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Genetic Variability and Spatial Separation of the Kelp *Postelsia palmaeformis* Based on DNA Fingerprinting

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Twenty-four individuals were investigated over a geographic range of from <1 m to 250 km using M-13 minisatellite DNA fingerprinting and RAPDs. Genetic relatedness within clusters (=coalesced holdfasts) was extremely high. Three of the tested clusters had at least two identical individuals. Similarity values among five of the six clusters (<1 m apart) examined were >90%. At distances of 10 m and 25 m, similarities dropped to 60% and 56% respectively. Among the three sites, similarity values dropped to about 50%. In contrast, RAPD data were unable to resolve any relationships within a site but were able to discriminate among the three sites corresponding to geographic distance. Results suggest that gene flow indeed occurs over distances of about 1 m. Clusters are most probably all siblings. Patches appear to be genetically discrete. As large patches of *Postelsia* are more likely to persist from year to year, patch size almost certainly influences the degree of intra- and inter-cluster relatedness.

Macroalgal Blooms in a Eutrophic Lagoon: Key Species and Controlling Factors*

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Within the framework of the European EUMAC project a study has been carried out on the effect of eutrophication on the benthic microphytic community in the Veerse Meer (south-west Netherlands). The Veerse Meer is an artificial, shallow, brackish lake, separated from the sea in 1961. Macroalgal species number was determined by sampling 17 stations in different seasons. Results were compared with results from surveys in 1959 and 1964 (just before and after closure). Biomass development, tissue composition and habitat characteristics of macroalgal blooms were monitored for one site (PQ1, sheltered) in 1992 and for two sites (PQ1, sheltered and PQ2, more exposed) in 1994 and 1995.

In the past 25 years, species number has decreased from over 64 to 29. Except for *Petalonia fascia*, all Phaeophyceae have disappeared from the Veerse Meer, the same goes for many perennial Rhodophyceae and Chlorophyceae. Instead, new species were found, most of which were small, finely branched (e.g. *Callithamnion* spp.) or siphonous (e.g. *Enteromorpha* spp.) Rhodophyceae and Chlorophyceae. The vegetation was dominated by three *Ulva* species: *U. curvata*, *U. lactuca* and *U. scandinavica*. The artificial low winter tide and the ongoing eutrophication are probably the main causes of the decrease in species number and the shift in species composition.

Species composition at PQ1 and PQ2 in 1994/95 was different. At PQ1 *Ulva* spp. were dominating the vegetation, while at PQ2 *Ulva* spp. dominated together with *Chaetomorpha linum*. Biomass levels at PQ1 were found to be much higher in 1992 (maximum value of 348 g AFDW m^{-2}) compared to 1994/95 (maximum value of 200 g AFDW m^{-2}). Water nitrogen concentrations and tissue nitrogen levels in *Ulva* spp. were highest in 1994/95. No overall difference was found in photon flux density between 1992 and 1994–95; however, at the beginning of the growing season, irradiance levels were much higher in 1992. From the results it can be concluded that light might probably be the main factor controlling macroalgal biomass development and that nitrogen is limiting only under high light conditions in spring, as was the case in 1992.

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Species Distribution and Zonation Pattern of Antarctic Macroalgae

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As part of the Netherlands Antarctic Research Programme 1990–94 (GOA-NWO) a study on subtidal macroalgae was carried out by the NIOO-CEMO (Yerseke) in co-operation with the British Antarctic Survey (Cambridge). During two field periods at Signy Island (60°42'S, 45°36'W), distribution and zonation pattern of the macroalgae were studied, and productivity and decomposition rates of some dominant species were determined. In this part of the project, a more complete species list was produced, information on the distribution and zonation pattern of the macroalgae was collected by studying the standing crop and percentage cover of the macroalgae in relation to depth, and the influence of exposure, depth and substratum on the species composition of the macroalgal community were quantified (Brouwer *et al.* 1995: *Bot. Mar.* **38**: 259–270). Transects were studied in detail using both a photographic and a harvest sampling method. Thirty-six species were identified, three Chlorophyta, nine Phaeophyta and 24 Rhodophyta. Both the number of species and macroalgal biomass were low compared to sub-Antarctic regions. The vertical zonation found was: an ice-abraded zone characterized by *Iridaea cordata*, a zone 5–14 m depth dominated by *Desmarestia anceps* and *Desmarestia menziesii* and a zone 15–25 m characterized by *Himantothallus grandifolius*. Below 25 m the Rhodophytes *Plocamium cartilagineum* and *Pantoneura plocamioides* were dominant. The species list and zonation pattern was similar to those found at King George Island (Antarctic Peninsula) (Klöser *et al.* (1996): *Hydrobiologia*, **333**: 1–17). Of the environmental variables studied (depth, substratum, slope, exposure), only depth and substratum were significantly related to the species composition of the algal vegetation. No species were found with an optimum at depths greater than 20 m and the lowest depth of occurrence for *Himantothallus grandifolius* were predicted at 35 m. To predict the probability of species presence in any random quadrat as a function of depth, a logistic regression was used.

