

# Phycological Society of Southern Africa



[www.bcb.uwc.ac.za/pssa/](http://www.bcb.uwc.ac.za/pssa/)

**Newsletter  
No. 63  
December 2006**



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## From the Editor

Welcome to the last edition of the PSSA newsletter for 2006. As you can well imagine, it has been difficult keeping abreast of all the new and exciting things occurring around us. I have non-the-less found a number of alarming (or perhaps not so alarming) articles that no doubt many of you may already be aware of. The potential lack of seafood by 2048 (see the *World Science* segment) is just one of these that has even made the news headlines in recent weeks.

I am characteristically not an alarmist, but not so surprising has been the increase in the number of doom-and-gloom topics making the rounds on the Internet lately. Our *Featured Article* in particular, provides a summary report of the recently held *Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-Based Sources: 2<sup>nd</sup> Intergovernmental Review* conference and once again highlights the sensitivity of our oceans to global pollution. I have no doubt that you will find this an interesting read.

Well, enough of the doom-and-gloom. We have come to the end of yet another year. I hope this year has been fruitful for all of you. With this in mind, I wish you all peace and happiness, and for those of you celebrating *Christmas*, here's wishing you all a blessed and safe festive season.

See you all next year!

Best wishes  
Sincerely  
Gavin



*Synarthrophyton patena*  
epiphytic on *Gelidium capense*

## The Annual Conference

### 1. In a Nutshell

So we have finally had a Phycological Society of Southern Africa meeting in Mozambique, after two meetings in Namibia and many in South Africa. I was, officially, the PSSA organizer, but I must admit that the SASAQs team did just about all the work. The meeting ran extremely smoothly, considering that arranging a meeting in Maputo by 'remote sensing' must have been very difficult. The only thing that didn't run smoothly was the flight from Cape Town (delayed by 5 hours due to fog, which meant that the Cape Town delegates missed their connection and lost their luggage for a day).

There were around 80 oral presentations, spread over 2.5 days, plus 24 posters, with about 120 registered delegates. The PSSA direct contribution was around 20% of the talks, although many other presentations were interesting and relevant for PSSA delegates. The low PSSA student turnout was worrying, undoubtedly caused by high costs of attendance. We must try very hard before the next meeting (KZN, January 2008, organized by Wendy Stirk) to increase our membership, especially among students, and to get as many people as possible to the meeting.

Although few in number in Maputo, I thought that the PSSA members contributed considerably to the science on display. Thoughts were expressed that some of the directly management-oriented presentations were somewhat lacking in critical scientific content – lots of planning and administrative systems with not much ground-work. Many of the PSSA contributions were either given plenary status, or fitted reasonably into relevant sessions (Estuaries, River Health, Marine Biodiversity etc.). It was very nice to meet again with PSSA member Flower Msuya, from Tanzania, at the meeting, but it was very disappointing that aquatic scientists from Mozambique were conspicuous by their absence.

A highlight of the meeting, for me, was the talk by Pedro Monteiro (CSIR) on the EU-funded Catchment2Coast project. This studied an estuary





in Mozambique, in which there is almost no nitrogen input from the river system – it is removed by a wetland – but most of the nitrogen which results in the production of the bay is a result of nitrogen-fixation in mangrove (*Avicennia*) stands. This was an elegant study producing important results, with great management implications, which were very different than originally expected.

Although we did not have a great deal of time to wander from the hotel, most of us managed a delicious meal of prawns at a local restaurant at some point. The food at the hotel was excellent, and the banquet entertainment (local music and dancing) of a high standard. The hospitality was helped along by a generous sponsorship from a local brewery (Laurentina). Allen Press (publishers of *Phycologia*) sponsored the printing of the programme. We were treated well by the SASAQS organizers, given equal prominence despite our small numbers, and they seemed happy that we had played our part in the success of the meeting.

**John J. Bolton – President**

All reports (President's, Secretary / Treasurer's and Newsletter Editor's reports) submitted at the AGM as well as the minutes of the meeting can be found on the Society's website.

