

## Pollock or Cod: Can the Difference Be Told?

The pollock, *Pollachius virens*, is a good source of protein which can often be processed and prepared in recipes that call for Atlantic cod, *Gadus morhua*, or haddock, *Melanogrammus aeglefinus*. The pollock is similar in flavor, odor, and texture to both cod and haddock, yet is not a popular catch among coastal water fishermen who often equate it with poor quality and throw it back.

The pollock is a relative of the Atlantic cod but is usually smaller, averaging 4-12 pounds compared with the cod's average of 10-22 pounds. Also, coastal-water caught pollock may be smaller yet. Although nutritional values are very similar (Table 1), our April 1983 survey of several fish markets in the Boston-Gloucester, Mass., area showed pollock costing an average of \$0.50 per pound less than cod.

Thus, we designed a study to see if the general public could distinguish between Atlantic cod and pollock prepared in three recipes (Table 2). Those tasters who could distinguish a difference were then asked to give their preference.

Tasters for this study were volunteers who attended an Open House at the Essex Agricultural and Technical Institute in Danvers, Maine, 30 Apr.-1 May 1983. Volunteers varied in sex, age, and

ethnic origin. The tests were conducted, and the samples prepared, by students of the Institute's Food Science and Nutrition Program. Fish used for the taste tests were donated by a commercial fish processor in the form of frozen fish fillet blocks. Recipe samples were prepared as in Table 3 for Gloucester Sea Puffs, Fishwiches, and Fishcakes.

The triangle test was used, with each taster given three samples of a particular recipe (Table 2). Two like samples were prepared using cod, one sample was prepared with pollock, or vice

versa. The tasters were asked to identify the two like samples and then give their preference of either the like pair or the odd sample. Tasters marked their results on score sheets which were returned for tabulation (Fig. 1). To avoid chance selection of the odd sample, samples were served in the order shown in Table 4, thus lowering to one-third the probability of chance selection of the odd sample.

The results of the 2-day test are given in Table 5. More than 60 percent of the tasters failed to identify the like samples of Fishwich and Fishcake, and nearly half of the tasters failed to identify the like samples of Gloucester Sea Puffs. About 50 percent of those tasters who correctly identified the like pairs of Fishwich and Fishcakes preferred pollock over cod.

Our conclusion is that pollock may be successfully substituted in these recipes with very little difference in quality and taste. In fact, in the case of the Fishwich, pollock seems to make the product even more desirable to tasters. We hope these results can help encourage consumers to request pollock from fresh fish retailers and thereby make it

Table 1.—Nutritional values of cod and pollock (per 100 g)<sup>1</sup>.

Item	Values	
	Cod	Pollock
Protein (g)	17.6	20.4
Fat (g)	.3	.9
Carbohydrates (g)	0	0
Sodium (mg)	70	48
Potassium (mg)	382	350
Water (g)	81.2	77.4
Calories	78	95

<sup>1</sup>Source: U.S. Department of Agriculture, 1973.

Table 2.—Test recipes<sup>1</sup>.

Gloucester Sea Puffs	
1¼ pounds fish	3 medium eggs
2½ cups self-rising flour	½ tsp. black pepper
2 tbsp. chopped parsley	1¼ cups milk
2 cloves minced garlic	4 cups vegetable oil

Cut fish into 5-inch strips ¼-½ inches thick. Season lightly with salt and set aside. Beat eggs well, add milk, and mix well. Combine flour, parsley, garlic, and pepper. Add to egg and milk mixture. Mix well. If batter is too thick, add a little more milk. Heat vegetable oil to boiling point in heavy pan or Dutch oven. Dip fish pieces in batter until well covered. It may help to stir with a large spoon. Brown pieces in oil; they will float. Turn them over to brown evenly, drain on paper towels. Puffs can be frozen and reheated in hot oven.

### Fishwiches

1 cup cooked fish	¼ cup mayonnaise
¼ cup chopped celery	2 tbsp. catsup
1 tsp. chopped parsley	salt and pepper

Mix the first five ingredients together and salt and pepper to taste. Then spread between slices of bread. Can also be served on crackers or used as a sandwich filling.

