O PGIA News



The Newsletter of Postgraduate Institute of Agriculture, University of Peradeniya



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ABOUT THE NEWS LETTER

Established in 1975, the Postgraduate Institute of Agriculture (PGIA), affiliated to the University of Peradeniya is a prestigious Institution devoted to the development of higher level manpower in agriculture and related areas in Sri Lanka. During its four decades of existence, it has made tremendous progress in developing nationally and internationally important consortium of degree and non-degree programmes together with necessary infrastructure for teaching and research. Its' biggest strength is the availability of qualified and experienced staff, both from within the university and outside research and development institutes and linkages with many reputed international universities and research centers. PGIA NEWS is the main organ for the communication of various activities of the institute to the policy makers, academic community, stakeholders and the general public. It is published semi-annually and incorporates current news, research briefs and other information relating to agricultural education, research and development. The PGIA requests comments/suggestions from the readers on this newsletter if any, to improve its quality and content in the future issues.

UNIVERSITY OF PERADENIYA: CONGRATULATIONS FOR REMARKABLE WORLD RANKING

For the first time in the history of higher education in Sri Lanka, University of Peradeniya has been ranked in the category of 401 – 500 best universities of the world by the Times Higher Education (THE) world mission ranking for the year 2020. THE world ranking for the year included about 1400 universities in 92 countries of the world. The judgment of ranking is based after evaluation of their core missions such as teaching, research, knowledge transfer and international standing.

The university ranking system use 13 calibrated performance indicators to provide reliable balanced comparisons of their performance. The performance indicators are grouped into five major areas which include teaching and teacher quality, research output, citations, industrial and international links with knowledge transfer. This system is widely accepted all over the world to recognize the quality of universities. In the previous year's top positions were won by universities of developed countries such as USA, and UK and only a few countries of the world occupied positions of 300 – 400.

Among the Asian countries, a few universities in China, Hong Kong, Singapore, Japan and S. Korea are listed with high rankings. The University of Peradeniya has maintained a glorious record for quality higher education. In 1019/20, according to the university ranking by academic performance (URAP) Peradeniya University ranked first in Sri Lanka and 1123rd in the world. It was also ranked No.1 in Sri Lanka based on total research gate scores. Previously, the University of Peradeniya has also emerged first in other rankings such as Web metric and QS in 2019/20.

University of Peradeniya with a long history has its origins to the University of Ceylon established in 1942 and became an independent entity in 1967. It is the largest residential university located in a picturesque setting along banks of the river Mahaweli at Peradeniya in the Central Province of Sri Lanka. Presently University of Peradeniya has nine faculties including the recently established Faculty of Management Studies, covering all disciplines, 73 departments, three postgraduate institutes in Agriculture (PGIA), Science (PGIS) and Social Sciences and Humanities (PGIHS) three teaching hospitals for medical, dental and veterinary and animal sciences and a large number of academic research centers and units. These are involved in various outreach activities providing services to the students and the general public. The teaching staff of this university, approximately 730 is highly qualified and experienced and conducts both undergraduate and postgraduate programs. They are also engaged in research programs of national importance. The student population is around 11,000 with a large number of undergraduate (9,600) and 1,440 postgraduates.

This unique achievement is a pride to the Sri Lanka's university system and the nation as a whole. The PGIA as partner of this university congratulates this remarkable achievement and assures sustained support to its further success.



MAIN STORY

PGIA SUCCESSFULLY RESPONDS TO CORONA VIRUS

The university education in Sri Lanka was greatly disrupted by the COVID 19 pandemic which began in March this year. Both state and private universities were virtually closed in an attempt to contain the spread of the virus infection and further due to social distancing and restricting the movement of people. The closure of universities has not only affected the students and teachers but also parents. This effect is also not limited only to the local universities, but has spread across all universities of the world. More importantly, it has affected all countries with long lasting economic and social consequences. Fortunately, the timely intervention and restrictive measures imposed by the government including the closure of universities, colleges, schools, and tuition classes had a positive impact in reducing spread of the infection rates and deaths.

This is a novel experience which was not witnessed before by big or small or rich or poor nations of the world. These are anxious times for the students as well as the teachers about the prevailing uncertainty when the university life will return to normalcy. The worse affected are the parents who provide financial support for university education and they too need reassurance by the state or the universities. It is only after considering the public health issues and safety of the people that the state will be able to ease restrictions on normal life.

