



PGIS News Internet Edition

Volume 3, Nos. 1 – 2, June 2002,ISSN 1391-5754

Quarterly Update of the work and progress of the Postgraduate Institute of Science (PGIS),
University of Peradeniya, SRI LANKA

PGIS News

Editorial Board:

Prof. K Dahanayake (Chairman)

Prof. N K B Adikaram

Prof. M A K L Dissanayake

Prof. O A Ileperuma

Dr. A A S Perera

Dr. K M Liyanage

Dr. N C Bandara (Editor)

We shall be pleased to receive your comments, suggestions and contributions with a view to improving the quality of this newsletter. Correspondence and requests for copies of PGIS News should be addressed to Dr. N C Bandara – Editor:

Phone: +94-8-385669

Fax: +94-8-389026

E-mail: ncbandara@pgis.lk

CONTENTS

- [National Workshop on Science Education for G.C.E.A/L Teachers](#)
- [PGIS – Six Productive Years](#)
- [Degrees Awarded \(January - June, 2002\) Ph.D., M.Phil. and M.Sc.](#)
- [Abstracts of Postgraduate Theses](#)
- [M.Sc. Programmes 2002](#)
- [Foreign Visitors](#)
- [Other PGIS Activities](#)
- [Forthcoming Events](#)

National Workshop on Science Education for G.C.E.A/L Teachers

Prof. Joan Solomon (Centre for Science Education, Open University, Milton Keynes, U.K) addressing the inaugural session. (Seated L to R): Dr. S. Karunaratne (Workshop Coordinator & Secretary, PGIS Board of Study in Science Education), Prof. M. A. K. L. Dissanayake (Chairman, PGIS Board of Study in Science Education), Prof. K. G. A. Goonasekera (Vice-Chancellor, University of Peradeniya), Prof. K. Dahanayake (Director, PGIS) & Prof. S. A. Kulasooriya (Dean, Faculty of Science, University of Peradeniya).

A national workshop on Science Education for G.C.E.A/L Science Teachers was organized by the Board of Study in Science Education of the PGIS in collaboration with the Teacher Education-Teacher Deployment (TETD) Project of the Sri Lankan Ministry of Education during March 13 – 15, 2002. More than 150 teachers drawn from state and private schools of different districts of Sri Lanka attended the workshop.

Rapid advances in science and technology necessitate measures to prepare the younger generations to meet the associated challenges. During the workshop deliberations, the introduction of new methodologies in teaching science was stressed. In this regard, with a view to strengthening the capacities of science teachers they were introduced to novel teaching practices in subject areas of biology, chemistry, mathematics and physics.

Resource persons for the workshop were drawn both from Sri Lankan universities (Colombo and Peradeniya) and the following foreign institutions: Centre for Science Education, Open University, Milton Keynes, U.K.; Departamento de Quimica e Bioquimica, Faculdade de Ciencias de Lisboa, Portugal; L' Academie des sciences, Nantes, France; Department of Physics, University of Tennessee at Martin, U.S.A.

The workshop provided an opportunity for the participants to interact closely with the Sri Lankan and foreign resource persons and amongst themselves. The participants gave positive feedbacks about the impact and outcome of the workshop.

Workshop Coordinator: Dr. S. Karunaratne

PGIS – Six Productive Years

The Postgraduate Institute of Science (PGIS) was established in 1996. It is the youngest member of the family of six postgraduate institutes in Sri Lanka. PGIS came into being due to the untiring efforts of the members of the Faculty of Science of the University of Peradeniya under the deanship of Prof. R P Gunawardane. In early 1996, the PGIS commenced its activities in the makeshift premises of the Faculty of Science. At its inception, all the postgraduate programmes (M.Phil. and Ph.D.) of the Peradeniya Science Faculty were transferred to the PGIS. The first M.Sc. Programme in Postharvest Technology of Fruits & Vegetables also came under PGIS tutelage. Currently, 19 M.Sc. programmes are being offered, some on a regular basis and others occasionally. Since October 1999, the PGIS is located in its newly constructed 3-storey building overlooking the Peradeniya campus cricket grounds. In the computer laboratory located in this building, state-of-the-art computer facilities are available to all the PGIS students and staff.

Through its postgraduate programmes, PGIS currently caters to the growing demand for trained S & T manpower needs of private and public sector organizations in Sri Lanka. Due to the shortage of foreign scholarships, more and more graduates employed in private and public sector institutions are turning to the PGIS to follow their postgraduate studies. The PGIS has thus embarked on a mission to fill the gap created during the last few years due to the paucity of opportunities for Sri Lankan scientific personnel to obtain overseas postgraduate training. It is filling this void indirectly by regularly training a significant number of scientific personnel needed for the country's development effort through some unique postgraduate programmes. The M.Sc. Programme in Science Education is designed to introduce G.C.E. (A.L.) Science teachers to the latest advances in science education while upgrading their knowledge in biology, chemistry, physics and mathematics with emphasis on computer literacy. The M.Sc. Programme in Oceanography is another case in point where the PGIS has embarked upon training scientists/engineers needed to explore the biological and mineral resources available in the vast tracts of the ocean in the Exclusive Economic Zone extending to more than 200 nautical miles where Sri Lanka has sovereign rights. The latest M.Sc. programme to be initiated by the PGIS is on Experimental Biotechnology. We wish to acknowledge the support extended to conduct our programmes by the S & T Personnel Development Project of the Ministry of Economic Reform, Science & Technology, and Teacher Education Teacher Deployment Project (TETD) of the Ministry of Human Resource Development, Education & Cultural Affairs and the National Aquatic Resources, Research and Development Agency (NARA).

The PGIS is pleased to record that by the end of the year 2001 more than 200 (M.Sc. – 168; M.Phil. – 26; Ph.D. - 17) degrees have been awarded through the University of Peradeniya. With its projects of international collaboration, the acquisition of computers and Internet facilities, the PGIS strives to provide its students, currently numbering over 400, with a postgraduate education on par with the best in the world. A significant number of our students carry out research projects of relevance to the industrial and development needs of the country. In conducting our programmes, we have been able to enlist the support of highly qualified experts available in the local universities, research institutions and other private and public sector organizations as well as those from abroad. Despite the handicaps due to non-availability of equipment and dearth of resource personnel, the PGIS has strived hard to offer high quality programmes to its students. We have been able to make much headway thanks to the laboratory facilities presently made available to us by the Faculty of Science and other faculties of the University of Peradeniya. In the future, we intend to acquire state-of-the-art equipment through foreign funding and continue to invite competent resource persons from abroad to conduct some of the programmes where the expertise is not available locally. We also intend to facilitate the conduct of more and more research projects at M.Sc., M.Phil. and Ph.D. levels with increased international support.

The crowning moment of six years of productive research will be the First PGIS Research Sessions that will be held in September 2002. It is very encouraging to note that more than 30 nationally and internationally refereed papers will be presented by PGIS students and staff at these sessions. These papers will be published as two special volumes of the Ceylon Journal of Science and they will be available for distribution at the Research Sessions.

