

Phycological Society of Southern Africa



**Newsletter
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From the Editor

Welcome to another edition of the PSSA newsletter. Like the many before, this edition is filled with exciting information from within and beyond the Society. As many of you know, IPC8 is fast approaching. If you haven't already done so, please register as soon as possible. Abstracts, in particular, need to be received in time, as they will be included in the Congress Abstracts booklet that will be published as a supplement of *Phycologia*. In this edition of the newsletter, Stuart Sym and Richard Pienaar have provided us with an update of the latest happenings around IPC8. Similarly, there has been much activity surrounding mariculture legislation for South Africa and this past year saw the establishment of the Mariculture Institute of South Africa (MISA). Lizeth Botes, acting CEO of MISA, has highlighted for us some of the milestones with regards to MISA. Also included are two exciting articles: a featured article on the recently held conference on *Biodiversity: Science & Governance*; and a student article by Deborah Robertson-Andersson on how nitrogen content influences colour in seaweeds. The biodiversity Conference, held independently from any intergovernmental negotiations, was part of the ongoing global effort to reverse the current rate of biodiversity loss by 2010.

Once again, a special thank you to all who have contributed to this edition of the newsletter. Please remember to send any and all information you think may be of interest to the society on to your regional collators (details below).

Northern Areas

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Southern Areas

Enrico Tronchin

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Sincerely
Gavin

Synarthrophyton patena
epiphytic on *Gelidium capense*



Attention All

1. Student Submissions and Prizes

To promote written submissions for the newsletter, R400 is awarded annually for the best popular student article. This is a great way to improve your writing skills and surely earn some extra cash. Supervisors, please encourage your students to submit articles.

Guidelines: See the website! Just follow the *Featured Articles* navigational link. Remember, there is R400 up for grabs. As of January 2004, judging of the student articles is by the invited speaker for the annual conference. The award is normally announced at the conference banquet. As there is no 2005 conference (see *Conference Countdown*), the award will be carried over to the 2006 conference. Articles should be simple, yet informative. Avoid jargon wherever possible.

2. New website address

The Botany and Zoology Departments at the University of the Western Cape have merged to form the new Department of Biodiversity & Conservation Biology. Since the old Botany Dept. was hosting the PSSA website, this has meant that the Society's website address has also changed. Please take note of the new website address: <http://www.bcb.uwc.ac.za/pssa/>. You may still, however, use the old website address; you will simply be routed to the new address.

3. Contact Details and Research Areas

A number of you have no doubt graduated, moved elsewhere, or had your contact details change. We are aware that a number of campuses nationally have merged which no doubt affects not only your email address, but also your mailing address. Please be so kind as to check all your membership details on the website. If this newsletter does not find its way to you directly, it probably means we do not have a recent address for you. A number of members still have very little information pertaining to their areas of interest. We all know you have phycological interests, let us know what your areas of expertise are.



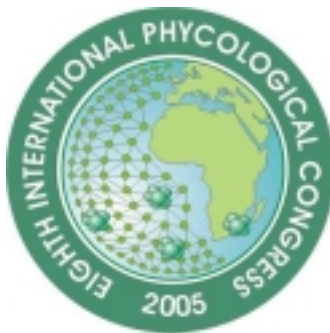
4. IPC8 Update

We are now at the stage where the deadlines for abstracts and early registration have been reached. So far about 250 abstracts have been submitted, which is considerably down on the 400-odd that were presented at IPC7, but they are still coming in and there have been several queries about whether late submissions will be considered. Because the special issue of *Phycologia* will be made available as part of the Congress package for delegates (with additional copies to non-attending delegates together with the September issue of *Phycologia*), we have advertised an extension of the deadline for abstracts on the website in the hope of attracting more submissions. The early registration figures should provide a realistic feel for the number of delegates we can expect.

Rob Anderson and John Bolton have worked very hard to secure what promises to be an outstanding pre-congress dive 'tour'. It has met with very favourable comment from several people that have written to me and any seaweed fanatic who misses out on this opportunity of getting to grips with the KwaZulu-Natal flora will curse themselves in time to come. Rob, John and Gavin Maneveldt have also kindly agreed to lead the seaweed forays that will be running at Rocky Bay as one of the mid-Congress tours on the Wednesday and again on the Saturday (if enough take up this option) after the Congress.

