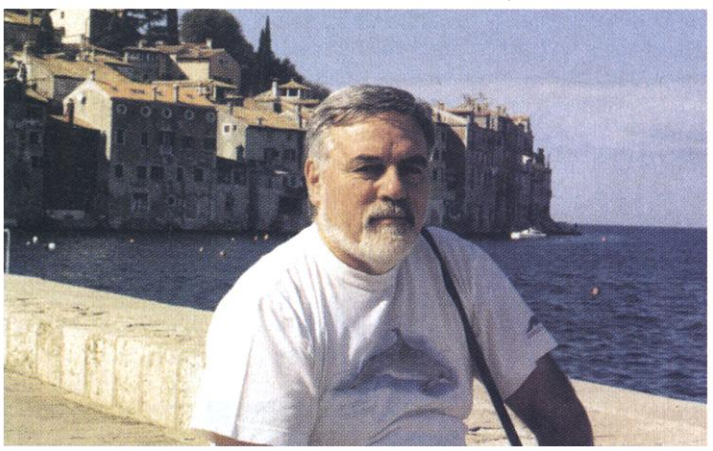
Adriatic Nations Team Up to Explore Spreading Marine Mystery

ROVINJ, CROATIA—Climbing aboard what was once a Croatian navy minesweeper, marine chemist Nedad Smodlaka fishes a key from his pocket and unlocks the door to his wet lab. Inside sit stacked rows of seawater-filled bottles. Smodlaka hopes the samples will help to unlock the mystery of a slimy biomass that sometimes despoils the sparkling blue-green waters of the Adriatic Sea. In the process, he also hopes to push open the door to greater international scientific collaboration in the troubled region.

The mystery that Smodlaka is probing is an organic "mucilage" that Croatians call "cvjetanje mora" and Italians "mare sporco." The biomass, thought to be generated by phytoplankton, entraps plankton and other small sea creatures that produce gases, causing the slime to rise like clouds to the sea's surface. It appears as a translucent white cloud in the sea's depths but turns into a murky mess when it reaches the surface and is pushed ashore by the wind and tides. The mucilage, which occurs only in certain warm summer months, was first reported in 1729. But its appearances, once rare, have become increasingly frequent since 1988, leading scientists to suspect pollution as a major factor. "This is a natural phenomenon," Smodlaka observes, "but its recent frequency indicates that there are environmental stresses."



Seaworthy. Croatia's Nedad Smodlaka seeks international help to address growing biomass plaguing the Adriatic.

It is not the only sign of environmental stress in the northern Adriatic, but it is perhaps the most visible. And its growing notoriety could lead to a major international program to study pollution and other environmental trends in the Adriatic.

Although researchers have long been interested in the phenomenon, Smodlaka and his team of 35 scientists at the Center for Marine and Environmental Research in Rovinj, on the sea's northeastern coast, haven't always had the resources they need. The turning point came in 1997, when a mass of the slime covered a beach near the vacation residence of Croatia's former strongman leader, General Franco Tudjman. There have been five acute episodes since 1988, says Smodlaka, including a visitation this past summer that has been studied extensively.

With its 700 islands and stunning 5700-kilometer-long coastline, Croatia is particularly sensitive to problems in the Adriatic. But any solution will require the cooperation of several other countries—including Italy, whose Po River is the biggest source of pollution to the northern Adriatic. "Protecting, restoring, and sustaining the Adriatic ecosystem requires the close cooperation of all the coastal countries," says Slovenian biologist Alenka Malej, who heads the Piran marine station of Slovenia's National Biology Institute. Serena Fonda-Umani, an Italian researcher at the University of Trieste's marine biology laboratory who works closely with Croatian and Slovenian counterparts, notes that "the sea has no borders, and what happens on one side of the Adriatic strongly influences what happens on the other side. If we are not able to work together, we'll never reach a complete understanding of 'our' sea."

Toward that end, researchers from the three countries are examining factors that may contribute to the mucilage. They include the role of bacterial plankton and the hydrochemical dynamics of the Adriatic. The work is part of a widening research effort into problems facing the shallow northern Adriatic, where pollution from the Po and other rivers has fueled the growth of phytoplankton and the depletion of oxygen along the bottom. That anoxia, in turn, has damaged the sea's mollusk and crustacean populations. In a series of workshops in Piran, Rovinj, and Trieste, Slovenia's Malej says that marine scientists from the three nations "were able to identify priority environmental issues and observation needs in the northern Adriatic."

The next step is to enlist colleagues in an ambitious effort—called the Coordinated Adriatic Observing System—to monitor pollution, currents, and other seawater trends. The joint project is an attempt to share marine data collected by countries that border the Adriatic, including Slovenia, Croatia, Italy, Bosnia-Herzegovina, Macedonia, and Albania. Smodlaka says that the U.S. government has offered to help fund the initiative, and the European Union (E.U.) is weighing a proposal. One problem, Malej says, is the checkerboard political landscape: Italy is part of the European Union and Slovenia has applied for admission, but Croatia and the Balkan nations south of it are outside the club. So getting E.U. funding is tricky. Even so, all the scientists agree that tackling common problems like sea pollution is one good way to increase research cooperation in the region.

Fortunately, Adriatic research has a long, multinational tradition. The first marine station on the sea was founded in 1876 in Trieste, followed in 1891 by a research center in Rovinj opened by the Berlin Academy of Sciences. The German-built facility has survived as an aquarium and research center despite a succession of political masters that included the Austro-Hungarian Empire, Italy, a "quisling" Nazi-era government, and Yugoslavia before the breakup that ended with Croatia's independence.

That history has created a wealth of long-term data about water quality, biodiversity, and weather in the northern Adriatic. Researchers in Rovinj have taken readings of oxygen levels in the region's seawater since the 1920s, for example, and for the past 2 decades the Croatians have teamed up with Slovenian and Italian researchers—as well as U.S. and other European oceanographers—to study the physical, chemical, and biological changes in the Adriatic. A 1996 project involving Smodlaka, Malej, and Thomas C. Malone of the University of Maryland's Horn Point Laboratory in Cambridge, Maryland, concluded that solving the Adriatic's problems will be even tougher than tackling those of the Chesapeake Bay in eastern Maryland because of the "complex mix of sovereign nations representing a diversity of cultures."

Pointing to the cracked walls and water-blistered plaster at his institute—a building so old that it hosted famous German bacteriologist Robert Koch a century ago—Smodlaka says that the problem is simple. "There is a lot of international collaboration, but not much money." Even so, he is optimistic that solid research will eventually lead to better equipped labs. "Our building may be falling apart," he says, "but we're holding together."

–ROBERT KOENIG

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