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enviroNews

Newsletter of the Environmental Sciences Association of Ireland - an association for people working in the environmental area

ESAI web address: esaiweb.org

ESAI Environmental Day

The Burren, Co Clare, 1 Sept 2006

The ESAI is organising an Environmental Day in the Burren, Co Clare on Saturday, 1st September, 2006 for interested members. Spaces are limited, so please book your place with the administrator (details below) at the earliest opportunity. Two walks are planned, as well as an indoor presentation at Carron Research Centre. The day is being sponsored by the Environmental Change Institute, NUIG.

1. Visit to Mullach Mór in the Burren National Park (9:15am)
Meet at Kilnaboy crossroads, just north of Corofin, at 9:15am. The walk will take in limestone pavement and other Burren habitats (meadows, turloughs, scrub woodland, etc), as time permits. It will look at an exclosure established by Dr Richard Moles (UL) as part of his research into the effects of grazing on vegetation composition and soil cover in the karst environment, and consider the drivers of biodiversity and implications for management of the Burren. The walk will last about two hours. Walking shoes and reasonable fitness are needed to negotiate the terrain.

2. The Fertile Rock: Introduction to the Burren (2:00-3:00pm)
An illustrated talk by Brendan Dunford of the Burren EU-LIFE Project (see www.burren.beo.ie for more information). Followed by 'questions and answers' session.

3. A Walk in the Burren (3:00-5:00pm)
A one-mile walk along a scenic road, starting at the NUIG Field Centre. This will be followed by a visit to a site of natural and cultural heritage interest before return to the centre.

Accommodation: Overnight facilities will be available in Carron Research Centre.

For more information and bookings, contact:
ESAI Administrator, Sinead Macken, Moy Road, Kinvara, Co Galway
Tel: (091) 637 630, Email: jbres@indigo.ie.

ESAI would like to thank the Environmental Change Institute, NUIG, for the use of their facilities.

'Challenges to Marine Ecosystems'

41st European Marine Biology Symposium
University College Cork, 4–8th Sept 2006

The world's marine ecosystems face multiple challenges, some natural, but many resulting from humankind's activities. Global climate change, driven by influences of energy usage and industrial practices, is a reality now accepted by most of the world's scientists, media and political establishments. Warming seas and rising sea levels are regarded as threats, while visionaries consider deep-ocean carbon disposal as a technological opportunity. Exploitation of the seas continues apace, with repeated concerns over the impact of over-fishing plus reservations about the environmental effects of marine aquaculture. We need to understand how resilient are organisms and ecosystems to these challenges, while responding by protecting biologically meaningful areas of the oceans.
The subthemes of the symposium will address these matters and will include:

- Genetics and resilience of marine organisms
- Marine protected areas
- Global climate change and marine ecosystems
- Sustainable fisheries and aquaculture

The full symposium fee is €500 (inclusive of reception, coffee/tea breaks, lunches, an excursion, the conference dinner and a copy of the proceedings. A reduced fee is available on proof of student status (no proceedings).

- For details, please contact: EMBS41@ucc.ie.

Photography Competition

The ESAI invites all members to participate in our first ever photography competition. The theme for the competition is *Ireland's Environment.* Entries are welcome from both amateur and professionals and will be assessed on the basis of picture quality, composition and appropriateness of the caption. The first prize will be a €100 voucher for www.pixels.ie.

Entry is now open and the closing date is Friday, 29th September 2006. The winner will be notified in October. See the ESAI website (www.esaiweb.org) for entry forms and conditions.

Inside

Environmental Sciences Association of Ireland

EnviroNews

Environews is published by the Environmental Sciences Association of Ireland (ESAI) and distributed free to members. Names and addresses of members are not provided to commercial concerns.

Editor
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Cóilín MacLochlainn

ENVIRON2007, IT Carlow

ESAI is pleased to announce that the 17th Environmental Researchers' Colloquium, ENVIRON2007, will be hosted by the Institute of Technology Carlow from Friday 26th to Sunday 28th January 2007.

The colloquium is an ideal forum for postgraduate students to present and discuss their research findings or ongoing projects. Students will also have the option of submitting a paper for publication by ESAI following peer review. We will be accepting oral and poster presentations from all areas of environmental research from biodiversity through to sustainable development. The first call for abstracts will be in September 2006. For registration and other details, contact the conference coordinator, Dr David Ryan (contact details below). ESAI awards prizes for the best presentation and best poster each year. We would ask students presenting in ENVIRON2007 to let us know when registering if they wish to be considered for a prize.

So, good luck with the preparations and we look forward to seeing you in Carlow in January.

Contact: Dr David Ryan, Head of Department of Science and Health, School of Science, Institute of Technology Carlow, Kilkenny Road, Carlow. *Email:* David.Ryan@itcarlow.ie.

Research at IT Carlow

By David Ryan

The Department of Science and Health at IT Carlow has a long history of undergraduate learning and postgraduate research in the environmental sciences.

Current postgraduate research is in the area of biotechnology and molecular environmental science (BMES). It includes the use of both soil- and wetland-based plant-microbe interactions in the phytoremediation and/or microbial bio-degradation of a wide range of organic compounds.

Coupled with this is the development of strain-specific quantitative detection systems to monitor bioremediation strains on release and the use of bioinformatically designed microarray and gfp-based biosensors for the detection and characterisation of individual micro-organisms, biodegradative processes and environmental diagnosis.

Research is also ongoing in the areas of microbial metal resistance mechanisms and their bioremediation potential, particularly examining recently described multi-efflux systems and their roles in metal efflux.

The exploration of the potential use of a range of organic biomass/industrial waste products for the production of bioethanol as an alternative fuel source is another area of BMES research at IT Carlow, as is the examination of lactic acid bacteria for potential in the treatment of high cholesterol, mutagen-removal and inhibition of intestinal pathogens in mammals and the use of brewing yeast to convert brewing wastes into economically valuable flavour compound.

The genetic and bioinformatic analysis of nematode species of economic importance, and the examination of their potential agricultural use as natural biocontrol agents, is also being examined. For example, these strains will eventually be used to target important agricultural pests (e.g. vine weevil), reducing pesticide input to the environment. Other aspects of this research deals with developing nematodes as biological indicators of soil pollution.

For further information, please visit: www.itcarlow.ie.

• Dr David Ryan, head of the Department of Science and Health, is a former ENVIRON prizewinner postgraduate from NUI Galway.

Shiji Li, ESAI bursary winner 2006, accepts his award for best oral presentation at ENVIRON2006 from John Breen, ESAI chairman.

Bursary winner

The ESAI bursary for 2006 has been awarded to Shijie Li of the University of Ulster at Coleraine. Li's project will assess internal phosphorus loading in rivers in the border area. His work will be supervised by Dr Phillip Jordan, senior lecturer at the School of Environmental Sciences, University of Ulster.

