**Rewards Ho! – A look at Ant usage and reliance of pheromone trails for the purpose of spatial navigation, with a particular look at their potential for resiliency and adaptability to an increasingly complex environ.**

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**Required Materials:**

Rectangle Tupperware container – approx. 40x20cm

Ant queen - <https://www.queenofants.com.au/collections/small-sized-ants/products/crematogastor-sp-queen?variant=31650281979986>

Sand, soil, rocks, twigs, foilage

Small dish to place food upon

Small dish for water

Spray bottle for misting

Cardboard

Paddle pop sticks

Hot glue gun + glue

Perspex sheet

Adjustable glassware holder – for phone to record experiments

Food – oats, fruit, honey, etc…

**Experiment:**

Increasingly complex mazes will be constructed with purpose of measuring ant navigability through them. Focusing on their usage and efficiency of pheromone trails, with two identical mazes being used. The treatment maze they will be able to establish their trails in and will persist between runs, the control maze will be lightly sterilized to remove the trail for the purpose of comparability.

This data can help further explore non-anthropogenic intelligence and methods for interacting with our world. It can potentially lead to a whole host of other experiments to limit test just how complex ant navigational abilities are. Especially as it has already been discovered that they not only use olfactory cues, but also landmarks, horizon, magnetism, electric fields, time of day and numerous other methods to navigate their environs with increasing efficiency.

A particular area that can be explored beyond these would be that of colony intelligence and communications, while we know ants share information via olfactory cues – do they also share information through a kind of language?

Once the mazes are constructed our plan moving forward is to place a highly-valued reward at the end(a drop of honey) as the goal, and then place one individual in both the control and treatment mazes beginning, observing the following variables:

* Time to complete the maze.
* Number of incorrect turns or decisions made before completing the goal.
* Time spent on incorrect paths, before exploring new options.
* How rigorously the pheromone trail was followed.

The mazes will be randomly generated until they seem somewhat fair, or at least of a complexity that doesn’t have a simple solution. The planned mazes at present are 6x6, 8x8, 12x12 and 16x16, though if these are found to be inadequate to properly test the ant’s abilities further and more complex mazes are easily generated. Note that one unit in these mazes will equivalent to 1cm.

https://www.mazegenerator.net/

If it’s found that the ant’s find no difficulty with the complexity of the maze, then the design itself can start to be modified between tests to observe how the subjects respond to unexpected complexity and adversity within a pre-established area.

Then again if this poses no issue and they are easily able to overcome, other external stimuli can be used to add a separate layer of complexity altogether – though it is expected that this will not be necessary and is best left for future experiments.

Once initial tests are run, and we obtain a better idea as to the speed of the subjects in the various mazes we will be able to garner a better estimate for how much data we can reasonably collect and examine.