## News and Reviews

### 1. XIX International Seaweed Symposium

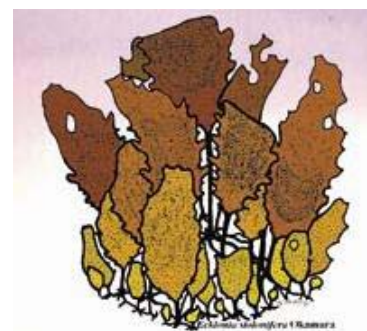
26-31 March 2007 at Kobe International Conference Center in Kobe, Japan.

Hosted jointly by the Japan Seaweed Association (JSA), the Japanese Society of Phycology (JSP) and the Japanese Society of Marine Biotechnology (JSMB), this is the second ISS meeting to be held in Japan (the first took place at Sapporo in 1971).



From Left to right: (front row) Gavin W. Maneveldt, John J. Bolton, Paul-Pierre Steyn, Deborah Robertson-Andersson, Flower Msuya, Wendy Stirk, Tamson Francis - (back row) Mark Rothman, Eileen Campbell, Tommy Bornman, Derek Du Preez, Neil Griffin, Robert Anderson, Grant Pitcher, Kishan Sankar, Bernadette Hubbert.

Contributions will be invited on all aspects of algal research and utilization. All relevant details are already available in the Second Circular.



Accepted papers may be eligible for publication in the Proceedings.

**Websites** <http://www.seaweed.ie/isa/kobe.lasso>  
<http://www.h4.dion.ne.jp/~jsaweb/>

### 2. 4<sup>th</sup> European Phycological Congress

23 - 28 July 2007 in the Palace of Congresses - Audience "Prince Felipe" of Oviedo, Spain.

#### Deadlines

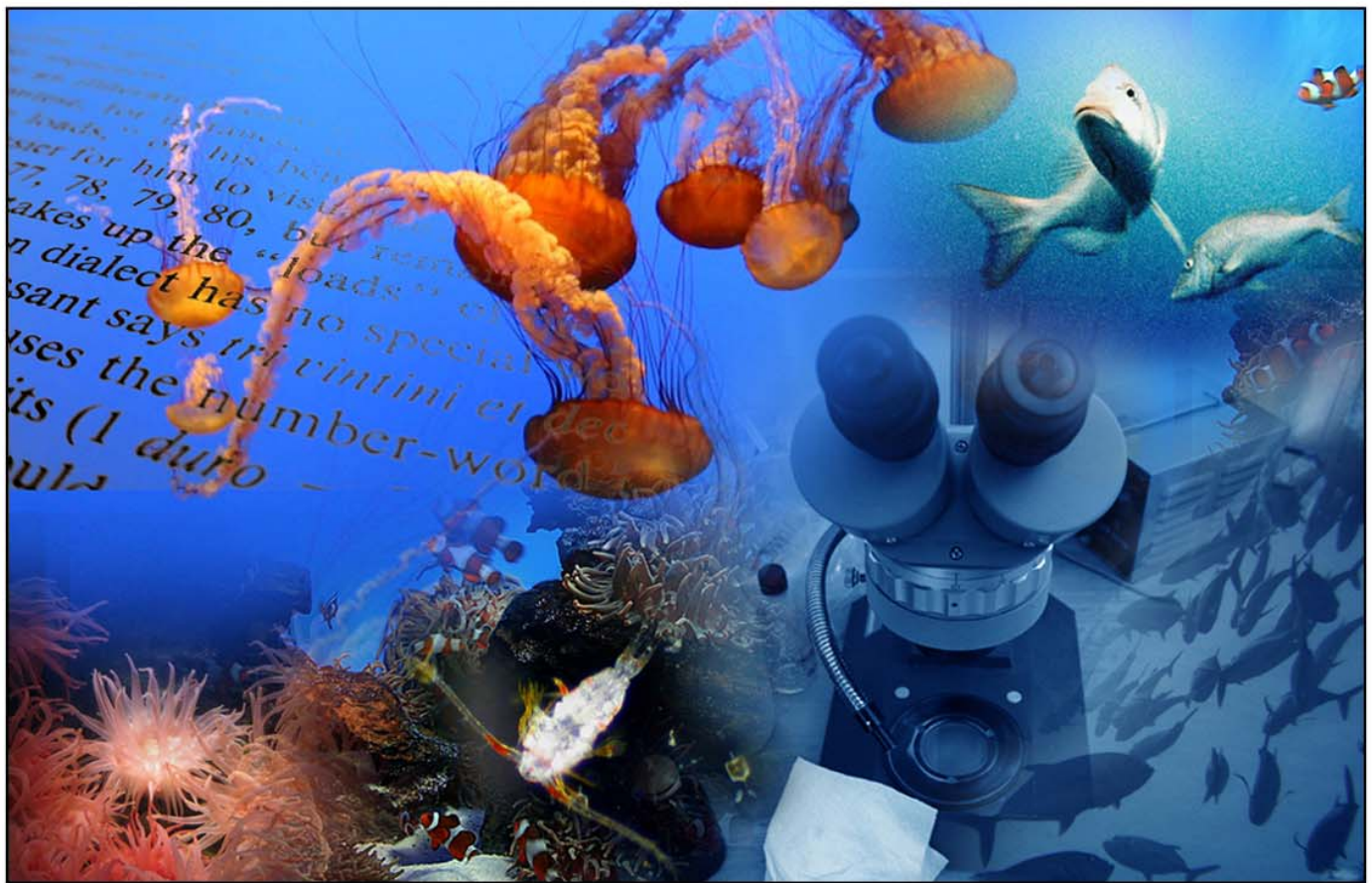
Pre-registration is now open!