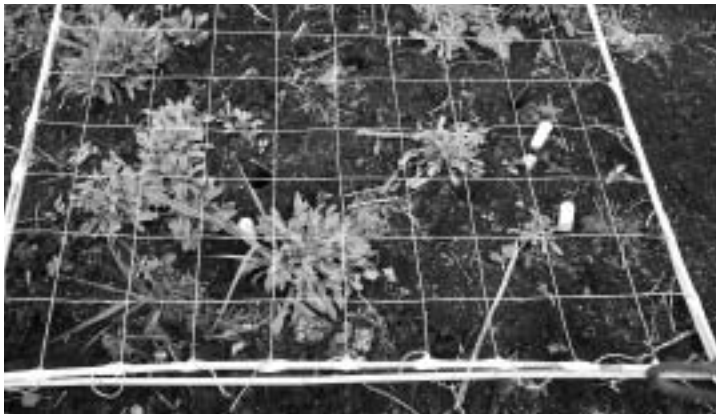
Shijie, who recently completed his fourth year of undergraduate studies, was the winner of the best oral presentation at the ESAI colloquium, ENVIRON2006, held in UCD last January.

An article based on Shijie's bursary research findings will be published in a later edition of *Environews* and presented at the next colloquium, ENVIRON2007.

Risk assessment for non-indigenous biological control agents in forestry

Abigail Maguire

Environmental Physiology and Behaviour Laboratory, Department of Biology, NUI Maynooth, Co Kildare (September 2005)



Forest soil plot treated with species of nematode.

The test site in a Coillte forest in north Co Kildare.

During summer 2005 I undertook a project funded by an ESAI Summer Student Bursary. My project tied in with ongoing research at NUI Maynooth on the use of insect parasitic nematodes as biological pesticide for a forest pest.

The pine weevil *(Hylobius abietis)* is the most important insect pest in Irish forestry. It is currently controlled using alpha-cypermethrin, which is highly toxic to fish. My project dealt with the persistence and spread of indigenous and non-indigenous nematodes currently being tested against pine weevil and was part of a broader risk-assessment exercise for the nematodes.

I treated replicate plots of forest soil with three species of nematode and monitored the results over an eight-week period. The test site was in a Coillte forest in north Kildare where nematodes are being trialled under licence from the Department of Agriculture and Food. The three nematode species were predicted to fare differently, based on background knowledge of their biology: *Steinernema carpocapsae* was predicted to neither penetrate deep in the soil nor establish; *Heterorhabditis downesi* was predicted to penetrate soil but not establish; *Steinernema feltiae* was predicted to penetrate and establish.

The site was sampled every two weeks. Both *H. downesi* and *S. feltiae* showed a similar persistence rate by the end of the project, while *S. carpocapsae* was less persistent, as expected. Contrary to expectations, all three species (including *S. carpocapsae*) penetrated to a depth of 50cm. My work shows that there is a need for further investigation of the dispersal behaviour of *S. carpocapsae.* The plots that I set up will be monitored by the research team at NUI Maynooth to record further changes in persistence and spread.

I would like to thank the ESAI for awarding me the Summer Student Bursary, and also COFORD, who sponsored it. I would like to thank Dr Christine Griffin, NUI Maynooth, for supporting my application for the bursary and supervising my work. I would also like to thank the other members of the laboratory for all their assistance and advice during the project, especially Dr Aoife Dillon who co-supervised the project.

Lizard study in Glendalough

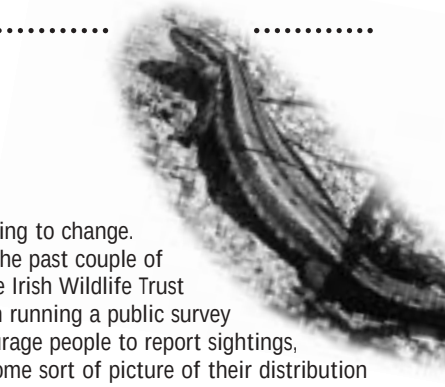
Michael Curran

Department of Zoology, University College Dublin

The grass rustles around the site of my next footstep. With a jump and a strange sinusoidal waddle, a reptile about the size of an index finger frantically tries to evade capture. I pounce on the lizard, pinning it down with both hands in the long grass, slowly untangling limbs and appendages until I am holding a rather fat, soft and quite docile Common Lizard *(Lacerta vivipara)*. This is Ireland's only surviving reptile species and a very important component of our island's biodiversity. An elusive beast, the lizard ekes out a living in grassy mountainside, boggy heathland, sandy shoreline and lowland fields. In fact, it is becoming apparent through recent surveys that this lizard's home range encompasses almost every environment on the island (well, anywhere that provides suitable basking space and a few tasty invertebrates scuttling around). Regardless of this apparent widespread distribution, much of the human population is still unaware that our cold and rainy little island has the climate to support cold-blooded reptile species, let alone the very successful, relatively large and rather unique Common Lizard.

For the ESAI bursary, I spent the greater part of June and July in Glendalough, Co Wicklow, to find as many of these little beasts as possible by attempting to attract them using large carpet tiles. It's a technique called "tinning." The carpet tiles get warm in the sun and provide a sheltered area in which the lizard can warm up whilst not exposing it to potential predators. In previous studies in Great Britain, it was shown that laying tiles, or refuges, does indeed attract reptiles; however, low levels of sightings were observed for *Lacerta.* For this project, I was interested in testing whether tinning was a practical method of measuring the presence, or absence, of *Lacerta* populations in an area.

Frankly speaking, we know almost nothing about our *Lacerta* here in Ireland. The details of physiology, life-cycle and genetics can easily be gleaned from research efforts that have been made in other European countries, where larger research budgets and wider interest has led to some very interesting discoveries. However, here in Ireland, few of us even know they exist, and even fewer are enthusiastic enough to check on them and see how they are doing. But things are starting to change.



Over the past couple of years the Irish Wildlife Trust has been running a public survey to encourage people to report sightings, to get some sort of picture of their distribution and habitat requirements. This is generating some much-needed publicity and interesting results, but what is really required is a concerted research effort to generate some solid scientific data that can be objectively interpreted and really give some insight into how these creatures got to our island, how they are getting on, and what the future holds for them. With a humble two research sites in Glendalough and a few stacks of carpet tiles, all I could have hoped for was to get a feel for what researching lizards is like. The results were not as promising as I would have hoped and the number of positive sightings was disappointingly low. However, the ESAI bursary allowed me to spend roughly eight weeks in a beautiful environment and I got a great chance to experience both the ups and the downs of fieldwork.

Distribution and genetic variation of Juniper *Juniperus communis* in Northern Ireland

Conor Wilson
Quercus, Queen's University Belfast

Juniper *Juniperus communis* is a slow-growing, low-lying or upright shrub and one of only three conifer species native to Ireland. It is mainly found in montane habitats and around limestone pavements or calcareous rocky outcrops and cliffs. Juniper was one of the first plants to recolonise the landscape of Northern Ireland post-glaciation.

It is thought that Juniper has declined by up to 60% throughout Britain since the 1960s. Consequently, Juniper is currently the subject of a Species Action Plan in the UK, although it is not subject to any protection in Northern Ireland. It is, however, listed on the Northern Ireland priority species list. There is little current information on Juniper in Northern Ireland, however. Populations are known to be small and fragmented, potentially leading to genetic isolation and decreased genetic variability in the species.

