meters! This was attributed to triglyceride, a high-energy lipid which kelps contain in large amounts.
There were several plenary lectures ranging from the role of light harvesting antennae systems and kelp ecology to evolution, biogeography and systematics of marine algae. We had the opportunity to speak with several well-known phycologists including Max Hommers and Paul Dayton, while Lisa had the chance to collect several alga specimens to boost her phylogenetic results.

A take home message is that one must be prepared and begin applying for funding at least six months beforehand. The conference provided insight into other research being undertaken and methodology used, and also provided the opportunity to make contacts at other research institutes.

After the conference, we travelled to Vancouver, Canada, where we met with and presented our research to Dr. Paul Harrison and his students at the University of British Columbia. We spent two days touring around UBC, and swapping research ideas with students and lecturers alike. A week was then spent at the Bamfield Marine Station on Vancouver Island, courtesy of Dr. Rob DeWreede. During this time we were field assistants for several UBC students working there which allowed us the opportunity to learn and identify some of the British Columbian algae we often read about. A great opportunity to make contacts, look for post-doc positions, pick brains of eminent researchers and generally enjoy a new environment (summer during our winter – superb).

My favourite seaweed: the bull kelp Durvillaea

by Catriona Hurd

To most phycologists, *Durvillaea* species typify the Australasian and Chilean marine flora. For those of us trained in the Northern Hemisphere, the first sight of *Durvillaea* is a mystical experience -

it is a magnificent sight but one many South Island New Zealanders might take for granted! Their huge size, leathery texture, sucker-like holdfast and trunk-like stipe makes them distinct from Northern Hemisphere seaweeds. *Durvillaea* grow only in highly wave-exposed sites and are considerably larger than any other seaweed occupying a similar habitat in the mid-intertidal zone. In the Northern Hemisphere you will find the small seaweeds *Fucus* (rockweed, North Atlantic) and the sea palm *Postelsia* (North Pacific) in the same shore position.

There are 3 or 4 species of *Durvillaea* globally, all Southern Hemisphere, cold water species. *D. antarctica* grows in New Zealand and Chile. The 'honeycomb' internal structure that allows *D. antarctica* to float on the sea surface is a unique property of this seaweed. *D. willana* grows only in New Zealand, and occupies a position on the shoreline beneath *D. antarctica*. It is only exposed to the air on very low tides and is distinguished from *D. antarctica* by side-branches arising from the stipe.

D. potatorum grows in Southern Australia and is morphologically similar to *D. willana*; these two species are considered ancestral. A 4th species *D. chathamensis* grows in the Chatham Islands although there is debate as to whether or not this is an ecotype of *D. antarctica* (Cheshire et al 1995).

Individuals of *Durvillaea* are either male or female. Reproduction occurs over several months during winter at which time reproductive conceptacles form over the entire blade surface – these appear as small raised dots. Each individual releases millions (up to 120 million overnight!) of eggs or sperm into the seawater. Despite extreme wave action, the sperm and eggs fuse and form a zygote, which then attaches to the rock surface and grows into a new adult. At the end of winter, you will see hundreds of small juvenile *Durvillaea* growing nearby established adults. Most of these juveniles will die in spring, when a combination of high air temperatures and low tides results in

dehydration stress that causes irreparable damage to the algal cells.

The taxonomic classification of *Durvillaea* has eluded phycologists. Its life cycle is similar to that of the Order Fucales (e.g. *Hormosira*, Neptune's necklace) and between 1826 and 1965 it was placed in this Order. In 1965, the Order Durvillaeales was established to accommodate differences in the growth pattern (*Durvillaea* = diffuse, Fucales = apical) and morphology between *Durvillaea* and the Fucales. However, recent molecular phylogenetic studies indicate the original classification was correct and *Durvillaea* are very closely related to the Order Fucales; its taxonomic status is currently undergoing revision.

In a collaborative project between the Botany Dept., University of Otago and NIWA (Wellington), we are examining the eco-biomechanical properties that allow *Durvillaea* to reach its massive size in an extremely wave-exposed environment. Over the past 3 years, myself and NIWA colleagues Drs. Craig Stevens (hydrodynamics) and Murray Smith (physics) have measured the wave-forces experienced by *D. antarctica* and *D. willana* directly, by attaching small accelerometers onto the kelp. This Marsden-funded project is the first internationally to measure wave-forces on seaweed directly and our results indicate kelps experience instantaneous accelerations of 40 m s^{-2}. PhD student Deane Harder, in collaboration with biomechanics expert Dr. Thomas Speck (University of Freiburg, Germany), has examined the biomechanical properties of *Durvillaea*. Deane found that *Durvillaea* is more extensible than Northern Hemisphere seaweeds that occupy a similar niche (*Laminaria* sp.) and hopes to determine if this biomechanical difference is related to the composition of the cell wall matrix, alginate.

Further reading on Durvillaea:

Hay, C.H. (1994). *Durvillaea* (Bory). Biology of Economic Algae. Ed. I. Akatsuka, SPB Academic Publishing, Netherlands

Cheshire, A.C., Conran, J.G. and Hallam, N.D. (1995) A cladistic analysis of the evolution and biogeography of *Durvillaea* (Phaeophyta). Journal of Phycology 31: 644-655.

Diary of upcoming events:

12th October, Thursday: BSO Talk and supper. Zoology Seminar Room, 7.00pm. With Professor Alan Mark: ***The History of New Zealand's Tussock Grasslands: Evolution and Management.***

13th October, 1-6 pm Botany Department Colloquium, Cargills Hotel and Botany Department

18th October, Wednesday: Botany Department Seminar, Botany School Annexe Seminar Room. MSc research proposals: **12.00pm** Alison Stringer: *Molecular identification of the edible ectomycorrhizal fungus* Boletus edulis *(Porcini)* **and:** Gudrun Wells. *Spatial genetic structure in a self incompatible herb* Rutidosis leptorrynchoides.

29th Dec – 7th Jan , Summer Field Trip at Borland Lodge with the Wellington Botanical Society.

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