It is unclear when the COVID 19 pandemic will become normal but most likely to continue for a long

period. In this context many universities of the world are continuing to offer different courses with flexibility of time and place of learning to help the students. These measures are to help the student to get back on tract of the educational programs and continue through the COVID 19 pandemic. As a consequence of this pandemic, many universities in Sri Lanka have become creative using on-line options to keep various degree programs active without frustrating the staff, students and the parents. Although the universities may return to the mode of teaching face to face in classrooms after the COVID 19 crisis, the on-line delivery have to be an inevitable option for the future. This is an excellent opportunity for the universities increase the programs that could be conducted on-line and systematically to expand the horizons of technology based learning that was found to be useful to tide over the COVID 19 crisis. At the beginning universities and institutions are likely to make mistakes due to lack of skills and equipment, as there was little time to prepare and switch to on-line teaching and virtual education but a genuine effort deserve to be made to improve on this aspect. As the saying goes; If the job is worth doing, it's worth doing badly'.

As a policy, the PGIA has consistently encouraged the staff to reduce face to face instruction on all its program offerings, make them full time and deliver through distance learning and virtual education. This could avoid the inconvenience of conducting lectures in the weekends. Although the institute had little time to prepare for a remote teaching regime, the COVID 19 has been a blessing in disguise. Currently, the PGIA offers most of the programs on-line which is a tremendous achievement and plans to continue in the future.



ACADEMIC NEWS

Admissions for the Academic Year 2020

Applications for the new academic year were called in March 2020. Due to Prevailed situation in the country and considering the requests made by the students closing date for applications has been extended until 30th July 2020.

Currently the institute offers 31 M.Sc. Degree programmes (by course work as well as by course work & research) MBA Degree (by course work and coursework & research) and research degrees (M/Phil., Ph.D.) and under 11 Boards of Study.

Two Ph.D. students graduated under the collaborative cohort Ph.D. programme

The MOU between University of Peradeniya and Queensland University of Technology (QUT) was first signed in 2014 and renewed in 2019. Under this agreement, the collaborating institutes have agreed to jointly develop a system of academic exchanges that will allow for a joint Ph.D. programme. Two students namely Ms. A.M.N.L. Abeysinghe and Ms. C.K. Pathirana have already completed their degree programmes under this joint Ph.D. programme.

Ms. A.M.N.L. Abeysinghe conducted her research on "Effects of Ultrasound on Homogenization and Fermentation Kinetics of Buffalo's Milk". Senior Supervisor of her research was Prof. Janak K. Vidanarachchi, Senior Lecturer, Department of Animal Science, Faculty of Agriculture, University of Peradeniya. Other supervisors were Dr. K F S T Silva, Senior Lecturer, Department of Animal Science, Faculty of Agriculture, University of Peradeniya, A/Prof. Azharul Karim, Senior Lecturer, School of Chemistry, Physics and Mechanical Engineering, Science and Engineering Faculty, Queensland University of Technology, Australia, Dr. Nazrul Islam, Senior Lecturer, Pharmacy Discipline, Faculty of Health, School of Clinical Sciences, Queensland University of Technology, Australia and Dr. Sangeeta Prakash, School of Agriculture & Food Sciences, University of Queensland, Australia

Ms. C.K. Pathirana conducted her research on "Influence of physico-chemical properties of biosorbents on heavy metal removal from industrial wastewater" under the Senior Supervisor Prof. Ashantha Goonetillke, School of Civil and Environmental Engineering, Queensland University of Technology, Australia. Other supervisors were Dr. Shameen Jinadasa, Senior Lecturer, Department of Civil Engineering, University of Peradeniya Dr. Prasanna Egodawatta, School of Civil and Environmental Engineering, Queensland University of Technology, Australia.

ACADEMIC NEWS CONTD.

PGIA Promotes Postgraduate Research

Research Publication Facilitation Fund (RPFF)

Research Publication Facilitation Fund (RPFF) of the PGIA promotes the publication and wider dissemination of research findings of students by providing financial assistance as subscription fees for the publication of postgraduate research articles in high impact peer reviewed scientific journals and participation of postgraduate students at international conferences/workshops for oral/poster presentations.

Following students presented their research findings in international conferences using the RPFF.



Ms. Iresha Edirisingha a student of the B/S in Agricultural Biology attended the 4th International Conference on Bioscience and Biotechnology (BioTech - 2019) organized by the International Institute of Knowledge Management (TIIKM). This conference was held in Kuala Lumpur, Malaysia on 21 - 22 Februry 2019. She presented her research findings on Characterization of bacterial leaf blight resistance genus Xa4 and Xa21 in Rice (*Oryza sativa* L.) Iresha won two gold medals, one for session best individual presentation and the other one for the overall best student presentation of the conference.



Ms. Dhanesha Nanayakkara from the B/S in Agricultural Biology attended the 5th International rice congress organized by the International Rice Research Institute (IRRI), Philippines on 15 -17 October 2018 at Marina Bay Sands Convention Centre, Singapore. This is the most prestigious conference in the field of rice breeding. She presented her research findings on Haplotype analysis of bacterial leaf blight resistance gene Xa21 in rice.

