraduate curriculum with Level 3 courses being reviewed.
- Review the MPhil and PhD graduate programmes so as to improve the quality of the experience for students and through-put.
- To revive the annual staff review process with emphasis on the goal setting sections, and focus on specific goals in the areas of research (especially in areas of national relevance), publications and grant acquisition.

- To improve collegiality through facilitating visiting colleagues from other universities and increasing the numbers of seminars, workshops and research presentations held in, or facilitated by the Department

These targets, while not fully achieved, have been substantially achieved. The Level 3 curriculum reform has been completed, the PhD and MPhil review, begun and there has been substantial improvement in the productivity of staff in the area of publications and research grant acquisition. However, we believe there is still work to be done in the following areas which will form our targets for 2012/13:

- Improvement in the quality of the experience and training for MPhil and PhD students as well as increasing the ratio of PhD: MPhil's in the Department.
- Improved collegiality through the regular hosting of or participation in seminars/workshops/international conferences.
- Engagement, training and empowering of administrative and technical staff in the Department.

PAPERS PRESENTED

- **Benkeblia, N.** (2011). Organic farming in tropical agro-ecological system: Case study of Jamaica. 47th Annual Scientific Meeting of the Caribbean Food Crops Society (CFCS), Bridgetown, Barbados, July 3-9, 2011.
- **Benkeblia, N.** (2012). Current status of sites and devices. Network of regional schemes for a Caribbean Agroecology. 2nd CAWAI Workshop, Guadeloupe, France, March 12-15, 2012.
- Emanuel, M.A. and **Benkeblia, N.** (2012). Variation of saccharides and fructo-oligosaccharides (FOS) in carambola (*Averrhoa carambola*) and june plum (*Spondias dulcis*) during ripening stages. 7th International Symposium, Kuala Lumpur, Malaysia, June, 24-29, 2012 (Oral).

- Emanuel, M.A. and **Benkeblia, N.** (2012). Variation of reducing and total sugars, total phenolics and anthocyanins in otaheite (*Syzygium malaccense* L.) during three “on tree” ripening stages. 7th International Symposium, Kuala Lumpur, Malaysia, June 24-29, 2012 (Poster).
- **Emanuel, M.** and **Benkeblia, N.** (2012) Variation of total phenolics, anthocyanins, and antioxidative capacities in Otaheite apple (*Syzygium malaccense*) during different ripening stages. 9th Conference of the Faculty of Pure and Applied Sciences, U.W.I., Mona, April 13-15, 2012.
- Emanuel, M.A. and **Benkeblia, N.** (2012). Variation of reducing and total sugars, total phenolics and anthocyanins in ribena (*Syzygium cumini*) during five “on tree” ripening stages. 7th International Symposium, Kuala Lumpur, Malaysia, June 24-29, 2012 (Poster.)
- Emanuel, M.A. and **Benkeblia, N.** (2012). Variation of reducing and total sugars, total phenolics and anthocyanins in star Apple (*Chrysophyllum cainito*) during three “on tree” ripening stages. 7th International Symposium, Kuala Lumpur, Malaysia, June 24-29, 2012 (Poster).
- Lee, S, **D. Buddo** and K. Aiken. 2011. Habitat Preference of the Invasive Lionfish (*Pterois volitans/miles*) in Discovery Bay, Jamaica: Use of GIS in Management Strategies. 64th Annual Conference of the Gulf and Caribbean Fisheries Institute, Cancun, Mexico, November 4-7, 2011.
- Moonsammy, S, **Buddo D.** and Seepersad, G. 2011. Assessment of the Economic Impacts of the Lionfish (*Pterois volitans*) Invasion in Jamaica. 64th Annual Conference of the Gulf and Caribbean Fisheries Institute, Cancun, Mexico, November 4-7, 2011.
- Morris, J.A., Jr., L. Akins, **D. Buddo**, S. Green, and R. Lozano, 2011. Strategies and practices for invasive lionfish control. 64th Annual Conference of the Gulf and Caribbean Fisheries Institute, Cancun, Mexico, November 4-7, 2011.

