Investigation on Amino Acid DL-Phenylalanine’s Ability as a Cognitive Stimulant in V. costata

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Snails are seemingly harmless animals in agricultural ecosystems: they are decomposers that feed off rotting vegetation and surplus soil nutrients. However, in order to move and maintain homeostasis, they produce mucus that, unfortunately, restricts crop growth. Since magnets possess a repelling nature on V. costata, a behavior chamber with a central magnet was created. After being supplemented 500mg of DL-Phenylalanine per day for 10 days, five simple random samples of 46 snails each were placed along the central magnet and observed for a 30-minute period; this was repeated on five SRS’s of non-supplemented snails of the same size n=46. The observed displacement of each individual was recorded for every 3-minute increment of each trial and the mean displacement was calculated. Results showed that the mean displacement over time of the supplemented snails was significantly less than the control snails, and the displacement-time graphs of both groups had approximately cubic regressions. The velocity of the cubic displacement functions was derived to graph approximate quadratic representations of snail speed over time and to emphasize “negative speed,” or the backward movement, of experimental snails that, by visual observation, displayed a trend of attraction toward the central magnet. Snails that did not move for at least six hours post-experimentation were labeled dormant. Because dormant snails were present in both control and experimental samples, phenylalanine is not responsible for dormancy. Rather, it is possible that hibernation patterns obstruct activity, and the amino acid may have a “blurring” effect on the cognitive function of active snails. Further research on DNA composition of offspring can reveal the genetic reasons for this decrease in awareness.

Awards Won:
Arizona State University: Arizona State University ISEF Scholarship
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