**Website** <http://www.ivepc.es/>

**Contact Person** - Verónica Menéndez  
([veronica@congresosasturias.com](mailto:veronica@congresosasturias.com))







## AFRICAN JOURNAL OF AQUATIC SCIENCE

Volume 31 (2), 2006

The African Journal of Aquatic Science is an international journal devoted to the study of the aquatic sciences, covering all African waters. The Journal publishes peer-reviewed original scientific papers and short articles in all the aquatic science fields including limnology, hydrobiology, estuarine and coastal marine science. Amongst the topics in this journal are ecology, biomonitoring, water quality, ecotoxicology, conservation, management, biological interactions, physical properties and human impacts on aquatic systems. Supported by the Southern African Society of Aquatic Scientists, the African Journal of Aquatic Science serves as a reference source for those interested in understanding the valuable aquatic resources in South Africa.

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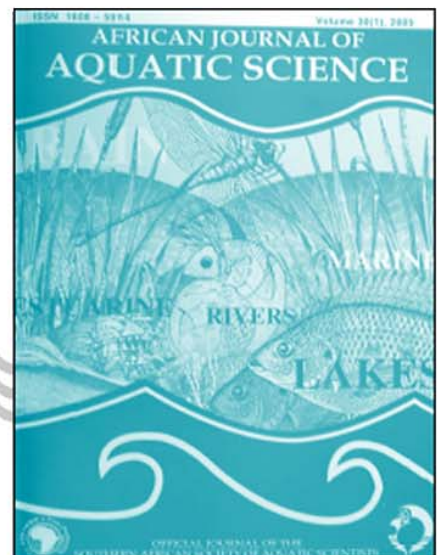
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ISSN 0257-7615  
 EISSN 1814-2338



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**World Science**

(<http://www.world-science.net/>)

**1. Oldest complex organic molecules found in fossils**

Oct. 25, 2006

By Pam Frost Gorder/Ohio State University and World Science

Geologists say they've found complex organic molecules, characteristic components of living things, in 350-million-year-old fossil sea creatures – the oldest such molecules yet found. These offer a new way to map evolution, the researchers said. The molecules, they added, are ones that today serve as orange and yellow pigments in related animals, and thus might have done the same back then.

Christina O'Malley, a doctoral student in earth sciences at Ohio State University in Columbus, Ohio, reported finding the bunches of atoms in fossils of several species of sea creatures called crinoids. She reported the research today (Wednesday 25 Oct.) at the meeting of the Geological Society of America in Philadelphia.

Crinoids, also known as sea lilies, still exist. They resemble plants, but are animals. They cling to the seafloor and eat plankton, masses of tiny plant and animal organisms that drift by. The crinoids in this study had flower-like fronds capping skinny stalks about six inches (15 cm) high – a look resembling “starfish on a stick,” said William Ausich, an earth sciences professor and O'Malley's co-advisor at Ohio State. Crinoids today display varied colors, including shades of red, orange, and yellow, so it would make sense that similar colors turned up in their forebears, Ausich said.