- Rankine, D.R., M.A. Taylor, **J.E. Cohen**, L.A Simpson and A.A. Murray. 2012. Towards parameterization of the FAO AquaCrop Model for rain-fed and irrigated sweet potato, *Ipomoea batatas*. FAO/IAEA International Symposium on Managing Soils for Food Security and Climate Change Adaptation and Mitigation, July 23-27, 2012, Vienna, Austria. Poster. IAEA-CN-191/116P.
- Rankine, D.R., **J.E. Cohen**, M.A. Taylor, L.A. Simpson, J.L. Lawrence and A. Murray. 2012. Improving yield estimation in a changing climate for root and tuber crops: the case of sweet potatoes, *Ipomoea batatas*. Jamaican Society for Agricultural Sciences 21st Annual Conference, June 6, 2012, Bodles, St. Catherine, Jamaica. Abstracts booklet.
- Reid, N.T.P. and **J.E. Cohen**. 2012. Weed management benefits of soil solarisation in Jamaica: solarisation in the warm dry months can reduce weed pressure in the succeeding rainy season. Jamaican Society for Agricultural Sciences 21st Annual Conference, June 6, 2012, Bodles, St. Catherine, Jamaica. Abstracts booklet.
- McLymont, P.E. and **J. Cohen**. 2012. Investigations on Jamaican pomegranate (*Punica granatum*): comparisons of vegetative propagation, flowering and fruit:juice ratio with commercial varieties. Jamaican Society for Agricultural Sciences 21st Annual Conference, June 6, 2012, Bodles, St. Catherine, Jamaica. Abstracts booklet.
- **Hyslop E.** 2012 Research in freshwater Ecology in Jamaican overview of the past 15 years of research. Freshwater Biological Association Annual Conference, University of Glasgow, Scotland. July 10-11, 2012.
- **Robinson, R.D.**, Lindo, J.F., Waugh, C., Brown, P. and Todd, C. (2011). Angiostrongyliasis in Jamaica: 1994 to present. Rat Lungworm Disease Workshop, University of Hawaii, Honolulu, August 16-18, 2011.

- **Todd, S-R. K. Prospere** and **E. Hyslop** (2011). Predictive distribution modelling as an environmental management tool: a case study of *Cherax quadricarinatus* in Jamaican Rivers. Jamaican Institute of Environmental Professionals, 5th Biennial Conference. May 2011
- **Webber, D.F.** 2012. The status and trends of marine and coastal resources across the Insular Caribbean; treats actions and requirements. The *Caribbean Challenge Initiative* first Senior Officials Meeting (SOM1), Kingston, Jamaica, July 10-11, 2012.
- **Webber, M.** 2011. Biodiversity and plankton of Jamaican bays and harbours: what do we know of our resident fauna? National Ballast Water and Marine Invasive Species workshop. 2011. Kingston.
- Wilson, B. S., and R. van Veen. 2011. Jamaican Iguana Recovery Project, 2011 Update. IUCN/SSC Iguana Specialist Group annual meeting, Antigua, Guatemala.

Ninth Conference: Faculty of Pure and Applied Sciences, The University of the West Indies, Mona, April 13-15.

- Mitchell, A.; **Webber, M.**; **Buddo, D.** and **Webber, D.** 2012. Oceans under threat: A study of ballast water stowaways entering a Jamaican Port.
- Rankine, D.R., M.A. Taylor, **J.E. Cohen**, L.A. Simpson, J. Lawrence and A. Murray. 2012. Assessing drought tolerance in rain-fed and irrigated crop production - the case of sweet potatoes, *Ipomoea batatas*.
- **Jones, A. D. and E. Hyslop** - Risk Classification of the Non-Indigenous Fish Species of Black River: Application of the Fish Invasiveness Screening Kit (FISK)
- **Mendes, J.** R. Reid and J. Douek - Population Structure and Genotypic Diversity of the Endangered Caribbean Coral *Acropora*

palmata in Barbados: The Implications for Conservation and Restoration.

