Newsletter Issue 3.2
November 2013

Seaweeds Australia

Contact editor: pia@uow.edu.au

Seaweed Species Profile

Durvillaea Potatorum

Photo courtesy of King Island Supplements

A magnificent feature of the far south east coast of Australia, Bull Kelp (*D. potatourum*) is currently the main native species harvest from wrack in Australia, by harvestors and staff at Kelp Industries Pty. Ltd., on King Island near Tasmania. A novel history of this industry development since the 1970's can be found on their website (www.kelpind.com.au). It tells of a seaweed journey that is influenced by international markets and natural phenomena of El Nino patterns.

Bull Kelp is thought to be on a southwards journey due to climate change (CSIRO Report Card), and a new website is up where everyone can contribute to help in the tracking of this species: Atlas of Life in the Coastal Wilderness (http://alcw.ala.org.au).

5th Congress of the International Society for Applied Phycology 2014

Australia Technology Park, Sydney, Sunday 22 – Friday 27 June 2014

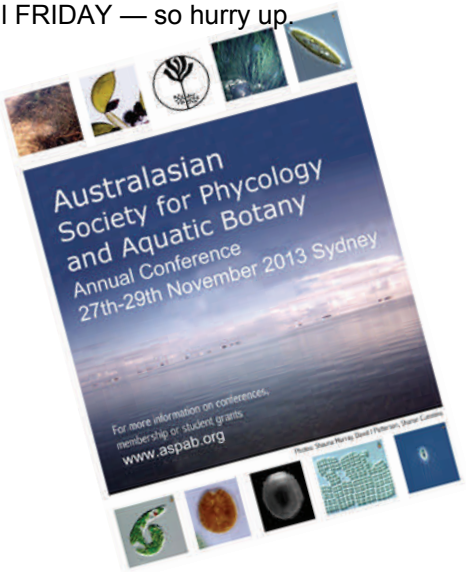
www.isap2014.com

ISAP 2014

It has been a few months now but this newsletter follows the International Seaweed Symposium in our neighbouring Bali. This conference was a success with over 700 international delegates, and Australia punched above its seaweed cultivation weight being represented by 28 delegates amongst representatives from over 25 nations. These delegates also had the benefit of meeting each other, and the ISAP2014 booth, sponsored by Tourism Australia and Business Events Sydney, proved a hit as a node of seaweed and Australia.

Apart from a plethora of interesting presentations and posters on all things seaweed, delegates could visit the seaweed farms of Indonesia and be taken out to experience first hand, the villages that have been established to create a seaweed industry for the nation. Thanks for the experience Indonesia—ISS was a great success.

Coming up however in only two weeks is ASPAB2013, to be hosted at the Sydney Institute for Marine Science (SIMS) in the beautiful Chowder Bay —you can still register up until FRIDAY — so hurry up.



Otherwise enjoy this edition which includes opportunities for sea based seaweed aquaculture alongside proposed shellfish leases, food foraging—a topic which I often get called up about and Gareth Belton has crossed the borders to deliver a national perspective, restoring missing marine forests with *Ezequiel (Ziggy) Marzinelli,* and a summary from BioMarine 2013 on the concept of biorefineries. Don't forget to email me if you have article to feature in next years issues leading up to ISAP2014.

Pia Winberg
Executive Officer Seaweeds Australia

Australian Government Fisheries Research and Development Corporation
Australian Government Rural Industries Research and Development Corporation
RURAL INDUSTRIES Research & Development Corporation
SMFC SHOALHAVEN MARINE & FRESHWATER CENTRE
UNIVERSITY OF WOLLONGONG

Theme: Cultivation - Spatial Planning and Aquaculture Lease areas in Jervis bay

Fisheries NSW, a division of the Department of Primary Industries, is seeking approval for the establishment of Commercial Shellfish Aquaculture Leases within the open marine embayment of Jervis Bay.

