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Effect of mesh size on the size distribution of Bigeye, Yellowfin and Skipjack caught by purse-seiners in the eastern Indian Ocean

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Introduction

Catch of juvenile Bigeye and Yellowfin by purse-seine FADs operations is considered to be harmful for the stock. Practical methods to reduce the proportion of juvenile tuna catch are needed. Using net with bigger mesh size would be a solution for this problem.

The size distributions of fish caught with nets of different mesh size were compared to study the effect on reducing catch of smaller fish.

Materials and method

Data from three tuna purse-seiners were used for the analysis; Nippon-maru Ⅱ (maximum mesh size of 210mm), Nippon-maru Ⅲ (270mm) and Taikei-maru No.1(300mm). The data were collected in 2004 and 05 for Nippon-maru Ⅱ and in 2008 for both Nippon-maru Ⅲ and Taikei-maru. Only catch data for April and May were used for the analysis as these are the season when smaller fish dominate in purse-seine catch in the eastern Indian Ocean.

Caught fish were randomly picked from brailing net and the fork length distribution of each catch was measured.

Results

Figure 1,2 and 3 shows the size distributions of Skipjack, Yellowfin and Bigeye caught by each ship respectively.

For Skipjack in April, the maximum value of first peak is in 34cm and 36cm for 210mm mesh size, 36cm for 270mm and 38cm for 300mm. In May, 36cm and 35cm for 210mm, 38cm for 270mm and 38cm for 300mm. The smallest peaks seem to shift to larger side slightly when using lager mesh. For Yellowfin and Bigeye, annual variance dominates and mesh size selectivity is not clear.

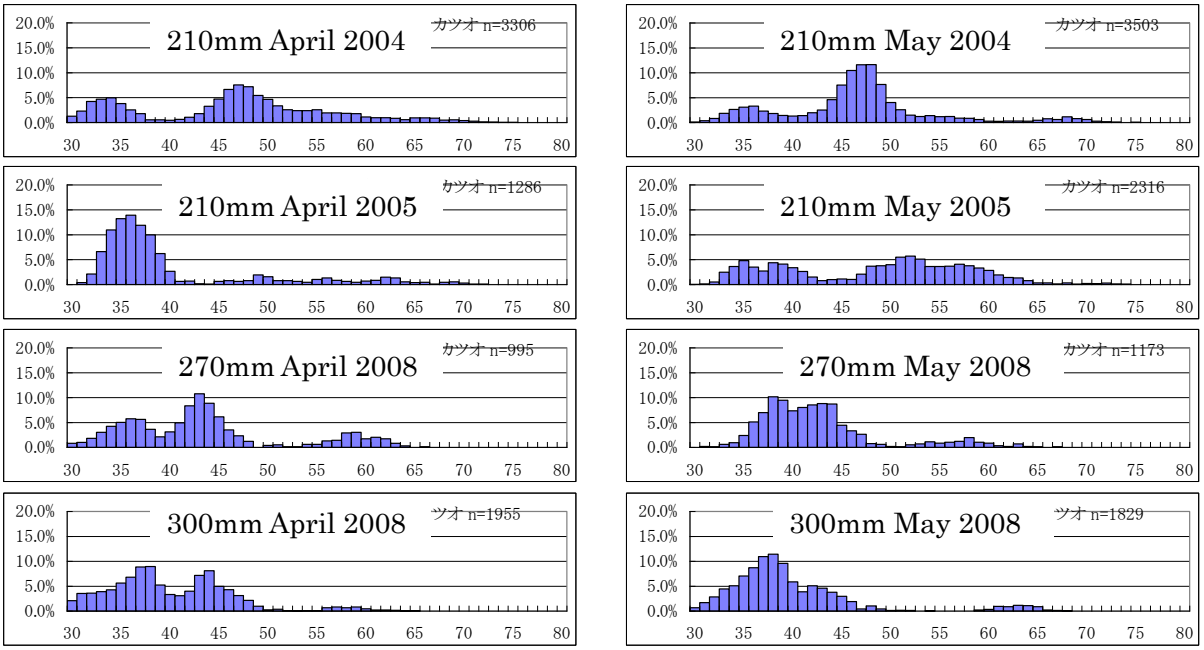

Fig.1 Size distributions of Skipjack caught by each ship in April and May.