Prof. K Dahanayake
Director, PGIS

Degrees Awarded and Titles of Theses (January - June, 2002)

Ph.D. (Chemical Sciences)	
R.M.R.P. Ratnayake	Chemistry of the genus <i>Hortonia</i>
Ph.D. (Physics)	
E.M.S. Wijeratne	Tidal characteristics and modelling of tidal wave propagation in shallow lagoons of Sri Lanka

Ph.D. (Plant Sciences)	
H.L.D. Weerahewa	A study of internal browning of two cultivars of pineapple with special references to heat shock treatment as a control measure
M.Phil. (Biochemistry & Molecular Biology)	
R.G.S.C. Rajapakse	Purification and characterization of acid proteinases from <i>Nepenthes distillatoria</i> L.
H.G.U.P. Jayaratne	Purification and molecular characterization of acid proteinases from filarial parasite <i>Seteria digitata</i>
E.M.I. Edirisinghe	Effect of dietary fat on blood lipids
M.Phil. (Chemical Sciences)	
B.M.M. Kumarihamy	Chemistry and bioactivity of some Sri Lankan Buxaceae and Rubiaceae
M.Phil. (Plant Sciences)	
H.S. Kathriarachchi	Performance of selected forest species providing non-timber forest products in Sinharaja MAB reserve, Sri Lanka
N.F. Nawas	The effect of potential bio-control agents isolated from food sources on fungal contamination of copra and fresh coconut and on quality of coconut oil.
M.Sc. (Analytical Chemistry)	
M.M. Sharifdeen	Variation of ground water quality trends - a case study from Sammanthurai well, Sri Lanka
M.Sc. (Applied Statistics)	
W.D.D.C Abeykoon	A statistical analysis on teachers awareness of the school based assessment programme
S.J.M.N. Anura	Fitting beta-binomial distribution to over-dispersed binomial data
U.N. Dissanayake	Optimal designs
C.G. Rajapakse	Forecasting accidents due to liquor in Sri Lanka
T. Vigneswaran	A time series model for paddy production in Sri Lanka
M.Sc. (Environmental Science)	
A.S.P. Manamperi	Quality assessment of deep ground water in Monaragala district
M.H. Munasinghe	Contamination of Menik ganga in Buttala-Pelwatta area due to anthropological activities
N.G. Seneviratne	Evaluation of water quality of Pinga-oya with emphasis on heavy metal pollution
J.P. Marasinghe	Environment friendly option for the control of sesame life Webber and pod borer; <i>Antigastra catalaunalis</i> Duponchel (Lepidoptera: Pyralidae)
R.M.N.P. Ranasinghe	Blue green algal populations of some irrigation tanks in Anuradhapura district
M.Sc. (Industrial Chemistry)	
A. Welagedara	Quality improvement of fertilizers by using control chart for variables
S.P.L. Fernando	Stream water blackening by effluent discharge of a yarn dyeing industry
M.Sc. (Industrial Mathematics)	
M.K.D.W. S. Mallawachchi	Upgrading the sampling procedure of surgical gloves
N.S.K. Mularachchi	An efficient transfer scheme for school teachers in Sri Lanka

T. Tharumasoruban	Optimizing the ordering of raw material for pharmaceutical products
M.Sc. (Postharvest Technology of Fruits and Vegetables)	
A.S.K. De Silva	Extending the storage life of “Mukunuwanna” using a low cost evaporative cooling system
W.M.D. Priyadarshani	Effect of modified atmosphere on extending storage life of “Embon” banana.
M.D. Lokuliyana	Studies on extending postharvest life of “Embul” banana in low cost, evaporative cooling system
S. Ratnarajah	Effect of different postharvest treatments and packing materials on the quality and shelf life of carrots (<i>Daucus carota</i> var. <i>sativas</i>)

↑ *Abstracts of M.Phil. and Ph.D. Theses*

Ph.D. (Chemical Sciences)

Chemistry of the genus *Hortonia*

R. M. R. P. Ratnayake, Department of Chemistry, University of Peradeniya

This thesis describes the isolation of bioactive compounds and biological activity studies on three endemic *Hortonia* species, namely *H. angustifolia*, *H. floribunda* and *H. ovalifolia*.

A comparison of biological activity, TLC and HPLC profiles of specimens of the above three species collected from nine different geographical locations in Sri Lanka was also carried out. The bioassays used on this study were antifungal assay against *Cladosporium cladosporioides* and the mosquito larvicidal assay against the 2nd instar larvae of *Aedes aegypti*. TLC, HPLC and bio activity studies of the three *Hortonia* species collected from nine different geographical locations showed that there were no significant phytochemical differences among the three species, *H. angustifolia*, *H. floribunda* and *H. ovalifolia*. In addition, protein extraction from the leaf specimens of the three *Hortonia* species followed by gel electrophoresis produced an identical band pattern in all specimens, further corroborating the chemical identify of the three species.

The CH₂Cl₂ extract of *hortonia* species furnished five new butenolides identified as (4*S*)-4-methyl-2-(11-dodecynyl)-2-butenolide, (4*S*)-4methyl-2-(11-dodecenyl)-2 butenolide, (4*S*)-4-methyl-2-(2*R*-hydroxy-11-dodecenyl)-2butenolide, (4*S*)-4-methyl-2-(9-epoxy-11-dodecynyl)-2butenolide, (4*S*)-4-methyl-2-(9*Z*)-11-epoxy-9-dodecynyl)-2butenolide, one new tetracyclic sesquiterpene identified as 1,5,12-trimethyltetracyclic[6,3,0,0,0 3,4,8]dodecane and ?-sitosterol. The first two butenolides were highly active against the 2nd instar larvae *Aedes aegypti* (LC₅₀ = 0.41 and 0.47 ppm respectively), the third butenolide was moderately active (LC₅₀ = 1.6 ppm), fifth butenolide was less active (LC₅₀ = 7.87) and fourth butenolide was inactive against 2nd instar larvae of *Aedes aegypti*. Complete hydrogenation of the first butenolide in the presence of Pd-C/H₂ yielded the saturated compound identified as (4*S*) (2- dodecyl)-4-methyl butenolide. This compound was inactive against 2nd instar larvae of *Aedes aegypti*, suggesting that unsaturation was required for biological activity. The five butenolides and tetracyclic sesquiterpene were active against the fungus *Cladosporium cladosporioides*.

Supervisor: Prof. V. Karunaratne (University of Peradeniya & PGIS)

Ph.D. (Physics)

Tidal characteristics and modeling of tidal wave propagation in shallow lagoons of Sri Lanka

E. M. S. Wijeratne, National Aquatic Resources, Research and Development Agency (NARA), Colombo

This thesis contains a thorough investigation of the tides around Sri Lanka including the behaviour of tidal co-oscillations in some shallow lagoons. Measurements of tides, currents and related hydrographic parameters were carried out in Puttalam, Negombo and Chilaw Lagoons. Puttalam Lagoon is large with a relatively wide entrance. Negombo and Chilaw Lagoons are small, featuring “restricted” inlets and seasonally large freshwater supply. Numerical tidal models driven primarily by the oceanic tide were elaborated and tested against field data.

The sea level variations of Sri Lanka feature both tidal and non-tidal fluctuations. The seasonal sea level range due to steric height, air pressure, wind and current variability amounts to 0.25m with maximum height in January and minimum in August. There are also oscillations of 80 and 120 hr period, related to equatorially trapped internal waves. The oceanic tide is mixed semidiurnal with a spring tidal range of 0.40 – 0.60m. The air pressure features relatively strong diurnal and semidiurnal variations, which also affects the sea level.