Dasya or *Dasysiphonia*? Identity of a Recently Introduced Red Algal Species in the Oosterschelde Tidal Basin, The Netherlands

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First collections of a marine algal species apparently new to The Netherlands were made near Yerseke in the summer of 1994. Although the alga clearly belongs to the Dasyaceae, it cannot be identified with any known European species. Its morphology can briefly be characterized as follows: plants up to 30 cm tall, lax, largely bilateral with up to five orders of branching, each segment producing a pseudolateral; segments of indeterminate axes with four pericentral cells and developing secondary cortication; tetrasporangial stichidia with a monosiphonous stalk and fertile segments with 6 or 7 pericentral cells each of which produces a tetrasporangium and (2 or) 3 post-sporangial cover cells.

Comparison with the literature and herbarium collections shows certain similarities with some Northern Pacific species of Dasyaceae, notably *Heterosiphonia japonica* Yendo and *H. densiuscula* Kylin. For both of these species (despite earlier claims, they appear not to be synonymous) it can be demonstrated that their taxonomic position in *Heterosiphonia* is untenable: their vegetative and stichidial morphology shows more *Dasya*-like traits. The more recently recognized genus *Dasysiphonia* Lee *et* West can only partly accommodate these species, and a reassessment of morphotaxonomic characters in this section of the Dasyaceae seems unavoidable.

Microalgal Growth: A New Modelling Approach

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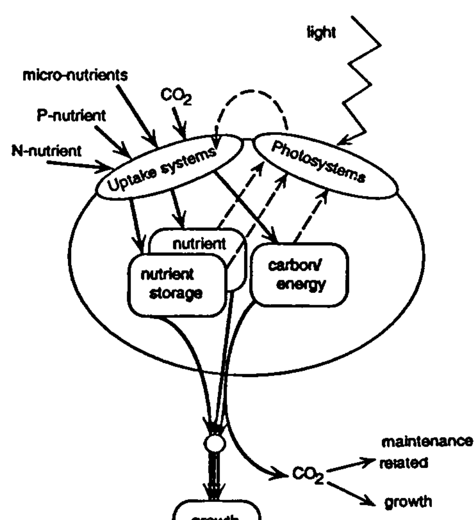
To date, a plethora of microalgal growth models exists. These models generally aim to predict primary production from as little measurements as possible. For instance, E. Sakshaug *et al.* (1989, *Limnol. Oceanogr.* **34**, 198–205) predict phytoplankton growth rates from the chlorophyll:C ratio, day length, irradiance and two composite parameters. More complex is the model of R.J. Geider *et al.* (1996, *Limnol. Oceanogr.* **41**: 1–15), which aims to explain growth on the basis of internal nutrient stores.



The chlorophyll:C ratio is generally thought to play an important role in microalgal physiology. As a result, this variable often figures in microalgal growth models. Remarkably, however, this ratio is often treated as an *input* variable. That is to say, the model does not describe how this ratio changes in relation to changes in the environment. Instead, measured values for the chlorophyll:C ratio are needed to calculate a growth rate. This situation is not satisfactory, as such models can never explain the dynamics of the chlorophyll:C ratio.

We propose to start modelling from the general scheme outlined in the above figure. A number of nutrient stores is distinguished. The model formulation focuses on the dynamics of these stores, defining uptake and utilization rates in relation to store sizes and nutrient and light availability. We illustrate this approach by a model dealing with growth on two nutrients. The model successfully describes the steady-state characteristics of both nutrients, with varying supply rates and various concentrations of both nutrients in the supply (C. Zonneveld (1996): *J. Mar. Syst.*, **9**: 121–136).