Both Iresha Edirisingha and Ms. Dhanesha Nanayakkara attended VI NGGIBCI Conference on Crop Genomics: Present & Future, organized by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) on the 6 – 8th December, 2017 in celebration of the 10th anniversary of the Center of Excellence in Genomics (CEG).



Iresha presented her research done on "Comparative analysis of leaf vein density in Sri Lankan traditional rice varieties" as a poster presentation in the Genome and Germplasm Diversity Session.



Dhanesha presented her findings on "A novel molecular marker for bacterial leaf blight resistance gene Xa21 in rice" in the Genomics-assisted Breeding poster session.



ACADEMIC NEWS CONTD.

Outbound Training Program

Out Bound Training of the 2019 MBA Batch was held on 1st and 2nd February 2020 at CHE Adventure Park Hanwella. It consisted of outdoor activities to improve individual skills and team skills and also a camp fire with a BBQ night party for fellowship. This successful event was attended by both 2018 and 2019 batches of the MBA program.



Outdoor leadership and team building Program

The BoS in Agricultural Extension organized the annual OBT (outbound training) programme for the students following MSc programmes in Organizational Management and Development Communication & Extension in the Board of Study of Agricultural Extension. It was held at the Ratnasiri Wickramanayake National Training Centre (RWNTC), Hantana, from 18th to 19th January, 2020.

During the training programme students got the opportunity to participate in a number of indoor and outdoor activities. They were able to improve their competencies in leadership, communication, interpersonal skills,

team building, problem solving, knowledge sharing, strategic planning, confidence building, time management etc together with capacity building through the various activities performed at the training programme.

Students and teaching panel members of the BoS, and the Director of PGIA had an enjoyable interaction and fellowship during the campfire conducted on January 18th evening. Programme was successfully conducted by the staff of 'Head' OBT training Institute, and was coordinated by Ms Isuri Kumarasinghe and Dr Chandana Jayawardena. Participants appreciated the event with numerous positive feedback pertaining to the programme outcomes.







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Staff Changes

Weensinghe Retired

Mr. R.D. Weerasinghe, a works aide retired from PGIA after serving the institute for 32 years. Since joining to the Agricultural Library, Faculty of Agriculture, University of Peradeniya in 1988, he has rendered his service for 32 years for the University diligently.





J.H.N. Piyasundara Ph.D. B/S in Agricultural Biology Senior Supervisor Prof. I.P. Wicramasinghe

RESEARCH BRIEFS

STUDY ON FLOWERING AND FRUITING PHENOLOGY, AND FLORAL BIOLOGY OF THE PARENTAL CULTIVARS OF TEA (Camellia Sinensis L.) SEED GARDENS IN SRI LANKA

With the expansion of the tea industry the cultivation has been occupied not only the high potential lands but also the low potential (marginal) lands where, the VP cultivars, do not perform as expected. This situation demands alternative planting material, better thrive under marginal conditions. Realizing the need, a few promising seed progenies, comparable to VP cultivars in terms of yield and tolerance to pest and diseases, have been identified. Therefore, it is timely to attempt, productivity enhancement of the tea seed gardens. Hence, flowering and fruiting phenology and floral biology of the parental cultivars in tea (*Camellia sinensis* L.) seed gardens in Sri Lanka were assessed. Aiming to utilize the information to plan and implement the productivity enhancement programmes. In the phenology study, the major flowering peak of the year was identified as September to December and additional brief peak in July. Major fruiting peak (crop

ping season) occurred from April to August. Profuse flower and fruit setters (cultivars) also identified. Based on the floral biology and phenotypic diversity assessments pollen donor potential of the cultivars also determined. Based on the outcome phenograms and phenological calendar have been formulated to streamline the garden management, aiming to exploit maximum production. Moreover, four poly-clonal and six bi-clonal parental cultivar combinations, have been proposed for future gardens to ensure the enhanced seed production. This is the first extensive report on flowering and fruiting phenology and floral biology of tea seed gardens both locally and internationally.