Gavin has done a sterling job of finalising the scientific programme. It has been quite challenging at times as very few of the symposia have been without their problems, and even now he has been fielding some very sticky issues. He has also kindly agreed to coordinate the NRF-sponsored funding opportunity for historically disadvantaged students to have their registration fees paid.

Wendy Stirk sacrificed a considerable amount of time in convening a local organising Committee meeting last year and has since been involved in fund raising for the event.



Richard Pienaar made a great coup for the IPC8 cause by securing R 50 000.00 from the University of the Witwatersrand and we have Professor Linda Bozolli to thank for this generous donation. The Society itself has also provided an amount of R 25 000.00.

The Phycological Society of America has committed to meet jointly with IPC8 in Durban and thus there will be a Bold Award session and a PSA evening on Tuesday, which they are kindly sponsoring.

We are extremely fortunate that we settled on Turners Conferences as our choice of professional conference organiser. Dudley Randall, the Managing Director, has personally kept in direct contact with me throughout the planning of this event and has provided indispensable advice at numerous critical points along the way. He also has established a very good rapport with the International Convention Centre and even until last week was busy renegotiating the contract that the PSSA has with the ICC. He genuinely has our interests at heart and wants this to be a success as much as the Society does. His network of support is in the form of Merle Dicks (budget), Gill Slaughter (general co-ordination), Kerry de Lange (abstract co-ordination), Kerryn Ferreira (fundraising), Linda Edwards (travel) and Linda Olsen (tours). I am certain that this appointment will prove the making of this event; it certainly has allowed me to continue at times when problems seemed immense.

Finally we can also be extremely grateful to the ICC and in particular Carol McNab and Marla Padayachee, who have bent over backwards to accommodate our last minute requests and who have allowed us to economise considerably on the original contract based on the 800 delegates that the IOC demanded we set as an initial goal.

Major sponsors of this event include:

Carl Zeiss, Blackwell Scientific, Wald, Marbef, Degussa Foods, The University of the



Witwatersrand, and The National Research Foundation.

Stuart Sym & Richard Pienaar

5. The Mariculture Institute of South Africa

2004 was indeed a very challenging but also exciting year in that national (DTI, DEAT, NDA, DST) and provincial government (departments of the four coastal provinces) as well as the aquaculture industry have worked together to legally establish the Mariculture Institute of South Africa (MISA).

We are proud to highlight some of the milestones of 2004 with regards to MISA.

- January and February 2004, a trust deed for MISA was drawn up.
- February 2004, MISA was legally registered with the Master of the High Court.
- The months following February, a conceptual business plan for MISA was drawn up.
- April 2004, the provincial department of Economic Development and Tourism's directorate Industry Development transferred seed funding from the Ikapa Elihlumayo Economic Leverage Programme budget (approved in Provincial Cabinet) into MISA's account.
- August 2004, a workshop was held and buy-in from all stakeholders was obtained on the Organisational Structure of MISA. The workshop was attended by the Aquaculture Association of South Africa, Abalone Farmers Association of Southern Africa, the Oyster and Mussel farming group, Feike consulting on the Mariculture Sector Plan, national departments (Trade & Industry: TISA, Science & Technology, Environmental Affairs & Tourism: MCM), and provincial departments (Western Cape department of Agriculture, Northern Cape Economic Affairs & Finance, Western Cape Economic Development & Tourism, Eastern Cape Development Corporation, Kwazulu-Natal Agri-Business via correspondence).

- Throughout 2004, all stakeholders attended monthly Mariculture Technical Forum meetings to maintain the drive behind furthering the process within their own organisations.
- A cooperative link with Wesgro has been established to inform the aquaculture sector of trade and investment related activities.
- By the end of 2004 a cabinet submission was drafted by the national departments (DTI, DEAT, NDA, DST) in preparation for 2005.

In 2005, we will enthusiastically dedicate our time to:

- on a national level, interact with the high-level political role-players to further the submission (MISA and the suggested stand-alone legislation for Aquaculture) to National Cabinet;
- on a provincial level, interact with the high-level political role-players to support, network and interlink with their national counterparts;
- interact with all stakeholders on the financial and operational targets to get MISA off the ground in an integrated manner

Recently, MISA became the Aquaculture Institute of South Africa and has now been mandated with dealing with all aquaculture issues.