Due to the interest in Jervis Bay from local and interstate shellfish growers and local Indigenous groups, it is timely to have a coordinated approach to assess the potential for aquaculture in Jervis Bay. Fisheries NSW has developed an Environmental Impact Statement (EIS) and draft Environmental Management Plan to accompany an application for three Commercial Shellfish Aquaculture Leases that, if approved, would be tendered to shellfish growers. The project would also provide the opportunity for research on sustainable and extractive aquaculture and other applied marine research, including the opportunities for sea-based seaweed production.

Three leases are proposed including: two 20 hectare areas 1.5 and 1.9 kilometres off Callala Beach; and a 10 hectare site 0.7 kilometres off Vincentia over an area previously leased for mussel aquaculture. Only species native to Jervis Bay like Blue Mussels, scallops and oysters would be grown, as well as any of the diverse species of seaweeds that can be found in Jervis Bay.

Global demand for seafood is rapidly expanding and seafood consumption per capita is increasing. In 2008, 46% of the seafood consumed worldwide was produced by aquaculture.

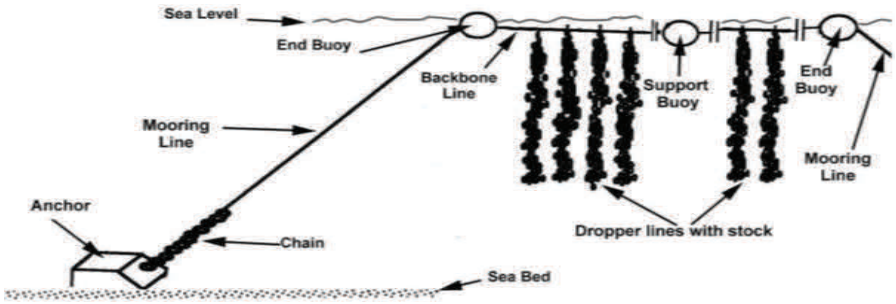
In NSW the supply of locally caught seafood is not expected to increase from current sustainable catch levels and approximately 87% of seafood purchased in NSW is imported.

Jervis Bay is one of only three marine embayments on the NSW coast that are suitable for deepwater aquaculture. The other embayments are Port Stephens, which has an established edible oyster industry and areas used for Pearl Oyster production, and Twofold Bay which has Blue Mussel aquaculture and also used to produce oysters. Oyster aquaculture is also undertaken in 32 estuaries along the NSW coastline from Wonboyn Lake on the Victorian border to the Tweed River in the north.

To reduce visual impact, floating rafts will not be considered in this application and dark, low profile buoys will be used. A longline culture system will be used which consists of an anchoring and mooring system where horizontal lines of rope (i.e. backbones) are suspended from the surface by buoys and anchored at both ends.

Longline systems are the predominant culture method for deepwater shellfish cultivation in Australia and seaweed cultivation internationally. The impacts of the leases on the marine environment in Jervis Bay are not anticipated to be significant given previous experience of aquaculture in the bay. There will be no nutrient input (feeding) of shellfish as stock relies upon naturally occurring feed.

Extract from ***Commercial Shellfish Aquaculture leases Jervis Bay, NSW Environmental Impact Statement, Summary Document,*** Published by the NSW Department of Primary Industries October 2013



Theme: Biotechnology - Biorefinery and Genetic management at BioMarine

Recently Australia was sponsored by Business Events to be represented at BioMarine Business Convention 2013 in Halifax. There I was invited to moderate two sessions that included representatives from Canada, Ireland, France, Mozambique, Portugal, Norway, Australia and the USA. Theses session topics were the Seaweed Biorefinery concepts and Selective Breeding & Genetic Management of seaweeds. There was a 1.5 hours discussion on each of these topics so they covered a lot of ground, but the final key points from the Biorefinery session included:

1) There is a discrepancy in what producers of algal biomass see as a value for effort in production and what the current biofuel and hydrocolloid markets are willing to pay, so higher value molecules are a priority.