My work formed part of a larger project conducted by Quercus (a partnership between QUB and EHS). We aimed to assess the distribution and current ecological and taxonomic status of Juniper in Northern Ireland, thus providing important information for future conservation efforts to halt further Juniper decline and provide genetic information for corrective conservation initiatives such as replanting programmes.

Tagged Juniper from Fermanagh *(Photo: Jane Preston)*

My field work was split into two phases. The first phase involved returning to sites that had historical records of Juniper and collecting detailed ecological and genetic information on Juniper populations. The second phase involved visiting a further 48 10km^2 squares across Northern Ireland that had apparently suitable habitat for Juniper but had no previous records of Juniper, and surveying them for Juniper presence.

To date, all of the 50 sites with historical records of Juniper across Northern Ireland have been surveyed and all but 12 of these sites still have Juniper populations.

Juniper was found in three main regions in Northern Ireland: Fermanagh, the Antrim and Derry coastline, and the Mourne Mountains.

181 plants were sampled in Northern Ireland during phase 1 of the survey. Most of these were found in Fermanagh, with the least found along the Antrim and Derry coastline. Of the plants found, the majority were prostrate, with few upright individuals. On average, on the Antrim and Derry coastline, there was only 57.9% cover of green leaves on the plants, which may imply a relict population. The second phase of the survey got underway with the aim of completion by the end of November 2005. The results from the survey will be used to inform the future conservation management of Juniper populations in Northern Ireland.

The bursary gave me the opportunity to gain valuable experience in the field of conservation management. I have gained invaluable experience in survey planning and preparation, standard species and habitat survey techniques, data analysis and report production. I have also been trained in plant identification and in the use of GPS (Global Positioning Systems) and GIS (Geographical Information Systems). I would like to extend my appreciation to the Environmental Sciences Association of Ireland for the prize bursary awarded to me.

ENVIRON2006 prizewinners

Prizewinners' abstracts

ENVIRON2006 was held in UCD in January. It was a well-organised, well-attended event, for which ESAI would like to thank the local committee, especially joint chairs Dr Mary Kelly-Quinn and Dr Tasmin Crowe. Our thanks also to the keynote speaker, Ken Whelan of the Marine Institute, who reviewed international research on North Atlantic Salmon stocks. The winning presentations chosen by the ESAI were as follows:

Best Overall Oral Presentation:
Shijie Li, University of Ulster at Coleraine
Best Oral Presentation, runner-up:
Tim O'Higgins, TCD
Best Overall Poster:
Shane McArdle, University of Limerick

The Soil Science Society of Ireland presented a prize to Mike Hawkins, UCD; and COFORD presented a prize to Liz Ryder, NUIG, for her poster on effects of forestry clearance. Articles based on the prize-winning presentations follow...

Modelling greenhouse gas emissions from Irish soils (Soil Science Society of Ireland Award)

Mike Hawkins
School of Mathematical Sciences, UCD

My thesis investigated annual emissions of nitrous oxide from fertilised and grazed grassland using statistical models.

Nitrous oxide is a greenhouse gas which is known to contribute to the greenhouse effect and the depletion of stratospheric ozone. Probably most of the nitrous oxide in the Earth's atmosphere is from microbiological processes in soils and aquatic systems. Nitrogen-based fertilisers typically increase emissions from grassland but their effect interacts with climatic factors, soil type and management practices, among other things.

I have been working on developing a variety of statistical models that relate field-scale emissions of nitrous oxide to a small set of important driving variables in the emissions process. These models are based on data collected by Bernard Hyde, Aidan Fanning and other researchers based in Johnstown Castle, Wexford. Combined with historic climatic data series, the models shed some light on the magnitude of interannual variability of annual emissions caused by variability of the climatic factors, and how this variability differs between soils. They also allow one to statistically test hypotheses regarding the effect of fertiliser application schedules on the level and variability of annual emissions.

My PhD work has been carried out as part of a collaborative research project investigating nitrous oxide and methane emissions from Irish agriculture. As a result, during my time as a PhD student I have collaborated with soil scientists from Teagasc's environmental research centre in Johnstown Castle, as well as animal scientists in UCD in Dublin.

I am in the latter stages of my PhD on "Modelling Greenhouse Gas Emissions from Irish Soils," co-supervised by Drs John Connolly and Patrick Murphy in the School of Mathematical Sciences, UCD.

Life as a PhD candidate has been challenging, interesting and rewarding and I hope to continue to research in this area in the future.

Phosphorus loadings in the River Blackwater (Best Overall Oral Presentation)

Shijie Li
University of Ulster, Coleraine

I am in the final year of my first degree in environmental science at the University of Ulster at Coleraine. My dissertation project was on the potential release and uptake of phosphorus by stream-bed sediments, and was supervised by Dr Philip Jordan of the School of Environmental Sciences. It was quite a perfect combination for me: thanks to the Freshwater Science Research Group's research input into the Blackwater TRACE project and the Blackwater Regional Partnership, the university had already had much research expertise, experience and water quality data from the area (courtesy of Dr Joerg Arnscheidt). Having taken an almost distractingly diverse range of modules as well as an industrial placement in previous years, I always wanted to do some work on eutrophication, since it is also a topical environmental issue in my native country, China.

A best summary of the project is already available in the ENVIRON2006 colloquium proceedings. Here, I shall not elaborate on that any further. However, I am hoping that this work can be expanded further, possibly as a summer research topic or even a PhD project. The current study has provided a good starting point, with limited equilibrium phosphorus concentration (EPC0) analysis at locations in Monaghan: it would be interesting to see how that compares against other areas of the Blackwater catchment and how the sediments' adsorptive capacities might evolve with time, for example, on a seasonal basis or before and after a major storm event. An important caveat in our conclusion was the poorly understood influence of redox potential on EPC0 – it would be helpful to explore that, too.

Overall, though, my learning experience as an undergraduate student at the University of Ulster has been tremendous. Receiving this award has certainly been the highlight of my short academic career so far and it has been a true honour and privilege. I am especially grateful to my supervisor for giving me this fantastic opportunity to present at ENVIRON2006, and I am deeply indebted to the School for their generous support.

Phytoplankton spring bloom decay in the Liffey estuary (Runner-up, Best Oral Presentation)

Tim O'Higgins
Zoology Department, Trinity College, Dublin

Dublin Bay and the Liffey estuary provide a recreational amenity of inestimable value to the people living in Dublin city. However, the growing population in the Dublin area is exerting increasing nutrient pressure on these amenities. In particular, sewage effluent from the city's main treatment plant at Ringsend has the potential to cause eutrophication within the bay and estuary.

Excessive growth of seaweeds has been a long-standing problem in Dublin Bay and huge amounts of brown alga have been washing up on the northern shores of the bay since the late 1980s. The decomposition of this seaweed produces foul-smelling diemtheyl sulphide gas.