It's not the first time that ancient organic molecules from fossils have been reported, O'Malley said. But



A modern crinoid, also known as a sea lily (Image courtesy NOAA).

to her knowledge, she added, these are the oldest, and also the first that can be linked to individual species.

**2. Almost no more seafood after 2048 at current rates, study warns**

Nov. 2, 2006

Courtesy: World Science

Seafood will be all but a memory by 2048 if bulging human populations keep devouring fish and polluting oceans at current rates, warns a study published in the Nov. 3 issue of the research journal *Science*.

“Species have been disappearing” faster and faster, said lead author Boris Worm of Dalhousie University in Halifax, Canada. “If the long-term trend continues, all fish and seafood species are projected to collapse within my lifetime.”

“Collapse” is defined as the catch of a species dropping by 90 percent, said Worm, one of a group of ecologists and economists studying how marine biodiversity helps sustain humanity. “Worm and colleagues have provided the first comprehensive assessment of the state of ecosystem services provided by the biodiversity of the world's oceans to humanity,” said *Science* international managing editor Andrew Sugden. The study is based on a wide array of historical and experimental data, he added.

Twenty-nine percent of fish and seafood species have collapsed already, Worm said. “It is a very clear



There will be few seafood fish left four decades from now if current trends keep up, a study suggests (Image courtesy NOAA).





trend, and it is accelerating. We don't have to use models to understand this trend; it is based on all the available data." The problem is much greater than losing a key source of food, he added. Damage to oceans affects not only fisheries, but the ocean ecosystem's overall productivity and stability, he said. A dwindling variety of species have a harder time maintaining water quality through biological filtering, protecting shorelines, controlling harmful algal growths and preserving oxygen levels.

"The good news is that it is not too late to turn things around," Worm said. The scientists studied 48 areas worldwide that have been protected to improve marine biodiversity. "We see that diversity of species recovered dramatically, and with it the ecosystem's productivity and stability. We hardly appreciate living on a blue planet," Worm said. "The oceans define our planet, and their fate may to a large extent determine our fate."

## Featured Article

### UN Warns Ocean Dead Zones on the Rise

BEIJING, China, October 19, 2006

The number of dead zones in the world's oceans and seas has increased dramatically in the past two years, endangering fish stocks and the people who depend on them for food and livelihoods, the United Nations Environment Program (UNEP) warned Thursday 19 October. The latest study finds at least 200 dead zones across the world, up from an estimated 149 only two years ago.

The new scientific estimates of dead zones (areas where algal blooms remove oxygen from the water) were released at a UNEP marine pollution meeting in Beijing. The conference, which began Monday 16 October and extended through Friday 20

October, reviewed the UNEP global program of action for protection of the marine environment. Delegates from 115 countries attended the inter-governmental review of the 10 year-old initiative.

The algal blooms that cause dead zones are triggered by nutrients from agricultural runoff, sewage and animal wastes, and pollutions from the burning of fossil fuels. The low levels of oxygen in the water make it difficult for fish, oysters and other marine creatures to survive as well as important habitats such as sea grass beds. Some of the earliest recorded dead zones were in places like Chesapeake Bay in the United States, the Baltic Sea, the Kattegat, the Black Sea and the northern Adriatic Sea.

Dead zones can be found [worldwide](#) (link to NASA dead zone page). The most well-known area of depleted oxygen is in the Gulf of Mexico which is also one of the largest in the world and grows to more than an 18,000 square-kilometers each year. This dead zone has been directly linked to nutrients or fertilizers brought to the Gulf by the Mississippi River.

The report identifies new dead zones in the Finland's Archipelago Sea, the Fosu Lagoon in Ghana, the Mersey Estuary in the United Kingdom and Uruguay's Montevideo Bay. Others have been appearing off South America, China, Japan, south-east Australia and New Zealand. The report warns that the pollution that contributes to dead zones shows few signs of decreasing. Nitrogen exports to the marine environment from rivers, for example, are expected to rise globally by 14 per cent by 2030 when compared with the mid 1990s.

"There are numerous compelling reasons for combating pollution to the marine environment," said UNEP Executive Director Achim Steiner. "These range from public health concerns to the economic damage such pollution can cause to tourism and fisheries."