**Lizeth Botes, Acting CEO
Mariculture Institute of South Africa**





Featured Article

**Biodiversity, Science & Governance
A Summary Report**

The International Conference “*Biodiversity: Science and Governance*” (Paris Conference) met from 24-28 January 2005 at the headquarters of the United Nations Educational, Scientific and Cultural Organization (UNESCO), in Paris, France. Over 1000 participants representing governments, inter-governmental organizations and non-governmental organizations, as well as academia and the private sector attended the Conference, organized by the French Government and sponsored by UNESCO.

The Conference, held independently from any intergovernmental negotiations, was part of the ongoing global effort to reverse the current rate of biodiversity loss by 2010, and ensure the long-term conservation and sustainable use of biodiversity, as well as the fair and equitable sharing of the benefits arising from genetic resources. The Conference was convened to assess the current knowledge in, and needs for, research and scientific expertise in biodiversity, as well as examine public and private approaches to biodiversity conservation and management, and the interactions between science and governance. The Conference produced two documents: the *Paris Declaration on Biodiversity*, an appeal by scientists on biodiversity; and a *Conference Statement*, which recalls governments’ commitments to the 2010 target and supports the launch of an international multi-stakeholder consultative process to assess scientific information and policy options for decision making.

What is Biodiversity?

Biodiversity is the variety of all life on Earth, encompassing genetic, species and ecosystem diversity. Today’s biodiversity is the fruit of billions of years of evolution, shaped by natural

processes and, increasingly, by the influence of humans. To date, about two million species have been identified. While many scientists think that there are about 13 million species on Earth, other estimates range from 3 to 100 million.

Biodiversity supplies a large number of goods and services that sustain human life, including:

- the provision of food, fuel and building materials;
- purification of air and water;
- stabilization and moderation of the Earth’s climate;
- moderation of floods, droughts, temperature extremes and wind forces;
- generation and renewal of soil fertility;
- maintenance of genetic resources as inputs to crop varieties and livestock breeds, medicines, and other products; and
- cultural, recreational and aesthetic benefits.



© INRA, photographer - Louis Vidal.

Over the past few hundred years, biodiversity has faced major challenges, including a growing demand for biological resources caused by population growth and increased consumption. This increased exploitation of biological resources has resulted in the loss of species at levels currently estimated to be **100**

times faster than the natural rate of loss prior to significant human intervention. Recognition of this problem is hardly new, and scientists and policy makers have worked to develop mechanisms to document, conserve and sustainably use biodiversity.

Report on the Paris conference

François d’Aubert, French Minister Delegate for Research, opened the Paris Conference on Monday, 24 January, welcoming a broad range of participants.

Noting the outcomes of the World Conference on Disaster Reduction, held in Kobe, Japan, prior to the



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Conference, Koïchiro Matsuura, Director-General of the UNESCO, highlighted the potential of healthy ecosystems for disaster reduction, and called for improved Earth observation systems. Supporting an ongoing dialogue between scientists and decision makers, he called for: additional research; involvement of the private sector and civil society, including local and indigenous communities; capacity building; and conflict prevention.

Klaus Töpfer, Executive Director of UNEP, said preserving healthy ecosystems is crucial for achieving the MDGs. He stressed the interlinkages between climate change, desertification and biodiversity loss, and called for investments in capacity building and in coherent, coordinated and policy-relevant science.

Hamdallah Zedan, Executive Secretary of the CBD, highlighted the challenges faced by the international community to achieve the 2010 target to significantly reduce the current rate of biodiversity loss, and called for stronger international cooperation and effective communication regarding biodiversity loss and its effects.

Mohammed Valli Moosa, President of IUCN - the World Conservation Union, highlighted direct links between biodiversity loss and human activities. He suggested developing a framework to put biodiversity at the center stage of human activities on the basis of four key elements: human resources from all around the world; science; regulations and laws at all geographic levels; and market forces.

Bertrand Collomb, Chairman of the World Business Council for Sustainable Development, said the business sector has recognized the importance of sustainability and nature conservation and that biodiversity-related projects can improve a company's public image. He stressed the need for partnerships, political will and consistency of

actions, and said governments should set appropriate frameworks for action.

