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枸杞岛近岸3种生境鱼类群落组成及岩礁区底栖海藻对鱼类群落结构的影响

Constitution of fish assemblages in three nearshore habitats and the effect of benthic macroalgae on fish assemblages in Gouqi Island

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中文摘要:

2005年—2006年及2010年5—6月对枸杞岛近岸岩礁生境分布的底栖海藻进行观测和潜水采样,发现岩礁生境潮下带底栖海藻组成模式分以大型底栖海藻铜藻为优势种和以孔石莼等小型藻类为优势种两类。2009年2月—2010年1月利用组合刺网对枸杞岛海域岩礁、沙地和贻贝筏式养殖区3种生境的鱼类进行了逐月采样,通过采用方差分析、聚类和非度量多维标度等统计分析手段发现:(1)岩礁生境鱼类以底栖趋礁杂食性为主,沙地生境鱼类以中下层洄游肉食性为主,贻贝筏式养殖区生境鱼类大型个体占优;(2)岩礁生境鱼类多样性较高,大型底栖海藻生长的岩礁生境中鱼类群落组成较小型底栖海藻生长的岩礁生境稳定。前者为枸杞岛近岸优势种群繁衍提供有利条件,对鱼类幼体和小型个体有诱集作用,为鱼类捕食者提供更多样化的食物选择,鱼类群落较稳定;后者易受外界鱼类迁移的影响,个体数量和生物量月间差异大。

英文摘要:

Macroalgae covering on the rocky reef around coast of Gouqi Island were surveyed and sampled through diving during 2005 to 2006 and May to June 2010, in order to find out the distribution, constitution and life history of macroalgae. Two composing patterns of macroalgae were shown in the subtidal zone of rocky reef: one was dominated by standing macroalgae *Sargassum horneri*; another was dominated by smaller macroalgae, such as *Ulva pertusa*, which is widely distributed both in intertidal and subtidal zone. The life history of *S. horneri* showed the four stages of the larger kelp bed: young seedling development period (August to September), slow growth period of seeding (October to February in next year), fast growth and reproduction period (March to May), decomposing and declining period (June to July). The smaller kelp bed exists the whole year, without much difference to outside of the kelp bed. To estimate the composition of fish assemblages in three habitats around Gouqi Island nearshore, i.e. rocky reef, sandy beach and mussel cultivation rafts, we sampled the fish assemblages in three habitats by combined gill nets every month from February 2009 to January 2010. The indexes of Jaccard similarity, Margalef richness and Shannon-wiener diversity were used to compare the variety of fish community structures among habitats, combined with statistical analysis of variance, UPGMA and nMDS. It showed that the differences of fish community structures among above three habitats were significant. The dominant fish species in rocky reef habitat were *Sebastes marmoratus*, *Agrammus agrammus* and *N. albiflora*. Fish community was mainly based on the demersal omnivorous rocky fishes, which prey mainly on benthic invertebrates living on macroalgae. The dominant fish species in sandy beach habitat were *Paraplagusia japonica* and *Nibeia albiflora*. Fish community was mainly based on the mid-lower migration fishes. For fish assemblages in mussel cultivation raft habitat, which were mainly bigger-size fishes, *Mugil cephalus* and *Decapterus maruadsi* were dominant species. The diversity of fish assemblages in rocky reef habitat was higher than that in the other two habitats, due to the relative complex habitat structure. The dominant fish species in both kinds of kelp beds were the same, i.e. *S. marmoratus*, *A. agrammus* and *N. albiflora*. But the structures of fish community were different, due to the species composition of macroalgae covering on rocky reefs. Fish communities in rocky reef habitat dominated by standing larger macroalgae were more stable than those in areas with smaller macroalgae, varied following the life history of *S. horneri*. The biomass of

fishes showed a similar trend to the abundance. But the biomass and abundance of fishes in rocky reef habitat dominated by smaller macroalgae were quite different. Fish assemblages in areas controlled by smaller macroalgae were affected greatly by the external migration fish assemblages. The species diversity based on abundance of the former was smaller than the latter, but the species diversity based on biomass of the former was larger than the latter. The abundance and biomass have a significant monthly variation in rocky reef habitat with smaller macroalgae. This can be due to the fish assemblages, in which fish species were with larger size, which migrated to rocky reef habitat from open sea area during February to May. Rocky areas covered by standing macroalgae provided a more diversified food selection for local dominant fish species. They possessed an attraction for partial group larvae and small size individuals. Meanwhile, they offered diversified food choices for upper class of fish, which contribute to the stability of fish community.

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