2) Production and volume are the current gap that needs to be addressed, and this can only be justified by addressing the high market value opportunities.

3) Realizing high value opportunities requires evidence of efficacy of product which requires further time for evidence based R&D and addressing complexities of different markets.

4) Processing technologies of seaweed biomass are still in need of improvement and are diverse. The application of skills in chemical engineering with those of biologists understanding species and fermentation processes can be anticipated to overcome these hurdles once biomass is available.

5) Biorefinery concepts offer the opportunity to build value to the species that already have a demonstrated production or wildharvest capacity, such as *Laminaria, Saccharina, Undaria, Ascophyllum, Kappaphycus, Eucheuma, Gracilaria, Porphyra* and some green seaweeds like *Ulva.*

The full panel transcripts on this and many other sessions at BioMarine 2013 can be downloaded from: www.biomarine.org

Pia Winberg

BioMarine 2013 Seaweed Biorefinery panel and delegates from Australia, Norway, Canada, USA, Ireland, Portugal & Mozambique.

Theme: Natural Resource Management—Restoring missing underwater forests

Seaweeds are the trees of the oceans, supporting very diverse communities. The loss of habitat-forming seaweeds along urbanised shorelines is, however, a global issue. Human impacts through multiple stressors, such as urbanisation and nutrient loading, are causing significant declines of key species of seaweeds that provide habitat and food to many marine organisms. As a consequence, the loss of seaweeds has significant impacts on local productivity and biodiversity. Understanding the factors and processes that allow the restoration and reestablishment of seaweeds and the biodiversity they support is critical for developing successful strategies for management.

Crayweed (*Phyllospora comosa*) is a key habitat-forming seaweed that forms extensive underwater forests on shallow rocky reefs in south-eastern Australia. Crayweed provides habitat and food to a wide variety of organisms, including commercially important species of fish, abalone and lobsters. Wrack of crayweed provides detritus to soft-sediment systems that underpin the food-webs of key fish populations. Crayweed has gone extinct from the Sydney metropolitan region. Its disappearance is related to heavy outfall discharges along the metropolitan coast during 1970's and 1980's. Despite the significant improvement in water-quality along the Sydney coast, crayweed has not re-established in this region.

To understand the processes preventing the re-establishment of this seaweed in Sydney and to provide sound information for restoration, our research group at the Sydney Institute of Marine Science and the University of New South Wales, lead by Prof. P. Steinberg, has undertaken several studies transplanting crayweed from populations north and south of Sydney into Sydney sites. Survival of adult crayweed transplanted to Sydney matched the survival of adult crayweed in natural (donor) populations and transplanted crayweed are growing at similar rates to those in donor habitats. Hundreds of crayweed recruits are growing within and around the restored patches in Sydney. Recruitment in the Sydney sites was in fact much greater than that in natural populations, suggesting that the proposed methodology not only allows the survival of adult crayweed in Sydney, but also enhances recruitment of new individuals into the population – which is of course necessary for successful restoration.

Given the global concerns about losses of key habitat-forming organisms such as seaweed forests and the consequences these have on ecosystem properties and services, there is an urgent need for sound information to successfully restore these degraded habitats and the diversity they support. The study system in this project provides a unique opportunity to develop successful restoration strategies to increase local primary productivity and enhance habitat and food supply, thereby increasing local diversity, particularly of commercially important species. This project will provide novel methods and information for restoration and management of underwater forests generally. Thus, as well as enhancing seaweed and associated organisms, the project has the potential to impact broadly on restoration of globally declining seaweed forests – habitats that are amongst the most sensitive to environmental change.

