Science and Industry Collaborate to Reduce Small Shrimp Catch

The reappearance of robust northern shrimp stocks, believed to be the result of strong 2003 and 2004 shrimp year-classes, has industry people hoping they'll be able to maintain a productive product stream that down the road could translate into increased economic benefits and stability for harvesters and processors.

However, stock abundance isn't the only element in a successful shrimp fishery. In the January 2007 issue of *Commercial Fisheries News*, Spencer Fuller of Cozy Harbor Seafood Inc. cautioned that market conditions – low worldwide shrimp prices, cheap warmwater shrimp, low prices for cooked/peeled northern shrimp out of Newfoundland and a 20% duty to export into Europe – factor in as well.

To compete in such a diluted market, fishermen have tried to improve quality and consistency to both increase local demand for fresh product and obtain higher prices for their catch.

Vincent Balzano, captain of the North Star out of Portland, has been working with Pingguo He of the University of New Hampshire to develop a new size-sorting grid system for the fishery in addition to the industry standard Nordmore grate.

He explained, "Although very successful at reducing fish bycatch, the Nordmore grate does not improve shrimp size selection, and large amounts of small shrimp are typically landed when they're present on the fishing grounds."

New grid design

Commercial shrimp fishermen are required to meet various gear restrictions, including a minimum mesh size of 1¾" and use of a Nordmore grate. They also must abide by a prohibition on mechanical devices used to cull, grade, separate or shake shrimp on board. Working with these requirements, industry has collaborated with researchers since the late 1990s to further reduce deck sorting time by eliminating bycatch, enhancing catch rates, and minimizing the gear's impact on bottom habitat through conservation engineering.

Pingguo He helps Carl Bouchard refine his shrimp gear.

With support from the Northeast Consortium, He and Balzano have designed, manufactured and evaluated a new size-sorting grid system.

While previous multi-grid designs placed sorting grids after the Nordmore grate with limited success, the prototype consisted of a size-sorting grid (38"x45" with 11mm slots) placed ahead of a standard Nordmore grate (38"x58" with 25mm slots).

The operating theory behind the design is to direct small shrimp to a size-sorting grid where they exit the net, while the targeted large shrimp pass through a standard Nordmore grate and proceed to the cod-end. Finfish would continue to exit through an escape vent located at the top of the second grid.

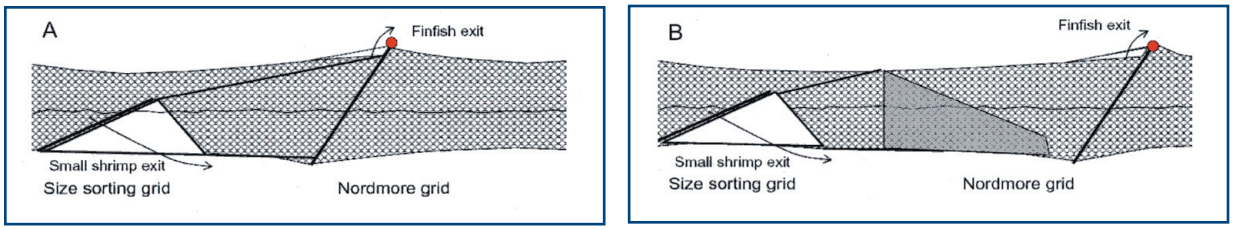
However, He was concerned that diminished water flow between the two grids might reduce sorting efficiency, so they decided to evaluate two prototypes – one with a mesh funnel after the sorting grid to direct shrimp to the base of the Nordmore grate and one with no funnel.

Aboard the Stormy Weather, Paul Kuncho hauls in about 1200 lbs of Northern shrimp using the dual-grid system.

Testing

The designs were tested at sea during the 2005-2006 shrimp season aboard Balzano's North Star and the Persistence, owned and operated by Tim Eddy of Portland, ME.

Both size-sorting prototypes – with and without funnel – reduced small shrimp landings considerably, by 18-20 count per



Two shrimp trawls, a dual grid without a funnel (A) and a dual grid with a funnel (B), are being tested in different areas and under different conditions to determine if either — or both — can help reduce small shrimp catch.

pound. The catch statistics appear to indicate that the majority of small shrimp excluded from the dual-grid system were 20mm (¾") carapace length and smaller.

Unexpectedly, the funneled design decreased shrimp catch by 43%, a margin clearly not acceptable for a commercial enterprise. But the catch rate using the no funnel grid system was comparable (no statistical difference) to the commercial catch. The research team did not observe a difference in finfish bycatch between the experimental systems and the commercial grate.

Top-less trawl

To address bycatch, He has been evaluating a "top-less" shrimp trawl with fisherman David Goethel of Hampton, NH, a project supported by the Northeast Cooperative Research Partnership Program of the National Marine Fisheries Service. This design has shown great promise and is continuing to be evaluated.

He believes that there will not be one gear design for the shrimp fishery that will work in every situation. "What we try to do as gear researchers is to give the industry additional tools," he explained.

During the later part of the season or in specific habitats where shrimp size classes are mixed, the dual-grid system would be appropriate. On the other hand, when fishing in an area with high herring abundance, the top-less shrimp trawl or other bycatch reduction system may be the gear of choice.

Ground truthing

The next logical step is to begin making this technology available to the shrimp industry and see how it fares under commercial fishing conditions.

He presented the dual-grid system at a January fisheries roundtable meeting held in Portsmouth, NH. The roundtable meetings are sponsored by NH Sea Grant and offer a broad range of fisheries topics that are discussed in an informal setting.

Following the meeting, Carl Bouchard, captain of the Stormy Weather, expressed an interest in using the size sorting system. Bouchard was going to be fishing in an area he knew to have small shrimp and was hoping the dual-grid would improve his counts.

At the same time, Bouchard thought that the design might lose a considerable amount of large shrimp through the escape exit above the Nordmore grate. As larger shrimp pass over the sorting grid, without a funnel or other means of mechanical direction, animals may first encounter the Nordmore grate nearer the fish escape exit, which could result in reduced separation time and loss of shrimp catch.

Always open to collaboration, He spent half a day working with Bouchard to place a panel of mesh after the sorting grid, hoping to direct shrimp to the bottom of the Nordmore grate and away from the fish escape exit. After fishing with the dual-grid several times over the following week, Bouchard came to the conclusion his counts were "definitely lower" and total landings were about the same.

"I'm not landing more large shrimp, I'm just catching fewer small shrimp," Bouchard said, adding that he would like to try to use the dual-grid approach combined with the top-less trawl to "get the best of both worlds – reduce bycatch and release most of the one- and two-year-old shrimp."

Bob Campbell, manager of the Yankee Fishermen's Cooperative in Seabrook, NH, agreed with Bouchard. "On a given day, Carl's counts have been lower than the fleet average. For example, on one particular day the co-op's average count was about 52 per pound and Carl averaged around 43 to 44 per pound," he said. Campbell also pointed out that if demand was higher, having a lower count would provide more opportunities for increased revenue.

Pingguo He will be presenting the dual-grid at the Maine Fishermen's Forum. Anyone interested in an at-sea demonstration or in using the gear should contact him at pingguo.he@unh.edu or Ken La Valley at ken.lavalley@unh.edu.

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