Spring tidal range in Puttalam lagoon is 0.30m. The range is slightly larger in the inner end than in central basin. 1-D and 2-D models with Cds of 0.0032 and 0.0025 respectively gave almost perfect agreements with measured tides throughout the lagoon. The phase difference between tidal elevation and currents shows that the tidal oscillation is a mixture of progressive and standing waves, where progressive waves dominate in the outer part and standing in the inner part of the basin. The diatribution of energy dissipation was consistent with co-tidal charts. The 2-D model was also run to estimate water and salt exchange and sea level set up by wind.

Spring tidal ranges in Negombo and Chilaw lagoons are 0.14 and 0.10m, respectively. Thus, both Lagoons are subject to finite amplitude influences, such as well-developed fortnightly tides. Negombo lagoon was modelled using 1-D, 2D and choking models. Chilaw lagoon has two inlets, one of which is intermittently closed due to sand bar formation. A 1-D model with Cd of 0.0028 showed good agreement with measured sea levels for both case.

Supervisors: Prof. Lars Rydberg (University of Gothenburg)

Prof. Ulf Caderlof (University of Gothenburg)

Dr. K. P. P. Pathirana (University of Peradeniya)

Dr. Upali Karunasiri (University of Peradeniya & PGIS)

.....
Ph.D. (Plant Sciences)

A study of internal browning of two cultivars of pineapple with special reference to heat-shock treatment as a control measure

H. L. D. Weerahewa, Department of Botany, University of Peradeniya

Internal browning is a disorder commonly encountered in pineapple during prolonged cold storage. This is a major obstacle to exportation of fruit under sea freight. The internal browning of fruit of two local pineapple cultivars was investigated with the view to establishing suitable postharvest physical treatments that induce tolerance to the disorder.

Three-week storage trials were conducted simulating sea freight export conditions at 10°C and 85% RH. In Mauritius, the internal browning symptoms appeared within a week of storage at 10°C initially in the marginal core tissue, which subsequently spread to the surrounding flesh. But in Kew, the symptoms commenced only after 2-3 weeks of storage as isolated patches in the tissue surrounding the core. There was a clear difference in the time of incidence and the pattern of symptom development between the two cultivars. The cv. Mauritius showed comparatively faster ripening and respiratory rates and greater accumulation of acids during cold storage, than the cv. Kew. In both cultivars, the tissue undergoing browning displayed greater Polyphenol Oxidase (PPO), peroxidase activity and electrolyte leakage. Harvesting fruit early at 100% green stage reduced the incidence and severity of internal browning in both cultivars.

Several postharvest physical treatments were tried out to induce cold tolerance in fruit. Heat-shock treatment in the form of hot water dip immediately after harvest was found to induce fruit tolerance to internal browning in both cultivars and the best temperature-time combination was 38°C for 60 minutes. The treated fruit developed 75% and 50% lesser browning in the flesh and core region respectively. The overall reduction of internal browning was about 55 – 60%. The results obtained from different temperature-time combination suggested that an internal tissue temperature of 36-38°C is a prerequisite for induction of cold tolerance in fruit. Although heat treatment significantly reduced internal browning, it slowed down fruit ripening and associated changes and increased water loss compared to untreated controls. However, provision of modified atmosphere conditions to heat-treated fruit during cold storage enhanced cold tolerance by another 10% and resulted in lesser water loss, hence better appearance. The mechanism of induction of fruit tolerance following heat treatment appeared to be through production of heat-shock proteins. It is possible that the cellular repair mechanism following cold injury may be taking place more rapidly in treated fruit.

A cold shock at 4°C for 60 minutes, preceded or followed by heat treatment, also reduced the internal browning of cv. Mauritius. Here the treated fruit remained firmer and showed lesser cell damage than the fruit provided with heat shock treatment alone or heat shock followed by MA. Intermittent warming of fruit during the cold storage regime also reduced internal browning in cv. Mauritius.

Supervisor: Prof. N. K. B. Adikaram (University of Peradeniya & PGIS)

.....

M.Phil. (Biochemistry & Molecular Biology)

Purification and characterization of acid proteinases from *Nepenthes distillatoria* L.

R. G. S. C. Rajapakse, Institute of Fundamental Studies, Kandy

Plant aspartic proteinases so far have received much less attention in contrast to well-characterized mammalian, fungal and viral aspartic proteinases. They are widely dispersed in the plant kingdom and have been detected in seeds, leaves and flowers of different plants as well as in the digestive fluid of some insectivorous species. Insectivorous plant *Nepenthes distillatoria* growing in the lowland wet zone of Sri Lanka is a good source of proteolytic enzymes. Proteolytic enzymes are interesting not only from the point of view of plant physiology but also from the point of view of structure-function relationship and molecular evolution of aspartic proteinases. The objective of this study was to isolate purify and characterize acid proteinases from the crude juice of the pitcher of *N. distillatoria* which could be useful for future studies on plant physiology structure-function relationship and molecular evolution of aspartic proteinases.

In this study, two acid proteinases, *Nepenthes* major and minor proteinases present in the crude juice of pitches of *N. distillatoria* were purified to near homogeneity. Purification steps used were DEAE cellulose chromatography, sephacryl S-200 chromatography, pepstatin-sepharose chromatography and mono Q chromatography. Enzymes after purification were analysed using SDS-PAGE to confirm the purity and to determine their molecular weights. Enzymatic properties of purified proteinases such as time dependency, enzyme concentration dependency, pH dependency, temperature dependency, stability at different temperature and pH, effect of proteinase inhibitors were studied. Partial amino terminal amino acid sequences of both proteinases were determined and compared with reported sequences of other known plant aspartic proteinases such as rice, barley and cardoon.

Antibodies to both enzymes were produced by immunizing rabbits with purified enzymes. Antibodies were purified by ammonium sulphate saturation and affinity chromatography on protein – A sepharose. Histochemical staining using both antibodies was performed using transverse section of fresh *Nepenthes* pitches obtained under freezing conditions. Proteolytic action of *Nepenthes* major proteinase at different pH levels was investigated on natural proteins.

Purification fold and yield obtained after mono Q chromatography step were 59 times and 26.1% with major proteinase and 44 times and 15.6% with minor proteinase. Based on the characteristics, it is suggested that both

proteinase have similar properties. Purified enzymes are likely to be aspartic proteinases as reflected by the complete inhibition of proteolytic activity by 0.1mM pepstatin. Both proteinases were inhibited by diazoacetyl-DL norleucine methyl ester (DAN) and the pattern of inhibition is completely different from that of porcine pepsin suggesting that they are non-pepsin type aspartic proteinases. Molecular weights of major and minor enzymes are 43 kDa and 35 kDa as per SDS-PAGE separation. Purified enzymes have an optimum pH of 3.0 with 2% denatured hemoglobin as substrate. Optimum temperatures for activity of major and minor enzymes are 55°C and 45°C respectively. Both enzymes show a remarkable stability at higher temperatures (50°C) and at a wide pH range (pH 2-10) compared to porcine pepsin. Low homology of both major and minor proteinases with the amino acid sequences of known aspartic proteinases suggests the unique structural features of *Nepenthes* proteinases.