The Dublin Bay Project, conceived to alleviate such problems, involved the centralisation of much of the city's wastewater processing and an upgrade of the Ringsend sewage treatment plant from primary to secondary treatment. My study ran in parallel with this project, and we monitored changes in the composition and loading of nutrient in the sewage effluent from 2000 to 2004. During the early part of the study we established that, in the Liffey estuary, the main plant nutrients (nitrogen and phosphorus) behaved conservatively with salinity and that neither nutrient was limiting to algal growth. In Dublin Bay, we observed a seasonal pattern of summer nitrogen limitation of phytoplankton.

We quantified the change in the nutrient composition of the sewage effluent over the course of the upgrade from primary to secondary sewage treatment in the Ringsend plant. The principal changes in the compostion of sewage effluent were a reduction in a shift from ammonia towards oxidised forms of nitrogen and a reduction in concentrations of suspended solids. The conservative behaviour of the nutrients in the estuary allowed us to develop a simple mathematical model to predict nutrient concentrations at a given salinity from the known nutrient inputs.

Following the upgrade of the treatment plant, we observed a brown discoloration of the waters of Dollymount strand in north Dublin Bay. The brown colour of the water was associated with a bloom of the diatom *Odontella aurita.* This event prompted a weekly monitoring program for phytoplankton and chlorophyll over the bathing season in all the bathing waters of Dublin Bay. Over the course of the summer, *Odontella* concentrations in the bathing waters reached a maximum of 8 million cells per litre. The phytoplankton bloom persisted in the north of the bay throughout the summer but was absent from the south. The location of the bloom suggested that the upgrade of the sewage treatment plant might have been implicated in its formation. However, since no monitoring of phytoplankton had been carried out in the area prior to the upgrade, we could not be certain that the bloom was caused by the changing nutrient composition. In order to ascertain cause and effect, I developed a biological model combining relationships between cell numbers, chlorophyll, carbon and nitrogen and linked this model to the existing nutrient dilution model. This allowed us to test whether nutrients were sufficient to cause such a bloom prior to the upgrade of the plant. The model results showed that before the upgrade of the plant, oxidised nitrogen concentrations in the waters of Dollymount strand could not have supported the amount of *Odontella* cells found after the upgrade, and that the shift from ammonia to oxidised nitrogen forms could reproduce the high cell concentrations observed during the bloom.

Pictured attending ENVIRON2006 in IT Sligo in January this year (left to right): Michael Quigley (NUIG), Christina Forbes (NUIG), Sharon McHugh (NUIG).

Biological and physical effects of forestry clearance on streams in western peatlands (COFORD Award)

Liz Ryder

NUI Galway and Marine Institute, Furnace, Newport, Co Mayo

I am carrying out a Research Masters with NUI Galway, based in the Marine Institute, Newport, Co Mayo. This is a brief summary of the work I am carrying out on the 'Red Area Forestry' project, funded by Coillte and COFORD.

Red Area Forestry sites have a low yield class with little potential of replacing the existing crop with a better one. The relatively poor economic return from Red Area forestry sites creates a unique opportunity to examine the potential environmental benefits of buffer zones along watercourses in forestry plantations. This provided the incentive for this project, whereby enhanced riparian areas will be developed in selected forests several years prior to the main crop being felled, and the impact on the water quality before, during and after the clearfelling will be documented.

Three study sites in the west of Ireland, representative of Atlantic blanket bog on which the majority of Red Area Forestry can be found, were selected. The sites were chosen to enable a range of forestry management treatments to be applied and to provide some comparisons between sites. While this is a long-term study requiring several years to allow riparian zones to develop, the first phase involved felling areas (300m x 50m) on both sides of rivers at the selected sites to create the buffer zones. The water quality will be determined before, during and after felling by undertaking freshwater invertebrate sampling and electro-fishing operations and by monitoring suspended sediment loading, water flow and volume. In addition, plant regeneration in the buffer zones will be documented.

One of the monitoring sites *(Photo: Liz Ryder)*

Development of an environmentally friendly process to improve healthcare aspects of hydrogenated sunflower oil (Best Poster)

Shane McArdle

MSSI, University of Limerick

What do cookies, chips, chocolate, margarine, crackers, pretzels have in common? Answer: *trans* fatty acids. *Trans* fatty acids or TFAs are found in numerous high-fat, tasty, comfort foods such as commercially packaged cookies and crackers, fried food (e.g. french fries), snacks such as microwave popcorn and vegetable shortening and some margarines. Indeed, any packaged goods that contain "partially-hydrogenated vegetable oils" or "shortening" often contain *trans* fatty acids.

Before the invention of hydrogenated vegetable oils, food was cooked and baked using lard or butter, which are high in saturated fats. It was subsequently discovered that these saturated fats were detrimental to our health, forming cholesterol in our bodies and therefore increasing risk of heart diseases. Manufacturers then started to look at using healthier vegetable oils in their food production. As a liquid, vegetable oils are not stable when heated, go rancid easily and do not have the required solid consistency desired for certain products, e.g. margarine, chocolate. Therefore, it was necessary to change or "hydrogenate" the vegetable oil in order to achieve these characteristics.

Liquid oils or unsaturated oils contain double bonds (present in the cis form). The presence of these double bonds renders the oil a liquid. Typically during hydrogenation, hydrogen, in the presence of a commercial nickel catalyst, at high temperatures, is added to the double bonds, breaking them or saturating them. This process is often used to make solid margarine out of oils that are normally liquid at room temperature. The oils are normally partially hydrogenated in order to obtain various consistencies. The problem with this process is that while the saturated fats are minimised, *trans* fatty acids are formed.

The unique structure of the *trans* fatty acids cause them to be similar to saturated fats, i.e. solid at room temperature: butter or lard, while still being chemically distinct. It has now been found that *trans* fatty acids raise the total blood cholesterol levels and LDL ("bad") cholesterol and lower HDL ("good") cholesterol when used instead of cis fatty acids or natural oils. Just like saturated fat, these changes increase the risk of heart disease. Because of the effects of *trans* fatty acids, the FDA ruled that the *trans* fat grammes would have to be listed directly below the saturated fat line on all food labels from January 2006.

"I can't believe it's not trans fatty acids!"

The research undertaken here in the MSSI at the University of Limerick entails the development of new catalysts and operating conditions to reduce the formation of *trans* fatty acids during hydrogenation of sunflower oil. At present, the hydrogenation process consists of a batch process where a quarter of the Ni catalyst is 'lost' per run. Each new reaction consists of a mixture of 25% fresh nickel catalyst with 75% of the spent catalyst. In an attempt to reduce this loss, a series of active catalysts have been developed that are more active and produce less *trans* fatty acid than the existing commercial catalyst. Work is being carried out in conjunction with EU partners to support one of the developed catalysts onto a membrane. This novel membrane reactor will have the benefit of reducing the loss of catalyst during a reaction, thereby producing less waste during the hydrogenation process.

