



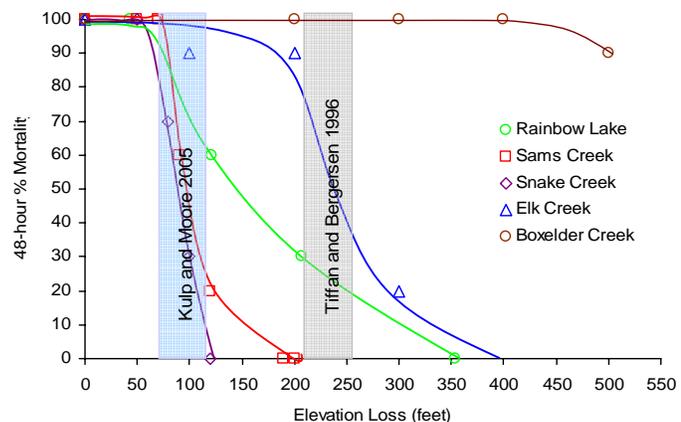
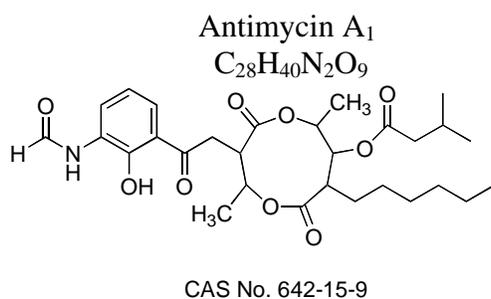
Antimycin Fact Sheet

Great Smoky Mountains National Park



What is Antimycin?

- An antifungal antibiotic discovered by Dunshee *et al.* (1949)
- Produced by common, naturally occurring soil bacteria (*Streptomyces*) (Dunshee *et al.* 1949)
- Only effects gill-breathing organisms such as fish and aquatic insects, not mammals
- Attributes that make it a useful restoration tool: *fish cannot detect it, works in water temperatures <15°C, effects on non-target species are minimal, used in small quantities (8 ppb)*
- Kills fish by inhibiting electron transfer in the mitochondria during cell respiration (Derse and Strong 1963)
- Trout are generally most sensitive (1 ppb) to antimycin followed by minnows (5-10 ppb); catfish are 8 to 50 times more resistant (25-200 ppb) (Berger *et al.* 1969)
- Effectiveness *increases* rapidly at higher water temperatures and *decreases* rapidly at higher pH levels (Berger *et al.* 1969; Gilderhus 1972)
- Increased stream gradients tend to reduce the effective range of antimycin as waterfalls and cascades tend to break up and hydrolyze the large chain molecule
- The effective vertical range of antimycin in western streams was 200-250ft (Tiffan and Bergersen 1996), but GRSM staff found 60-120ft to be more effective in small streams with stream gradients >8%
- Degrades into naturally occurring compounds such as antimycetic acid, blastmycic acid, and lactone all of which are harmless to people at these low concentrations (Hussain 1969).
- Fish eggs can be killed with antimycin (100% mortality using 10ppb for 1 hr), but eggs in the gravel don't mix well with stream flow thereby limiting mortality (Berger *et al.* 1969; Olson and Marking 1975)
- Results from three separate projects indicates antimycin treatment has minimal short-term (<6 months) and **NO** long-term (>6 months) impacts on aquatic insects (Walker 2003)



What is Potassium Permanganate (KMnO₄)?

- Low concentrations (2-4 ppm) are effective in detoxifying 8 ppb antimycin
- Strong oxidizing agent commonly used to purify drinking water and kill pond algae
- Toxicity *greater* in cooler (7°C) vs. warmer (12-17°C) water temps (Marking and Bills 1969)
- Toxicity *greater* in hard water (>300mg/l) vs. soft water (<12 mg/l) (Marking and Bills 1969)
- Toxicity *greater* in high pH (>7) vs. low pH (<7) (Marking and Bills 1969)
- Can be toxic to fish and insects if used for prolonged period of time

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