Immunohistochemical staining suggest that both enzymes are produced by the cells located in the inner wall of the lower 1/3 part of the pitcher. Proteolytic action of *Nepenthes* major acid proteinases on dhal and other proteins at acidic as well as natural pH level was remarkable. Further studies on the three dimensional structure of the enzymes is recommended to precisely relate the unique properties of *Nepenthes* major and minor proteinases to their structure.

Supervisors: Prof. H. R. W. Dharmaratne (Institute of Fundamental Studies, Kandy)
Dr. S. B. P. Athauda (University of Peradeniya & PGIS)

.....

M.Phil. (Biochemistry & Molecular Biology)

Purification and molecular characterization of acid proteinases from filarial parasite *Setaria digitata*

Upeksha Priyantha Jayaratne, Department of Biochemistry, University of Peradeniya

Acid proteinases are important as new targets for chemotherapy in the control of parasitic diseases. Proteinases of cattle filarial parasite *Setaria digitata* were characterized for this purpose.

Crude extract of the female cattle filarial parasites separated on PAGE showed three different acid proteinase activities. When the body parts of the parasite were separated into uterus and oviducts, esophagus and intestine and body wall, three acid proteinases appeared differently. The uterus and oviduct representing the reproductive system, showed the highest levels of activity for all three enzymes. But in the esophagus and intestine, which represent the digestive system, there were only two enzyme activities and these two were at a lower level than those of the reproductive system. In the case of body wall there were only two enzyme activities, similar to the digestive system but at a much lower level of activities.

In developing methods for purification of the acid proteinases, crude extract of the whole parasite was used. The step included DEAE cellulose chromatography, S-200 gel filtration, pepstain sepharose affinity chromatography resolves three distinct enzyme activities. Each of these was then separated by S-200 gel filtration, pepstain sepharose affinity chromatography and mono-Q chromatography. In DEAE cellulose chromatography, the enzyme activity detected in a single peak eluting during sample injection was referred to as DE unbound (DEUB) proteinase. The second peak eluting at 0.4M NaCl was referred to as DE-bound major (DEBMJ) proteinase and showed the highest activity. The third peak eluting at 0.8M NaCl was referred to as DE-bound minor (DEBMN) proteinase.

All these proteinase activities separated had a molecular weight of 42 kDa as determined by SDS-PAGE. Since all these proteinase activities couldn't be resolved further using SDS-PAGE under reducing conditions, it is suggested that three acid proteinases are made from a single polypeptide.

The optimum pH for enzyme activity was observed to be pH 2.0, 1.5 and 2.5 for DEUB, DEBMJ and DEBMN proteinases, respectively. Optimum temperature was observed at 45°C for all three proteinases. The DE-unbound proteinase was stable over a wider pH range than the DE-bound types. Even though DE-bound proteinases were stable in neutral and alkaline pH, they had a very little stability in acidic pH. They were not inhibited with soybean trypsin inhibitor, phenol methane sulphonyl fluoride (PMSF) and EDTA, but totally inhibited by pepstatin, confirming that

they belong to the family of aspartic proteinases.

Proteinases isolated from different tissues showed some similar as well as different characteristics. The results confirm the presence of three types of proteinases localized in different tissues of the parasite. The N-terminal amino acid sequencing is required to clarify whether they are isozymes of the same enzyme or different enzymes. Identification of cleavage specificity of the acid proteinases against susceptible biological peptides is necessary to clarify the physiological role of these proteinases. These investigations will clarify the physiological role of three acid proteinases and the possibility of identification as a therapeutic target point to control filarial infection in the future.

Supervisors: Prof. P. A. J. Perera (University of Peradeniya & PGIS)
Dr. S. B. P. Athauda (University of Peradeniya & PGIS)

.....

M.Phil. (Biochemistry & Molecular Biology)

Effect of dietary fat on blood lipids

E M Indika Edirisinghe, Department of Biochemistry, University of Peradeniya

A diet rich in saturated fat is considered atherogenic and therefore, nutritionists have recommended limiting the proportion of calories derived from saturated fat, as a means of reducing the incidence of coronary arteriosclerosis. According to the health statistics of 1998, coronary heart disease is a leading cause of mortality and morbidity in the middle-aged population of Sri Lanka. Among the possible factors, high intake of coconut oil is believed to play a central role in developing coronary arteriosclerosis. This resulted in a shift in the use of dietary coconut oil towards other vegetable oil in the market. Metabolism of lipids in the guinea pigs, especially that of cholesterol, closely resembles that in man, carrying the majority of cholesterol in the low-density lipoprotein (LDL) fraction and responds to change in the dietary fat quality, especially in the absence of dietary cholesterol.

Guinea pig diets were formulated with defatted coconut poonac, textured soya protein, wheat flour, paddy husk, mineral and vitamin supplements, and 5% or 15% w/w fat in the form of coconut oil, soya oil or 1:1 mixtures of coconut and soya oil. The test diet was fed for periods of four weeks and a two weeks adaptation period was allowed in-between dietary changes. Following feeding of test diets, animals were fasted 14 h and bled by cardiac puncture. Serum was analyzed for total cholesterol, HDL cholesterol, triglycerides and plasma was used to determine the prothrombin time. Results were analyzed using two-way anova and least significance test.

At 5% dietary fat level coconut oil gave a high serum total cholesterol value of $58.8 + 7.3$ mg/dl, whilst soya oil gave a low serum total cholesterol value of $38.3 + 7.3$ mg/dl. The serum cholesterol level at 5% coconut-soya mixture (1:1) dietary fat level was $52.8 + 8.5$ mg/dl. The serum cholesterol concentration of animals fed with diet containing coconut oil, soya oil or coconut – soya mixture (1:1) at 15% level was significantly higher than that on oils at 5% level. Higher serum cholesterol level of $107.6 + 6.6$ mg/dl at 15% dietary fat level was observed in the coconut oil diet. The lowest serum cholesterol level of $58.2 + 6.5$ mg/dl at 15% (w/w) dietary fat level was observed in the soya oil diet. Both serum total and HDL cholesterol levels were significantly increased when a diet containing 5% (w/w) coconut oil was replaced by a diet containing 15% (w/w) of the same oil. Serum total cholesterol increased by 83% and HDL cholesterol increased by 27%. However, when the diet containing 15% (w/w) coconut oil was replaced by 15% (w/w) coconut-soya oil mixture (1:1), their serum total cholesterol level decreased significantly from $107.6 + 6.6$ mg/dl to $63.2 + 6.8$ mg/dl, while HDL cholesterol level did not change significantly.

Serum triglycerides significantly increased, when the total fat content of the diet was increased from 5% to 15% (w/w), with both soya and coconut oils. There was no significant difference in the mean serum triglyceride levels in the groups that were fed soya oil and coconut oil, at the same dietary fat level. Prothrombin time was $30.2 + 4.1$ sec. at the 5% coconut oil containing diet and $31.0 + 3.5$ at the 5% soya oil containing diet. No significant changes were observed when both coconut and soya oils increased from 5% to 15% (w/w).

The higher serum cholesterol concentration due to the ingestion of coconut oil and a lower serum cholesterol concentration due to similar quantities of soya oil are in agreement with what is known. These results reiterate the cholesterogenic properties of coconut oil. However, as opposed to soya oil, coconut oil was able to increase the serum HDL cholesterol as well. It is interesting to note a lowering of serum total cholesterol, when high fat diet containing coconut oil was replaced by coconut soya oil mixture (1:1), while HDL cholesterol level remained the same without significant changes. This could be a safe way of dealing with those with an elevated blood cholesterol level, whereby introduction of an equal amount of soya oil to coconut oil could create a lowering of cholesterol, whilst maintaining a high HDL cholesterol level and thereby lowering Total Cholesterol: HDL Cholesterol ratio to a reasonable safe level.

