

Seaweed hydrodynamics: research plans

Catriona Hurd

Seaweeds dominate coastal ecosystems world-wide and play an essential role in primary production and nutrient cycling. As in terrestrial plants, the control of seaweed growth and production rates is attributed to variations in light levels, nutrient supply and temperature. Of these factors, the role of nutrient supply is poorly understood because it requires knowledge of both nutrient levels in the surrounding medium and the rate of transport of those nutrients to the seaweed. The greater density of seawater compared to air means that transport rates of essential nutrients (carbon and nitrogen) in seawater are 10,000-fold slower than in air. This slow nutrient transport rate is exacerbated in habitats where seawater flows are low because a region of stagnant flow forms at the seaweed surface. In slow flows, the removal of nutrients from the seawater adjacent to the seaweed is greater than the rate of diffusion of nutrients through the stagnant region, resulting in the formation of a concentration gradient, termed the diffusion boundary layer (DBL). The supply of nutrients to a seaweed surface is thus controlled ultimately by transport across the DBL. My research goals in relation to DBLs and nutrient acquisition are to: 1. examine how DBL thickness varies with seaweed morphology and seawater velocity using oxygen microelectrodes; 2. determine if kelp production rates *in situ* are influenced by wave exposure and, 3. determine if levels of surface enzyme and microbial activity increase in slow flows thereby enhancing nutrient supply.

Fruit choice by common skinks (*Oligosoma maccanni* and *O. nigriplantare polychroma*: Scincidae)

Jane Marshall

Fruit colour is one of a suite of traits that might reflect frugivory by particular types of animals. As part of a study on the evolution of fruit colour, fruit-colour choice tests were performed on common diurnal skinks. Both skink species are omnivorous and are known to exist sympatrically with many fleshy-fruited shrub species. Ten animals, housed individually, were offered dishes of two different coloured *Coprosma* fruits daily. The fruit was presented on a contrasting green background. The fruit was left and the animals' responses were recorded on video tape for three hours. The amount of fruit they ate, the colour of the first fruit they approached, and the colour chosen on return visits to the fruit were analysed and a chi-squared test of independence was applied to the results. When fruit colour is classed as red vs 'not red' (both blue and white) the number of 'not red' fruits consumed is significantly more than the number of red fruits consumed. The number of blue and the number of white fruits approached first are also significantly greater than the number of red fruits approached first. These diurnal skinks show a strong preference for pale *Coprosma* species over red species. These results contrast with a pilot study done in

1999 where fruit was presented on a pale background and red was found to be significantly preferred. These results have to be tested further and the effect of fruit smells examined.

Poster Session

Barley yellow dwarf luteovirus (BYDV) invasions of Australasia's native grass flora.

Davis, L.T. & Guy, P.L.

The introduced barley yellow dwarf viruses (BYDVs) have invaded native grasses in New Zealand. Virus incidence was significantly lower in the native species (2%) than in the introduced species (12%). Even though overall incidences were low, hotspots were found where incidences reached 30-40% in some species. Four different serotypes (RMV, RPV, PAV, MAV) were detected in the introduced grass flora but only two (RMV, PAV) were detected in native species. In experimental transmission tests the aphid vector *Rhopalosiphum padi*'s survival was variable on the 20 native species tested but this was not due to the presence or absence of endophytic fungi as none were detected in the New Zealand species. Aphid numbers increased and plants were killed when *R. padi* fed on *Agrostis muelleriana* and *Festuca multinodis*. *R. padi* transmitted a PAV isolate to these and six other native species. *Agrostis capillaris*, *Dactylis glomerata* and *Lolium perenne* were identified as the most likely reservoirs of infection for the native flora. *Anthoxanthum odoratum* was not infected but if the SGV serotype and its vector *Schizaphis graminum* were ever introduced, *A. odoratum* could form an effective reservoir from near sea level into alpine areas.

Six viruses in *Narcissus* spp. from New Zealand.

Clark, V.R. & Guy, P.L.

Narcissus spp. from Otago showing virus-like symptoms were surveyed for viruses using ELISA and mechanical transmission tests. High incidence of virus infection was detected at five sites. *Arabis mosaic virus*, *Cucumber mosaic virus*, *Narcissus latent virus*, *Narcissus mosaic virus*, *Narcissus tip necrosis virus*, and *Narcissus yellow stripe virus* (NYSV) were detected but not *Tobacco rattle virus*, the only virus previously identified from infected *Narcissus* spp in New Zealand. There was a high incidence of NYSV in infected plants both as single and mixed infections. This is the first record for each of these viruses in *Narcissus* in NZ.