S.R.W. Pathiranage Ph.D. B/S in Crop Science Senior Supervisor Prof. W.A.J.M. De Costa

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AN IN-DEPTH INVESTIGATION ON THE RESPONSE OF PHYSIOLOGY, GROWTHANDYIELDOFTEA (Camellia sinensis) TO MECHANICAL HARVESTING

Manual tea harvesting is highly labour intensive and therefore, severely affected by labour shortage resulting extended harvesting intervals and subsequent yield losses. Although motorized harvesters are successfully used in other tea growing countries in labour scarce situations, in Sri Lanka they have reported considerable yield losses. Therefore, to elucidate the physiological basis of mechanical yield reduction, a series of field experiments were conducted comparing non-selective mechanical harvesters with manual selective harvesting. Three basic mechanical impacts were identified as removal of arimbu shoots (RAS), higher severity of harvesting (HSH) and removal of maintenance foliage (RMF). They adversely affected yield determining physiological parameters such as shoot density, shoot weight, branch girth and root starch reserves and subsequently reduced tea yield by 46% -54% compared to manual harvesting. The individual contribution of RAS, HSH

and RMF in aforementioned yield reduction was 55%, 15% and 12%, respectively. Using machines only during the cropping seasons and when the manual harvesting rounds are unduly extended, avoiding deep cuts into the plucking table, proper shade and fertilizer management, irrigation during drought and manual removal of banji shoots left on the plucking surface are some of the key remedial measures in arresting the yield decline under motorized harvesting.



S.G.R.T.K.Ariyawansha Ph.D. **B/S in Agric.** Engineering **Senior Supervisor** Prof. B.F.A. Basnayake

DEVELOPMENT AND VALIDATION OF INTERACTIVE MATHEMATICAL EX-PRESSIONS FOR BIOCHEMICAL TRANSFORMATION KINETICS

This study was conducted to derive mathematical expressions to define stages of growth and decay, climatic influences, nutrition levels, media, pH, and ionic strength which can be applied to all Biochemical transformations (BT). To do so, six studies were conducted and secondary data from elsewhere were used to validate the new expressions. As the first study, equations were derived based on first-order rate kinetics describing scaling-up of a laboratory scale up-flow anaerobic sludge blanket reactor. It resulted in fabrication of the second prototype reactor. Best is to examine formation of enzyme-substrate complexes, which is the basis of BT kinetics. Thus in second study, a robust scheme was formulated by defining correctly a century-old Michaelis-Menten kinetics. It can now be used to evaluate any BTs. Enzymatic reactions are governed by pH, ionic strength, and temperature. Thus, mathematical expressions were derived to describe the influences and to determine the energy levels of BT.

In third and fourth study analytical procedures were developed to evaluate and to determine the design and operational parameters of two bioreactors with the applications of Michaelis-Menten kinetics and in fifth study using logistic growth kinetics. The sixth study revealed that simulation and prediction can be done fairly accurately using logistic growth equation.



M.A.L.N. Mallawaarachchi Ph.D. **Senior Supervisor** Prof. W.M.T. Madhujith

PROXIMATE COMPOSITION, TOTAL PHENOLIC CONTENT, ANTIOXI-DANT EFFICACY AND BIO-ACCESSIBILITY OF SELECTED UNDER UTILIZED FRUIT SPECIES OF SRI LANKA

Many of underutilized fruit species of Sri Lanka play an important role in the diet of rural households. However, the nutritional significance of these fruit crops is inadequate and has not been systematically studied. The study was conducted to determine the nutritional composition, total phenolic content, antioxidant efficacy and in vitro bioaccessibility of total phenolics of selected underutilized fruit species of Sri Lanka (Beli, Billing, Kamaranga, Gaduguda, Maha-karamba, Lolu, Nami-nam, Galsiyambala, Thimbiri, Weralu, Uguressa, Goraka, Diwul, Mulberry, Jam, Mal-Nelli, Nelli, Lawulu, Ka-B/S in Food Science and Technology lukamberiya, Heen-Dan and Dan). Among fruit species tested Diwul could be recognized as potential source of macro nutrients and minerals on dry weight basis. Among

the selected fruit species, Nelli, Heen-dan, Mulberry, Jam, Uguressa, Kalukamberiya, Lawulu, Beli, Dan and Mahakaramba obtained the first ten ranks in terms of overall antioxidant activity, respectively thus they could be used as good sources of natural antioxidants while Gaduguda identified as a fruit species with least overall antioxidant activity. Gallic acid identified as predominant phenolic compound in all species except in Gaduguda, Maha-karamba and Heendan, while cyanidin-3-glucoside was the predominant flavonoid among tested phenolic compounds. Nelli possessed the highest vitamin C content and *in vitro* bioaccessibility of total phenolic compounds after simulated oral and gastro intestinal digestion.



EFFECTS OF ULTRASOUND ON HOMOGENIZATION AND FERMENTATION KINETICS OF BUFFALO'S MILK

This research has developed a new method of fermentation of set-yoghurts made from buffalo's milk using ultrasound technology. For the first time, the overall fermentation profile of the ultrasound-treated buffalo's milk was revealed. The identification, quantification, and optimization of power ultrasound as an advanced process to improve the fermentation of buffalo's milk and to improve the gel properties of buffalo's milk setyoghurt are the key contributions of this research work. It investigates the effects of power ultrasound on the starter culture members which are used to ferment buffalo's milk. Also, the study revealed the changes resulted in the components present in buffalo's milk due to ultrasound. The results were used to identify the optimum processing conditions of the fermentation of buffalo's milk. The knowledge gained from this study can potentially be employed in the buffalo's set-yoghurt production to improve

the process efficiency and product quality using ultrasound technology.