Noting that good politics should be based on good science, Stavros Dimas, European Commissioner for the Environment, said the European Union (EU) will continue to work on integrating environmental concerns into its policies and support funding for environment programmes. He stressed the need to accelerate action to achieve the 2010 target, prioritize activities and mobilize support, as well as to build scientific capacity and better communicate scientific issues regarding biodiversity.

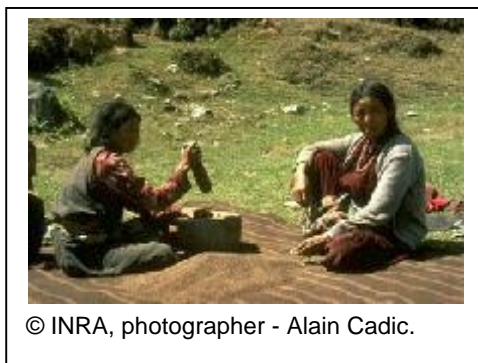
Nicolas Hulot, President of the Nicolas Hulot Foundation, said the primary aim of the

Conference should be to ensure coherence among policies and actions rather than raise awareness. He noted that there is no conflict between various interests involved in biodiversity, and stressed the need for cooperation and new forms of solidarity.

Matsuura, on behalf of UN Secretary-General Kofi Annan, stressed that biodiversity is essential to life, and called upon countries which have not already done so, to ratify the CBD. He said biodiversity conservation is not only the responsibility of governments, but also of non-governmental organizations, the private sector and all the Earth's inhabitants.

Edward Wilson, Harvard University, said there is overwhelming scientific evidence of human activities' impact on biodiversity, much of which is still unknown to science. He called for fact-based and ethical decision-making, and stressed that poverty inhibits conservation.

Wangari Maathai, Assistant Minister for Environment and Natural Resources of Kenya and 2004 Nobel Peace Prize Laureate, reviewed lessons learned from two mountain ecosystems in Kenya with regard to biodiversity loss and the



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consequences for local communities, and said political will is the key to taking effective actions to conserve biodiversity.

Noting the importance of balancing economic development and conservation of natural resources, Abdullah Badawi, Prime Minister of Malaysia, highlighted aspects crucial to biodiversity conservation, including: capacity building; discussions on biodiversity governance; negotiation of an access and benefit-sharing regime under the CBD; intellectual property rights; and implementation of the Cartagena Protocol on Biosafety.

Marc Ravalomanana, President of the Republic of Madagascar, highlighted the importance of the Conference’s topics to his country, noting its biodiversity wealth. Arguing that sustainable development, the protection of nature and good governance are interlinked, President Ravalomanana stressed the need to reconcile the needs of rapid economic growth with those of preserving outstanding biological wealth.

Jacques Chirac, President of the French Republic, stressed that the fate of humanity is bound to that of other species, and proposed creating an intergovernmental panel to assess trends in biodiversity and developing a worldwide network of experts. President Chirac noted that France has incorporated an Environment Charter into its Constitution, highlighted France’s biodiversity-related policies and proposed hosting in Paris a high-level seminar on intellectual property rights as they relate to biodiversity. President Chirac stressed the need for urgent measures to achieve the 2010 target.

Conference Plenaries

- The challenges of biodiversity, science and governance;
- Status and trends of the world’s biodiversity;

- Social and ecological benefits of biodiversity; and
- Biodiversity and the management of living resources.

Conference Workshops

- Biodiversity governance;
- Agriculture and biodiversity - policies, institutions and practices;
- Environmental education and communication for biodiversity;
- Strategies and infrastructures for documenting biodiversity;
- Challenges to achieving the 2010 target - funding research for biodiversity and conservation;
- Integrative approaches to biodiversity;
- Biodiversity and urban areas;
- Biodiversity and health;
- Microbial diversity and society;
- Challenges for fisheries management;
- Biodiversity - the new frontier of innovation;
- Biodiversity indicators and the 2010 target - scientific challenges;
- Sustaining biological and cultural diversity - local knowledge, practices and worldviews;
- Appropriation regimes and management systems for biodiversity; and
- Sustainable management of tropical and subtropical biodiversity - islands and forests.