### Fishcakes

1 pound fish	1½ cups diced potatoes
1 cup bread crumbs	¼ cup grated parmesan cheese
2 large cloves garlic, finely chopped	1 tsp. parsley flakes
1 tsp salt	dash pepper
cooking oil	2 eggs

Cover potatoes with water and bring to boil. Add fish and continue boiling until potatoes are tender and fish flakes easily. Drain, cool for 10 minutes, and mash. Add crumbs, cheese, garlic, parsley flakes, salt, pepper, and eggs. Mix well. Shape into cakes and fry in cooking oil at 375°F until brown. Drain on absorbent paper.

<sup>1</sup>Source: The Fishermen's Wives of Gloucester, 1976.

Table 3.—Sample preparation.

### Gloucester Sea Puffs

- 1 Frozen fish blocks were cut into about 1 × ½ × ½-inch pieces.
- 2 Fish pieces were rolled in the flour mixture and dipped in the batter.
- 3 Dipped pieces were drained briefly to remove excess batter and placed on cookie sheets lined with freezer wrap.
- 4 Coated pieces were frozen at -20°F and then packed in 1-pound batches in polyethylene freezer bags.
- 5 Bags were held in the freezer at 0°F until preparation.
- 6 Frozen puffs were fried in soybean oil at 375°F until golden brown (about 90 seconds) prior to serving.

### Fishwiches

- 1 Frozen fish blocks were thawed at 40°F and cooked in steam-jacketed kettles.
- 2 The fish was cooled and packed in polyethylene bags with enough celery, parsley, salt, and pepper for a double recipe, and held at 40°F until ready for use.
- 3 Before serving, mayonnaise and catsup were added and the salad was made.
- 4 Salad was served on round crackers.

### Fish Cakes

- 1 Frozen fish blocks were thawed at 40°F and the cakes were prepared and fried according to the recipe.
- 2 Fish cakes were cooled and wrapped in a clear plastic food wrap, boxed, and stored at 40°F.
- 3 Prior to serving, the fish cakes were reheated in a convection oven at 325°F for 15-20 minutes.

Two of the samples are identical and the other different. Please check the duplicate samples and score your preference for either the identical or odd samples.

**SCORING:** Designate whether you prefer the pair or the odd sample by (P).

Sample #	Identical samples (indicate by check mark)	Score
_____	_____	_____
_____	_____	_____
_____	_____	_____

Plate # \_\_\_\_\_ Date \_\_\_\_\_

Figure 1.—Sample score sheet.

Table 4.—Serving guide for triangle test.

Plate #	Product	Arrangement of pollock (P) and cod (C) on test plate
1	Fishwich	P P C
2		P C P
3		P C C
4		C P C
5		C C P
6		C P P
7	Sea Puffs	P P C
8		P C P
9		P C C
10		C P C
11		C C P
12		C P P
13	Fishcakes	P P C
14		P C P
15		P C C
16		C P C
17		C C P
18		C P P

Table 5.—Test results.

Recipe	Total	Cor- rect	Incorrect	Preference	
				Cod	Pollock
Fishwich	168	65	103 (61%)	17	24 (59%)
Sea Puffs	190	97	93 (49%)	46	28 (38%)
Fishcakes	119	45	74 (62%)	17	15 (47%)

more profitable for coastal water fishermen to keep and utilize their pollock catches.

### References

- Amerine, M. A., R. A. Payborne, and E. B. Roesler, 1965. Principles of sensory evaluation of foods. Acad. Press, N. Y.  
The Fishermen's Wives of Gloucester. 1976. The

- taste of Gloucester. Gloucester Cookbook Committee, Gloucester, Mass.  
Ryan, J. J. 1979. The cod family and its utilization. Mar. Fish. Rev. 41(11):25-36.  
\_\_\_\_\_. 1978. Preparation of fish fillet blocks. Mar. Fish. Rev. 40(1):5-12.  
U.S. Department of Agriculture. 1973. Composition of foods. Agric. Handb. 8.