INFLUENCE OF PHYSICO-CHEMICAL PROPERTIES OF BIOSORBENTS ON HEAVY METAL REMOVAL FROM INDUSTRIAL WASTEWATER

Contaminants generated from industrial wastewater have the capacity to alter receiving water quality. Heavy metals present in wastewater play a major role in the degradation of surface water quality and can cause significant health and environmental impacts. Therefore, an efficient treatment method is required for the removal of heavy metals from industrial wastewater before being discharged into the environment. Among the available treatment techniques, sorption utilising agricultural waste is generally considered as an effective, economic and eco-friendly treatment option. Efficiency of these biosorbents mainly depends on the physico-chemical properties of the material used. The innovative outcome of this research study is the approach developed

to assess the sorption capacity and sorption kinetics using sorbent physico-chemical properties. It enables the quantification of sorption capacity and sorption kinetics using physico-chemical properties of the sorbent used. This can also be used to assess the ability of different sorbents to remove heavy metals and provide means to select sorbents with higher sorption efficiency in relation to a specific heavy metal species *via* the analysis of sorbent physico-chemical properties. An empirical equation and a simulation was develop to estimate the breakthrough time of a sorbent column using parameters of batch sorption studies.



T.C. Jeyaseelan Ph.D. B/S in Plant Protection Senior Supervisor Prof. D.M. De Costa

MOLECULAR CHARACTERIZATION OF BEGOMOVIRUSES INFECT-ING OKRA VARIETIES GROWN IN DIFFERENT LOCATIONS IN SRI LANKAAND DEVELOPMENT OF EFFECTIVE AND ECO-FRIENDLY AP-PROACHES FOR ITS' MANAGEMENT

Yellow vein mosaic disease (YVMD) is a major biotic constraint in okra cultivation in Sri Lanka. The present study aimed to characterize the causal agent/s of OYVMD, to screen resistant varieties of okra to OYVMD, to find out reliable methods to detect OYVMD in plant tissues, and to discover a set of non-chemical pesticidal and eco-friendly approaches to manage the disease. In order to confirm the pathogen, symptomatic leaf samples were collected from six different locations in Sri Lanka. Based on the sequence analysis and ICTV guidelines, two different types of begomoviruses; *Okra enation leaf curl virus* and *Bhendi yellow vein mosaic virus* were identified with association of *Bhendi yellow vein mosaic betasatellite* in OYVMD infected plants. Furthermore, dot blot hybridization and qPCR assay were developed which were

sensitive in detecting β Cl gene of BYVMBs and quantifying BYVMBs with more precision respectively. In the screening of resistant varieties, the disease incidence was comparatively lower in *maha* than in *yala* season. The plant response against different treatments (*Bacillus megaterium*, neem leaf, salicylic acid, and insecticide) was not uniform between varieties in both seasons. Finally, an integrated pest management (IPM) package tested in the study revealed as an effective management practice towards the management of OYVMD with higher yield.



J.B.D.A.P. Kumarae Ph.D. B/S in Crop Science Senior Supervisor Prof. L.D.B. Suriyagoda

SIMULATION MODELING TO PREDICT THE RESPONSE OF MAIZE, MUNG BEAN AND TOMATO TO PRESENT AND FUTURE CLIMATE ACROSS AN ENVIRONMENTAL GRADIENT

This work developed three crop simulation models to simulate growth and yield of maize, mung bean and tomato to predict the impacts of long-term climate change on their phenology and productivity. Data required for model development were obtained from multi-locational field experiments conducted at *Rahangala, Kundasale, Maha-illuppallama* and *Kilinochchi* in Sri Lanka representing a range of temperature and rainfall conditions. These models were validated using independent data gathered from multi-locational field experiments and secondary data obtained from the Department of Agriculture. Accordingly, the three simulation models were able to predict the productivity of maize, mung bean and tomato in different agro-climatic regions of Sri Lanka under future climate change scenarios. Model predictions revealed potential shifts in maize and tomato cultivation from warmer lower-elevations to cooler higher-elevations

in the future, unless new heat tolerant varieties are introduced. Moreover, increasing future temperatures would increase crop productivity in cooler environments while decreasing productivity in warmer areas. Furthermore, parameters estimated in the present study fill existing knowledge gaps for modeling phenology, growth and yield of mung bean and tomato. Predictions of this study could be used in policy formulation to increase climate resilience and protect farmer livelihoods in vulnerable areas.