Cleaner drug development: a research project by the Green Chemistry Group, DCU/TCD

Dr Nicholas Gathergood
The School of Chemical Sciences, Dublin City University

The National Institute of Cellular Biotechnology and School of Chemical Sciences at Dublin City University, combined with Trinity College Dublin, have formed the Green Chemistry Group. They are working together to develop more efficient and environmentally friendly processes for the pharmaceutical industry.

The goal of the Dublin-based Green Chemistry Group is to develop clean and environmentally friendly synthetic methods for the pharmaceutical industry from lead discovery to process development. The research areas of the Green Chemistry Group are:

- Ionic liquids: tailored solvents for synthesis
- Biodegradation
- Photochemistry with concentrated sunlight
- Bioremediation
- Catalysis
- Organocatalysis
- Synthetic medicinal chemistry
- Single enantiomer drug preparation

The Green Chemistry Group tackles some of the problem issues of fine chemical synthesis ,including waste production, heavy metal contamination and volatile solvent emissions. By investigating procedures of great interest to medicinal chemistry, advances and benefits in 'greener' and more economical methods for the pharmaceutical industry are envisaged. Consideration of green synthetic methods as part of the medicinal chemistry of drug design and development process will yield less toxic procedures and reductions in waste.

Over the past ten years greater awareness of the importance of green processes in the chemical industry has been raised. One of the forefathers of this movement is Paul Anastas, Director of the Green Chemistry Institute at the American Chemistry Society in Washington, DC. He brought this issue to the attention of US politicians and was instrumental in the establishment of the Presidential Green Chemistry Award. In 1998, Paul Anastas presented his famous 'Twelve Principles of Green Chemistry'.

The scope of the Green Chemistry Group includes the application of solar photochemistry (Dr Oelgemoeller), organocatalysis (Dr Connon), catalysis and ionic liquids (Dr Gathergood) to drug synthesis. This yields methods which are energy-efficient, atom-efficient and selective. Ease of recovery of products, reagents and solvent also leads to less waste. Catalytic amounts of toxic reagents reduces noxious by-products, while the application of metal-free organocatalysts leads to reactions with an extremely low toxicity profile.

Dr Connon, Trinity College Dublin, is a leading authority in organocatalysis in Ireland. Dr Gathergood *(pictured)* and Dr Oelgemoeller are members of the School of Chemical Sciences at Dublin City University and the National Institute of Cellular Biotechnology (NICB), a multi-disciplinary research institute based at Dublin City University, NUI Maynooth and IT Tallaght. High throughput preparation and screening of biologically active leads using green chemistry methods are currently being integrated into the NICB medicinal chemistry research programme.

Dr Nicholas Gathergood, School of Chemical Sciences, Dublin City University

MCERTS develops its international outlook

Mr Paul Wiggins
Environment Agency, UK

Mr Paul Wiggins, Environment Agency, UK

Publication of Version 2 of the MCERTS Product Standards for continuous water monitoring equipment (flow monitoring equipment and online analysers) has been delayed slightly. This, however, is good news! Strong representation was made during the technical review that MCERTS should reflect international standards such as the "Guide to Measurement Uncertainty" (known as GUM) when calculating combined performance uncertainties. This approach is now being incorporated, as far as possible, into the newly drafted standards. The intention is to publish Version 2 of the Analyser Standard early in 2006. This will be followed by Version 2 of the Flow Standard slightly later in 2006.

Following pressure from international manufacturers and industry, a MCERTS standard is also being produced for portable water monitoring equipment. WRc plc have the contract to produce a draft document, undertake a technical review and take account of feedback. The target for publication is autumn 2006.

MCERTS presentations were made in Ireland at the Environmental Sciences Association of Ireland conference Environmental Sampling: *ES2005*, in November 2005. Around 140 delegates attended the conference in Cork. An MCERTS presentation was also made in Scotland at the NEL "Oil-in Water Monitoring Workshop.. The conference was held over two days in Aberdeen and was attended by around 80 delegates.

The intention is to continue to adopt an international approach when developing MCERTS for the water industry. This will build on the approach already taken elsewhere in MCERTS, for example, in air emission monitoring.

Details of progress will be posted on the website www.mcerts.net.

Quality requirements for environmental monitoring

Stuart Newstead
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At the ESAI conference on environmental sampling, *ES2005,* held in Cork on the 18th of November 2005, speakers from the USA, UK and Ireland focused on current best practice and future improvements in environmental sampling.

A significant theme was the growing requirement for more monitoring stemming from regulatory pressures and demands from an increasingly environmentally-aware public. Furthermore, legal aspects of enforcement are placing greater emphasis on the reliability of results. EU directives are the main driving force, with the Water Framework Directive coming hard on the heels of the Integrated Pollution Prevention and Control Directive. All of this at a time when finding additional resources for environmental regulators is becoming more difficult.

In these circumstances, regulators must look for efficiencies. It is now much more common for regulators to require industrial operators to monitor and report their emissions under "operator self-monitoring arrangements" and to outsource their own monitoring requirements to third-party contractors. Also, monitoring techniques are developing fast. Online instrumental monitoring systems are now available at competitive prices, which can provide continuous surveillance compared to the traditional grab sample and laboratory analysis approach.

One of the unintended consequences of this approach is that quality can be lost in the search for cost savings. So, if these arrangements are to be successful and command public trust, then the requirements for self-monitoring and third-party monitoring need to be clear, well-founded and fit for purpose.

The requirements are generally available in the form of the legislation, formal European and national guidance, licences issued by the regulators, and measurement and quality standards published by the standards institutes. Monitoring requirements in European directives vary in their detail. Some specify the sampling frequency and analytical technique, for example by reference to a CEN standard, while others leave it to be detailed in licences. Guidance generally takes the level of detail a stage further. The EIPPCB guidance "Reference Document on the General Principles of Monitoring" explains the merits of different sampling frequencies and chain of custody needs and sets a hierarchy of measurement methods from which the regulator should specify licence requirements. This hierarchy starts with standards published by CEN, then by ISO, national and other national institutes. CEN publishes a wide range of standards covering sampling, analytical and instrumental techniques for air, land, waste and water. CEN also publishes quality standards including EN/ISO 17025 "General criteria for the competence of testing and calibration laboratories," and is working on an application of 17025 for laboratories carrying out air emission measurements.

However, to the busy and commercially-challenged laboratory, these requirements are far too disparate, confusing and capable of misinterpretation. What the regulator needs to do is to pull all of these requirements together within coherent and easily accessible arrangements to provide a quality measurement infrastructure. IMPEL, an EU network of regulators, has recognised this and issued guidance on the need for regulators, working with other interested parties, to establish quality measurement infrastructures for environmental monitoring.

EIPPCB: European Integrated Pollution Prevention and Control Bureau. Visit the site: www.eippcb.jrc.es.

IMPEL Network: European Union Network for the Implementation and Enforcement of Environmental Law.