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Recalling the Conference’s conclusions on the importance of biodiversity for human well-being, François d’Aubert, French Minister Delegate for Research, called for: improved interdisciplinary science to strengthen government policies and international negotiations; the development of market instruments and indicators; voluntary corporate involvement; capacity building, especially in developing countries; and international solidarity. Minister d’Aubert pledged France’s commitment to achieving the



2010 target through intensified international cooperation. Bernard Bachelier, French Ministry Delegate for Research, closed the meeting at 12:40 pm, Friday 28 January 2005.

Outcomes

1. Paris Declaration on Biodiversity:

The Declaration is composed of three sections and recommendations.

The first section states that biodiversity, as the natural heritage of and a vital resource for all humankind:

- is a source of aesthetic, spiritual, cultural and recreational values;
- provides goods that have direct use values, such as food, wood and pharmaceuticals;
- supports and enhances ecosystem services upon which human societies depend indirectly, including the maintenance of water, air and soil quality, and ecosystem resilience to change; and
- provides opportunities for human societies to adapt to changing needs and circumstances, and to discover new products and technologies.



© IRD, photographer - Ester Katz.

The second section recognizes that biodiversity is being destroyed irreversibly by human activities, noting that:

- humans are altering the environment at an unprecedented rate, affecting sustainable development and the quality of life;
- species are being lost at a rate that is about 100 times faster than the average natural rate;
- large-scale loss is irreversible; and
- the underlying causes of destruction are of a demographic, economic and institutional nature.



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The third section states that a major effort is needed to

discover, understand, conserve and use biodiversity sustainably, including:

- immediate strong actions to meet the MDGs and ensure food security, human health and quality of life;
- an international coordinated effort to mobilize scientists to expand the knowledge of biodiversity; and
- integration of conservation and sustainable use into social and economic development.

On this basis, governments, policy makers and citizens are urged to take necessary actions, including:

- ambitious interdisciplinary research programmes;
- integration of biodiversity into the criteria for all economic and policy decisions and environmental management;
- improved education and public awareness; and
- a major effort to build capacity, especially in developing countries.

The Declaration also calls for an international mechanism that includes intergovernmental and non-governmental elements, and builds on existing initiatives and institutions to provide information, identify priorities and inform relevant biodiversity-related conventions.

2. Conference Statement:

The Statement recalls the commitment of governments to achieving the 2010 target as a condition for sustainable development, and recognizes that:

- biodiversity is a vital and poorly appreciated resource that underpins the MDGs;
- biodiversity is being irreversibly destroyed by humans at an unprecedented rate;
- unless the rate of biodiversity loss is significantly reduced, any effort to reduce poverty will be undermined; and
- although enough is known to justify immediate action, major efforts are still needed to fill knowledge gaps.



The Statement urges:

- governments to take all necessary actions needed to reach the 2010 target, including capacity building;
- civil society and the private sector to take actions in line with the 2010 target; and
- the scientific community to develop greater national and international coordination.

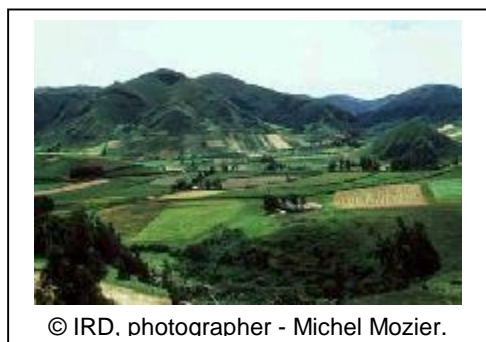
The Statement also calls for:

- public and private resources for understanding and conserving biodiversity;
- communication between all stakeholders, including local and indigenous communities; and
- greater cooperation and synergies between Parties to, and secretariats of, multilateral environmental agreements.

Finally, the Statement recommends, in response to the proposal made by French President Jacques Chirac, launching an international multi-stakeholder consultative process to assess the need for an international mechanism that would provide a scientific assessment of information and policy options required for decision making, building on existing bodies and activities.

The International Institute for Sustainable Development (IISD)

Daily reports and web coverage of the conference is still available at <http://www.iisd.ca/sd/icb/>



Popular Student Articles

Nitrogen and seaweed thallus colour

**Deborah V. Robertson-Andersson and
D. T. Wilson**

Botany Department, University of Cape Town

It's always amazing that in research when trying to find the answer to one question you come up with several other questions, and if you're lucky, a possible answer to a question you never asked in the first place. This was certainly true of research done between 2000 and 2003 on integrated seaweed and abalone mariculture by researchers from UCT, UWC, MCM and Stockholm University.