Supervisors: Prof. P. A. J. Perera (University of Peradeniya & PGIS)
Dr. P. H. P. Fernando (University of Peradeniya & PGIS)

.....

M.Phil. (Chemical Sciences)

Chemistry and bioactivity of some Sri Lankan Buxaceae and Rubiaceae

B M Mallika Kumarihamy, Institute of Fundamental Studies, Kandy

This thesis includes chemistry and bioactivity studies of *Sarcococca zeylanica* of the family Buxaceae and *Hedyotis lawsoniae* and *Lasianthus gardneri* of the family Rubiaceae.

Methanol extract of the aerial parts of *Sarcococca zeylanica* was processed for non-quaternary alkaloids. Chromatographic separation of these alkaloids furnished (20S, 2'Z)-20-(N,N-dimethylamino)-3'-(2-methyl-2Z-butanamido)-pregn-5-en-4-one (19), 3'-methoxy-20'-dimethylamino-pregn-5-ene (15), iso-N-formyl-5-en-chonemorphine (68), 3'-methylamino-pregn-20-one (69), 3'-monomethylamino-20'-dimethylamino-pregn-5-ene (70). Compounds 19 and 15 have been previously reported from *Sarcococca saligna* and *Sarcococca brevifolia* respectively. Compounds 68, 69, and 70 are new natural products. Compound 19, 15 and 69 showed strong antifungal activity against *Cladosporium cucumerinum* and *Cladosporium cladosporioides*, while 68 and 70 showed moderate activity for the same fungi. Compounds 19, 15, 69 and 70 showed antibacterial activity against *Bacillus subtilis* and compounds 19, 15 and 69 - showed anthelmintic activity against *Caenorhabditis elegans*.

Chromatographic separation of hexane and methanol extract of the stem of *S. zeylanica* yielded three triterpenes, lupenone (77), lupeol (78), ursolic acid (72), and β -sitosterol (71) and some polar compounds, which are highly unstable at room temperature. Chromatographic separation of the hexane, dichloromethane and methanol extract of flowers of *Hedyotis lawsoniae* furnished six compounds namely, friedelin (73), taraxerol (74), β -sitosterol (71), ursolic acid (72), hederagenin (75) and β -sitosterol-D-glucoside (76).

Methanol extract of stem of *Lasianthus gardneri* showed the presence of alkaloids in minute amounts. Chromatographic separation of the n-butanol soluble fraction of the methanol extract yielded lupenone (77), lupeol (78), β -sitosterol (71), ursolic acid (72) and stigmasterol- β -D-glucoside (79). This is the first chemical investigation carried out on *L. gardneri*. Antifungal, antibacterial, molluscicidal, anthelmintic, antifeedant, plant growth regulatory and nematocidal activities of some Sri Lankan Buxaceae and Rubiaceae are reported.

Supervisors: Prof. G. P. Wannigama (University of Peradeniya & PGIS)
Dr. U. L. B. Jayasinghe (Institute of Fundamental Studies, Kandy)

.....

M.Phil. (Plant Sciences)

Performance of selected forest species providing non-timber forest products in Sinharaja MAB reserve, Sri Lanka

H. S. Kathriarachchi, Department of Botany, University of Peradeniya

The Sinharaja forest, Sri Lanka's only natural world Heritage Site, was selectively logged from 1972 to 1977, when the logging was banned. Since then it has been declared as a conservation forest and *Pinus caribaea* was planted in the buffer zone around it. This study conducted during 2000 - 2002 covered three main aspects. Firstly, the evaluation of the growth performance of selected primary forest species introduced to a part of the *Pinus* buffer zone and secondly the regeneration of same species in a selectively logged part of the forest was carried out. Thirdly a preliminary community survey was carried out to examine the potential to develop a community based management system in the buffer zone of Sinharaja.

In 1991 a field trial was initiated to enrich a part of the *Pinus caribaea* buffer zone of Sinharaja using selected timber and non-timber primary forest species after creating different size gaps by thinning the *Pinus* trees. Since then the pine trees as well as the species used for enriching the *Pinus* stand have grown and the initial light environment in the gaps had gradually changed. In this restoration field trial the selected enrichment species were also planted in the understorey of the *Pinus* stand, which was not thinned. This served as the control.

In the present study, the light variations at different canopy levels in the different size gaps and the control in this restoration trial were examined. The adaptability of six selected non timber forest species *Shorea disticha* (Thw.) Ashton, *Shorea megistophylla* (Thw.) Ashton, *Caryota urens* L., *Calamus ovoideus* Thw., *Coscinium fenestratum* Colebr and *Elettaria cardamom* var. *major* Thw.,) to the different light levels in the treatments and the control were also investigated. The present vertical gradient of total daily photosynthetic photon flux within the treatments and the control, at the top of the crown of the enriched species and at ground level, during both rainy and dry periods ten years after initial establishment of the trial was observed.

After ten years (1991-2001) of growth the following observations were made. The endemic, late successional canopy dominants, *S. disticha* and *S. megistophylla* performed well under the 3 rows and 1 row removed canopy gaps. *Elettaria cardamomum* var. *major* showed its best height, height increment, number of fronds/plant and net photosynthetic rates in the 3-pine rows intact treatment (144 cm, 11.5 cm/yr, 17 fronds/plant and $1.8 \mu\text{mol m}^{-2}\text{s}^{-1}$ respectively) and the closed canopy control (140 cm, 9 cm/yr, 18 fronds/plant, $2.9 \mu\text{mol m}^{-2}\text{s}^{-1}$ respectively). Both liana species *C. ovoideus* and *C. fenestratum* grew poorly in the *Pinus* understorey compared to that in the other canopy removal treatments. The best height (12.5m) growth for *C. ovoideus* was recorded in the three-row canopy removal treatment. In contrast to cane, the growth performances and physiological features of *C. fenestratum* showed only a smaller variation among the canopy removal treatments. This suggests that they can tolerate the light levels in the 3 pine rows removed. 1 pine row removed and 3 pine rows under planting treatments. After ten years, the growth performance and net photosynthetic rates of *C. urens* were significantly higher in the 5 rows removed and the 2 rows removed treatments compared to the closed canopy control treatment.

The population structure of this selected non-timber forest species except *C. urens* in disturbed sites indicating that these species could survive and regenerate naturally in the selectively logged disturbed sites. The better growth performances of these species in gaps of the *Pinus* enrichment trial corroborate that the intensity of selective logging was at a level favourable for the regeneration of these species.

The findings of the preliminary community survey showed that there is a great potential to initiate a community participatory management program within the buffer zone of Sinharaja forest with native non-timber forest species. Among the study species tested *Caryota urens*, *Calamus ovoideus*, *Coscinium fenestratum* and *Elettaria cardamomum* var. *major*) *C. urens* and *Elettaria cardamomum* var. *major* could be introduced to initiate such a project in the buffer zone by using the traditional knowledge and the resourcefulness of local community in the periphery.

