

DISCUSSION

Industrial Fisheries Session

Discussion Leader: HOWARD O. STURGIS

Discussion Panel: RAYMOND L. HAYNIE, JR., JACK T. STYRON,
JOHN S. ROBAS, WAYNE M. WALLER, T. A. BARBER

Technology of the New Industrial Fish Industry of the Central Gulf of Mexico

TRAVIS D. LOVE

- Q. Haynie: You classify these species as industrial fish. How do you determine whether a fish is a trash or whether it is an edible fish or a sport fish?
- A. Love: This depends partly on vicinity. For example, in the north central Gulf, where we are working, there is no large commercialization of croakers for food, so at least 99 per cent of the utilization of croakers as well as of anchovies, razor-belly herring, and round herring falls in the classification of trash fish.
We anticipate in the future that there may be a conflict in the designation because our technology laboratory is now doing work on the canning of several of these species, notably on the anchovy.
As far as sport fishing is concerned, the only one of these fish large enough to eat is the croaker in Lake Pontchartrain. At this time there are a few hundred pounds of so-called bull-croaker caught by sportsmen. Most of what we have called industrial fish would never get big enough to be of interest to the sportsman.
- Q. Styron: In using trash fish for mink food, is the fish frozen?
- A. Love: Yes. The whole fish is frozen in 50 pound blocks and shipped under refrigeration.
- Q. Robas: Concerning the problems of the thiaminase content of certain fish which you use for feeding mink, some years ago we investigated the possibility of using frozen menhaden press cake on the theory that pressing reduced the water content considerably and that the cooking had destroyed the thiaminase. Has this been tried in the Gulf?
- A. Love: I have no information on that.
- Q. Robas: You mentioned that the trawlers which fish for trash fish are paid \$35 a ton for their fish. Can you give us more details on this?
- A. Love: The company doing the biggest part of the packing, rather than deal with the fishermen, has set up a broker system. The plant guarantees the broker a price and he in turn guarantees the boat crews a price, of \$35 a ton. The broker has enough boats under contract that they sometimes must

wait to ~~unload~~. This is the reason he guarantees them this high price, so that they will be willing to sit at the dock and wait to unload.

Q. Waller: How much further expansion can this industry expect? You show that only a small area was being exploited; is this the extent of the resource?

A. Love: No, only a small part of the potential resource is now being utilized.

Holston:
(Comment) In our College Park Laboratory we are conducting nutrition studies on the use of unprocessed menhaden as a possible form of animal food. The results to date have not been too gratifying. There is a possibility that there may be more than one antimetabolite, such as thiaminase, present, or some other factor that we as yet do not recognize. There will not be any immediate market for unprocessed menhaden.

Recent Accomplishments in the Fish Oil Utilization Program

JOHN HOLSTON

Q. Haynie: As some of this work is complete, what plans does the Service have for the dissemination of information to the people that it will help? How are we going to get the refiners or the users of this stuff to look at it?

A. Holston: As soon as enough scientific data are available, we publish the Technical Supplements to the Commercial Fisheries Review. There has been one on the fish oil program, one on the fish meal program; we expect within the next month to have the second one on the fish oil program and sometime perhaps in January or February the second one on the fish meal program.

There is a six to eight months' delay in publication in scientific journals. We try to prevent a lag in the dissemination of knowledge by means of Digest Reports that we distribute to a limited number of people on a quarterly basis.

Thirdly, we are making a collected bound volume of reprints of technical publications that appear in outside journals. These will be available on an annual basis for study at any one of our major laboratories. The actual problem of distribution I will leave up to you and your treasurer. I do not know how we will do that.

Q. Styron: Most fish oil producers are interested in the product finding its way into a product in some volume. When you talk of leather tanning and ore flotation and insecticides do you know what volume is involved?

A. Holston: I cannot give you exact figures, but in the case of ore flotations process alone the figures are astronomical. Ap-

proximately one-half pound of fatty acids per ton of ore is used and in over a year this alone would require more fish oil than is presently produced in the United States.

Q. Barber: I think the Fish and Wildlife Department should have a man who has had experience in the industry so that he could interpret technical data to the numerous industries. This man might develop certain information which could be referred back to the institutions doing the research work so that they might carry on along certain useful new lines.

A. Holston: This was the whole point of my paper this morning. We feel that it is time that the industrial fisheries paid as much attention to organic chemistry as they do to nutrition.

Q. Robas: So far, the discussion this morning has been related to American fish oil problems. I would like to point out that we are fortunate to have with us three men from Mexico who are presently building a fish reduction plant on the Yucatan coast. Now, Mr. Holston, imagining yourself in a remote area in the Caribbean where technical skills are few and where anyone producing fish oil will have to start with a crude product, is there any presently simple chemical process for removing some of the triglycerides from fish oil?

A. Holston: I think it would be a much easier job to remove the non-saponifiable matter and the stearin contents and what he had left would be very highly enriched in triglycerides.

Q. Robas: Isn't it true though that most of those processes start out first with refrigeration which, in remote areas, is difficult and expensive?

A. Holston: Yes.

Exploratory Fishing for Sardine-Like Fishes in the Gulf of Mexico

JOHN THOMPSON

Q. Styron: Is the midwater trawl a net that has proved to be efficient in other areas?

A. Thompson: The midwater trawl of the pattern that we are using, a modified British Columbia type trawl, has been used in northern waters where tremendous hauls have been made. In fact, one of the difficulties with the net is the fact that it runs into dense schools which at times tear the net apart. With the advances in electronics, and a device for measuring the tension on the net we will be able to avoid tearing the net.