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## All-Tackle Angling Records Are Expanded

The International Game Fish Association (IGFA) has announced the revision and expansion of its all-tackle world record program by opening it to game fishes not currently on its record lists (past catches included) and by reviewing well-documented applications for past catches that exceed its current listings.

All-tackle records are maintained for the heaviest fish of a species caught according to IGFA angling rules on any line up to 60 kg (130-pound) class. The listings are being expanded to recognize catches of species which, though popular in various fishing areas, have never been documented in a world record program. The evolution of the all-tackle program to date has also excluded recognition of past catches in instances where new species have been added over the years.

Late last year IGFA began accepting

applications for "all-tackle" recognition of species whether or not they were included among the world record species in the association's "1983 World Record Game Fishes" book. This applies to both freshwater and saltwater fishes. Catches made after 1 January 1984 must be in accord with current IGFA angling rules and world record requirements. The angler must complete the IGFA world record application form in its entirety and submit the required data and information.

For catches made in the past, as much information as possible must be submitted on an IGFA world record application form with additional substantiating data. Acceptable photographs must be submitted, the weight of the fish must be positively verified, and the method of catch must be substantiated.

Applications for "new species" must conform to the following requirements in addition to published IGFA rules:

1) The fish must represent a valid species with a recognized scientific name.

2) The fish must be a species commonly fished for with rod and reel in the general area where the catch is made.

3) The fish must be identifiable based on photos and other supporting data presented with the application.

4) The fish must be considered "trophy-sized." A rule of thumb will be that the weight must fall within the top half of the estimated maximum weight of the species. (The minimum weight requirement for any IGFA record is 1 pound or 0.45 kg.)

All-tackle record applications for "new species" will be accepted throughout 1984, and the first new listings of all-tackle records will be announced in January 1985, at which time appropriate certificates will be issued for the largest approved catches. Entries in IGFA's Annual Fishing Contest (including validated entries from past years) will also be considered for all-tackle recognition. No new species will be recognized or added to the record system during the calendar year of 1984.

All-tackle record applications for species currently included in IGFA's record program will be processed and

awarded during 1984. Decisions by IGFA's Executive Committee regarding acceptance or rejection of record claims will be final.

"We are undertaking this revised and expanded record program," said IGFA President E. K. Harry, "in order to recognize all sport fish of interest to anglers worldwide and so that our all-tackle listings will truly reflect the heaviest catches made in a sporting manner on rod and reel, whether past or present." A current copy of IGFA world record rules and requirements is available for US\$1 to cover cost, postage, and handling from IGFA, World Record Department, 3000 East Las Olas Blvd., Ft. Lauderdale, FL 33316-1616. (Source: IGFA.)

### **USITC to Investigate Northeast U.S. Scallop, Groundfish Industries**

At the request of the United States Trade Representative (USTR), the U.S. International Trade Commission has instituted investigation 332-173 to gather and present information on the competitive and economic factors affecting the performance of the Northeastern U.S. groundfish and scallop industries in selected Northeastern U.S. markets and will analyze these industries' competitive position in these markets. Specifically, the Commission has been asked to develop the following information, with an emphasis on, but not limited to, the Canadian and U.S. industries: Government assistance to the fisheries industries; fisheries resources and their trade; industry integration; employment; product prices, financial structure of the harvesting and processing industries; the effect of exchange rates and tariff and nontariff barriers on the flow of trade between the two countries; the importation of other product types, like frozen fish blocks; and trade barriers of other potential Canadian export markets.

The USTR requested on 8 November 1983, that the Commission investigate the competitive conditions affecting the performance of the fishing industry in the Northeastern United States. The

USTR specified that the investigation should cover fresh and frozen whole groundfish (cod, haddock, pollock, flounder, and sole), groundfish fillets, and scallops and that the study should concentrate on the industries and markets of the New England and Middle Atlantic States. To the extent possible, the study will provide information on the distinct markets for each of the groundfish species and the interaction between U.S. imports and the operations of U.S. harvesters, processors, and importers. The USTR also requested that emphasis be placed on an analysis of industry conditions in Canada and U.S. imports from that country.