UNEP released another report on Thursday 19 October that warned



The Mississippi River dead zone is overloaded with nutrients from upstream sources. This photo shows the color change between the hypoxic (brown) and oxygen-rich (blue) waters (Photo courtesy of NOAA).



that coral reefs worldwide are facing major threats from pollution and climate change. The ability of coral reefs to survive warming waters may "crucially depend" on the levels of pollution to which they are exposed, the report said. "If we fail to protect the coastlines from unchecked piecemeal development, or protect the water sheds from deforestation, huge amounts of sewage and sediment loads will reduce the ability of reefs to recover dramatically," said Christian Nellemann, a researcher with UNEP's rapid response team. "Once they are overgrown, it is difficult for them to recover, and over time they change or even die entirely."



Satellite image of the northern Gulf of Mexico - Mississippi Delta showing hypoxic coastal water (light blue). This color change is due to excessive nutrients being washed into the sea (Source: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC, January 2003).

The study is based on surveys carried out between 2004 and 2006 following damage caused to reefs world-wide in 1997-1998 when surface sea temperatures reached up to 34 degrees Celsius. Corals in an estimated 16 per cent of the world's coral reefs suffered up to 90 per cent mortality as a result of mass bleaching, with reefs across the Indian Ocean, including around the Comoros, La Reunion, Madagascar, Mauritius and Seychelles, among those severely damaged. But, soft coral cover and stony coral increased rapidly in areas least affected by coastal development.

Source: Environment News Service Newswire  
 Website: <http://www.ens-newswire.com/>

**Popular Student Article**

**Investigations into the harvesting ecology of *Ecklonia maxima***

Mark Rothman

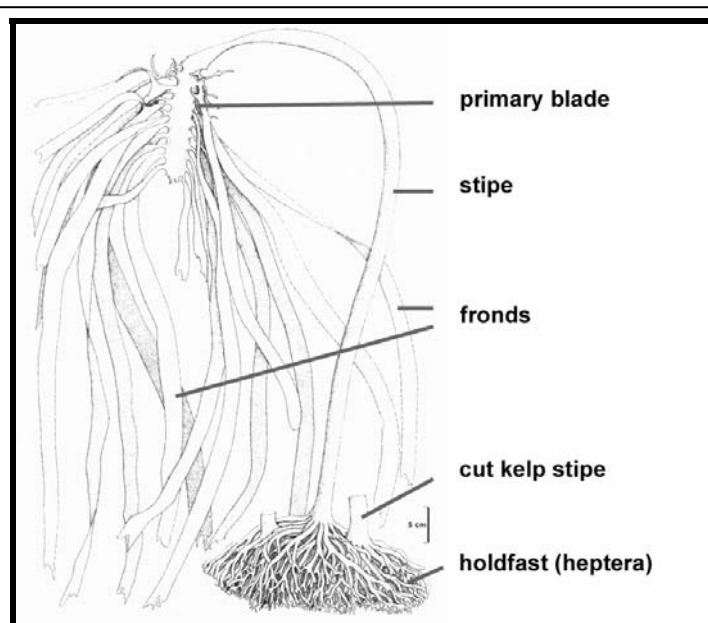
Seaweed Unit, Marine & Coastal Management, DEAT

Kelp (*Ecklonia maxima*) exploitation in South Africa has increased exponentially over the last

decade from less than 0.2 tons in 1992 to about 7000 tons in 2003. This increase in harvesting is being fuelled by the ever-increasing demand for fresh kelp fronds for cultured abalone (*Haliotis midae*) and has raised some concerns about its effects on kelp bed ecology in South Africa. This study examines several questions that were not addressed by previous studies of South

African *Ecklonia maxima* beds.

First, we examined the distribution of kelp biomass at various sites around the Cape Peninsula and on the west coast, all at different depths within sites. An attempt was made at calculating a single figure that could be used to determine the biomass of kelp beds. Using SCUBA, divers collected data at each site by cutting kelp from a series of 1 m<sup>2</sup> quadrats that were placed on the substratum. From these quadrats, all the kelp were cut just above their holdfasts. The kelp were then brought to shore where the stipes and fronds were weighed separately. The average kelp biomass over all the sites was 14.4 kg wet wt m<sup>-2</sup> and the average frond biomass was 8.6 kg wet wt m<sup>-2</sup>. Sixty two percent



A young *Ecklonia maxima* sporophyte. (After Stegenga et al., 1997).