Wastewater treatment systems: a major component for domestic houses

Michèle Castiaux
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Whether you call it a septic tank or a treatment plant, wastewater treatment systems are a major component of our dwelling houses. This insignificant tank, buried in the ground and often forgotten, plays a major role in our private lives and in our environment. When properly installed and maintained, it prevents the pollution of our own wells but also our major aquifers and surface waters. The key word in this last sentence is "properly." Too often, septic tanks are installed without care for guidelines and/or planning conditions.

Who wants bad smells in the garden? Who wants septic tank effluent ponding in the garden? And worse, who wants contamination of their own well? This comes down to the initial site suitability assessment. Sometimes considered expensive, this "percolation test" will tell you if your site is suitable for a wastewater treatment system. The guidelines currently followed by most local authorities for site suitability assessments are laid out by the Environmental Protection Agency in their "Waste Water Treatment Manuals – Treatment Systems for Single Houses" (EPA, 2000). Other counties, such as Laois and Offaly, currently follow the SR6:1991 standard, which is a previous version of the current guidelines. The various pieces of information collected during an assessment will be combined to make a decision on whether a site is suitable for a septic tank or a treatment plant and what size of percolation area will be required. Unsuitability generally occurs when there is no possible outlet for the treated effluent on the site, such as discharge to groundwater or discharge to surface water.

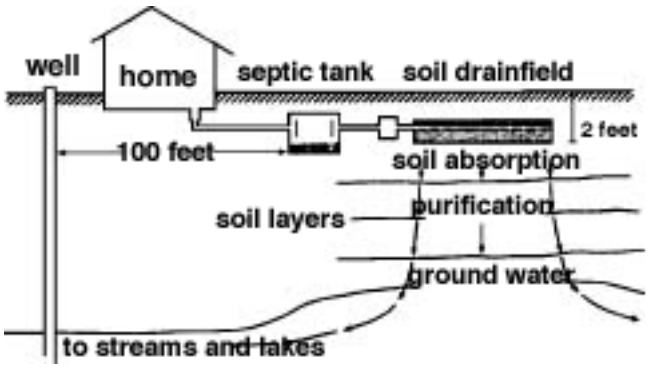
The Site Suitability Assessment Report becomes, then, an integral part of the planning application document. When planning permission is granted, it is understood that what was submitted will be followed by the applicant. Sometimes, planning conditions are added by the local authority. It is vital that these are followed to ensure the health and safety of the future residents of the site.

Following the approval of planning application and the building of the dwelling, the chosen wastewater treatment system will be installed. It is important that the system and its installation are in compliance with the initial recommendations of the Site Suitability Report and the Building Regulations (1997). When a wastewater treatment plant is necessary, it is usually recommended to select a system carrying an Irish Agreement Board (IAB) certificate. The IAB is part of the NSAI (National Standards Authority of Ireland) and this will guarantee system compliance with the building regulations. Furthermore, when it comes down to the installation, it is crucial to follow to the letter the manufacturer's recommendations, which will be based on the Site Suitability Report. Where possible, the manufacturer should install the system himself. Indeed, the most sophisticated and expensive systems will not work when not installed properly. This could give rise to groundwater pollution, private or public well pollution and surface water

pollution, with the health risks associated with water pollution, such as infection by *E. coli*.

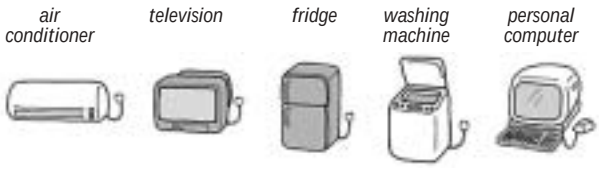
Finally, all wastewater treatment systems need maintenance. Some systems, such as septic tanks, require very little maintenance, while others, such as wastewater treatment plants, require a higher level of maintenance. In the latter case, the services of qualified maintenance contractors should be used as they will have a better knowledge of the fragile balance that exists between the mechanics and the micro-organisms in a treatment plant. Lack of maintenance often results in surface water pollution.

For all the issues raised in this article, it is important to remember that money spent to safeguard our health is always money well spent. Children and elderly people are the first victims of water pollution cases, and it is our responsibility to take the necessary precautions to protect them.



The WEEE Directive

Michèle Castiaux
Better Environmental & Engineering Services Ltd (email: beesltd@eircom.net)



Five types of domestic electrical appliance

From Saturday, 13th August 2005, every retailer and producer has had to comply with the WEEE Directive (2002/96/EEC) on the recovery of used white goods.

This EU legislation on Waste Electrical and Electronic Equipment (WEEE) was transposed into Irish law on the 5th July 2005 as the Waste Management (Waste Electrical and Electronic Equipment) Regulations 2005 (S.I. 340 of 2005). The aim of the directive is promote the recovery of WEEE goods.

These regulations apply to a wide range of products, from household appliances to toys and lighting equipment. But practically, what does it mean? In this situation, the three main actors involved are the producer, the retailer and the consumer, or members of the public.

The producer of electrical and electronic equipment (EEE) has to answer to higher production standards, to ensure a better reusability and/or recyclability of his products. Each producer had to register with the WEEE Registration Body prior to the 13th August 2005. This means that they were given a registration number which must be displayed on any invoice, credit note, dispatch or delivery docket. Also, any item of their product should now display a crossed-out wheeled-bin symbol, which means that it is not suitable for disposal with domestic waste.

The retailer of EEE had to register with their local authority to comply with General Binding Rules on the environmentally-sound management of WEEE. It is recommended that they do not retail EEE that does not carry the crossed-out wheeled-bin symbol. They should also provide free in-store take-back of household WEEE on a one-for-one basis on the sale of a new like product. This means that they are obliged to accept an old washing machine, say, if a new one is bought in their shop, but, on the other hand, they are not obliged to accept an old toaster for the purchase of a radio. They should also ensure proper storage of the WEEE and delivery to the appropriate facilities, such as civic amenity sites. By law, civic amenity sites are obliged to accept free of charge WEEE from both public and private sectors. Finally, the retailers should inform private households and encourage them to participate in the WEEE take-back operations.

Last, but not least, the members of the public will play a major role in this new environmental policy. Newly-produced EEE that do not show the symbol described above should not be bought. When disposing of WEEE, they should avail of the retailer facilities or bring their obsolete appliances to civic amenity sites.

The main change, however, which concerns us all, is the new Environmental Management Costs (EMC). Some of us have already come across it while purchasing new electrical appliances. The EMC can vary from a few euro to more than €40 for larger appliances such as fridges, etc. The EMC was put in place to cover the cost of collection, treatment and disposal of EEE in an environmentally sound manner. Since 13th August 2005, the retailer has had to include the EMC in the total retail price when quoting the price of a product. However, from 13th February 2006, the price of the product, exclusive of EMC, the EMC and the price inclusive of EMC (retail price) has had to be shown where the EEE is displayed. This should make it much clearer to everybody what the final cost of a product will be.

Finally, the environmental motto "reduce, reuse, recycle" should apply to all of us when it comes down to WEEE. If we all tried to take care of our electrical appliances and kept them running as long as possible, we would reduce the turnover of waste going into recycling facilities. This would also reduce our consumption of electrical and electronic goods, which could encourage producers to manufacture more easily reusable and recyclable products.

