Recruitment enhancement/limitation of marine animals: the role of macroalgal habitat structure.

Paola Bouley

Carr, M.H. 1994. ***Effects of macroalgal dynamics on recruitment of a temperate reef fish.*** **Ecology, 75(5): 1320-1333**

***paper assigned for reading.**
This study shows that spatial and temporal variation in recruitment of temperate reef fish is strongly related to the variation in the structure of macrophyte assemblages. Density-dependant features of *Macrocystis* blade biomass (structural complexity), and not recruitment limitation of the kelp bass (*Paralabrax clathratus*), was shown to drive an asymptotic relationship between recruit density and kelp density. Conclusions supported by reef surveys as well as experimental work.

Dayton, Paul K.1985. ***Ecology of kelp communities.*** **Annual Review of Ecology and Systematics. Vol. 16: 215-245.**

A good, long review paper that discusses everything about kelp forests – from physical environment to population dynamics, life history, patch dynamics, dispersal, grazers, spatio-temporal dynamics, etc.

Gaines, S.D. and Roughgarden, J. 1987. ***Fish in offshore kelp forests affect recruitment to intertidal barnacle populations.*** **Science Vol. 235: 479-481.**

***paper assigned for reading.**
This paper illustrates that the dymanics of offshore kelp forests and intertidal communities can be strongly coupled. Juvenile rockfish that recruit too, seek shelter, and feed in kelp forests prey on barnacle larvae passing through the kelp forests as the larvae move shoreward toward the intertidal substrate. This predation by juvenile rockfish on barnacle larvae was shown to reduce barnacle populations to $1/50^{th}$ of their level in the absence of predation. A great paper that expands the way we think about the interactions between, and recruitment of marine populations.

Gaines, S. and Roughgarden, J. 1985. ***Larval settlement rate: a leading determinant of structure in an ecological community of the marine intertidal zone.*** **Proceedings of the National Academy of Sciences (USA) 82:3707-3711.**

Local population structure of the intertidal barancle *Balanus glandula* is shown to be related to local settlement rates. In locations with a low settlement rate show a low barnacle abundance with high year-to-year variations in their abundance, while locations with high barnacle settlement rates show high abundances with low year-to year

variation. (Not directly related to the topic of habitat structure, but important to consider with regard to the paper we read (see above) by these authors that showed a coupling between near shore kelp forests and patterns in barnacle recruitment).

Gaines, S. and Roughgarden, J. 1985. ***Spatial variation in larval concentrations as a cause of spatial variation in settlement for the barnacle, Balanus glandula.*** **Oecologia 67: 267-272.**

Local settlement rates for this intertidal barnacle is shown to mirror adjacent, offshore cyprid larval concentrations. (Again, not directly related to the topic of habitat structure, but important to consider with regard to the paper we read).

Ebeling, AW., Laur, DR., 1985. ***The influence of plant cover on surfperch abundance at an offshore temperate reef.*** **Environmental biology of fishes. Vol. 12, no. 3, pp. 169-179.**

Examines, experimentally, the role of kelp density in providing refuge for juvenile surfperch which inhabit kelp forest together with adult surfperch and kelp bass, both predators on these juvenile stages. Indicates that kelp bed structure can play an important role in the recruitment of age-classes to a population, since the occurrence and abundance of juveniles is tied to kelp bed cover (or refuge structure).

Holbrook, SJ, Carr, MH, Schmitt, RJ, Coyer, JA., 1990. ***Effect of giant kelp on local abundance of reef fishes: the importance of ontogenetic resource requirements. Bulletin of Marine Science [BULL. MAR. SCI.], vol. 47, no. 1*** **pp 104-114.**

Giant kelp forests undergo large variations in structure over space and time which in turn affect the recruitment of temperate reef fishes dependant on the kelp substrate as habitat.

Hoven, H., Grizzle, R., Short, F., Kindblom, L., 1991. ***Eelgrass as a larval trap: The "Honami" effect.*** **Journal of Shellfish Research [J. SHELLFISH RES.], vol. 10, no. 1, pp. 275-276.**

This field study shows that most post-larval and juveniles stages of the blue mussel occur on the distal tips of eelgrass. Since these distal tips move through the water column more per unit time it is proposed that the hydronamical effect of seagrass leaf blade waving in response to tidal current (the "Honami" effect) is a mechanism that promotes more larval settlement from the water column by simply encountering more larvae. No experimental evidence for this is shown.

Editors: D.M. John, S.J. Hawkins, J.H. Price. Plant-Animal Interactions in the Marine Benthos. Systematics Association , Clarendon Press, Oxford, 1992.

A large volume with numerous contributions regarding many plant-animal interactions in the sea - endosymbioses, coevolution, and herbivory.

Tegner, MJ., Dayton, PK. 1981. Population Structure, *Recruitment and Mortality of Two Sea Urchins (Strongylocentrotus franciscanus and S. purpuratus) in a Kelp Forest.* Marine Ecology Progress Series. Vol. 5, no. 3, pp. 255-268.

Sea urchins populations, grazers on kelps, in southern kelp forests are examined. It is determined that spiny lobsters and giant sheephead are the main controlling force on urchin populations. May be important in that the lobster and sheephead are both harvested by humans.

Tegner, MJ., and Dayton, PK.. *Ecosystem effects of fishing kelp forests communities.* ICES Journal of Marine Science [ICES J. Mar. Sci.]. Vol. 57, no. 3, pp. 579-589. Jun 2000.

This is a very interesting biogeographical review paper that examines the potential ecosystem effects of human exploitation of sea-urchins (major grazers on kelps), sea-urchin predators, and kelps themselves.
