'Fish Gynecologist' Helps Spawn Million-Dollar Industry

Dr. Craig Sullivan routinely uses ultrasound, biopsies and early pregnancy tests to check the fertility of his patients.

But unlike most fertility specialists, Sullivan's doctorate is a Ph.D. in zoology.

His patients are fish.

And his discoveries of how to control their reproductive cycle, and induce and extend their spawning season without harm, have helped to give birth to a new million-dollar industry in North Carolina.

Sullivan, who only half-jokingly calls himself a "fish gynecologist," is an associate professor of zoology at N.C. State University.

Working with Dr. Ron Hodson, associate director of N.C. Sea Grant at NCSU, Sullivan is helping North Carolina fish farmers unlock the mysteries surrounding the reproductive cycle of hybrid striped bass.

Hybrid striped bass is a "gourmet" variety of finfish favored by culinary cognoscenti at upscale restaurants in New York City and other metropolitan areas in the Northeast.

Because demand for the flavorful fish is great, it yields top dollar for growers—about $2.50 a pound.

North Carolina growers, most of whom are within 30 miles of the NCSU Pamlico Aquaculture Field Laboratory in Aurora, produced about 600,000 pounds of the fish last year. About 6 million pounds were produced nationally.

Hodson expects national output to exceed 10 million pounds by the year 2000, as new markets open up in other American regions and Europe.

The bass' steadily increasing market potential is what convinced former land-crop farmer Lee Brothers to trade in his plows for production ponds.

"It's a growing industry with greater profit margin than other crops," says Brothers, owner of Carolina Fisheries of Aurora. Brothers formerly grew corn, soybeans and tobacco on his Beaufort County farm, but switched from agriculture to aquaculture in the 1980s. He now produced 200,000 pounds of hybrid striped bass a year and 4 million fingerlings—baby fish—that he sells to other growers.

Few fish farms anywhere raised hybrid striped bass prior to the mid-1980s, however, because they lacked a domesticated broodstock. Farmers had to go to the wild to get the male white bass and female striped bass that are crossbred to make the hybrid.

"Imagine raising chickens if you had to go out into the wild and catch each new generation," Sullivan says. "That's what these growers had to do."

In 1988, he and Hodson teamed up to change that. Sullivan studies the reproductive physiology of the fish in his lab at NCSU. Hodson tests his partner's findings in the indoor production ponds at NCSU's field laboratory in Aurora, about 20 miles northeast of New Bern on the Pamlico River.

Funding for the multiyear project comes from N.C. Sea Grant, which has actively helped to foster the new industry's growth in the state since 1987. A National Coastal Research and Development Institute grant helps make the new technology available to growers.

"Although we use high-tech tools to answer the questions, our goal has been to develop low-tech solutions that are practical for use on the farm today," Hodson says.

Among the NCSU researchers' discoveries have been an early pregnancy test that tells when a female is making yolk, nine months before she actually spawns; and a pelletized form of a synthetic hormone, GnRHa, which is injected, without harm, under a female striped bass' skin to make her eggs develop faster.

They also have found that GnRHa can be used to synchronize the spawning of males and females.

"The procedures we use to conduct the research—ultrasound, biopsies under anesthesia, hormone therapy—are very similar to those used on humans," Sullivan says. "We've taken the latest developments in biochemistry, microbiology and medical technology and applied them to fish."

The NCSU researchers' work has led to "new, better spawning techniques," says Brothers. "That means we can have our own domesticated broodstock now, which saves a lot of time and trouble. Domesticated broodstock responds to handling better. They don't stress out like ones in the wild."

Sullivan and Hodson also have discovered that by keeping the water cool, they can extend the spawning season from 2-3 weeks to 2-3 months. This helps growers spread out "crunch time" and work at a less harried pace during the critical period.

By adjusting the duration and intensity of light, they can induce spawning at nine-month or 12-month intervals, allowing growers to produce four crops in a three-year period.

Spawning can be induced every six months, but, because of the strain it puts on broodstock, Sullivan and Hodson discourage it.

Within five years, the researchers will complete their work on the hybrid striped bass's reproductive cycle and will begin their next project.

"We've already got a grant from the National Oceanic and Atmospheric Administration to do for flounder what we've done for hybrid striped bass," Sullivan says, with the enthusiasm of one who enjoys a good challenge.

"The quality of flounder is high. The market for it is already there," he says. "It's just a matter of finding a way to meet the demand."

Here Are 'Sound Facts' About The Coastal Area

An Egg Of A Different Kind

A pretty shell isn't a whelk's only gift to beachcombers. From May until October, the whelk's egg cases are also commonly found on Tar Heel beaches.

The egg case is a spiraling strand of parchmentlike oval sacs connected like a necklace. The mother whelk creates these egg cases, which can measure up to 2 feet long, and attaches them to a shell or rock or buries one end in the subtidal sand. But often the cases wash ashore after becoming dislodged by storms and waves.

Inside each sac are 20 to 100 eggs. The eggs first hatch inside the sac, where they feed on other unhatched eggs and stored protein. Then they chew their way out of their incubation chamber. Each whelk hatchling emerges as a tiny replica of its parents, with shell already in place.