- Lindo, **A and D. E. Robinson** - An Assessment of the Flowering Pattern of *Theobroma cacao* L. In Four Major Cocoa Producing Parishes in Jamaica and the Effect of Shoot Age and Shade on the Relative Abundance.
- Todd, **S-R., J. Meikle, K. Prospere and E. Hyslop** - How Many and How Far? Using Species Distribution Models for Research in Jamaica.
- **Williams, S., R. Bennett and D. E. Robinson**, Raymond Reid - The Persistence of Deltamethrin And Lambda-Cyhalothrin on Callaloo under Natural Field Conditions in Jamaica and During Post-Harvest Storage and Processing.
- **Thomas, L., Williams, K., Coates-Beckford, P.** and Tennant, P. (2012) *Alternaria* leaf spot on pumpkin in Jamaica.
- Johnson, J. N., **B. Wilson**, and **R. Robinson**. 2012. Surveillance of the parasitic fauna of the cane toad, *Bufo marinus* (Anura: Bufonidae), Mona, St. Andrew, Jamaica.

PUBLICATIONS

Refereed

Books, Book Chapters and Monographs

- * **Benkeblia, N.** 2012. (Editor) Sustainable Agriculture and New Technologies. CRC Press. 560 pp.
- * Hewett, E.W., Aldous, D.E. and **Benkeblia, N.** (Editors) (2012). XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): VI International Symposium on Horticultural Education, Research Training and Consultancy, *Acta Horticulturae* # 920, ISHS, Leuven, Belgium, 175 p.
- * **Benkeblia, N.** 2012. (Editor) Omics technologies: Tools for food Sciences. CRC Press, Boca Raton (FL), 421 p.

- * **Benkeblia, N.** 2012. Metabolomics and food science: Concepts and serviceability in plant food and nutrition. In: Benkeblia N (ed.). Omics technologies: Tools for food Sciences. CRC Press, Boca Raton (FL), pp. 57-76.
- * **Benkeblia, N., Tennant, P., Jawandha, S.K. and Gill, P.S.** 2011 Pre-harvest factors influencing fruit quality after harvest. In: Yahia EM and Brecht JK (eds.). Postharvest Biology and Technology of Tropical and Sub-Tropical Fruits. Volume 1. Woodhead Publishing, Cambridge. pp 112-141
- * **Benkeblia, N.** (Guest Editor) (2011). Special issue: Potato 5. *FOOD, GSB Publisher*, Isleworth (UK), 5(1), pp. 1-101.
- * **Benkeblia, N.** (2011). Mining omic technologies and their application to sustainable agriculture and food production systems. In: **Benkeblia, N.** (Ed.). Sustainable Agriculture and New Biotechnologies. *CRC Press*, Boca Raton, FL, pp. 117-148.
- * **Benkeblia, N.** (2011). The world of edible Alliaceae. In: Lal, R. (Ed.). Encyclopedia of Life Support Systems (EOLSS): Agricultural Science. EOLSS Publishers, Oxford, UK, [<http://www.eolss.net>]
- * Emanuel, M. A. and **Benkeblia, N.** (2011). Ackee fruit (*Blighia sapida* L.). In: Yahia, E.M. (Ed.). Postharvest biology and technology of tropical and subtropical fruits. Vol. 2. Woodhead Publishing, Cambridge (UK), pp. 54-64.
- * Droby, S., Wisniewski, M. and **Benkeblia, N.** (2011). Postharvest pathology and strategies for decay control. In: E. M. Yahia (Ed.). Postharvest Biology and Technology of Tropical and Sub-Tropical Fruits. Volume. 1. *Woodhead Publishing*, Cambridge, 194-223.
- * Lindo, J.F., Waugh, C., Todd, C., Brown, P., and **Robinson, R.D.** (2011). The emergence of *Angiostrongylus cantonensis* as a cause of eosinophilic meningitis in Jamaica: Progress and pitfalls. In: Angiostrongylus and angiostrongyliasis – Advances in the disease, control, diagnosis, and molecular genetics. P.