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E.D.J. Prince M. Phil B/S in Agricultural Engineering Senior Supervisor Prof. N.D.K. Dayawansa

MONITORING FLOATING AQUATIC PLANTS AND ALGAE DISTRIBUTION AND ASSESSMENT OF BIOMASS IN BATTICALOA LAGOON USING RE-MOTE SENSING & GIS

This study was aimed at mapping the spatial and temporal distribution of Floating Aquatic Plants (FAPs) and Floating Algae (FAg) in Batticaloa Lagoon using remote sensing and GIS and to explore the relationship with water quality and the LULC in lagoon surrounding. The study used Landsat and Sentinel 2A (S2A) images to detect FAPs and FAg to assess the temporal (1988-2016) and seasonal changes (2017-2018). Field measurements of biomass of FAPs and water quality were obtained for the period of March 2017 to February 2018. The multi-temporal analysis revealed that the distribution of FAPs and FAg showed an increasing trend from 1988 to 2016. Among tested band ratios and indices, Green/ NIR and NIR/Red of Landsat 8 images showed strong positive correlation with field

NIR and NIR/Red of Landsat 8 images showed strong positive correlation with field measured Green and Dry Biomass in dry season and wet season. NDREI of S2A showed strong positive correlation with field measured Green and Dry Biomass in dry season and NIR/Red and NDREI_Narrow in wet season. The developed WQI showed a strong inverse relationship with field measured Green and Dry Biomass of FAPs in both seasons and with the coverage of FAg in dry season. LULC analysis showed that these locations are prone to urban and agricultural runoff discharges due to rapid urbanization and intensive agricultural activities. The study showed that the Landsat and S2A images have the potential to detect and map the level of risk in the spreading of FAPs and FAg which can be linked to WQI-LULC dynamics in the lagoon buffer zone.



P.H. Ranaweera M. Phil B/S in Plant Protection Senior Supervisor Dr. L. Nugaliyadda

DEVELOPMENT OF A DIVERSITY AND BIONOMICS GUIDED MANAGE-MENT SYSTEM FOR MELON FRUIT FLIES (DIPTERA: TEPHRITIDAE) IN SRI LANKA

Several melon fruit fies (MFF) are considered as the most destructive pest complex of the cucurbits. Three species of cucurbit infesting MFF namely *Bactrocera cucurbitae*, *B. tau* and *Dacus ciliatus* with abundance of >86%, 12% and <1% respectively have been recorded in Sri Lanka. *B. diversa* was recorded only from the pumpkin flowers. The Para pheromone study revealed ten species of MFF attracted to Cue Lure traps. *D. ciliates* did not attract to Cure Lure and Methyl Eugenol traps. The rate of parasitism of MFF observed in infested cucurbit fruits collected from Kandy, Anuradhapura and Kurunegala Districts was around 2% , <1% and 0% respectively. Cucurbit samples collected from farmer fields exposed to different insecticides were tested for residues of Acephate,

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Profenophos and Abamectin showed that some cucurbit samples contained residues of Acephate 75% SP and Acetamiprid 20% SP. Number of MFF attracted to a blend of Cue Lure: Methyl Euginol (ME) (3:1) traps were significantly higher for *B. cucurbitae*. Therefore, continous mass trapping MFF using Cue Lure: Methyl Euginol (3:1) blended parapheromone, removal and destroy of infested fruit through Augmentorium, covering of fruits in post set stage using breathable cloth material (Polypropylene material, 8-200 GSM, Air permeability in c.c/cm.sq/sec-526.1) and application of protein bait for larger fields would help lower the MFF infestation (<5%).



Ashani Arulananthan M.Phil. B/S in Animal Science Senior Supervisor Dr. H. M. V. G. Herath

A BASELINE SURVEY OF CORAL REEFS AND GENETIC DIVERSITY ANALY-SIS OF SELECTED CORAL SPECIES IN JAFFNA PENINSULA AND ITS' MAJOR ISLANDS, SRI LANKA

Coral reefs of the Jaffna Peninsula are mainly found scattered around the seven major islands in the Palk Bay and along the northern coast in the Palk Strait of Sri Lanka. However, historical data on status of coral reefs in Jaffna Peninsula, remains scarce due to the lasted three decades of civil war. Detailed species diversity and health status of reefs were first time assessed at six sites around four major islands, and four northern coastal regions by Point Line Intercept Transect (LIT) method. Results reveal that highest live coral cover recorded in the northern coast than around the islands. Based on the percentage of live coral cover, reefs were arbitrarily categorized as good at Point Pedro (56%), fair in Thon-daimanaru (48%), Inbarsitty (44%), Valithoondal (45%), Karainagar (25%), Punkudutivu fore reef (42%) and back reef (29%), Kayts fore reef (29%), and poor in Delft reef crest (19%) and Kayts back reef (18%). Bray- Curtis cluster analysis based on benthic categories recorded in all the study sites categorised into two major clusters with 60% similarity.