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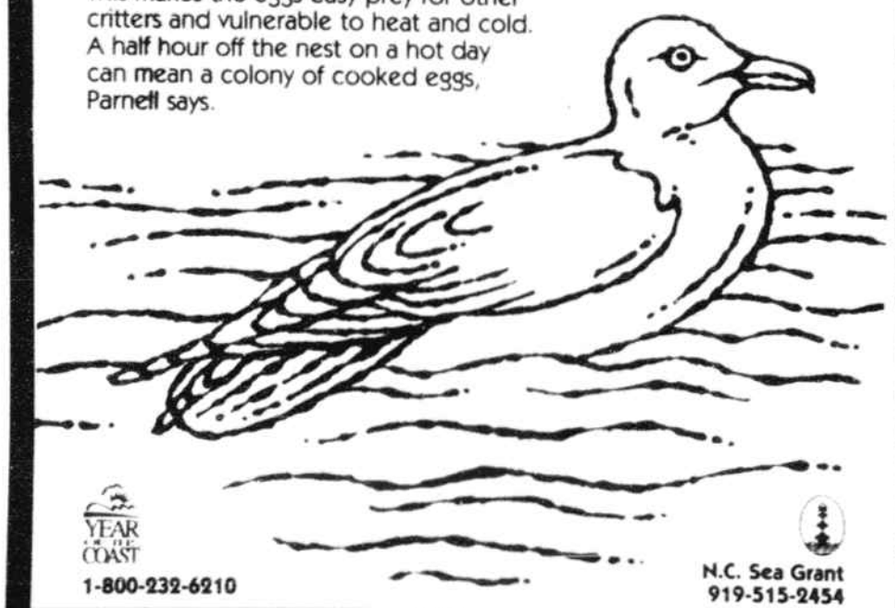
Nesting Birds

Gulls, terns and skimmers are as much a part of the coastal panorama as sea oats, crashing waves and ghost crabs. And they're more than just pretty to look at, says ornithologist and N.C. Sea Grant researcher James Parnell. These birds are an important part of the food chain, and they're excellent indicators of environmental quality.

In the spring, gulls, terns and skimmers nest in groups called colonies along bare or sparsely vegetated beaches or dredge-spoil islands. Unfortunately, this type of uninhabited real estate becomes increasingly hard for the birds to find because of development. As a result, more birds are crowding into larger colonies, making them vulnerable to predators and disturbance.

If you see colonies of these nesting birds, leave them alone. The birds react to people by leaving their nests and flying overhead. This makes the eggs easy prey for other critters and vulnerable to heat and cold. A half hour off the nest on a hot day can mean a colony of cooked eggs, Parnell says.



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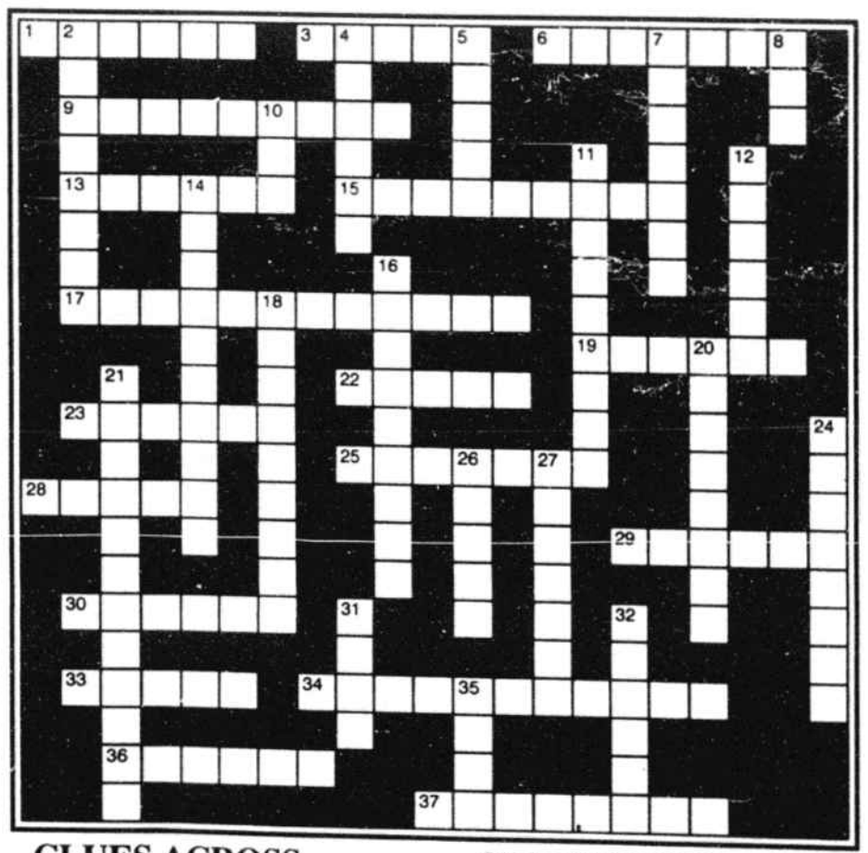
Crossword Puzzle



CLUES ACROSS

1. To seize unlawfully
3. Not happy
6. My way or the ____
9. A standard of comparison
13. Any special privilege accorded a firstborn
15. Really scared
17. The quality or state of being generous
19. Flexible
22. Not the winner
23. Opposite of outside
25. Sounds good in music
28. Get bigger
29. Cashiers make this
30. Prisoner
33. _____ of wisdom
34. Need these at a party
36. Fat
37. Not guilty

CLUES DOWN

2. Uttering meaningless words
4. Plunderer a float
5. _____ of Babel
7. Day off
8. _____ hoo!
10. March, April, _____
11. A hindrance
12. Weak
14. Available for use
16. Something that bothers
18. Goal
20. Indicates a limit
21. Freedom
24. Able to read
26. Used to start fires
27. Disregard
31. Verse
32. Decide between
35. Drops from clouds

(Answers are on Page 4)