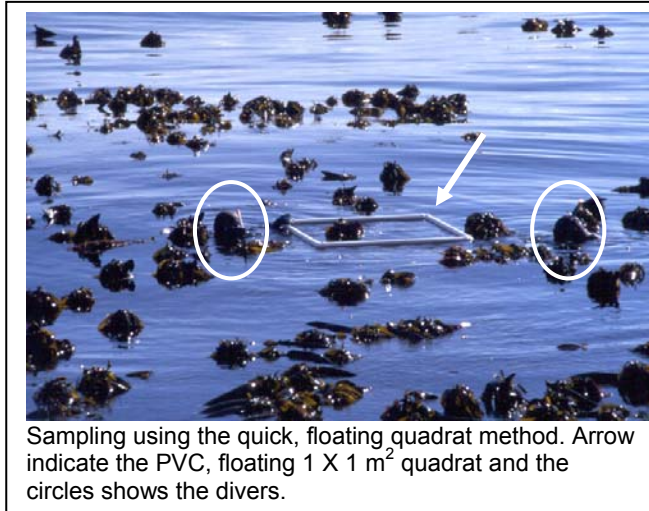




of the kelp biomass comprised surface-reaching individuals while 38% was subsurface kelp. Sites differed statistically in their average biomass  $m^{-2}$ . The lowest average biomass was  $10.5 \text{ kg wet wt } m^{-2}$  and the highest  $21.3 \text{ kg wet wt } m^{-2}$ . It was suggested that a conservative figure of  $10 \text{ kg wt } m^{-2}$  be used to estimate standing kelp stock. This conservative figure would eliminate the possibility of kelp beds being over harvested. Kelp densities at different sites were also variable, ranging from  $2.8 - 5.7 \text{ plants } m^{-2}$ .

The method described above was fairly accurate, but very labour intensive and time consuming. Thus a quick method for estimating biomass from measurements of the density of kelp heads at the surface was tested. Two snorkel divers worked at 2 m intervals along a transect, from the seaward edge of the kelp bed towards the shore. The number of kelp heads in  $1 \text{ m}^2$  quadrats at the surface, was counted. The surface-reaching individuals were followed down to the substratum and then cut just above the holdfast, and brought to shore and then weighed. A relationship was established between the number of kelp heads at the surface and the kelp biomass. This method ('surface method') was compared to the data from the 'bottom quadrat method'. A direct correlation was established between the number of kelp heads at the surface and the kelp biomass. This latter method provided a quick estimate of *E. maxima* biomass, and can be used together with a limited number of 'bottom quadrats' to obtain more accurate biomass determinations.

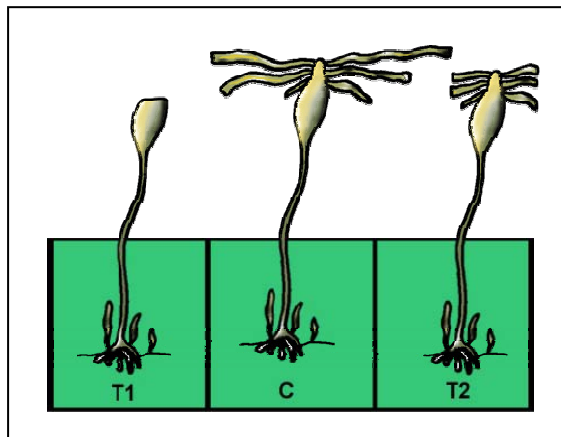
Although some studies have examined the effects of kelp harvesting on understorey seaweeds, their effects on subsurface kelp have not been examined.



Sampling using the quick, floating quadrat method. Arrow indicate the PVC, floating  $1 \times 1 \text{ m}^2$  quadrat and the circles shows the divers.