The silvicultural, biological, ecological and physiological information gathered on each study species in this investigation enable us to recommend the optimal growing conditions for each species in reforestation and enrichment planting programs in the buffer zones of protected areas throughout the lowland wet zone of Sri Lanka. These findings

could also be used as a guideline to recommend the intensity of selective logging that would encourage advanced regeneration in the forest.

Supervisors: Dr. K. U. Tennakoon (University of Peradeniya & PGIS)
 Prof. C. V. S. Gunatilleke (University of Peradeniya & PGIS)
 Prof. I. A. U. N. Gunatilleke (University of Peradeniya & PGIS)
 Prof. H. Gunatilleke (University of Peradeniya)

.....
M.Phil. (Plant Sciences)

The effect of potential bio-control agents isolated from food sources on fungal contamination of copra and fresh coconut and on quality of coconut oil.

Noorul Fahima Nawas, Department of Botany, University of Peradeniya

The present study was a preliminary investigation to determine fungi growing on coconut kernel and copra. Succession of fungal invasion on fresh coconut kernels was investigated in two distinct seasons; June to September, 1996, and December 1996 to April 1997. The temperature ranges and the relative humidities of the two seasons were 25 – 27°C and 28 - 32°C respectively, and 67 – 77% and 55 – 65% respectively. Among the organisms isolated were potential mycotoxin producers, *Aspergillus* spp., *Penicillium* spp., and *Fusarium* spp. Of these, the following were used as test fungi; *Aspergillus flavus* (coconut), *Aspergillus niger* (coconut), *Aspergillus clavatus* (coconut), *Fusarium* sp. (coconut), and *Penicillium* sp. (copra) to determine their response to microbial antagonists. Potential antagonists to control these fungi were isolated from several food sources. Initially, 13 microorganisms were isolated which consisted of 4 yeasts (from coconut water, black gram paste, curd and Kampucha tea mushroom) 9 bacteria (from coconut water, rice flour slurry, black gram paste, yoghurt starter culture, curd, Kampuch tea mushroom and gingelly paste). Of these antagonists, one yeast (*Candida lusitanae*, from coconut water), and four bacteria (*Pantoea agglomerans*, *Flavobacterium* sp. and *Bacillus macerans* from rice flour, and *Enterobacter* sp. from coconut water) inhibited growth of all test fungi in cultural plates. Therefore they were selected for further investigations. Different techniques were used to screen the antagonists. They were growth inhibition on culture plates, conidial germination assays, and mycelial growth reduction in broth cultures. Their effect on fresh coconut was investigated by using pieces of coconut and scraped coconut as the substrate. There was evidence that all five antagonists produced antibiotic compounds into the substrate. Both live cells and cell-free culture filtrates of antagonists were effective in controlling the test fungi.

Out of the five antagonists *Bacillus macerans* was selected to evaluate the effect of quality of coconut oil obtained from fresh coconut and copra treated with this antagonist. Both laboratory experiments and field-based experiments were performed. There was no evidence that the treatment affected the quality of coconut oil. The quality parameters observed were density, free fatty acid, refractive index, matter volatile, impurities, mineral acidity and acid value. None of these were significantly different ($P=0.05$) from the respective controls, and they were within the range specified by the Sri Lanka Standards Institute. An attempt was made to characterize the antifungal compounds produced by *Bacillus macerans* by using Gas-chromatography-mass spectroscopy. These investigations suggested that the compounds may be a derivative of 1,2 – Benzenedicarboxylic acid and diphenyl ether or Benzenedicarboxylic acid.

Supervisor: Mrs. A. M. Karunaratne (University of Peradeniya & PGIS)

.....
 ***M.Sc. Programmes 2002***

The following M.Sc. programmes commenced during the first half of 2002.

M.Sc. Programme	Board of Study	Coordinators	No. of Students
Oceanography	Earth Sciences	Dr. H M T G A Pitawala Dr. E M S Wijeratne	11
Postharvest Technology of Fruits & Vegetables	Plant Sciences	Prof. N K B Adikaram Mrs. C. Breckenridge	13

↑ **FOREIGN VISITORS (January – June, 2002)**

- Prof. Lars Rydberg, Professor of Oceanography, Gothenburg University, P.O. Box 460, 40530 Gothenburg, Sweden.
- Prof. V. Subramanian, School of Environmental Science, Jawaharlal Nehru University, New Delhi – 110067, India.
- Prof. Stephen Kumarapeli, Concordia University, Montreal Quebec, Canada H4B 1R6.
- Mr. T. Joseph, International Officer, Queen Mary University of London, U.K.
- Prof. Joan Solomon, Centre for Science Education, Open University, Milton Keynes, U.K.
- Prof. Elisa Maia, Departamento de Quimica e Bioquimica, Faculdade de Ciencias de Lisboa, Portugal.
- Prof. Josiane Hamy, L' Academie des sciences, Nantes, France.
- Prof. Tahira Arshed, Department of Physics, University of Tennessee at Martin, U.S.A.
- L.A. Eramudugolla, Royal Australian Mint, Denison Street, A C T 2611, Australia.
- Benito C Tan, Biology Department, NUS, Singapore.
- Dr. S. John Britto, Director, Reader, Centre for Natural Resources Study (CNRS), St. Joseph's College (Autonomous), Tiruchirappalli – 620002, Tamil Nadu, India.
- Dr. S. Senthilkumar, St. Josephs College, Tiruchirappalli – 620002, Tamil Nadu, India.
- Dr. Jayantha Wimalasena, Professor & Director of Research, Department of Obstetrics and Gynaecology, 1924 Alcoa Highway, U-27, Knoxville, Tennessee 37920, U.S.A.
- Madame Hannelore Bossmann, Director, Regional Office (Bangladesh, India, Nepal, Sri Lanka), German Academic Exchange Service (DAAD), 176, Golf Links, New Delhi, 110003, India.
- Dr. R. Shankar, Department of Marine Geology, Mangalore University, India.
- Dr. S.A. Hussain, Reader in Wildlife Science, Wildlife Institute of India, Post box # 18, Chandrabani, Dehra Dun – 248001, India.
- Dr. Lareef Zubair, Associate Research Scientist, Lamont-Doherty Earth Observatory, Colombia University, 61 Rt. 9W Monell Building, Palisades, NY 10964 – 8000 USA.