And eventually, let's hope that the production of easily recyclable appliances will lead to a reduction in EMCs, as they can be a nasty surprise when it comes down to furnishing our homes.

• For more information, see: www.environ.ie.


Tvs for sale


Landfilled tvs


Dedicated disposal unit

ESAI celebrates its 10th anniversary and looks forward to the next 10 years

Shirley Gallagher
Vice-Chair, ESAI

Minister of State at the Department of the Environment, Heritage and Local Government, Batt O'Keeffe TD, meets Shirley Gallagher (ESAI Vice-Chair) at the ES2005 conference in Cork, November 2005. The event was the first international conference held by ESAI.

Inset: Pictured at the launch of the ESAI programme for 2005/2006 (from left): Theresa Kiely (Environmental Engineer, Heineken Ireland), Cork County Mayor Michael Creed, Shirley Gallagher (ESAI Vice-Chair) and Martina Prendergast (ESAI Treasurer).

The ESAI celebrated its 10th birthday in style at the Kiln in the Heineken Brewery in Cork on the 24th October 2005. At the same event, the ESAI launched its programme for 2005/2006, the first programme launch in its history.

The celebrations were well attended, with ESAI members and representatives of the environmental community as well as dignitaries including Dan Boyle TD (Green Party) and the Mayor of County Cork, Michael Creed TD (Fine Gael), attending.

It was a night for looking back and reflecting on what the ESAI had achieved since 1995, and one for looking forward also.

The ESAI vice-chair, Dr Shirley Gallagher, said the ESAI was a networking tool for environmental professionals in Ireland. "We are developing a network for communication and interaction, one that is usable by everyone interested in or concerned about the environment."

The importance of education and continuing professional development (CPD) for professionals was growing rapidly, she added, and the ESAI's range of networking tools would help it to prioritise the areas where further training was most needed.

"We are launching website pages on environmental courses and careers, geared towards second and third level students. Future plans include using the ESAI as an independent body that can assess, grade and monitor professionals practising to the association's code of practice, and lobbying the government for essential changes to legislation."

The Cork County Mayor, Michael Creed, said the ESAI was taking a proactive approach to protecting Ireland's environment: "The ESAI is fostering an appreciation of good environmental quality and practice, and is promoting the disciplines and professions most relevant to environmental issues. ESAI events are geared towards professionals, present and future, both policy-makers and people on the ground, including Ireland's own highly skilled workforce."

The ESAI treasurer, Dr Martina Prendergast, spoke of the ESAI's delight in obtaining funding for three bursaries in 2005 and one in 2006: "We run a summer student bursary scheme for undergraduate students majoring in any one of the environmental sciences or environment-related discipline. We are currently seeking funds to support selected student research projects in 2007 and are looking to industry to sponsor these."

The ESAI webmaster, Adrian Corcoran, reviewed improvements made to the ESAI website and the development of a Directory of Expertise (DOE) – a talent bank usable by the public as well as by ESAI members and which provides the facility to search for technical experts in Ireland for any given field. Adrian also highlighted the benefits of ESAI membership, which are listed on the site.

One of our council members, Dr Debbie Chapman, looked forward to our international conference, *Environmental Sampling: ES2005*, which was held in the Clarion Hotel, Cork, in November 2005. She said the Water Framework Directive and local regulation had raised the profile of the environmental measurement and monitoring industry and that reliable, high-quality data was never more important. The *ES2005* conference would address the issue by bringing together world-class experts on environmental sampling.

• *ESAI would like to express its gratitude to Heineken for sponsoring the programme launch, and say a special thank you to Theresa Kiely, Heineken's environmental engineer, who did so much to ensure the event was a success.*

ES2005, Cork, November 2005

It was the ESAI's first international conference, and it was a great success. *ES2005: Environmental Sampling,* held in the Clarion Hotel, Cork, on 18th November 2005, was officially opened by Minister of State at the Department of Environment, Heritage & Local Government, Batt O'Keeffe TD. The conference was attended by a number of key international speakers and nearly a hundred and fifty delegates, ranging from scientists and solicitors to ecologists and engineers. This interdisciplinary approach led to frank and open discussion.

We hope delegates gained a wealth of information from the speakers, and from the participating exhibitors, on legislation, compliance, instruments, services, consultancy and standards.

For some time now, much of the emphasis has been placed on analysis, whereas the design of sampling programmes is just as important, if not more so, than analysis. The conference highlighted that there was more to it than meets the eye. Environmental sampling has changed, increased and developed and the focus now is on continued improvements.

Minister Batt O'Keeffe, addressing the conference, said Ireland was blessed in that it enjoyed a very high quality environment and had inherited an environment relatively free of the problems faced by other nations in the western world. He said, "We must guard against complacency: It is important that our environmental and monitoring policies continuously adapt to a changing legislative environment, much of which stems from Europe. This conference will help support good decision-making on monitoring programmes."

The keynote speaker, Jake Peters from USGS, Panola Mountain Research Centre in Georgia, USA, said there were over 100,000 known chemicals and, globally, we routinely monitor less than 1,000. He said there needed to be closer links between science, policy and decision-making: "The need for quality environmental networks with improved national monitoring programmes will lead to better information for policy-makers to make informed decisions for all our futures."

The first parallel session concentrated on physical aspects of how we sample. Highlights included the difficulties of marine sampling, such as those experienced on board the Marine Institute's research vessel, the *RV Celtic Voyager,* as described by John Breslin.

The second session concentrated on policy, the growth of certification and the increasing emphasis on quality. These and other issues were addressed by Stuart Newstead and Paul Wiggins who focused on the MCERTS scheme set up by the Environment Agency in the UK.

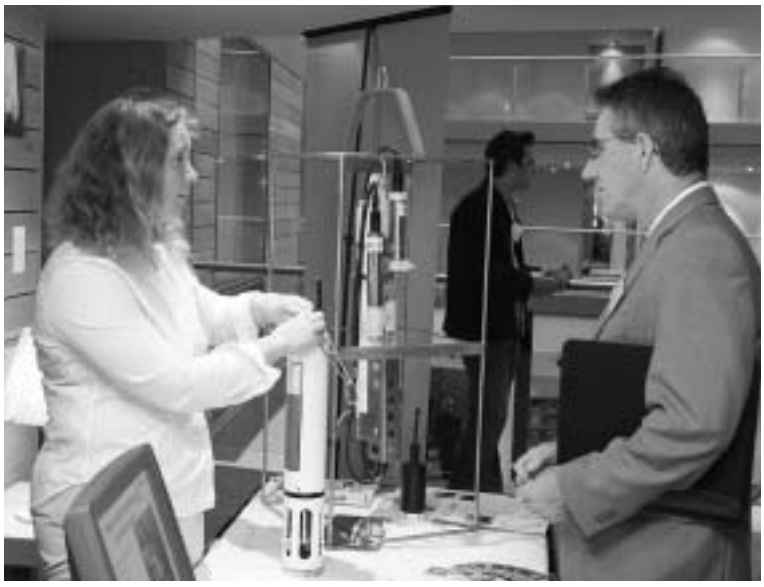
Owen McIntyre gave an enlightening talk on environmental law and the divergence in Irish and UK law on environmental sampling. There was a need for more evidential criteria, he said, and for the judiciary to become more environmentally aware.