A public hearing for the investigation will be held on 5 September 1984, in Boston, Mass., and on 7 September 1984, in Portland, Maine. At least 60 days before the hearings, a *Federal Register* notice will be posted giving the exact times and locations. All interested persons may present information and be heard. Requests to appear at the public hearing should be filed with the Secretary, U.S. International Trade Commission, 701 E Street NW, Washington, DC 20436, by noon, 29 August 1984.

In lieu of or in addition to appearances at the public hearing, interested persons are invited to submit written statements concerning the investigation at the earliest practical date, but not later than 22 August 1984. All submissions should be addressed to the Secretary at the Commission's office in Washington, D.C. Further information is available from Doug Newman or Tom Lopp, Agriculture, Fisheries, and Forest Products Division, U.S. International Trade Commission, Washington, DC 20436.

### **Louisiana Fisheries Well Managed and Productive Report State Officials**

Persistent charges by some environmental groups that Louisiana fisheries, including the important shrimp fishery, are declining in productivity because of improper management of those re-

sources are false and unsubstantiated by fisheries statistics, according to the Louisiana Department of Wildlife and Fisheries. Jesse J. Guidry, department secretary, said that in 1981 Louisiana had led all of the other states in total fisheries poundage produced, with a catch of 1,168,579,000 pounds, representing 20 percent of the entire national catch. In 1982, total poundage was even greater. Louisiana produced 1,718,700,000 pounds.

Louisiana shrimpers, along with all American shrimpers, didn't catch as much shrimp as they did in 1981 which was the all-time record year for shrimp production in American waters. The catch in 1981 surpassed any previous catch since records have been kept. However, Guidry said, in 1982, for the third year in a row, the value of the shrimp catch went up. The national 1982 harvest returned \$509.1 million to shrimpers at dockside, an increase of \$45.9 million over 1981. The value of the catch set a record for shrimp, surpassing the value of the 1979 catch when 335.9 million pounds brought \$471.5 million.

Guidry said that statistics released by the National Marine Fisheries Service showed that Louisiana shrimpers produced some 57 million pounds of heads-off shrimp in 1982 at state docks. This was less than the 71 million pounds produced in the all-time record year of 1981, but the dollar value to Louisiana shrimpers was \$146 million, compared to 1981's \$136 million. In reality, he said, this is where economics enters the seafood picture. The total catch was down 19 percent, but the smaller catch brought Louisiana shrimpers an extra \$10 million more than the banner catch of 1981.

It is significant to note that during the past 5 years of shrimp production in Louisiana, three of those years have been progressively better record years. There were 66 million pounds of headless shrimp produced in 1977; 66.2 million pounds in 1978; making two back-to-back record years; and 71 million pounds in 1981.

Guidry said there is a rule of thumb in calculating the value of dockside shrimp landings to the overall

economic importance of the shrimp industry to the state. The dockside value of the catch is multiplied by three to provide a broad base. Consequently, the \$146 million dockside value of the 1982 shrimp catch in Louisiana is projected to be a base \$438 million segment of Louisiana's seafood economy. When oysters, crabs, menhaden and finfish values are added, we are looking at a half-billion dollar seafood industry, he added. Contrary to unsubstantiated statements by some groups, Louisiana's fisheries resources have never been more productive and this certainly reflects sound and wise management of those resources, Guidry concluded.

