The Use of Nicotine sulfate in fish Narcotization

Lamarr B. TROTT

Associate in Zoology, University of California, Los Angeles, California

Abstract

The use of nicotine sulfate, commercially available for crop spraying as "black leaf 40," in fish narcotization is described. Solutions of 5 parts per million were found to be effective in the laboratory, and stronger concentrations were used in field collections as a substitute for narcotizing agents not available in remote areas. No adverse effects on the fish used in experimentation was noted; invertebrates, however, did not generally recover. Use as a collecting agent in the field is noted.

Narcotizing agents, such as quinaldine, are not generally available in more remote collecting areas of the world. Ichthyologists in such areas who find that they wish to capture reef fish alive for study may readily obtain a 40 % solution of nicotione sulfate, commonly called "black leaf 40," from agricultural experiment stations or the like. This chemical may prove to be of great aid in such instances.

At the suggestion of Mr. Albert Bronson, I used this solution for collecting live specimens in Guam during the summer of 1962. I was particularly interested in narcotizing pearlfish as they were removed from their holothurian hosts. By pouring about 5 ml. of the 40 % solution into approximately one quart of sea water, the pearlfish were narcotized within one minute. These fish could then easily be handled and transferred to either preserving jars, or buckets of fresh sea water (where they would revive completely within five minutes). The use of nicotine sulfate was thus highly successful in a closed container, and was particularly helpful in handling these slippery, eel-like fish.

To quantify the effects on fishes in the laboratory, several specimens of the pomacentrid *Dasyllus aruanus* were kept in a large aquarium for roughly two weeks, during which time they were repeatedly subjected to different concentrations of nicotine sulfate, in separate experimentation containers, with no adverse effects. Concentrations as low as 5 parts per million caused narcotization after two minutes. The recovery period was approximately five minutes in fresh sea water.

Experiments were performed in one gallon aquaria containing one liter of sea water. To this was added the various concentrations of nicotine sulfate, this stirred, then the fish added. The fish used were 2 to 3 inches in standard length. The response to the narcotizing agent was always a tetanic quivering and loss of equilibrium. The fish were left in this solution about two minutes, then removed to the same volume of fresh sea water in which they recovered within five minutes. No after effects were noted, and the same fish were used repeatedly with no mortality.

With success in the laboratory, our next procedure was to attempt to use nicotine sulfate as a collecting agent. On using a dilute solution over an open

coral reef with considerable wave wash, no effect was noted on fishes. Under milder conditions and using a more concentrated solution (about 10 %), certain of the fishes were affected, particularly pomacentrids and chaetodonts. These fish quickly revived when placed in a floating wire bucket. Invertebrates were greatly affected and did not survive as readily as did the fish.

When used in a closed area, such as a rock crevice, the 10 % solution is quite effective. It is in conditions such as this that field use of nicotine sulfate is suggested. Most of the reef fishes were affected in this situation, however this was not true with eels. More concentrated solutions were used on morays and ophichthids, which left the area quickly, not remaining long enough for the nicotine sulfate to have an effect.

No previous literature is available on the use of nicotine sulfate in fish narcotization. Care should be taken in its use, as prolonged skin contact of stronger solutions may be toxic.