

United States Department of the Interior  
Fish and Wildlife Service

-----  
Fishery Leaflet 136

Washington 25, D. C.

Rerun May 1956

September 1945

DRY-SALTING MULLET, RED DRUM (CHANNEL BASS) AND KINGFISH (KING MACKEREL) <sup>1/</sup>

By Norman D. Jarvis, Technologist  
Division of Commercial Fisheries

Illustrations by Katherine L. Howe

Mullet, mullet roe, red drum (channel bass), and kingfish (king mackerel) are about the only fish dry salted commercially in the South Atlantic and Gulf of Mexico areas. Of these, mullet is most important. The latest available data show a production of 1,749,500 pounds of salted mullet in 1940.<sup>2/</sup> The largest share of this was prepared on the west coast of Florida, the second largest amount in North Carolina, and the smallest in South Carolina and Alabama. Production figures for red drum (channel bass) and kingfish (king mackerel) are not available. These are cured by fishermen in small quantities for local use or for distribution over a limited area.

MULLET

Some of the mullet are brine salted especially in North Carolina, but the greater part is dry salted. The most important area for production of dry-salted mullet is from Carabelle to Cedar Key on the west coast of Florida. Practically all of the curing is done in the late fall and early winter months.

Most of the mullet must be transported a considerable distance to the curing plant. Some fish are still brought in by boat but probably the greater part is delivered by truck and no special care given in handling. Most of the fish are taken by gill net, a smaller quantity being caught by haul seine. These fish are frequently mixed with sand and weeds but to obtain a better product should be washed before loading in the boat or truck.

Preparation begins as soon as the mullet are landed at the fish house. They are first washed to remove sand and other debris. The heads are usually removed, especially from the larger fish, but the collarbones or "napes" are retained. If this is not done, the fish are apt to shred in handling. The mullet are split in a manner usually referred to as "mackerel style." The splitter holds the fish with his left hand with its tail toward his body. He places the knife blade so that it will scrape along the backbone, then, splits the fish along the back without cutting through the belly wall, leaving the backbone on the

---

<sup>1/</sup> This leaflet supersedes S-27, issued by the former Bureau of Fisheries.

<sup>2/</sup> Fiedler, R. H. - Fishery Statistics of the United States, 1940.

Statistical Digest No. 4, Fish and Wildlife Service, 225 pp. (Obtainable from the Superintendent of Documents, Washington 25, D.C. Price 35 cents a copy.)

right side of the cut and the halves attached at the tail. The backbone may be partially removed in the larger fish by making an additional cut on the other side.

If the mullet contain roe, this is carefully removed for salting separately. The viscera, the black membrane lining the body cavity or so-called "black skin," and coagulated blood are scraped out as thoroughly as possible. Careful salters scrub the intestinal cavity with a piece of gunny sacking or coarse canvas as the most effective means of removing black skin and blood. The flesh is scored longitudinally on both sides at intervals of about one inch, so that the salt can readily penetrate the flesh.

The fish are then put into a tub of clean sea water, where they remain for about 30 minutes, after which they are thoroughly washed. The soaking aids in removing diffused blood from the flesh. After the mullet are removed from the washing tank they are allowed to drain for a short time. They are then rubbed thoroughly with a medium-grain salt. They are next piled in kenches or stacks inside the fish-house. The kenches are about 3 feet in height. The fish are arranged in regular layers, skin side down and two deep, with heads to the outside and tails to the center. A thin layer of salt is scattered over each layer of fish. The total amount of salt used is about 30 lbs. to 100 lbs. of fish.

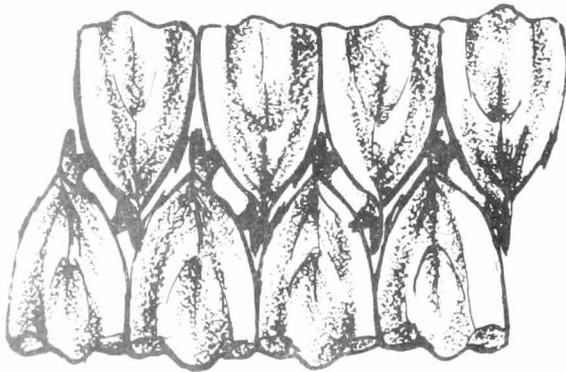
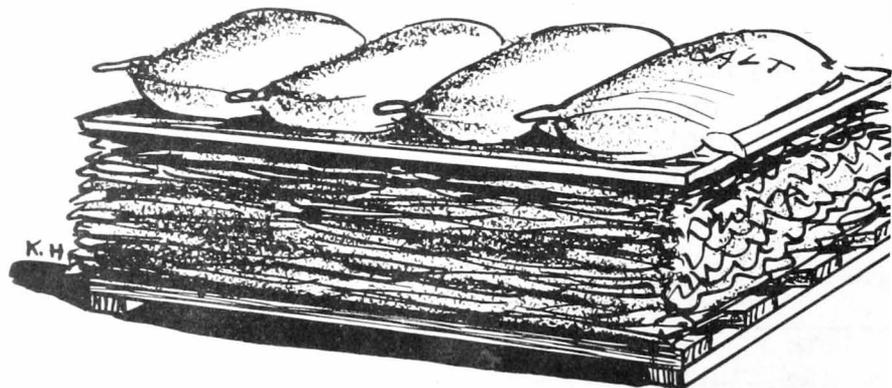