Dr Ezequiel Marzinelli

Sydney Institute of Marine Science and Centre for Marine Bio-innovation, University of NSW

Theme: Food and Nutrition – the legalities of seaweed foraging - by Gareth Belton

Whether fresh, dried, pickled or brined, there is no doubt that seaweeds are tasty. Thus, it comes as no surprise that seaweeds are part of the hottest new trend taking off across Australia's culinary landscape: wild and foraged foods. As a result of this, many chefs have started to look to the ocean for menu inspirations and it is now relatively common to see such things as 'Tasmanian Wakame', 'Australian Seagrapes' and 'Native Sea Lettuce' on menus across the country. However, as seaweeds do not feature in Recreational Fishing Bag/Catch limit brochures, websites or beach signs, the rules regarding the collection of seaweeds for personal or commercial use in Australia remains largely unknown to the public. With this in mind I have taken this opportunity to summarize the rules regarding seaweed collections in each state [see next page].

If you do choose to collect attached seaweed and have obtained the relevant permits in your state, keep in mind that harvesting seaweed by hand is the most sustainable means to do so. Only remove the upper portions of the plant with a knife or scissors, leaving the holdfast intact and thus allowing the seaweed to regrow. In the case of larger brown algae (*Ecklonia*, *Sargassum*, *Cystophora* etc…), only remove a few fronds or branches from each plant.

As we are unsure what impacts may arise from increased wild harvesting from Australian shores, I urge potential foragers to remember that as with any wild food, by collecting it, you are taking away food from grazers. So please rotate between your collection sites and only take what you need. In this way, we can avoid adding any more pressure to our marine benthic communities that are already under pressure from other human related impacts (nutrient and sediment runoff, climate change, invasive species etc…).

Also, make sure you know what species you are cooking and the water it comes from is clean—you might need to become friends with a phycologist at your local University for this!

Gareth Belton is a PhD student at the University of Adelaide working on the biodiversity of green macroalgae in Australia. Gareth and his wife, Rainbo (also a phycologist), are currently exploring the southern coastline of Australia in an attempt to find new species as well as tasty local seaweeds that can be used in the kitchen and they have no doubt that local seaweed consumption will become more widespread over the next few years.

New developments in Australian seaweed as a food

Kai Ho Sea Vegetables Tasmania is a new business marketing Tasmanian edible seaweeds from July this year. The Kai Ho story though, started three years ago by long time marine biologist/phycologist Craig Sanderson and James Ashmore of Ashmore Foods Tasmania. Craig knows his seaweeds better than many in Australia having done national diversity audits and other ecological research. Kai Ho sea vegetables, mostly wakame and mekabu (*Undaria pinnatifida*), are locally foraged and harvested sustainably in Tasmania. These are available in the dried, salted or fresh frozen form. Dried and salted versions are available through the internet, the fresh frozen can be obtained through local suppliers around Australia.
www.oceantreasure.com.au

海宝 Kai Ho Tasmanian sea vegetables

The **ISAP2014 Algae Gastronomy Cocktail Event** will welcome congress delegates and their company to Sydney in June next year. Although seaweeds and microalgae already exist as a food ingredient and most of the global $6B worth of cultivated product is sold as food, there is still little appreciation in the west of the health benefits associated with including seaweed in your diet. Also, there has been limited innovation in the way that seaweed and microalgae can be incorporated into foods.

ISAP 2014 Sydney Australia 22-27 June 2014

So this ISAP2014 event invites potential chefs and suppliers of seaweed and microalgae biomass to submit expressions of interest for a gastronomical creation WITH A DIFFERENCE. The best will be selected by the working group comprising three seaweed researchers and two gastronomy experts. Go to http://isap2014.com/social_program.html

- the legalities of seaweed foraging cont.;
Summary of rules regarding seaweed collections in each state

In **Tasmania**

No license is required when less than 100 kg per person of beach-cast seaweed is collected daily for personal use. However, collecting beach-cast seaweed in Marine Nature Reserves is not allowed and the direct harvesting of native seaweeds attached to the sea floor is prohibited. Also, seaweed collection is only permitted from beaches with public access. Contact the Tasmanian Department of Primary Industries, Parks, Water and Environment for further information.