Eamsobhana (ed.) pp. 27-31. Wattanakij Panich Press, Bangkok.

- * **Tennant P**, Fermin, G, Fisher L, Fuchs, M (2011). Virus diseases of fruit crops. In: UNESCO-EOLSS Joint Committee (eds) Agricultural Sciences. Encyclopedia of Life Support Systems (EOLSS) Publishers, Oxford, UK, [<http://www.eolss.net>]
- * Maxam, A. and **Webber, D.** 2011. The Hydrodynamic Modelling of Reefal Bays – Placing Coral Reefs at the Center of Bay Circulation, Hydrodynamics - Natural Water Bodies, Harry Edmar Schulz, André Luiz Andrade Simões and Raquel Jahara Lobosco (Ed.), InTech, Available from: <http://www.intechopen.com/books/hydrodynamics-natural-water-bodies/the-hydrodynamic-modelling-of-reefal-bays-placing-coral-reefs-at-the-center-of-bay-circulation>

Refereed Research and Review Articles

- * **Aiken, K.A.** 2012. Our Men Who Served- Selected Stories of Jamaican Airmen in World War II. Life & History section, *The Jamaica Journal*. Vol. 33 (3):22-31.
- * Meggs, L.G., R.D.Steele & **K.A. Aiken.** 2011. Settlement patterns of spiny lobster (*Panulirus argus*) postlarvae on collectors in Jamaican waters and culture of juveniles. Proc. 63rd Gulf & Carib. Fish. Instit. Nov. 1-5, 2010, Puerto Rico: 472-481
- * **Benkeblia, N.** (2012). Role of Horticulture in Agriculture Development and Food Security in Jamaica. *Acta Horticulturae*, 921: 43-48.
- * Emanuel, M. A. and **Benkeblia, N.** (2012). Variation of color, reducing and total sugars, total Phenolics and chlorophylls in carambola (*Averrhoa carambola*) during five “on tree” ripening stages. *Acta Horticulturae* 932: 285-290.

- * **Benkeblia, N.** (2012). Accumulation of total and reducing sugars in the green leaves and bulb tissues during growing and bulbing of onion (*Allium cepa* L.). *Acta Horticulturae* 932: 291-294
- * **Hyslop, E.J.** & Hunte-Brown, M. 2012. Longitudinal variation in the composition of the benthic macroinvertebrate fauna of a typical North coast Jamaican river. *Rev. Biol. Trop. (Int. J. Trop. Biol.)* Vol. 60 (1): 291-303.
- * **Hyslop, E. J.** and Nesbeth, D. A. 2012. The effects of bauxite/alumina waste on the composition of the benthic macroinvertebrate community of the Rio Cobre, a major river in Jamaica. *Biota Neotropica*. April/June 12(2)
- * Lanigan, A. C. and **E. J. Hyslop** (2011) The Aquatic and Semiaquatic Hemiptera of Jamaica. *Journal of Freshwater Ecology*. 26(2) 295-297
- * **Hyslop E. J.** (2011). *Pomacea diffusa* (Blume 1957), a new addition to the freshwater malacofauna of Jamaica. *Aliens newsletter* 4 (2).2
- * McKoy, S.A.; **E. J. Hyslop** and **R. D. Robinson** (2011) Associations between two trematode parasites, an ectosymbiotic annelid, and *Thiara (Tarebia) granifera* in Jamaica. *Journal of Parasitology* 97(5):828-832.
- * Olarte Castillo XA, Fermin G, Tabima J, Rojas Y, **Tennant P**, Fuchs M, Sierra R, Bernal AJ, Restrepo S (2011) Phylogeography and molecular epidemiology of Papaya ringspot virus. *Virus Research* 159: 132-140
- * Foster, N. L., Paris, C. B., Kool, J. T., Baums, I. B., Stevens, J. R., Sanchez, J. A., Bastidas, C., Agudelo, C., Bush, P., Day, O., Ferrari, R., Gonzalez, P., Gore, S., Guppy, R., Mccartney, M. A., McCoy, C., **Mendes, J.**, Srinivasan, A., Steiner, S., Vermeij, M. J. A., Weil, E. And Mumby, P. J. (2012). Connectivity of Caribbean Coral Populations: Complementary Insights from Empirical and Modelled Gene Flow. *Molecular Ecology*, 21: 1143-1157.