Fig. 1.-Method of arranging mullet in kench.

Fig. 2.-Dry-salt mullet in kench.



The fish remain in the kench until they are to be placed on the market which may not be for 3 or 4 months. Some packers weight down the fish to press out moisture and some rekench the fish once or twice reversing the order of layers, but this practice is not common. For shipment, the fish are brushed, weighed, and placed in open boxes or bushel baskets with a scattering of salt on top.

The following method is used by those who wish to prepare a choice product and are willing to go to the extra trouble. The cleaned fish are washed thoroughly and dropped in a tub of salt brine made in the proportion of 1 pound of salt to 1 gallon of water. They are allowed to soak in the brine for 30 minutes to remove all traces of blood from the cut flesh. After brining, the mullet are drained for at least 20 minutes to remove surplus moisture.

A shallow box, about 2 feet square, is filled with salt, usually a "dairy-fine" grade. The drained fish are rolled in this salt, which is also rubbed into slashes in the flesh. A thin layer of salt is scattered over the bottom of a tub or salting tank. The mullet are then picked up with as much salt as will cling to them and are packed in even layers in the tub, flesh side up, with each layer at right angles to the preceding one. A small amount of salt is scattered between the layers. A loose-fitting cover is placed on top and weighted down sufficiently so that the fish will be covered by the brine formed. In warm weather, a saturated brine may be added immediately instead of allowing brine to form gradually by extracting moisture from the flesh. The maximum amount of salt used is about 30 lbs. to 100 lbs. of fish, the same as that recommended for kench-curing mullet.

The mullet should be sufficiently salted in about 48 hours, after which they are removed from the brine. The fish are then scrubbed thoroughly to remove excess salt, and placed in layers, flesh side up (except for the top layer) on a low rack. The stack is weighted down heavily to press moisture out of the fish. The next morning the mullet are hung in a shady spot where there is a good breeze, or they may be dried on racks of chicken wire in an open-walled shed. At night they are re-stacked and weighted down, but are set out to dry again the next morning.

In good drying weather the mullet will be sufficiently cured after 6 days of drying. In unfavorable weather, and for the larger fish, more time is required. In damp, humid weather, the salters allow the fish to remain kenched, re-stacking them occasionally with a scattering of salt between the layers. After the drying process is completed each fish is sprinkled with fine, dry table salt and wrapped in waxed paper. The fish are then packed in tightly-covered wooden boxes holding about 10 pounds.

#### DRY-SALTED MULLET ROE

From 80,000 to 150,000 lbs. of dry-salted mullet roe are prepared commercially each year in the United States. Production is divided between North Carolina and Florida.

The requirements in quality of the raw product are the same for the two methods of dry salting used. That is, the roe must be fresh, of good color, and the skin of the roe sac must not be broken.

The first step, in both methods, is to prepare the roe by freeing the lobes from blood, gall bags, bits of intestine, and black skin. After being washed thoroughly and allowed to drain, they are ready for salting.

In the first method, after this preliminary treatment, the lobes of roe are rolled in fine salt; 2 pounds of salt to 10 pounds of roe are sufficient. Too much salt must not be used as an excess will break the egg sacs. The lobes are picked up with as much salt as will cling and packed in tubs with a scattering of salt over each layer. They remain in salt for at least 48 hours, and may then be placed in chill storage and held in salt for some time if not to be marketed immediately. In packing for sale, the roe are taken out of salt and placed in fillet boxes with a light scattering of fresh salt.

In the second method, the washed and drained lobes of roe are rolled in fine salt, using about one pound of salt to 10 pounds of roe. The lobes are removed from the salt in from 6 to 12 hours, and are brushed well to remove excess salt. They are laid in direct sunlight, usually on a shed roof. During the first day of drying, they are turned every hour, and in the evening are brought indoors. Any night moisture or rain falling on the roe after drying has started will spoil, or at least damage, the product. Boards and weights are placed on the roe for the first night or two in order to compress them slightly. Drying requires about one week under good dry weather conditions.