There were 123 hard coral species recorded from this study, of which 46 were new to the Sri Lanka reefs. Higher percentage of standing dead coral covers of branching Acropora and large domes of Porites, Goniastrea observed at Kayts, next to Punkudutivu island. Higher percentage of dead corals in the island sites demonstrating that there had been relatively recent large-scale coral mortality occurred; however, a long term study to evaluate their status and shifts is the need of the hour for recognizing the causative factor in order to framing the suitable management strategies. Bleaching has not been recorded in Jaffna during the past warming years, though the loss of coral reefs in the region is attributed to destructive fishing practices particularly dynamite fishing and bottom trawling.



W.M.A.A. Kulasinghe M.Phil. B/S in Food Science and Technology Senior Supervisor Prof. K.M.S. Wimalasiri

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EVALUATION AND COMPARISON OF THE NUTRITIONAL COMPOSI-TION OF TRADITIONAL CEREALS, PULSES AND YAMS GROWN IN SRI LANKA.

This study was conducted to determine the nutritional composition of selected locally available traditional rice, millets, yams and pulses grown in Sri Lanka. Proximate composition, dietary fiber content, fatty acid profiles, mineral profiles and vitamin profiles of pooled composite powders of ten rice varieties, five millet varieties, eight pulses varieties and four yam types collected from all agro-climatic zones of Sri Lanka were evaluated. Yams contained the highest available carbohydrates compared to all the samples tested. Pulses were rich in ash and proteins. Millet varieties analyzed were richer in ash and dietary fiber compared to rice varieties tested. Available carbohydrates in tested rice va-

Prof. K.M.S. Wimalasiri rieties were higher than in millet varieties tested. Foxtail millet contained richer crude fat content and fatty acid profiles compared to all the other samples analyzed. Pulses were the best source of dietary fiber out of all the varieties tested. All the samples analyzed were rich in potassium while heavy metal content of all the commodities were remained below the harmful level to the human health. Finger millet varieties analyzed were rich sources of calcium and manganese while foxtail millet varieties were rich in copper and zinc. Pulses are rich in iron while Angili ala was found to be a good source of sodium. Foxtail millet varieties tested were the richest in both saturated and unsaturated fatty acids out of all tested samples. All the commodities analyzed were richer in thiamin and riboflavin compared to fat soluble vitamins. Nutritional profiles of tested varieties proved that adding these verities to the daily diet can meet RDA values successfully.



S. M. L. D. Samarakoon M. Phil B/S in Agricultural Engineering Senior Supervisor Prof. N. D. K. Dayawansa

ENVIRONMENTAL AND LIVELIHOOD IMPACTS OF DEDURU OYA DAM CONSTRUCTION AND WATER DIVERSION

Deduru Oya Reservoir Project (DORP) was executed in Kurunegala District, Sri Lanka aiming to augment water to downstream tanks and to raise the cropping intensity up to 150% in the area. Positive and negative impacts to the downstream environment and to the affected resettled community were mainly evaluated under the study. Legal framework for land acquisition and resettlement in Sri Lanka was first studied and the process of land acquisition and resettlement was appraised in DORP comparing that of Moragahakanda Reservoir Project. Then the livelihood impacts of affected community were analyzed using socio economic surveys, key informant interviews and documentary evaluations. Land use / land cover change was analyzed using GIS techniques. Economic loss sue to land inundation was calculated based on the output of GIS analysis. Hydrological impacts to the downstream due to dam construction were also studied based on flow data and rainfall data obtained from nearby stations. DORP has displaced

1062 families and has inundated 1170 ha of land including 40% of paddy lands and 31% of coconut lands. This has led to loss Rs. 52 852 per family yearly in the affected resettled community. However those people have found better opportunities to diversify the livelihood methods after resettlement. The study reveals that DORP has brought positive and negative impacts to the people and environment.