- * Holmes, I., **K.P. McLaren** and B.S. Wilson (2012). Surveys for Frog Diversity and Batrachochytrium dendrobatidis in Jamaica. *Herpetological Review*, 43, 278-282.
- * Rose, P.E., **D.F. Webber** and T. Commock. 2011. The Use of Open Source Technologies in Developing Botanical Databases. *Acta Hort.* (ISHS) 894:153-159
- * Elliott, T. Persad, G. and **Webber M.K.** (2012) Variation in the colonization of artificial substrates by mangrove root fouling species of the Port Royal mangrove lagoons in the eutrophic Kingston Harbour, Jamaica. *Journal of Water Resource and Protection* (JWARP). *Journal of Water Resource and Protection*, 2012, 4, 377-387, June 2012 (<http://www.SciRP.org/journal/jwarp>)
- * **Wilson, B., Edwards, T., and R. Powell.** 2012. **Pages 126-128** in: Island lists of West Indian amphibians and reptiles (R. Powell and R. W. Henderson, Eds.). *Bulletin of the Florida Museum of Natural History* 51(2):85–166.

Technical reports and Non-refereed Articles

- * Trench, C. and **Webber, M.** 2012. Coastal Plants Nursery Manual. P.R.M.L. Publication # 10. 65 pp. March 2012.
- * **Webber, M.K.** 2011. The Mangrove Ecosystem: A Biodiversity Hot-Spot. In Research for Development - 2011. Pp 58 – 61. University of the West Indies, Mona Campus Research Day Publication.

Workshops Attended

- * **Dr Karl Aiken** attended the 64th Annual Gulf and Caribbean Fisheries Institute conference in Mexico (October 30, 2011) and presented a paper on “*Creating a Fish Sanctuary Network in Jamaica, West Indies.*” The paper is co-authored by Stephen Smikle, Andre Kong and Oliver Squire (Fisheries Division- MOA).

- * **Dr. Kurt McLaren** attended the BioSonics Hydroacoustic Assessment Workshop in Seattle (Sept 12-14, 2011) and the rotomotion UAV flight training workshop in Charleston South Carolina (September 22-23).
- * **Prof. Ralph Robinson** attended the Rat Lungworm Disease Workshop, University of Hawaii (August 16-18, 2011), Honolulu. A paper Robinson, Lindo, Waugh, Brown & Todd 2011. Angiostrongyliasis in Jamaica: 1994 to present was presented, and an information-based website for the conference created.
- * **Dr. Byron Wilson** was the keynote speaker at the EFJ 7th Annual Public lecture on October 20, 2011. Lecture title: *On the brink of Extinction: Saving Jamaica's Vanishing Species*. The event was reported to be EFJ's best lecture of the series. The work of the DLS in the areas of Habitat/ Species conservation and Environmental Education was well presented and received.

INCOME GENERATION

Research grants:

Dr. Karl Aiken

- Research grant for **J\$1,025,000.** from the Natural Resource Conservation Authority (NRCA) to conduct a survey of the sea cucumbers in Jamaican waters with emphasis on species being collected for export.

Dr. Mona Webber

- EU/UNEP/GOJ Climate Change Adaptation and Disaster Risk Reduction project (NEPA) for the expansion of mangrove nurseries at Port Royal and Discovery Bay Marine Laboratories **US\$30,000.00.** June 2012.
- Forest Conservation Fund- FCF grant for **J\$4,626,000.00** with Mr. Camilo Trench (Scientific Officer, DBML) to investigate and conduct re-forestation of critical coastal forest areas around

Jamaica. Phase 1: Nursery expansion to DBML and selection of critical areas for mitigation. December 2011.