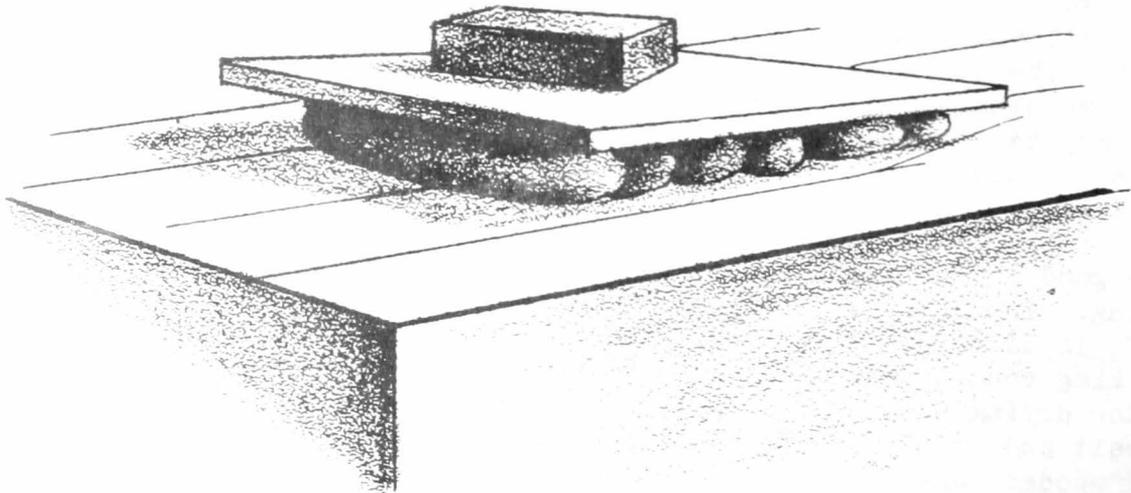


Fig. 3.-Pressing mullet roe during drying process.

Drying is completed when the roe are reddish-brown in color and feel hard. The thumb should leave no impression. The dried roe are dipped in melted beeswax. After being allowed to cool for about 15 minutes they are wrapped in waxed paper, packed in a wooden or tin box, and stored in a cool dry place.

The product is sliced thin and eaten as an appetizer without further preparation. The custom of preparing roe in this manner is said to have been introduced in colonial times by Englishmen who had enjoyed a like product in Greece. Mullet roe salted and dried according to this method, called "bolargo", was well-liked in England during the 17th century.

#### CHANNEL BASS OR DRUM

Channel bass or drum are caught in considerable numbers along the South Atlantic coast in the late summer and fall. Since there is not a great demand in the fresh-fish market, much of the catch is dry salted for local use, especially along the North Carolina banks. The only market is among the coast people, the fishermen and their neighbors on the shore of the adjacent mainland.

The heads are cut off, the fish are split into two sides, and the backbones removed. Each side is scored through the flesh lengthwise from collarbone to tail, the cuts, about 2 inches apart, penetrating almost to the skin. The sides are washed thoroughly in salt brine to remove blood or other waste, and drained for about 20 minutes.

The drained sides are rolled in a box of fine salt, and the salt is rubbed well into the flesh, especially into the cuts. The sides are then packed flesh side up in even layers in tubs. A little more salt is scattered over each layer and the top layer is weighted down. The tub is then filled with a saturated salt brine. The fish are allowed to remain in brine for about two weeks. The sides are then removed and scrubbed thoroughly to rid them of excess salt, blood spots, or black skin. The sides are stacked not more than 2 feet high, the bottom layer being placed skin side down, and the others skin side up. The top layer is covered by boards and heavily weighted.

The next day the sides are hung in a shady place for about 10 hours of air drying. If the weather is unfavorable, the kench is repiled, reversing the order of layers. The flesh must not be exposed to direct sunlight during the first few days of drying, as a crust will form which hinders the removal of moisture from the inner flesh. At the end of the day, the fish are stacked as before and weighted down heavily. They are left in the kench during the next day, after which they are given a day of air drying. The process of a day of drying followed by one of pressing is continued until the fish are well dried. The product is considered thoroughly cured when the pressure of a thumb in the thick part of the back leaves no impression.

#### KINGFISH

Small quantities of kingfish (king mackerel) are dry salted in the Florida keys and on the west coast for local sale. The quantity so prepared has decreased in recent years, but it is still a commercial product.

The fish salted are usually those taken during the first part of a long fishing trip, or those which cannot be disposed of profitably in the fresh-fish market. The fish are split open, eviscerated, and the membranes removed. The split fish are then washed. The thick part of the flesh is slashed crosswise

from back to belly with cuts about 2 inches apart. A small amount of salt is sprinkled over the surface of the flesh and rubbed well into the cuts. If the fish are to be used in a day or two they are given no air drying, but if held for a longer period, they must be dried. The fish are spread on shed roofs or wood piles, or are hung under the eaves by their tails.

