CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
J1210

Project Title
Fox's Response to Territorial Markings

Abstract

Objectives/Goals
My objective was to determine the concentration of ammonium hydroxide masking necessary to purge the pheromones and scent-qualities of coyote urine (which has naturally occurring ammonia) to the extent where a fox is unable to detect the pheromones.

Methods/Materials
Six cans of coyote urine were needed to complete 4 tests at each of 3 locations in a fox territory. For each test, coyote urine was sprayed for 30 seconds, and then masked with 3 milliliters of 1 of 4 ammonium hydroxide solutions (0%, 2%, 3%, or 4%). A game camera was placed facing the brush that had the coyote urine and ammonium hydroxide deposited on it. The camera records anything visiting the site for two nights, which is the length of time urine can be detected by a fox. I then determined the effectiveness of the ammonium hydroxide masking by whether a fox responded territorially to the urine.

Results
Consistent with all 3 locations, the fox responded to the control, which has 0% ammonium hydroxide masking (0.05% of the total contents of urine). The tests with 2% ammonium hydroxide masking, which is 0.166% of the total contents of urine, showed that a fox ceased to respond at 2 out of the 3 locations. This gives you a 33% chance of attracting a fox with 2% ammonium hydroxide masking. The remaining tests with levels of 3% (which is 0.22% of the total contents of urine) and 4% ammonium hydroxide masking (which is 0.28% of the total contents of urine) failed to attract any fox. Therefore you have a 0% chance of attracting a fox with 3% or 4% ammonium hydroxide masking.

Conclusions/Discussion
I can conclude that fox have an instinctive response to coyote urine (which has 0.05% ammonia), and that if sprayed in their territory they are almost certain to react to it in a territorial fashion. I can also conclude that ammonium hydroxide masking, even in concentrations as low as 2%, can mask the pheromones and scent-qualities in urine. I can also conclude that fox cease to respond to 3% ammonium hydroxide masking, which equals 0.22% of the contents of urine. Because ammonia in urine increases over time, I calculated the growth rate of ammonia in urine to be 7.3% per hour. Therefore, I can also conclude the best chance to attract a fox with urine is within the first 31 hours. This is the time it takes urine to reach 0.166% ammonia, which equals 2% ammonium hydroxide masking.

Summary Statement
My project deals with urine as a form of communication for fox and ammonia's masking effect on it.

Help Received
Father helped dilute ammonia and with board; Nina Kidd and Julie Bundy approved animal care plan