

Preview Material for Exam 1 - Spring 2003

Fisheries restoration projects often require removing non-native (species moved in from other sites) fish that are present in a particular stream or pond and then replacing them with native fish. There are three commonly used mechanisms for removing non-native fish: (1) Allowing fisherman to take as many of the species as they can catch; (2) electrofishing, which uses an electrical current to stun fish for collection; and (3) chemical treatments which stun the fish and allow for easy removal. For most fisheries restoration projects, chemical renovations are the only sure way to remove all the non-native fish. Two chemicals are commonly used for chemical renovations - rotenone and antimycin. Antimycin is a fungal antibiotic produced by certain members of the genus *Streptomyces*, a bacterium, that is found naturally in forest soils. The most widely accepted hypothesis to explain antibiotic production is that antibiotics are an adaptation in response to fungi that help the bacterium compete with fungi in the relatively nutrient-depleted environment of the soil by reducing competition between the two species. It was first used as a piscicide (fish killer) in 1963. It enters through the gills and inhibits fish from consuming oxygen at the cellular level, however, it does not eliminate the cells' consumption of glucose or the release of CO₂. Antimycin is a selective piscicide, meaning that it affects some fish more than others. Catfish are very resistant to antimycin; therefore it is commonly used to eliminate unwanted fish from catfish ponds without harming the catfish.

In an experiment to determine the appropriate dosage level of antimycin to apply to a catfish pond, a fisheries biologist used 4 identical tanks containing equal amounts of pond water. Each tank contained 20 members (of approximately equal size and age) of the non-native fish species. The following table contains a summary of the tank treatments and the results of the experiment.

	Tank 1	Tank 2	Tank 3	Tank 4
Dosage of antimycin	90 parts per billion (ppb)	30 ppb	10 ppb	0 ppb
Number of dead fish	20	10	2	1

Wanda and Louise, former BIOL 1114 students, are planning a road trip for spring break. Wanda has agreed to drive her 1982 Honda Civic and pay for gas if Louise provides food for a six day trip taking them through southwest Texas and New Mexico (desert areas) and then into the mountains of Colorado (alpine tundra) before returning to Stillwater. They plan to camp, so Wanda checks out a tent and sleeping bags, ice chest, camp stove, hot/cold beverage containers, etc. from the OSU student recreation department. Louise buys food items including cereal, sandwich makings, chips, pickles, drinks, and freeze dried entrees to make on their gas campstove in the evenings.

While camping in the desert of southwest Texas, Wanda observes abundant cactus plants, assorted lizards, and jackrabbits. Ambient temperatures reach a maximum of 90° F during the day and a minimum of 35° F during the night while she is there. Wanda observes lizards (poikilotherms) sunning themselves in the mornings as ambient temperatures begin to rise. She does not observe the jackrabbits (homeotherms) doing this. During the heat of the day, both species retreat to the shade.

Dusky Flycatchers (a bird) build nests in open areas of sub-alpine (near tundra-like summer conditions) in the southwestern and western U.S. Dr. Pereyra and Dr. Morton investigated how well these birds thermoregulated as they grew from hatchlings to adults. These birds hatch without feathers and remain in the nest while they grow. Drs. Pereyra and Morton found that a single, newly-hatched bird had more trouble maintaining its body temperature than did several in the same nest. As dusky flycatchers grow, they are able to thermoregulate better. Drs. Pereyra and Morton measured the chicks' ability to thermoregulate as the chicks grew and began to produce feathers. They found that the production of feathers over this period of the chicks' growth was NOT well correlated with their increased ability to thermoregulate. At night, very young (< 5 days old) dusky flycatcher chicks are likely to become hypothermic (their body temperature drops very low) in these sub-alpine nests.