Dr. Byron Wilson

- Mohamed bin Zayed Species Conservation Fund (**US\$10,000**); Co-PI with PI M. Welsh): Conservation genetics of three *Cyclura* species (on-going).
- Disney Worldwide Conservation Fund (**US\$25,000**); submitted through International Iguana Foundation): Conservation of the Jamaican Iguana (on-going).
- Fresno Chaffe Zoo Conservation Fund (**US\$1213**); Co-PI with PI T. Grant): Genetic analysis of the Jamaican iguana (on-going).

Departmental Income Generating Activities

Activity/Programme	Income (J \$)
Lab Space/Bus Rental	608,000.00
Sale of Lab Manuals	1,058,488.00
Summer School	5,692,500.00
DLS Consultancy	659,900.00
Port Royal Consultancy (BDC)	1,014,014.95
Documentation Centre	388,294.00
MSc Programmes: MATE	2,605,000.00
PPP	120,000.00 (no new registrations)

PUBLIC SERVICE

Dr Karl Aiken

- Member, Caribbean Maritime Institute (CMI)
- Member, Board of Directors & Chair, CMI Academic Council
- Member, CITES Scientific Authority of Jamaica

- Fisheries Advisory Board, Ministry of Agriculture & Fisheries (Board member & Chair of Fish Sanctuaries sub-committee)

Prof. Nouredine Benkeblia

- Member, Editorial Board of: *OnLine Journal of Biological Sciences*.
- Editor-in-Chief, “*Journal of Food Processing and Technology*”, Omics Group Publishing, CA, USA.
- Member, Editorial Board, Recent Patents on Food, Nutrition & Agriculture Bentham Publisher
- Serial Editor, Potato Issues & Serial Editor of Citrus Issues Global Science Publisher
- Chairperson, **SERT** (Roots and Tubers Section), International Society for Horticultural Science
- Editor, journal: *Agricultural Science Research Journal*.
- Member, Editorial Board, *Journal of Food Technology & Processing*

Mr. Frederick Boyd

- Member, Standards Subcommittee, Jamaica Organic Agricultural Association (JOAM)
- Member, Phycological Society of America
- Member, International Society for Horticultural Science
- Member and Institution contact, Society for Economic Botany
- Member, International Association for Plant Taxonomists
- Member, Liaison for Department of Life Sciences / Nature Preservation Foundation partnership
- Board of Education, East Jamaica Conference of SDA

Dr. Dayne Buddo

- Chair, Regional Marine Invasive Species Working Group
- Member, Regional Lionfish Committee
- Resource Scientist, Regional Ballast Water Task Force
- Member, National Fish Sanctuaries Committee
- Member, National Steering Committee for the Regional Invasive Species Project
- Member, National Invasive Species Working Group

Dr. Jane Cohen

- Acting-Chair, CITES Scientific Authority of Jamaica:
- Member, Alien Invasive Species Working Group
- Member, Consultation Group for Pest Risk Analyses of National Plant Protection Organization, Jamaica
- Member, Plant Conservation Group, National Environment and Planning Agency (NEPA)
- Advisor (in weed control and plant nutrient analyses), Banana Board Research Department.
- Member, Jamaican Society for Agricultural Sciences.
- Member, Jamaica Organic Agriculture Movement.