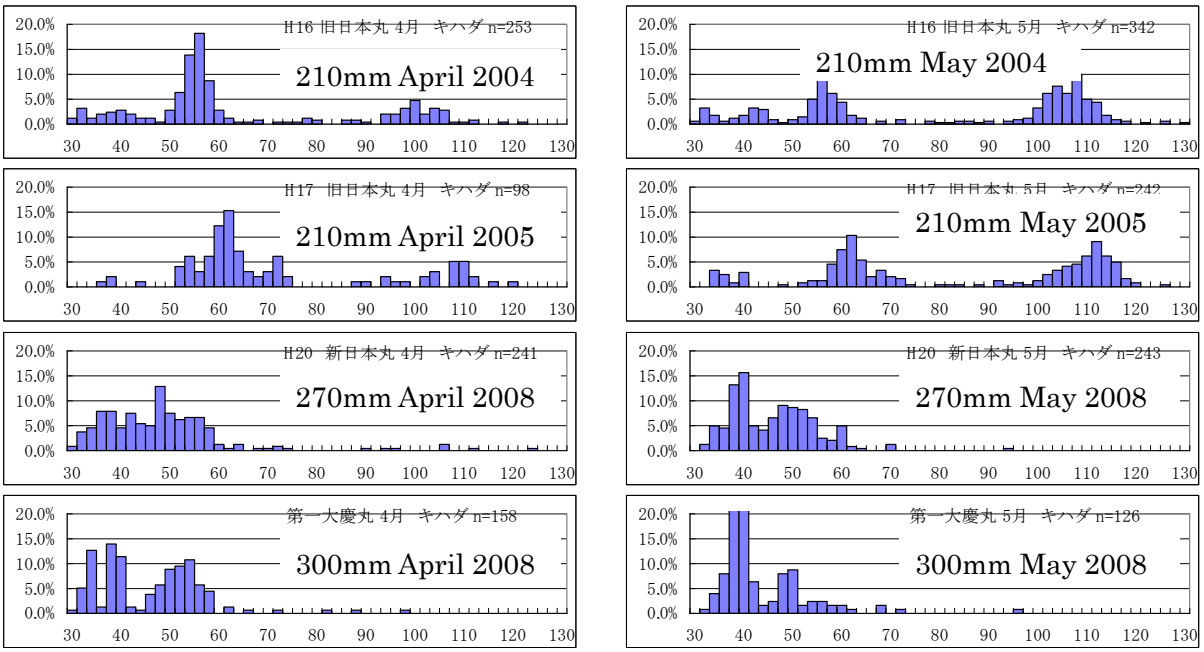

Fig.2 Size distributions of Yellowfin caught by each ship in April and May.

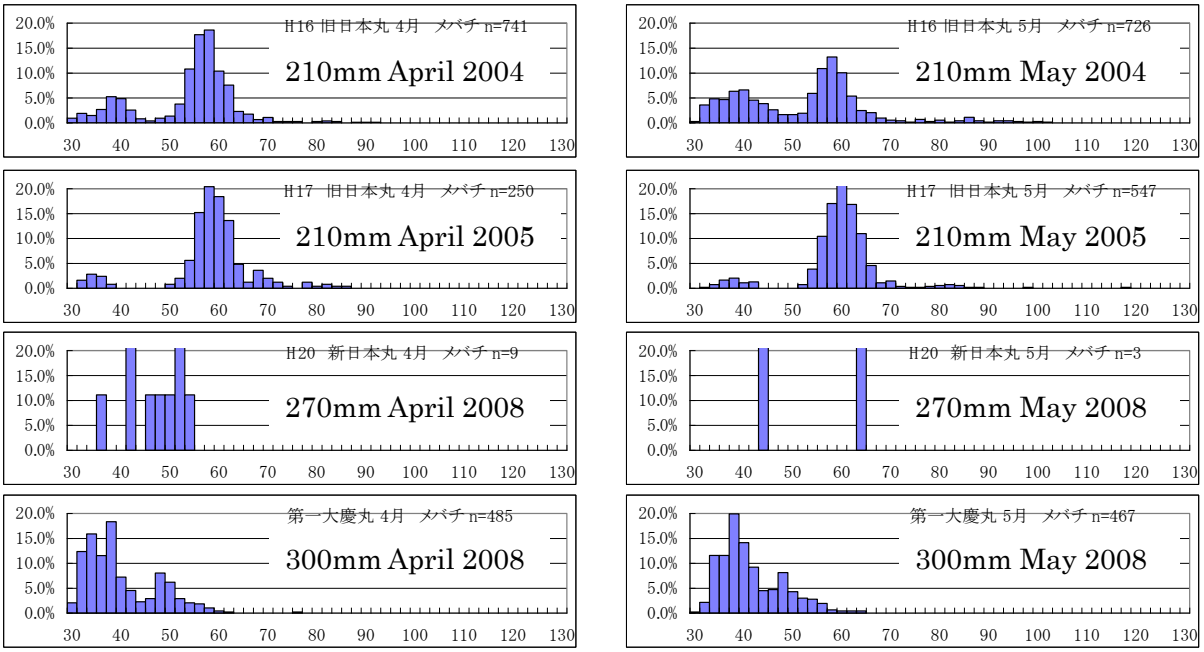

Fig.3 Size distributions of Bigeye caught by each ship in April and May.

Discussion

Larger mesh size seemed to have limited effect on reducing juvenile catch by purse-seine.

That's because size selectivity of purse-seine net is influenced by many factors other than mesh size. One of the factor is the movement of the net during haul. When the net is moving continuously fish cannot go through the mesh even if the opening is big enough. Experienced fishermen say that when the hauling stopped due to some problem, small fish are likely to escape through the mesh. Another factor that affects selectivity is the current. Fishermen say when operating in strong current, escape of the fish through mesh increases. That's probably because under strong current, smaller fish are carried away with water and has more chance to pass through the net. Contrary, when there is no current, fish are more likely to stay away from the net until the hauling goes on and they were surrounded by 90mm mesh of bunt section.

Thus our provisory conclusion is that using larger mesh might be a necessary condition, not a sufficient condition. To reduce juvenile catch, we plan to conduct following works on the field.

- Study the mechanism of escape of fish through net; when, how and where they go out from the net?
- Effect of using sorting grid or square mesh
- Explore the way to increase the contact of fish and net after pursing.