Upon investigating the food quality of the seaweeds (*Gracilaria* and *Ulva*) cultivated in a variety of aquaculture effluent media, we noticed that the colour of the seaweeds changed according to their tissue nitrogen content. Past studies on *Gracilaria* showed that levels of pigment proteins are often closely correlated with nitrogen content (Lapointe & Ryther, 1979). This is because the pigment protein phycoerythrin is largely responsible for determining the red colour of the thalli, and the concentrations of this pigment change according to nitrogen content, causing lightening or darkening of the seaweeds' thallus.

A number of algal researchers have tried to quantify colour of seaweeds, mainly for descriptive purposes (e.g. Chamberlain & Keats, 1994), using the Methuen Handbook of colour¹. To our knowledge no one, other than Wilson (1999), has tried to quantify the relationship between tissue nitrogen and thallus colour for either *Gracilaria* or *Ulva*. Wilson (1999) quantified this relationship for raft cultivated *Gracilaria* using the Methuen handbook (colours converted to Pantone®). He found a relationship between thallus colour and tissue nitrogen, as well as a transition between green-yellows and yellow-browns which occurs between 0.8 – 1.6 % (Figure 1) of the total nitrogen with the green-yellow

¹ Kornerup, A. & Wanscher, J.H. 1989. Methuen Handbook of Colour. Richard Clay Ltd, Sussex. 252pp.



colour indicating nitrogen starved material and the yellow-browns indicating nitrogen rich material.

While this colour change has been shown clearly for *Gracilaria* (Lapointe & Ryther, 1979; Wilson, 1999), the authors were unable to find literature relating this relationship for *Ulva*, although chlorosis (yellowing of the thalli due to pigment destruction) has been well documented (Turpin, 1991; Floreto & Teshima, 1998). In *Ulva* the main pigment proteins are chlorophylls, and changes in the concentration of chlorophylls would theoretically lead to changes in thallus colour.

Instead of using the Methuen book of colour which provides a glossy guide that is difficult to match to seaweeds, the Pantone® colour print guide for matt colours was chosen as there is a greater selection of greens. Furthermore, each colour has a printer guide for the reproduction of the exact colours either on a PC or at the printer interface. Also, the guide is easier to use than the book format.

After many hours in the lab correlating seaweed colour to a Pantone® colour guide and analyzing protein content of *Ulva*, an interesting result was observed. When tissue nitrogen of *U. lactuca* is

plotted against tissue colour from thalli obtained from 2 abalone farms in a number of different effluent treatments, a broad relationship between thallus colour and nitrogen content is clearly evident (Figure 2). Although the colour reproduction is not perfect, the darker colours indicate more nitrogen rich material than the paler colours. The transition between green-yellows and green appears to occur between 25–35 mg N per g tissue and is indicated by bars labeled with Pantone® matt colours 585u and 583u. Laboratory experiments would prove useful to determine the validity of these results. As the accumulation of pigment occurs directly in response to the availability of N in excess of that required for growth, then green would indicate nitrogen rich material while yellow-green would indicate nitrogen starved material.

The colour relationship shown in these figures could be used by mariculture farmers to assess the nutrient value of seaweeds as a food source for abalone and thus has important benefits for seaweed aquaculture. More laboratory work, however, needs to be done to find the exact “switch over” point as is represented by the colours in the graphs.