In this third study, we examined the effects of canopy harvesting on the stipe growth, recruitment and population structure of *E. maxima*. Two  $30 \times 10 \text{ m}$  sites were demarcated and subdivided into three  $10 \times 10 \text{ m}$  plots, each with a different treatment. The treatments mimicked the harvesting methods commercially employed. In treatment 1 (T1), the whole kelp 'head' was removed ('lethal' harvesting, killing the kelp). In treatment 2 (T2), only the fronds were harvested, leaving 20-30 cm of frond on the primary blade and thus not killing the plants ('non-lethal' harvesting). The third treatment was the control (C). The data show that neither harvesting method had any effects on rates of stipe elongation, recruitment or the population structure of the subsurface kelp. It was therefore

concluded that factors other than irradiance levels drive these processes. However, the data show that the stipes of long individuals had a higher relative growth rate than medium and short individuals. Furthermore, once sporophytes attain a stipe length of 11-25 cm, they have a 70% chance of becoming a surface-reaching individual.



*Ecklonia maxima* is a canopy forming kelp and a high proportion of its biomass is situated at the surface. The fertile material is borne on the fronds, which are often harvested for abalone feed. A fourth study investigated the effects that harvesting could have on the potential spore output of a kelp bed. Thirty surface-reaching individuals and thirty subsurface individuals were harvested in a deep and shallow zone of a typical kelp bed. The length of fertile material on each frond was related to the total frond length as well as the stipe length of the kelp. Surface-reaching individuals in the deep zone had the highest amount of fertile material, followed by the surface-reaching individuals in the shallow zone,



Fertile area on a kelp frond.

and then followed by those subsurface plants in the deep and shallow zones; the subsurface kelp from both zones had similar amounts of fertile frond material. Using these results, and data from the previous studies, it was estimated that plants in a 1 m<sup>2</sup> area will produce  $2.46 \times 10^{11}$  spores annually. If the whole canopy was removed, the subcanopy would still be able to produce  $9.35 \times 10^{10}$  spores annually. It is calculated that current levels of frond-harvesting (limited to 10% of the estimated biomass of kelp beds) is unlikely to have significant effects on recruitment of gametophytes, and ultimately on the population structure and biomass of sporophytes populations.

The combined results of this study indicate that current methods of harvesting *E. maxima*, and current management controls, should ensure that harvesting has minimal effects on kelp population structure, recruitment and reproductive output.

## Getting to Know your New Members

### New Members for 2006

#### Thembinkosi Steven Dlaza

([sdlaza@botzoo.uct.ac.za](mailto:sdlaza@botzoo.uct.ac.za))

Steven has recently graduated with a Masters Degree from the University of the Western Cape (under the supervision of Gavin W. Maneveldt) and is currently registered for a PhD degree in the Botany Department at the University of Cape Town

under the supervision of John Bolton and Rob Anderson.

Steven's primary research focus is on mariculture. For his MSc, he examined the effects of fresh seaweed supplementation, basket design and water systems on the growth of the South African abalone, *Haliotis midae*. His PhD research is centered on the cultivation of local *Porphyra* species for use in the abalone feed industry as well as its potential for use as 'nori' in South Africa.

During his spare time, Steven is a soccer coach for Salt River Blackpool Football Club under 15 division. Steven's other personal interests include singing (not only in the shower), listening to Dance-Hall music, writing poetry and reading sports magazines. He enjoys reading about cowboys in the Western Classical novels and loves going to the theater and watching stage performances. Although (by his own admission) he is not a good swimmer, he enjoys being on the beach in summer. In the spring he loves visiting plant nurseries to see the range of flowering plants.

## Where in the World?

This new segment focuses on the professional careers of those members who have recently (or not so recently) moved.

### 1. Alan T. Critchley

I worked at 'Maritzburg, Wits and the University of Namibia. After banging the drum about the value and application of seaweeds, I decided to go and see what work was like in the commercial arena of seaweed utilisation. I spent a very pleasant time in



T. Steven Dlaza







France learning about colloids and particularly carrageenan and carrageenophyte cultivation.

What am I doing now?

