Antifouling Paints Threaten Fisheries Resources

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You should know that developments in environmental protection legislation of the West may threaten the resource base of third-world fisheries through promoting the dumping of toxic antifouling paints on developing nations.

The use of antifouling agents on boat bottoms to minimize drag and prevent damage from wood-boring organisms has a long history. The early use of copper sheathing has been largely replaced by the use of metallic paints which prevent fouling through the slow leaching of compounds toxic to marine life. Most early antifouling paints were copper-based, soft formulations which could prevent heavy fouling for periods up to one year. More recently, the use of more toxic compounds in harder paints has allowed for longer periods in the water with minimal fouling. Most notable amongst this new wave of antifouling agents is Tributyltin (TBT).

Tributyltin (TBT)

TBT is not only the most effective antifouling agent yet devised; it is also claimed to be the most toxic compound purposely introduced by man into natural waters. The main problem with TBT is its extreme toxicity to non-target organisms. Alarm over the effects of TBT was first raised when spatfall of the Japanese oyster *Crassostrea gigas* failed for five successive years (1977-1981) in the Bay of Arcachon, a major spat production area for French oyster culture. It was determined that nearby marinas, situated in areas of restricted water exchange, were sources of TBT contamination which inhibited the reproductive success of these shellfish. This discovery sparked many studies throughout the developed nations to assess the extent of the threat of this compound on aquatic organisms.

Effects of TBT

In addition to causing shell deformation and reduced reproductive success in oysters, TBT has been found to be toxic to a wide variety of marine animals. The use of TBT as an antifouling compound on nets used for the culture of salmon has been identified as a vector for the transmission of this contaminant to man. Salmon reared in cages so treated have been analyzed with traces of TBT being documented in the flesh. Larval stages are particularly vulnerable and pulse loading of inshore waters at the beginning of the boating season is potentially disastrous to these nursery areas. To reduce the possibility of pulse loading of the environment and to increase the effectiveness of TBT-based antifouling paints, this compound has been bound to copolymers.

Copolymers: A Greater Risk?

The effectiveness of the use of copolymers to reduce environmental impacts has been debated with evidence showing that, in the long term, the copolymer form may actually pose a greater environmental risk. One major constraint to the study of the toxicity of this compound is the fact that its effects are exerted at concentrations at, or below, the levels of detection of the presently available analytical techniques.

Legislation on Use of TBT

The concern of marine scientists over the long-term effect of the use of TBT in antifouling formulations has prompted legislation controlling its use in several developed nations. In France, the use of this compound is banned on small vessels; England has imposed restrictions on allowable levels of TBT in paint formulations and, like the USA, is considering an outright ban on its use. The EEC is also pondering its stance on the issue. It should be noted that the developed nations don't initiate regulation which inhibits commerce unless the need is great. It appears as though it is simply a matter of time before the use of TBT is banned outright in these countries.

Learning from Experience

As lessons can often be learned from history, it is clear that there is a real threat of TBT-based antifouling paints being "dumped" on the third world in order to avoid legal restrictions imposed at their point of manufacture. The conservative legislator would be well advised to take action to avoid this problem before it arises.

Further Reading:

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