↑ **OTHER PGIS ACTIVITIES**

Workshops (WS) and Short Courses (SC) conducted from January to June 2002

Event	Co-ordinator/s	Period	No. of Participants
Environmental Organic Chemistry (WS)	Prof. S. Sotheeswaran Prof. N.S. Kumar	Jan. 18 – 20	15
	Dr. A. Wickramasinghe	Jan. 25 - 27	
Rocks & Minerals (SC)	Dr. R. Fernando Mrs. D. Weerakoon	Jan. 25 – 27	19
Microcomputer Interfacing Methods in Chemistry (SC)	Prof. H.M.N. Bandara Prof. R. Weerasooriya	Feb. 8 - 11	13
Business Statistics with Computer Applications (SC)	Dr. P. Wijekoon	Feb. 23 - 25	06

Repair and Maintenance of Laboratory Equipment I (WS)	Prof. H.M.N. Bandara	Mar. 1 - 4	38
Scientific Writing (WS)	Dr. N.C. Bandara	Mar. 2	69
Aphid Taxonomy (WS)	Prof. J.P. Edirisinghe	Mar. 9 - 11	15
Science Education for G.C.E.A/L Teachers (WS)	Dr. S. Karunaratne	Mar. 13 - 15	154
Repair and Maintenance of Laboratory Equipment II (WS)	Prof. H.M.N. Banadara Dr. A.D.L.C. Perera	May 9 - 12	24
Identification of Tropical Mosses in the Old World (WS)	Prof. I.A.U.N. Gunattilleke	May 9 - 10	14
Protection Against Lightning (WS)	Mr. K.R. Abhayasingha	May 19	43
Landslides and Construction (WS)	Mr. U.B. Amarasinghe	June 8 - 9	13

Coordinators' Reports

WORKSHOP ON ENVIRONMENTAL ORGANIC CHEMISTRY

A Workshop on Environmental Organic Chemistry was held during January 18 - 20, and 25 - 27, 2002, at the PGIS, University of Peradeniya. The Environment Action 1 Project of the Ministry of Environment and Natural Resources sponsored the Workshop. The Principal Resource Person at the Workshop was Prof. S. Sotheeswaran of the Department of Organic Chemistry, University of the South Pacific, Fiji. Other Resource Persons who contributed to the Workshop included Prof. V. Kumar, Prof. O. A. Ileperuma, Prof. B. M. Ratnayake Bandara, Prof. R. M. G. Rajapakse and Dr. A. Wickremasinghe (Dept. of Chemistry), Dr. A. Senaratne (Dept. of Geology), Dr. N. C. Bandara (PGIS) & Dr. B. F. A. Basnayake (Dept. of Agricultural Engineering) of the University of Peradeniya, Dr. K. Mahanama (Dept. of Chemistry, University of Colombo) and Ms. Y. Deraniyagala.

The fifteen participants of the Workshop, drawn from different institutions and organizations, contributed to the lively discussions after each presentation. Lecture sessions were conducted during the first two days and thereafter the lecture presentations were interspersed with laboratory sessions, which were conducted at the Department of Chemistry, University of Peradeniya.

Anthropogenic hydrocarbons, organochlorines in the atmosphere, chemicals that cause ozone destruction, indoor air organic pollutants, free radical reactions of hydrocarbons in the atmosphere, industrial explosions, industrial effluents, organic pollutants in water, toxic effects of organic pollutants and biotechnology in environmental management were some of the topics covered during the Workshop. Three laboratory sessions were conducted during the Workshop. The participants conducted experiments on the detection of pharmaceutical pollutants in drinking water, determination of the cadmium content of industrial effluent samples, hydrocarbon analysis in leaded and unleaded petrol using GLC, detection of limonene from citrus peel, TLC of organochlorine, pyrethroid and other halogenated pesticides. An amperometric method and UV spectroscopy for the determination of thiram, determination of the Chemical Oxygen Demand of a brackish water sample, and an electrochemical method for the determination of propanil. The Workshop concluded on January 27, 2002, with the presentation of Certificates to the participants.

Chief Guest, Mr. D. B. Sumithraarachchi (Coordinator of the EA1 Project, Ministry of Environment and Natural Resources) addressing the inaugural session. (Seated L to R): Prof. S. A. Kulasoorya (Dean, Faculty of Science, University of Peradeniya), Prof. K. Dahanayake (Director, PGIS), Prof. N. S. Kumar (Chairperson, PGIS Board of Study in Chemical Sciences), Prof. S. S. Sotheeswaran (Principal Resource Person) & Dr. A. Wickramasinghe (Workshop Coordinator).

Workshop Coordinators: Prof. N. S. Kumar & Dr. A. Wickramasinghe

SHORT COURSE ON ROCKS AND MINERALS

A two-day short course on 'Rocks and Minerals' was successfully conducted by the Board of Study in Earth Sciences of the PGIS in collaboration with the Geological Survey and Mines Bureau (GSMB) from 25 - 27 January 2002. The main objective of the course was to impart basic knowledge on rocks & minerals and their various geological applications. The programme included lectures on rocks, minerals, groundwater, landslides, earthquakes, gem minerals and related laboratory works. One-day field excursion was also conducted to observe rock quarries and recent landslides at Udadumbara under the guidance of Mr. Udeni Amarasinghe and Dr. Rohan Fernando.

There were 19 participants drawn from universities, research institutes, etc. They included professionals working in areas related to the theme of the Short Course. Resource persons were university lecturers and senior scientists drawn from various professional organizations.

Short Course Coordinators: Dr. G.W.A.R. Fernando and Ms. D.P.R. Weerakoon

SHORT COURSE ON MICROCOMPUTER INTERFACING METHODS IN CHEMISTRY

A 4-day short course on Microcomputer Interfacing Methods in Chemistry was held in the Department of Chemistry, University of Peradeniya during February 8 – 11, 2002. Thirteen participants from universities and research institutes participated in the workshop.

The main objective of the workshop was to introduce the concepts of computer control of instruments to chemists and research students engaged in chemical research. A knowledge in this area is now essential for research scientists since even the most simple of instruments such as a pH meter is now microprocessor controlled. The topics covered in the programme included digital electronics, analogue to digital conversion, data acquisition, instrument control, data processing, serial & parallel ports and relevant programming.

Short Course Coordinators: Prof. H.M.N. Bandara & Prof. R. Weerasooriya

SHORT COURSE ON BUSINESS STATISTICS WITH COMPUTER APPLICATIONS

The Board of Study in Statistics & Computer Science of the PGIS conducted a Short Course on Business Statistics with Computer Applications from 23rd to 25th February 2002. Six participants were present for the short course, and the course provided a basic understanding of risk management tools using industrial applications and a computer based practical training related to problems in the finance and insurance sectors.

The principal resource person was Dr. R. Perera, Director, Imperial Consultants, U.K. He is also a Financial Consultant to Banks and Marketing organizations in U.K. The Board members Prof. R.O. Thattil, Dr. P. Wijekoon, Dr. S. Samita and Dr. L.H.P. Gunaratne served as resource persons. All participants evaluated the course as very useful, and requested follow-up courses in the future.

Short Course Coordinator: Dr. P. Wijekoon

WORKSHOP ON REPAIR AND MAINTENANCE OF LABORATORY EQUIPMENT

The Board of Study in Chemical Sciences of the PGIS conducted two workshops on Repair & Maintenance of

Laboratory Equipment. These were conducted primarily for the technical staff to impart further technical skills in repairing instruments in their laboratories. The first workshop was held from March 1– 4, 2002 and the second one from May 9 – 12, 2002 in the Department of Chemistry, University of Peradeniya. These workshops were partially funded by the Asian Development Bank supported S and T Personnel Development Project, Ministry of Economic Reform, Science and Technology. 38 participants attended the first workshop and 24 participants the second workshop. Participants were mostly from universities and research institutions.

The programme consisted of about 12 hours of lectures covering Basic Electronics such as transistor circuits, voltage regulators, operational amplifiers, transducers etc., safe handling of chemicals and equipment and spectroscopic techniques such as atomic absorption spectrometry, flame photometry, UV-visible spectrophotometry. The programme also included about 16 hours of practical sessions covering construction of sampling circuits, glass blowing, and troubleshooting.