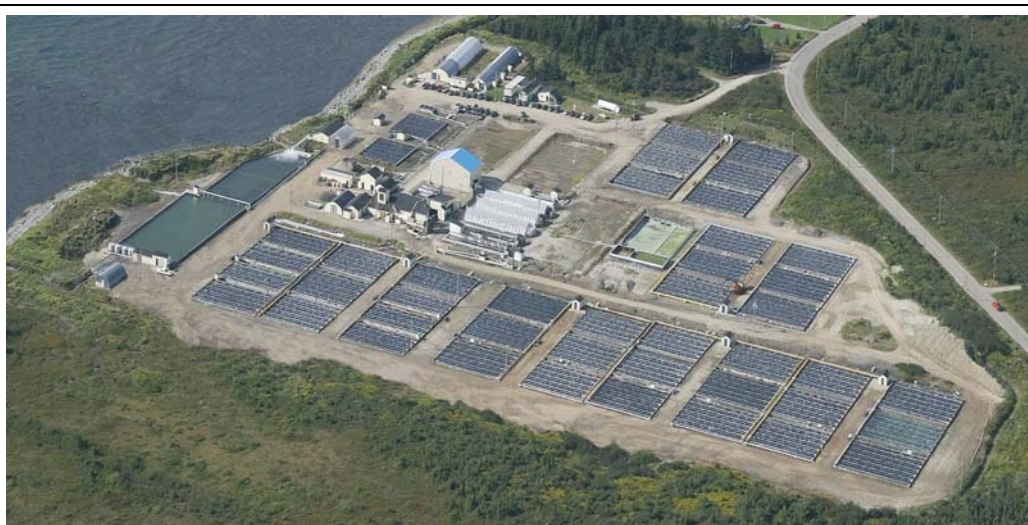
**Position:** VP Research, Acadian Seaplants Limited, Nova Scotia, Canada ([www.acadianseaplants.com](http://www.acadianseaplants.com)).

Acadian Seaplants Limited (ASL) is a bio-tech company and the largest independent manufacturer of marine plant products of its type in the world. It is engaged primarily in the sustainable harvesting of wild seaweeds and in the cultivation of unique marine plants for the development of value-added seaweed products. Through five processing plants located in the Maritime provinces, of Canada, the company processes thousands of tons of marine plants annually providing quality products to global food and agricultural industries. Its value-added products are sold into health, beauty, brewery, nutraceutical and pharmaceutical markets, agricultural markets involving animal feeds and specialty fertilizer products such as nutritional products, plant growth regulators and crop biostimulants. The company also cultivates and processes unique seaweeds for the Asian food market. ASL has the world's largest land-based facility for the cultivation of seaweeds (see picture and also visit the web site for more details of the Hano-Nori™ product).

Several noteworthy aspects of ASL's operations include: the advanced methods used to harvest seaweeds as a sustainable, renewable resource and the technologies created to process the natural seaweed resources into value-added finished products for sale in exacting global markets.

Acadian Seaplants Limited is a recognized industry leader in the manufacturing of seaweed-based products and has advanced both the fundamental

and applied scientific study of seaweeds and is responsible, in real terms, for advancing, on a global scale, the understanding of the biochemistry and processing of seaweeds and their benefits. Given the technical nature of the research work conducted at ASL, the company has assembled an expert scientific team. In addition to the company's own compliment of technical staff, ASL works with local research partners and contracts research to international organizations as required.



The ASL's land-based seaweed cultivation facility.

Approximately 95% of ASL's products are exported to 70 countries worldwide. There are sometimes employment opportunities advertised on the company's web site. If you have any queries, please contact us.

Alan's email address can be found on the Society's website.

### Conference Countdown

Because of the two international conferences (HAB2004, IPC8) that PSSA has hosted over the past two years, the following PSSA conference will only be held in January 2008 and hosted by Wendy Stirk (Burnett) from the Research Centre for Plant Growth and Development, University of KwaZulu-Natal Pietermaritzburg. Please keep an eye on the website for regular updates on the Society's conferences.



## Calendar of Events

### Upcoming Conferences

1. 33<sup>rd</sup> Annual conference of the South African Association of Botanists (SAAB), 14-18 January 2007.  
<http://www.saab2007/uct.ac.za>
2. 5<sup>th</sup> Southern Connections Conference. Adelaide, South Australia, 21-25 January 2007.  
<http://www.ees.adelaide.edu.au/events/SouthernConnections/>
3. 8<sup>th</sup> International Marine Biotechnology Conference. Eilat, Israel, 11-16 March 2007.  
<http://imbc2007.ocean.org.il>
4. The XIX International Seaweed Symposium (ISS). Kobe, Japan, 26-31 March 2007.  
<http://www.h4.dion.ne.jp/~jsaweb/>
5. 4<sup>th</sup> European Phycological Congress (EPC4). Asturias, Spain, 23-28 July 2007.  
<http://www.ivepc.es/>

