

Inter- and Intra-specific Stock and Recruitment

The stock-recruitment relationship has traditionally been considered in the intraspecific mode — interactions within a single-species stock. Many of these species have shown a strong relation, fitting either the dome-shaped (Ricker) curve or the asymptotic (Beverton-Holt) curve, but other species have shown little or no relation between stock size and recruitment.

The failure to demonstrate a stock-recruitment relation may be influenced by interspecific relations as indicated by Pauly (Trans. Amer. Fish. Soc., 111, 1982). He showed that recruitment of penaeid shrimp in the Gulf of Thailand was related to the annual egg production of shrimp and the biomass of predators and competitors. His findings were based on evidence that the prerecruit mortality of shrimp was dependent on the total standing stock of demersal species, fish and shrimp (see figure). Skud (Science, 216, 1982) also proposed an

species. The continued examination of stock recruitment on a species by species basis seems incongruous with the mounting evidence of species interactions — in both freshwater and marine environments — and with the present-day emphasis on an ecosystem approach to management. If one accepts the premise of competition among species, it is incompatible to assume that recruitment is independent of the results of competition. The existence of an interspecific stock-recruitment relation may also explain the apparent disparity between the dome-shaped and the asymptotic recruitment curves. A decline in recruitment may result in a subordinate species when the biomass of all its competitors is high, but the same species, if dominant, may maintain a high recruitment at the expense of subordinate species.

Reader's views on this topic are invited. We would welcome receiving supporting or opposing evidence to the existence of interspecific stock-recruitment relation.

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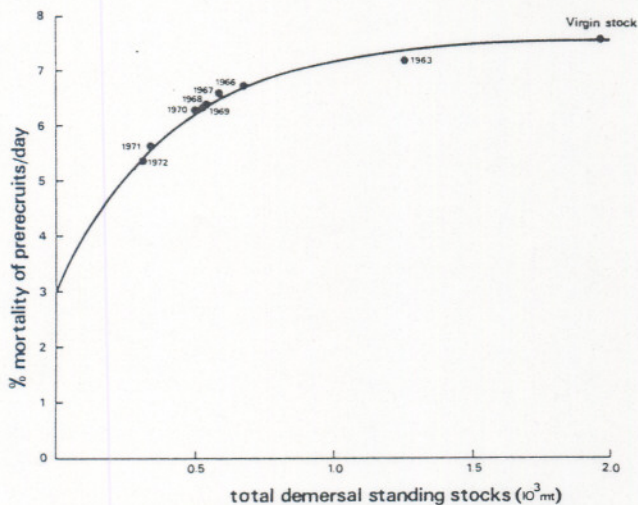


Figure: Relationship between the percent daily mortality of penaeid shrimp prerecruits and the biomass of potential shrimp predators and competitors in the Gulf of Thailand. (From Pauly, 1982)

interspecific explanation for recruitment of competing species such as Atlantic herring, *Clupea harengus*, and Atlantic mackerel, *Scomber scombrus*, which have alternated as the dominant and subordinate species in the Western North Atlantic. He concluded that the density dependent factors that govern the recruitment of the dominant species also function in an interspecific mode to control the abundance of subordinate species.

Interspecific relations may well explain the lack of a stock-recruitment relation in so many studies of single

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