Most of the participants acknowledged that they had no opportunity to undergo any training programme of this nature previously. According to the feedback received from participants, they had gained a considerable knowledge & experience sufficient to open up any faulty instrument with confidence. There is a great need to conduct more similar workshops.

Workshop Co-ordinators: Prof. H.M.N. Bandara & Dr. A.D.L.C. Perera

WORKSHOP ON SCIENTIFIC WRITING

The PGIS conducted a one-day workshop on Scientific Writing on March 2, 2002 for PGIS students who were getting ready to write their theses. 69 students registered for M.Sc., M.Phil. and Ph.D. degrees participated in the workshop.

The workshop consisted of lectures/discussions on various aspects of postgraduate theses writing. The topics covered at the workshop were: Scientific Writing - Structure/layout of a thesis, Problems in Thesis Writing – Sri Lankan Situation, Title & Abstract, Introduction & Bibliography, Computer Aided Literature Survey, Experimental/Materials and Methods and Results, Interpretation & Conclusion. Professors B. M. R. Bandara, M. A. Careem, K. Dahanayake, M. A. K. L. Dissanayake, O. A. Ileperuma & U. Samarajewa (University of Peradeniya) and S. V. R. Weerasooriya (Institute of Fundamental Studies, Kandy) served as resource persons.

Workshop Coordinator: Dr. N. C. Bandara

WORKSHOP ON APHID TAXONOMY

A three-day workshop on Aphid Taxonomy was jointly conducted by the National Science Foundation (NSF) and the PGIS Board of Study in Zoological Sciences. The purpose was to train 16 participants in the identification of the aphid fauna of Sri Lanka. Aphids (Insecta: Hemiptera) while contributing to the invertebrate diversity are important pests of crops and vectors of virus diseases in plants. The participants were trained in the collection and slide mounting of aphids

Mr. M. Watson (Director, National Science Foundation) addressing the inaugural session of the workshop on Aphid Taxonomy. Seated (left to right): Prof. P. K. de Silva (Chairperson, PGIS Board of Study in Zoological Sciences), Prof. K. Dahanayake (Director, PGIS) and Prof. J. Edirisinghe (Coordinator) for microscopic examination. The common aphid genera and species were identified using a taxonomic key.

Participants were provided with a taxonomic key, a checklist of aphids of Sri Lanka and their host plants and a reference collection of identified slides of aphids, to be used at their places of work. The objective of this workshop was to impart knowledge on yet another, lesser-known group of insects of Sri Lanka thereby, contributing to our knowledge of insect taxonomy and diversity. The workshop was well received by the participants who represented universities, Agriculture and Plantation sectors and the NGO-Horticulture sector.

Workshop Co-ordinator: Prof. J. P. Edirisinghe

WORKSHOP ON PROTECTION AGAINST LIGHTNING

A one-day workshop on Protection against Lightning was organized by the PGIS Board of Study in Physics. It was held at the PGIS Auditorium on 19th May 2002. At the inaugural session Prof. K. Dahanayake, Director, PGIS welcomed the guests and participants of the workshop. Prof. R. P. Gunawardane, Chairman, National Education Commission was the Chief Guest. There were forty-three registered participants. Workshop was partly sponsored by Richardson Projects (Pvt) Ltd. (Level 3, Galle Road, Colombo 3), Power Management Technologies (321, Union Place, Colombo 2) and Empire Trading Agency (110, Layards Broadway, Colombo 14).

Mr. K. R. Abhayasingha, Deputy Director, Department of Meteorology and Workshop Coordinator addressing the inaugural session of the workshop on Protection Against Lightening. Seated (left to right): Dr. A. A. S. Perera (Acting Dean, Faculty of Science, University of Peradeniya), Prof R. P. Gunawardane (Chairman, National Education Commission), Prof. K. Dahanayake (Director, PGIS) and Prof. M. A. Careem (Chairman, PGIS Board of Study in Physics).

Lectures delivered in the workshop covered the topics: Physics of lightning and some aspects of precautions against lightning (Dr. Chandana Jayarathna, Senior Lecturer, University of Colombo); Death and Damage caused by lightning (Mr. K.R.Abhayasingha, Deputy Director, Department of Meteorology, Colombo); Effects of lightning on Structures, Electrical/electronic systems and their protection (Mr. Lalith Fernando, Chief Engineer, Standard and Specification, CEB) and (Mr. W.J.K.de Mel, Chief Engineer, Distribution and Protection, CEB); Designing of a Lightning Protection System (LPS) – A case study (Mr. Nuwan Kumarasingha, Electronic Engineer, Department of Meteorology, Colombo); Short presentations were given by representatives of sponsoring organizations.

Workshop Coordinator: Mr. K. R. Abhayasingha

NATIONAL WORKSHOP ON LANDSLIDES AND CONSTRUCTION

The workshop was successfully conducted on 8th and 9th June 2002 by the PGIS Board of Study in Earth Sciences with the collaboration of the National Building Research Organization (NBRO) and National Disaster Management Centre (NDMC), Ministry of Social Welfare.

Thirteen participants from the following institutions attended the workshop: Irrigation Department, National Housing Development Authority, Municipal Councils, Road Development Authority, Upper Watershed Management Project of the Mahaweli Authority, Divisional Secretariats, Survey Department, Central Province District Engineers Office.

Mr. Basil Fernando, Director, National Disaster Management Centre (NDMC) was the Chief Guest who also served as a resource person. Other resource persons were Prof. Kapila Dahanayake & Mr. Udeni B. Amarasinghe (Department of Geology) and Prof. Nimal Seneviratne (Department of Civil Engineering) of the University of Peradeniya, Mr. R. M. S. Bandara, Mr. M. I. D. H. Wijewickrama and Mr. K. N. Bandara (National Building Research Organization).

On 9th June 2002 the participants were taken to witness landslide occurrences in the Pooliyadda area by Prof. Kapila Dahanayake and Mr. Udeni Amerasinghe.

Workshop Coordinator: Udeni B. Amarasinghe

↑ **FORTHCOMING EVENTS**

- Training Programme on Medicinal Plants (August 10 - 11, 2002)
 - First PGIS Research Sessions (September 7 - 8, 2002)
 - Workshop on Analysis of Quantitative Trait Loci (September 16 - 17, 2002)
 - Commencement of the following eight M.Sc. programmes (October, 2002):
 - Analytical Chemistry
 - Applied Statistics
 - Experimental Biotechnology
 - Gemmology
 - Industrial Chemistry
 - Industrial Mathematics
 - Parasitology
 - Science Education (with specialities in Biology/Chemistry /Mathematics/Physics)
 - UNESCO/ASPEN Regional Workshop on Active Learning Methods in Physics (December 2 – 7, 2002)
-



Postgraduate Institute of Science (PGIS)

University of Peradeniya
P.O. Box 25
Peradeniya 20400
Sri Lanka

Website: www.pgis.lk

Director:

Prof. K Dahanayake
08 – 387218
08 – 388693/389151-2 (ext. 4243)

Assistant Registrar:

Ms. A A P Athauda
08 – 387542
08 – 388693/389151-2 (ext. 4242)

Senior Assistant Bursar:

Ms. W A P S Molagoda
08 – 389027
08 – 388693/389151-2 (ext. 4244)

PGIS Office:

08-385660
08-388693/389151-2 (ext. 4247)
Fax: 08-389026 (local)
+94-8-389026 (intl.)