### Lobster and Crab Bait Studied in California

The results of a California research project on odors influencing the foraging behavior of spiny lobsters, *Panulirus interruptus*, and rock crabs, *Cancer antennarius*, provide data for lobster and crab fishermen and to those interested in developing artificial baits. University of California at Santa Barbara (UCSB) Sea Grant researchers R. K. Zimmer-Faust and J. F. Case conducted the research on a small rocky reef area 4-7 m deep near the UCSB campus. Elliptically shaped 40" × 31" × 12" polyethylene mesh traps were used. Some of the primary findings were:

- 1) Live prey (bait) failed to attract lobsters. Mussels, urchins, abalones, polychaete worms, and snails were tested. The results suggest that odors from live prey are not effective in attracting prey. Visual and tactile contact may be necessary in addition to odor.
- 2) Injured live mussels, urchins, and abalone did attract lobsters.
- 3) Chopped abalone muscle was most effective and selective in capturing lobsters, while chopped angel shark muscle was most effective and selective in capturing crabs. Angel shark also attracted sheep crab, *Loxorhynchus grandis*. Mackerel was effective for lobsters but gave highly variable results with crabs.
- 4) Ridgeback shrimp heads and soft

tissues of sea urchins were ineffective baits for both crabs and lobsters. The shrimp appeared to repel lobsters.

5) Traps baited with 180 g (6 ounces) of abalone were most effective after 24-48 hours of exposure, but were ineffective by the fourth day. Traps baited

with 1,600 g of abalone were most effective after 48-72 hours of exposure and were effective until the seventh day. The researchers suggest that the decomposition of the abalone muscle produces odors stimulating lobster foraging.

### Oregon Shrimp Landings Depressed

Oregon shrimp landings for September 1983 totaled 390,000 pounds, compared with 1,696,000 pounds for September 1982. Total cumulative landings through September were about 6.1 million pounds, a decrease of 66 percent from the 17.7 million pounds landed through September 1982.

The number of vessels fishing and

the number of deliveries continued to decline, with 35 vessels making 69 deliveries in September. During September 1982, 89 vessels made 213 deliveries. The average catch dropped from 8,000 pounds/trip in 1982 to 5,600 pounds/trip in 1983. Almost all of the shrimp delivered was caught in the Gray's Harbor or Destruction Island area. Fishermen received \$0.77-0.80 per pound for their catch. (Source: Oregon Dep. Fish Wildl., Newport.)

Table 1.—Preliminary Oregon shrimp landings, 1-30 September 1983.

Area	Landings (1,000 lb)		No. of vessels		No. of deliveries		Season totals (1,000 lb)	
	1982	1983	1982	1983	1982	1983	1982	1983
North <sup>1</sup>	1,038	364	40	30	92	60	6,689	4,255
Central <sup>2</sup>	236	26	16	4	33	8	4,315	1,435
South <sup>3</sup>	422	<sup>5</sup>	33	1	88	1	6,722	1,377
Total	1,696	390	89	<sup>6</sup> 35	213	69	17,726	6,067

<sup>1</sup>Astoria and Garibaldi.

<sup>2</sup>Newport.

<sup>3</sup>Coos Bay and Brookings.

<sup>4</sup>Includes 51,179 previously unreported during June and July.

<sup>5</sup>Under 1,000 pounds delivered.

<sup>6</sup>May be high due to duplicate counts among some ports.

### Record 468-Pound Sturgeon Caught

A 468-pound sturgeon taken ½-mile off Benecia, Calif., by Joey Pallotta last summer has been approved as a new all-tackle world record by the International Game Fish Association, Ft. Lauderdale, Fla. The fish, identified as a white sturgeon by California Fish and Game Department biologists, was estimated at about 100 years old.

Pallotta was fishing from an 18-foot fiberglass boat when the sturgeon took a shrimp bait just a few minutes after his

first cast. He radioed a nearby friend in a 26-foot cruiser. When the boat pulled alongside, Pallotta jumped aboard, never releasing the rod. It took 5 hours to subdue the 9-foot fish on 80-pound line.

The catch, made 9 July 1983, broke both the all-tackle record and the 80-pound line class world record of 407 pounds set in the Sacramento River, Colusa, Calif., in 1979. Pallotta, of Crockett, Calif., reportedly donated the huge specimen to the Crockett Historical Society Museum. (Source: IGFA.)