Feedback from delegates was positive. Some delegates said the conference was very streamlined and topics were grouped well, while others jumped between sessions.

New networks were built during the event, which was considered very worthwhile. It was an important day for the ESAI in its promotion of professional development through education. Again, we thank all our sponsors and exhibitors, and all our speakers and delegates, for making it such a special day.

Shirley Gallagher,
ESAI Vice-Chair

Dr Shirley Gallagher (Vice Chair, ESAI), Mr Sean Lehane (MCDS), The Minister of State for the Environment, Heritage and Local Government, Mr Batt O'Keeffe TD and Dr Norman (Jake) Peters (USGS), the keynote speaker, at ES2005.



Ms Charlotte O'Reilly (Techworks Marine) and Mr Seán Ó Breasail (SWRBD) at the ES2005 conference in Cork.

Mr Colman Concannon (EPA) and Ms Caroline Bowden (EPA) at ES2005.

Benefits of ESAI membership

Discount schemes available to ESAI members

Health insurers BUPA Ireland (www.bupaireland.ie) now offer a 10% group discount to all our members – Call 1890 700 890 and their customer services advisors will give you a quotation. To avail of the discount, simply quote the ESAI.

AA Ireland (www.aaireland.ie) now offers our members a special introductory Roadside Rescue Package with savings of up to €58 (they will waive the €20 joining fee if you agree to pay by direct debit and will give a free Home Start add-on which gives all the benefits of roadside rescue at your home). To avail of this offer, contact customer services on (01) 617 9977 or Andrew Murphy on 086 226 1011 and quote the ESAI.

Frank Glennon Insurance Brokers have put in place car (Drivesure) and home (Homesure) insurance schemes for members of the Environmental Sciences Association of Ireland and their spouses/partners. These schemes are underwritten by Allianz Corporate Ireland plc. To get a quotation and to find out what savings Glennon can achieve for you, simply phone (01) 707 5999 or email esai@glennons.ie.

Manor House Hotels & Irish County Hotels have 58 hotels nationwide – see their websites www.manorhousehotels.com and www.irishcountryhotels.com for listings. They now offer ESAI members a discounted corporate rate of 10% on their normal published rates. Simply dial central reservations on (01) 295 8900 and quote ESAI Corporate Rate to avail of the offer.

The Choice Hotel Group (www.choicehotels.com) includes the Clarion, Quality and Comfort Hotels. They are offering ESAI members 50% off their Published Rack Rate. Call central reservations on 1850 605 705 and quote ESAI.

Lynch Hotels (www.lynchotels.com) have eight hotels nationwide and are offering ESAI members 20% discount on their Short Breaks & Family Holidays Brochure 2005/2006. To avail of your discount, call their central reservations office on (065) 682 8300 and quote the ESAI.

If you have any difficulties availing of the above discounts, please contact our administrator, Sinead Macken, at administrator@esaiweb.org. Membership benefits are available on website at http://www.esaiweb.org/membershipbenefits.htm.

Publication of selected papers from ENVIRON colloquia

For many years, participants at ESAI ENVIRON colloquia have commented that many oral papers and posters presented are of a very high standard and of interest to a wider audience. As a rule, presenters put in a lot of effort and might like to have the reward of a written peer-reviewed paper for their CVs, and of course the process of writing, editing and finally polishing a paper for publication is a very useful experience for all postgraduate students. Therefore, ESAI took the decision to publish proceedings of last year's colloquium, ENVIRON2005.

Presenters were asked it they would like to submit a short written paper based on their presentation. About 20 presenters took up the option. Most of the papers submitted were accepted for publication after a rigorous peer review process. Reviewers made detailed comments on draft manuscripts, and authors were asked to respond to these. In general, the responses met the needs of the reviewers, and most of the papers submitted were accepted for publication.

The publishing of proceedings proved to be a rewarding and successful project and ESAI intends that publication of proceedings will form an integral part of future ESAI colloquia. If you gave a presentation at the 2006 colloquium, or are planning one for the 2007 colloquium, you should consider also submitting a written version, 4-5 pages in length, carefully following the 'Notes for authors' for the RIA journal *Biology and Environment*.

If you are supervising a student who is giving a paper or poster, perhaps you should encourage your student to write a paper for possible publication in the proceedings. Further details are available from Sinéad Macken at administrator@esaiweb.org. Please note that ESAI will publish selected short papers, not abstracts, and that publication will be in conference proceedings (in book form) and not in *Biology and Environment*.

Richard Moles, University of Limerick

News in brief

Isotope Ecology Conference held in Belfast in August

The 5th International Conference on Applications of Stable Isotope Techniques to Ecological Studies took place at Queen's University Belfast, 13-18th August, 2006. Keynote speakers included Graham Farquhar (plant ecophysiology) and Keith Hobson (wildlife ecology).

- For further information, contact: Dr Olaf Schmidt, School of Biology and Environmental Science, UCD, Belfield, Dublin 4, Tel: (01) 716 7076, Website: http://www.isoecol.org.

AquaLife 2006 conference in September

The AquaLife 2006 seminar/workshop will take place on September 12-14th, 2006 at the Kiel Innovation and Technoloy Centre (KITZ) in Holland. Topics will include:

* Monitoring in limnic and marine waters, WFD
* Toxicity assessment
* Chemical and biological parameters in water monitoring/ sensors
* Aquaculture
* Monitoring networks
* International cooperations

Please feel free to propose any additional topics you would like to discuss, and visit our website http://www.bbe-moldaenke.de.

- Contact CCarstens@bbe-moldaenke.de.

Hedgerow Day in Clare in October

CELT, the environmental training charity, is holding a Hedgerow Maintenance Day at Seedsavers, Scariff, Co Clare, on Saturday, 14th October, 2006. For information and bookings, see www.irishseedsavers.ie. CELT held other training courses during the year, including dry-stone and lime-mortar walling weekends on 18-19th March and 20-21st May, and a tree planting & nursery weekend on 25-26th February.

Natural history website

See this new online source for literature on natural history of Ireland (including marine): www.habitas.org.uk/literature.

Comments invited on river management plan

Public participation in the roll-out of the Water Framework Directive is being facilitated by River Basin District Advisory Councils, consisting of elected local representatives and representatives of stakeholder interests such as farming, angling, environmental ngos, industry. Shirley Gallagher, ESAI Vice Chair, is on the South Western River Basin District (SWRBD) Advisory Council. Comments are invited from interested parties in relation to the work programme for the production of a SWRBD Management Plan and consultation measures to be taken. Closing date for comments is 22nd December 2006. Contact the SWRBD Project Coordinator, Sean Ó Breasail, at Sean.OBreasail@CorkCoCo.ie.