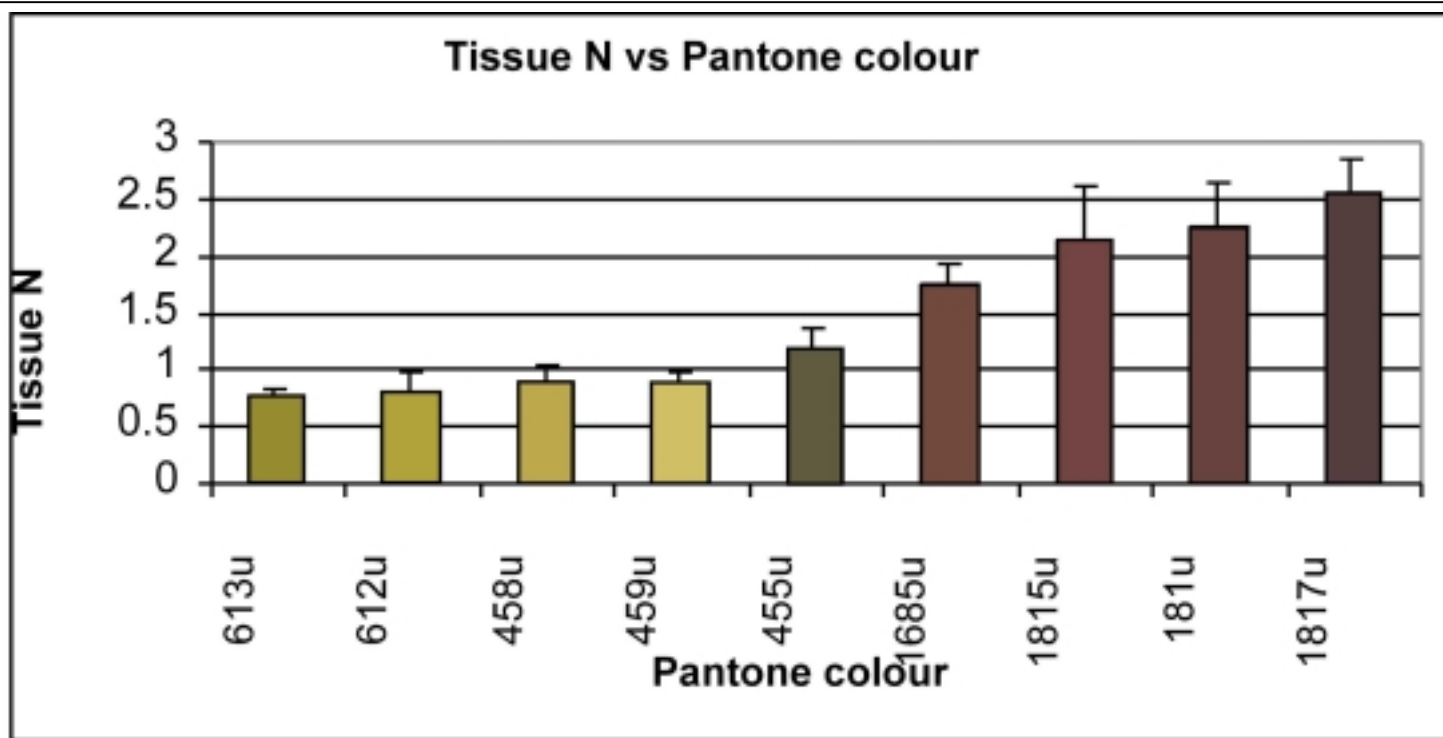


FIGURE 1: Relationship between tissue nitrogen (% δ^{15} N) and thallus colour of *Gracilaria gracilis* (shown by Pantone ® matt colour labels). *Gracilaria* was analysed for percentage N using δ^{13} (sigma¹³) C Isotope analysis.