In **New South Wales**

You can obtain a permit for the commercial harvest of seaweed limited to the harvest of *Ecklonia radiata*, *Phyllospora comosa*, *Ulva intestinalis* and *Ulva lactuca* (contact the NSW Department of Primary Industry in order to apply for a permit). The collection of any other species attached to the sea floor is prohibited. However, it is legal to collect up to 20kg of beach-cast seaweed per day for personal use without the need for a permit. Anything above this weight requires a permit and collecting is not allowed in Intertidal Protected Areas, RAMSAR wetlands and Aquatic Reserves.

In **South Australia**

It is illegal to remove seaweed from Marine Parks and Reserves as well as from any intertidal rocky reef from the high water mark out to a water depth of two meters. There are currently no limits to the amount of seaweed that can be collected for personal use from areas outside of these zones. The collection of seaweed for commercial purposes is illegal unless an *exemption* is obtained from the Primary Industries and Regions South Australia, Fisheries Division.

In **Victoria**

It is legal to collect small amounts (apparently this equates to few shopping bags) of beach cast seaweed for personal use, but local council offices need to be contacted prior to collections. The rules pertaining to live algal collections are unknown but collecting is definitely illegal in Marine Parks and to the low tide level in areas adjacent to land based parks, including coastal reserves.

In **Western Australia**

Licenses are required from both the Department of Parks and Wildlife and the Department of Fisheries for personal and commercial collections of live seaweed (an Other Prescribed Purposes Licence). Permission from the relevant land manager/s (e.g. local government authority) is also required. However, dead beach-cast seaweed is not protected and if only dead seaweed is being collected and it is not being removed from a marine reserve, then no license or authorisation is required. However, another separate department, the Department of Environment and Regulation should be contacted to ensure that one does not undertake activities that may constitute 'clearing' under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* made under the *Environmental Protection Act 1986*.

I have been unable to obtain information regarding the regulations of seaweed collecting in Queensland and the Northern Territory so I advise any potential seaweed foragers to contact their relevant government departments before heading to the beach. In **Queensland**, contact that Department of Agriculture, Fisheries and Forestry and in the **Northern Territory**, contact the Department of Primary Industries and Fisheries.

**As a disclaimer, please note that this is the best information we could obtain from the relevant authorities and in many states the rules were unknown or quite ambiguous. We therefore strongly suggest speaking to your local Fisheries office to confirm the rules in your region prior to collecting.*

International Events - ISAP2014

5th Congress of the International Society for Applied Phycology 2014

Australia Technology Park, Sydney, Sunday 22 – Friday 27 June 2014

ISAP 2014
Sydney Australia
22-27 June 2014

www.isap2014.com

Strengthening algal industries for the future: key knowledge and skills gaps

Proposed Conference Themes

- Photobiology - the efficient use of light
- Health & nutrition – multidisciplinary approaches
- Biodiscovery & bioresources – metabolites from lab to market
- Selecting the strain – application of molecular and traditional phylogenetics
- Strain improvement – genetic, mutagenetic & environmental approaches
- Agricultural applications – benefits, economics and scale
- Developing nations – harnessing resources and value adding the future
- Novel industries – polymer and nanotechnology research and applications
- Advances in biofuels – status, collaboration, multidisciplinary approaches, achieving market diversity, current impediments
- Industry showcase session – the latest phycological tools and technologies
- Phycological networks – alignment, services and membership.

International Society for Applied Phycology
ISAP

Other upcoming International Events

Australasian Society for Phycology and Aquatic Botany
27th Annual Conference
Sydney Institute of Marine Science
27 - 29 November, 2013
www.aspab.org

IV CLABA
Congresso Latino-Americano de Biotecnologia de Algas &
REDEALGAS
Workshop Rede Nacional de Biotecnologia de Algas Marinhas

The Fourth Latin-American Congress in Algal Biotechnology, Brazil 18-23 November, 2013

10TH IMBC INTERNATIONAL MARINE BIOTECHNOLOGY CONFERENCE • BRISBANE 2013 •