Ms. Marcia Creary

- Chairperson, National Biodiversity Clearing House Mechanism Steering Committee
- Immediate Past President, JIEP
- Acting Treasurer, University Sub Aqua Club
- Member, FCF Technical Review Committee
- Member, Diving sub-group, National Council on Oceans and Coastal Zone Management
- Member, Marine Geology Unit Photo Database Advisory Committee
- Member, International Society for Reef Studies

Mr. Peter Gayle

- Member, Diving sub-group, National Council on Oceans and Coastal Zone Management

Dr. Eric Garraway

- Member, Advisory Board, National History Division, Institute of Jamaica
- Advisor, Vincentian Students Association
- Member, Association of Tropical Lepidoptera
- Member, Natural History Society of Jamaica

Dr. Eric Hyslop

- Member, CXC Subject panel in Biology

- Jamaica Clearing-House Mechanism Steering Committee, Institute of Jamaica

Dr. Judith Mendes

- Member, Education Sub-Committee, International Society for Reef Studies

Dr. Kurt McLaren

- Member of the Board- Forestry Department

Dr. Dwight Robinson

- Chairman, Jamaica Organic Agricultural Association (JOAM)
- Chairman, National Organic Agriculture Steering Committee , Ministry of Agriculture
- Member, Board of Directors- Greencastle Tropical Study Centre, St. Mary
- Member, National coordinating committee for Agricultural Research and Development, Jamaica

Professor Ralph Robinson

- Board of Directors, Jamaica Agricultural Development Foundation
- Member, American Society of Parasitologists
- Scientific Member, The National Bioethics Committee of Jamaica
- Justice of the Peace, St. Andrew, Jamaica
- Member, Lay-Magistrates' Association of St Andrew, Jamaica

Professor Paula Tennant

- Member, Caribbean Academy of Sciences, Jamaica Chapter
- Member, Jamaica Society of Scientists and Technologists
- Member, American Phytopathological Society

Dr. Kisan Vaidya

- Member, Gene Bank Committee, Jamaica
- Member, Review Committee, *Jamaican Journal of Science and Technology*

Professor Dale Webber

- Chairman, Board of Directors-Environmental Foundation of Jamaica
- Deputy Chairman, National Council on Ocean and Coastal Zone Management (NCOCZM) Ministry of Foreign Affairs and Foreign Trade
- Chair, Diving Sub-Group of the National Council on Ocean and Coastal Zone Management
- Member, Board of Trustees-Jamaica National Park Trust Fund
- Chairman, CXC panel on CAPE Environmental sciences
- Chairman, CL Environmental Company Limited

Dr. Mona Webber

- Member, CITES (Committee for the International Trade of Endangered Species) Scientific Authority of Jamaica
- Member, National Ramsar committee, NEPA
- Member of the Caribbean Academy of Sciences, Jamaica Chapter
- Member of the Association of Marine Laboratories of the Caribbean
- External Examiner, University of Technology BSc Degrees in Biological Sciences

Dr. Byron Wilson

- Member, IUCN SSC Iguana Specialist Group
- Member, IUCN SSC Amphibian Specialist Group
- Member, IUCN SSC Boa and Python Specialist Group
- Member, IUCN SSC Small Mammal Specialist Group
- Member, Working Group on Invasive Species, NEPA
- Member, Crocodile working group (NEPA)

Students – Graduates up to Summer School 2011/12

Class of Degrees		Types of Degrees 2010/2011 Graduates		
I	2			
II i	8	1	Botany Major	9
II ii	51	2	Zoology Major	13
Pass	35	3	Marine Biology Major	13
Total	96	4	Experimental Biology Double Major	25
		5	Environmental Biology Double Major	27
		6	Biology with Education	2

Departmental Prizes to students

Kimone Johnson	-	The Don Skelding Prize - Best Preliminary Biology Student
Sashonie Goodwin	-	The Sasikala Potluri Prize- Best student in Seed Plants
Damion Neath	-	The L. B. Coke Prize - Best Plant physiology student
Shelly-Ann Stephenson	-	The Charlotte Goodbody Prize - Best 1 st year student (Semester 1 courses)
Camilla Campbell	-	The Avinash Potluri Prize - Best 1 st year student (Animal Diversity)
Randy Aird	-	The Devi Prasad Prize - Best 1 st year student (Plant Diversity)
Rowan Newman	-	The Vincent Hugh McKie Prize in Zoology (2 nd year)
Kimani Kitson-Walters	-	The Ivan Goodbody Prize- Best Marine Biology major (2 nd year)