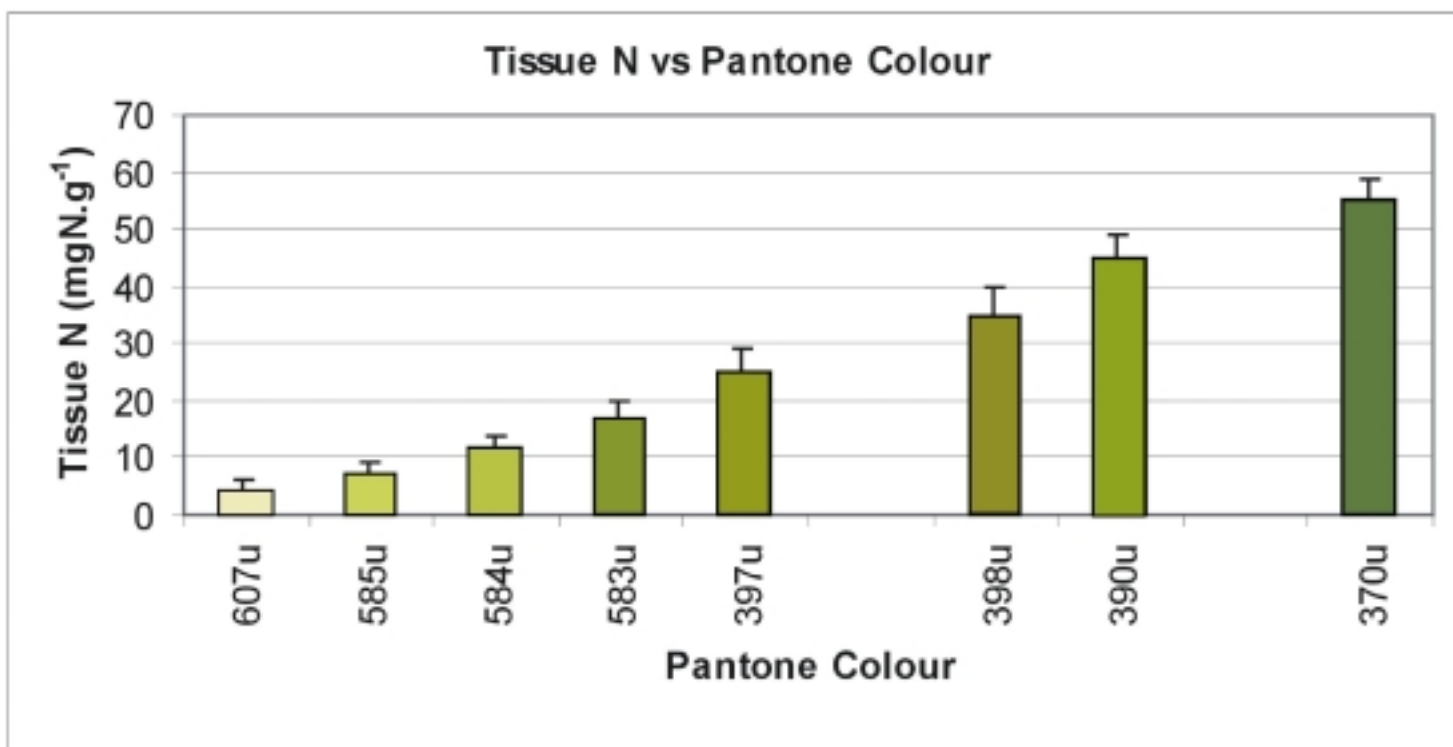


FIGURE 2: Relationship between tissue nitrogen (mg.g⁻¹) and thallus colour of *Ulva lactuca* (shown by Pantone ® matt colour labels). *Ulva* was analysed for percentage N using the micro Kjeldahl method.

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Getting to Know Your New Members

New Members for 2004/5

Baptista Bina (International Student) (baptistabina@yahoo.com.br)

Baptista is from Mozambique and is currently registered for a PhD degree under the supervision of Profa. Dra. Alessandra Giani from the Minas Gerais Federal University in Brazil.

Baptista’s primary research focus is in Cyanobacterial bloom effects, limnological characterization and water quality.



Baptista Bina



Baptista has a passion for nature and reading works on the natural sciences. He also has a love for Southern African music and is a keen sportsman.

Conference Countdown

At the PSSA AGM early in 2004 we discussed the scheduling of future PSSA Congresses owing to the fact that the PSSA is hosting the 11th International Conference on Harmful Algae [November 2004] and the 8th International Phycological Congress [August 2005]. In addition to these meetings, the Southern African Marine Science Symposium will be held in July 2005. Owing to the interest and commitment of many of our members to the above meetings, the PSSA executive proposed that a PSSA AGM be held at the IPC8 in Durban in 2005. It was also decided that the following PSSA Congress would be held in July 2006 before reverting to a date in January in 2008. John Bolton from UCT will host the July 2006 Congress.

Calendar of Events for 2005

Upcoming Conferences

1. New Currents in Conserving Freshwater Systems: A Biodiversity Science Symposium, 7-8 April 2005. Website: <http://cbc.amnh.org/symposia/freshwater/>
2. The 12th Southern African Marine Science Symposium, 4-7 July 2005. Website: <http://www.ori.org.za/samss12/>.
3. A joint meeting of the 59th annual meeting of the Phycological Society of America and the 8th International Phycological Congress (IPC8), 13-19 August 2005. Website: <http://www.ipc8.org.za/>.
4. Diversitas Open Science Conference, 9-12 November 2005. Website: <http://www.diversitas-osc1.org/>
5. The XIX International Seaweed Symposium, Kobe, Japan, 2007.