S. Sriskandarajah M.Sc. (CW &R) B/S in Food Science and Technology Senior Supervisor Prof. D.C.K.Illeperuma

UTILIZATION OF INDUSTRIAL FRUIT WASTE: EXTRACTION, CHARACTER-IZATION AND INCORPORATION OF PECTIN FOR VALUE ADDITION TO ICE CREAM

Volume of fruits processed into a variety of products shows drastic upsurge with the growth of population and increased demand for convenient foods possessing functional properties. In Sri Lanka, pineapple, passion fruit, mango, lime, papaya and melon are the most common fruits used in fruit processing industries and the wastes from these are significantly high. Therefore, management of fruit waste for sustainable environment has become a challenge. Valorization of fruit wastes is considered to be one of the solutions to minimize its impact on the environment while opening an avenue for adding value to foods that are already manufactured. The present study focused in utilization of lime and mango peel wastes from food processing industries in North and North Western

provinces of Sri Lanka into pectin production. Effects of extraction conditions namely, temperature, time and pH employed in the acid extraction method on yield and degree of esterification (DE) of pectin were evaluated using Box - Benkhen design of response surface methodology and the empirical quadratic polynomial models were developed. The models were then authenticated to make sure their accuracy in predicting the yield and DE at specified conditions in the extraction of pectin from the said fruit wastes. Further, the lime and mango peel pectins extracted under optimized conditions were characterized, compared with commercial pectin in order to evaluate its suitability as food grade pectin for industrial use. In addition, the study investigated the possibility to use these pectins (extracted at optimized conditions revealed in the modelling) as fat replacers in frozen dairy dessert (similar to ice cream). A 2 factor – mixed level full factorial design was used to design the formulations with varying levels of pectin. Effect of the level of pectin on hardness, melting rate and overrun of the ice creams were determined to select the ice cream formula which showed almost similar characteristics of commercial ice cream.

CONFERENCES, SEMINARS AND WORKSHOPS

Training Programme on Capacity Building of the Leaders of Community Based Water Societies- Cap-NET Sri Lanka



The First one-day programme of the Training on Capacity Building of the Leaders of Community Based Water Societies in Badulla & Nuwara Eliya was held on 26th June 2020 at the Opel Hotel, Rikillagaskada, Nuwara Eliya District in collaboration with World Vision Lanka (WVL) and WaSo

Project. A total of 102 participants (61 Males and 41 Females) participated the programme. This was the first face to face training program conducted by Cap-Net Lanka after the Covid19 Pandemic. The programme consisted of presentations and discussions on "Community Based Adaptation for Water Resource Management and Conservation". At the end of the programme, the participants came up with Action Plans for Water Source Conservation as "Our actions to conserve our Natural Water Springs".

The programme was coordinated by Mr. Dimuthu Daluwatte, World Vision Lanka (WVL), WaSo Project and Dr. S. Pathmarajah, the Coordinator of Cap-Net Lanka.

Leadership and Research Methods for Interdisciplinary Water Research

2nd Regional Training Workshop for the second batch of IDRC -SAWA fellows was held at Centre for Water Resources (CWR), Anna University, Chennai from 25 August to 8 September 2019. This workshop gave students an exposure to eminent researchers in the field of integrated water management. The

studens had the opportunity to spent the first six days of the workshop with

concepts of interdisciplinary research.



interactive roundtable discussions with internationally celebrated scientists, understanding the multifaceted

Master of Science (M.Sc.)/ Postgraduate Diploma (PGD) Pass List – 2020

B/S in Agricultural Biology - M.Sc.

T. Nagendran

B/S in Agricultural Economics

M.Sc. M.S.A. Dilsath E.M.A. Ekanayake

S.C.G. Pathiranage

R.D.C. Rupasinghe

PGD W.M.C. Abeyrathna



Master of Science (M. Sc.) Pass List - 2020- CONTD.

B/S in Agricultural Engineering		
H.M.C.M. Jayawardana R.A.T.N. Ranasinghe	M. Rajethan D.T.H.P. Rathnaweera	V. Tharsan R. Thusyanthini
B/S in Agricultural Extension		
K.S. Dhanapala S. Majunath	V.Sinthujan	T. Tharshicga
B/S in Animal Science W.P. Amarasinghe K.G.G.G.Amarawansa E.M.B.S. Eakanayake O.G.D.C.Gunawardhana G.C. Jayasinghe	N.M.I.D. Karunadasa U. Kishokkumar A.M.G.U. Kumara A.J.M.S.W. Kumari N.D.K. Liyanage	K.V.P.J. Madushanka G.D. Shajini S.Sukeerthan W.M.M.K. Weerasekara
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B/S in Food Science & Technolo)gv	2
K W A Bandara	TDKNK Invavardana	FHIFR Silva
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I.P.E. Jayarajh	R.A.C.H. Seneviratne	S.K.D. Wijesinghe
M. Jayawardana	and the second	
B/S in Plant Protection D.H. Dilrukshika H.K.B.M.I. Karunarathne	K.M.T.M. Kumarasingha	D.A.G.S.H. Samaranayake
Master of Business Adm	ninistration (MBA) Pass I	List – 2020
	200 C	
B/S in Business Administration		
W.A.M. Fernando W.H. Hemal	I.K.M.C.B. Illangansekara	R.J.R. Senadheera

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