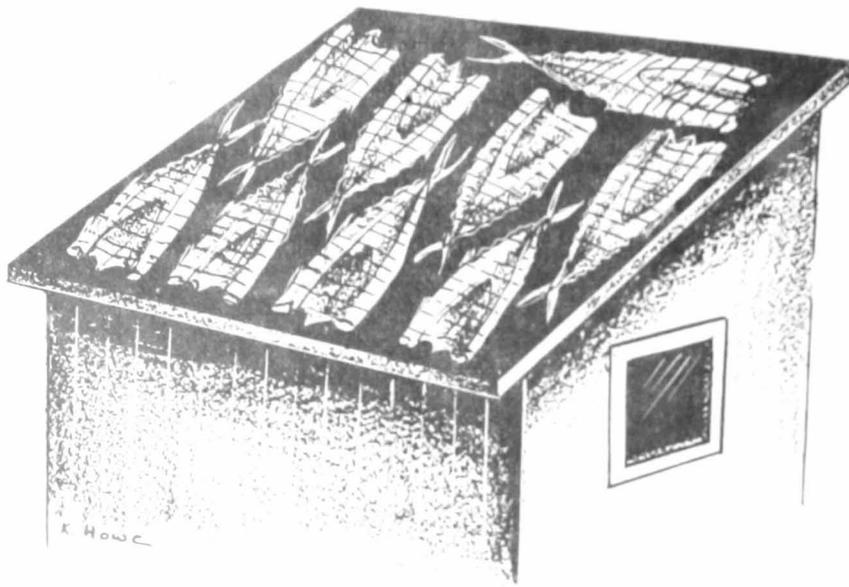


Fig. 4.-Drying kingfish on shed roof.

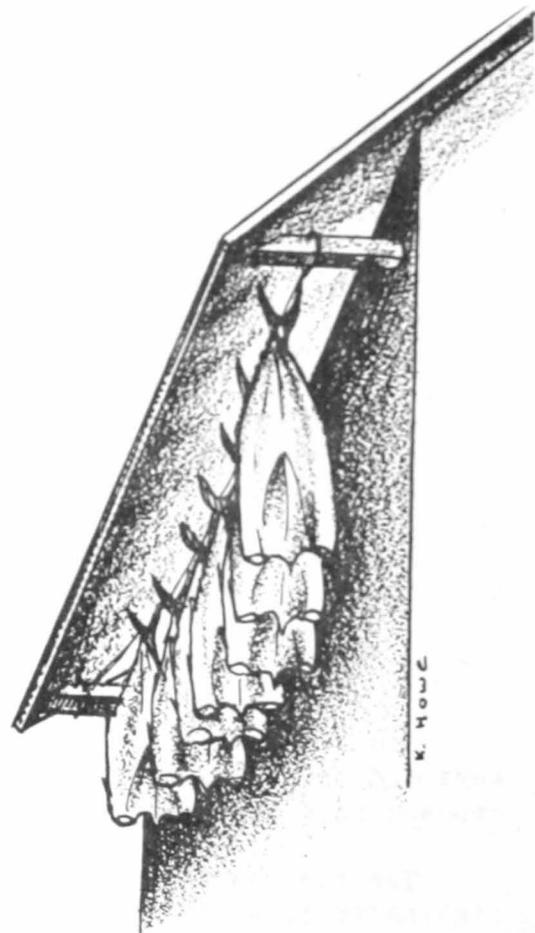


Fig. 5.-Drying kingfish under eaves.

## REFERENCES

### FISH AND WILDLIFE SERVICE.

1944. Striped mullet and their preparation for the table. Fishery Leaflet 48. (Obtainable from the Fish and Wildlife Service, U. S. Department of the Interior, Chicago 54, Ill.)
1945. Available publications on fisheries. Fishery Leaflet 9. (Many of the publications listed in this leaflet are available for free distribution by the Fish and Wildlife Service, while others may be purchased only from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.)

### JARVIS, NORMAN D.

1945. Brine-salted mullet. Fishery Leaflet 51. (Obtainable from the Fish and Wildlife Service, U. S. Department of the Interior, Chicago 54, Ill.)
1945. Home preservation of fishery products. Fishery Leaflet 18. (Obtainable from the Fish and Wildlife Service, U. S. Department of the Interior, Chicago 54, Ill.)

### TRESSLER, D. K.

1923. Marine products of commerce. Reinhold Publishing Corp., 330 West 42nd St., New York, N. Y. Price \$12.00.