The Role of the Estuary in the Life History and Biology of the Atlantic Menhaden

FREDERICK C. JUNE AND J. LOCKWOOD CHAMBERLAIN

Q. Haynie: Do you think that sufficient emphasis has been placed on

the consequences that could result if we continue to destroy our estuaries?

- A. June: I do not think that there has been enough emphasis on the importance of estuaries. Many fishes must have these waters for completing their life cycle. While all of the activities such as dredging, filling, and spraying may have little effect by themselves yet the sum total of all these may seriously affect our fishery resources. These problems keep coming up. One in particular is in Narragansett Bay, where consideration is being given to the construction of a barrier across the bay for hurricane protection. Another is in Delaware Bay, where serious consideration is being given to the construction of a barrier across that area. As time goes on more and more of such activities are coming into being. We must be concerned not only with the immediate, but also with the long term effects of such activities on our fisheries.
- Q. Styron: Do you think that the data you are getting on the Atlantic menhaden will be of assistance in studying those in the Gulf?
- A. June: The menhaden of the Gulf are entirely different from those on the Atlantic coast. However, there are certain similarities and there is little doubt that the information which we are getting on the Atlantic Coast menhaden will apply to a useful extent to the Gulf menhaden.
- Q. Robas: You mentioned this morning a southern river where industrial pollution resulted in massive killing of menhaden. Would you give me the name of the river and the year?
- A. June: It was in 1957 in the Pamlico River, North Carolina.
- Q. Robas: Do you know if anyone has ever studied the tolerance of juvenile or larval menhaden to the pollution from paper mills?
- A. June: There are no such studies to my knowledge.
- Q. Waller: Should we expect an abundance of menhaden in the Atlantic next spring?
- A. June: From our look at the estuaries along the Atlantic Coast this past summer we think that there are more menhaden in the 1958 year brood than there have been in any of the previous year broods which we have examined.
- Q. Menzel: Have adverse estuarian conditions caused the disappearance of menhaden in some of the northern areas, such as New Jersey?
- A. June: We do not know to what extent changes in estuaries have affected the menhaden resources in the past. It would seem that the decrease in the water temperature, particularly the Gulf of Maine areas and slightly farther southward, had most to do with the disappearance of menhaden in those areas.
- Q. Costello: Would you elaborate on your estimate of the abundance of pre-recruits?

A. June:

We are interested in deriving an index of abundance of a year class in the estuary, and relating this with the relative abundance of those fish the following summer in the commercial fishery. This essentially consists of marking menhaden in tributary streams. We close off the mouth of the tributary and mark the fish by clipping off the lower lobe of the caudal fin. We estimate the number of fish in that population from the proportion of the recaptures in samples of random catches. Tests on mortality resulting from fin clipping show virtually no mortality. We also hope to utilize fluorescein dyes for such population estimates. It would seem that dyes could be most effectively used by dyeing the plankton, letting the fish eat the dyed plankton and utilizing ultra-violet light for determining the number of marked fish that were in the population.

The Use of Electricity in Commercial Fishing in the Sea

CONRADIN O. KREUTZER

- Q. Haynie: Where do we go from here?
- A. Kreutzer: We hope one day to be able to fish without nets. We want to develop a greater "reach" of the electrical field.
- Q. Styron: How elaborate is the equipment that is necessary to do what you showed this morning?
- A. Kreutzer: It is a very small apparatus that is used now [about 2¼ feet by 1½ feet by 2 feet]. We use the power on the boat, between 10 and 30 kw. The apparatus works from any kind of voltage or current, AC or DC, 110 or 220.
- Q. Styron: What is the distance over which you are able to control these fish?
- A. Kreutzer: A distance of about 15 feet. If you want to use stronger units, you can attract them from farther distances, but that is not necessary in this case.
- Q. Styron: Have you found that the use of this method has any effect on the hulls of boats as far as electrolysis is concerned?
- A. Kreutzer: The whole unit is insulated from the boat and no current goes into the boat which can cause any electrolysis. Is this device available for lease or sale to industry?
- Q. Waller: It will be available.
- A. Kreutzer: I think that this is a major step in the engineering and technology of catching fish. But carrying this on a step forward, one naturally wonders how this can be extended to the utilization of electrical fields extending over a considerable distance, which would appear to be a revolutionary thing if it can be done. In this connection, I remember some experiments carried out thirty years ago in Plymouth on the schooling of fish which seemed to indicate that the direction of travel of schools of fish depended partly upon the movement of individuals. Individuals at the tail end of the school would exert comparatively little influence on the

remainder of the school, but if individuals in front of the school strayed out in a different direction they would exert more influence on the remainder of the fish. So, a comparatively small proportion of fish in the vanguard moving to one side would cause the remainder of the fish to follow them. It occurs to me that the use of a comparatively restricted electrical field to motivate the leaders of a school might induce the entire school to follow them. You mentioned that you have already considered ways in which the electrical field can be extended, and I would like to have specific information on that point.

- A. Kreutzer: At present we use the electrical field like the light that goes out in all directions from a light bulb. It decreases in strength after a very short distance. But like the light, the electrical beams can be focused with a mirror so that the current in the water can be sent out like a light beam for long distances. For example, there is the possibility of leading the electric current in the water by laying a cable on the ground of the ocean, maybe five miles long.
- Q. Chapman: What is the effect of attenuated current on the outer edges of the school? I assume we are working with a hemispherical field and at the outer edges do you get an escape reaction by the fish?
- A. Kreutzer: No. At first we thought we would get an escape reaction, but we did not.
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