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Diagnosis of the behavior of the African snail (Lissachatina fulica) by means of its mucous membrane interspecies communication vector.

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Abstract:
Several pulmonary snails search for and / or follow trails left by their species for purposes such as feeding, aggregation and reproduction. In the project characterization of the ecological behavior under controlled conditions among the individuals of the species *Lissachatina fulica* to know the frequency with which they follow the trail and directions made by their congeners, and with that to plan a later control of this pest, for these Variables such as the age, size and condition of the snail and the receiving snail were proposed. Nine treatments were performed during the day and at night. The directions chosen by the recipient snails were observed during the experiments, followed by statistical analysis of the data using the chi-square test, obtaining results in relation to the treated individuals versus the total of the repetitions of the treatments and the control. From the statistical processing, the three more significant treatments(C, D, H) were selected, which were repeated at night. The results show that the treatment C is significant and its ecological behavior indicates that a number of snails follow the trail, concluding that there is a chemical communication between juvenile snails, being designated as the best treatment, nevertheless treatment H was also statistically significant. However it was defined as the worst treatment, since its ecological behavior is similar during day and night, the individuals don't follow the trace demonstrating that there is no chemical communication between adult and juvenile snails. Between adult and juvenile snails.

Keywords: Behavior, *Lissachatina fulica*, trail, direction

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1. Introduction

The African giant snail (Lissachatina fulica) introduced to Ecuador, comes from the class Gastropoda, the order Pulmonata, and the family Achatinidae. Is native to Africa and over time has spread to different tropical regions, reaching South America affecting countries like Ecuador, Brazil, Colombia and Venezuela among others.

"It is difficult the situation facing Ecuador in different environmental areas: environmental and epidemiological agricultural, caused by the deliberate introduction of African snails of the achatina fulica family (Bowdich, 1822) synonymous with (achatina fulica)" [1]

The Ministry of Agriculture reported its presence in Ecuador since 2005, was introduced in the coastal region for commercial purposes. The mucus also began to be used for cosmetological purposes, although the lack of knowledge in malacology and lack of concern about the control of public entities gives rise to the formation of a very dangerous pest in rice, banana and cocoa crops, among others . Currently, it has begun to spread in the rest of the region, with reports in the Ecuadorian Amazon region. [2]. Due to the introduction of this exotic species in different ecosystems of Ecuador, whether due to ignorance or irresponsibility, many threats have been created for diversity, both in flora and fauna. [3].

2. Materials and Methods

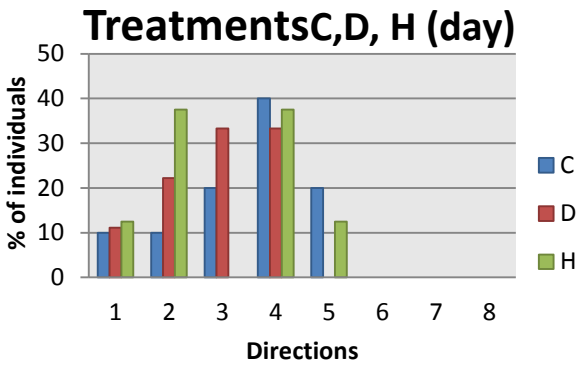
Two hundred and sixty snails (L. fulica) were randomly harvested from three locations in the Pastaza canton, 48 hours before the experiment were collected from the field, depending on the treatments that were performed during the day, their feeding was by cat food. The snails collected before each experiment were weighed using a digital scale, measured using a digital scaler and also cleaned with distilled water. They were kept at room temperature and in natural light. The experiments started from eight thirty in the morning until six in the afternoon in the laboratory.

The experiment process consisted of a tracking snail (receiver) placed perpendicularly, a few centimeters of an approximately straight track produced by a marker snail (emitter). It took into account the time, distance and direction in which the snail tracker follows the marked wake once it finds this route was recorded. [4] Then data obtained from both replicates and more were processed using ANOVA and the SPSS statistical program. The results will allow us to find which is the most effective and most universal emitter of the emitted chemical signal, have created many threats for the diversity, as much in flora as in fauna. [3].

3. Results and Discussion

It can be asserted that there is a chemical communication among juvenile snails for several reasons, one of the most important being the aggregation, because as mentioned [4], they can be protected from several threats such as predators or the environment that surrounds

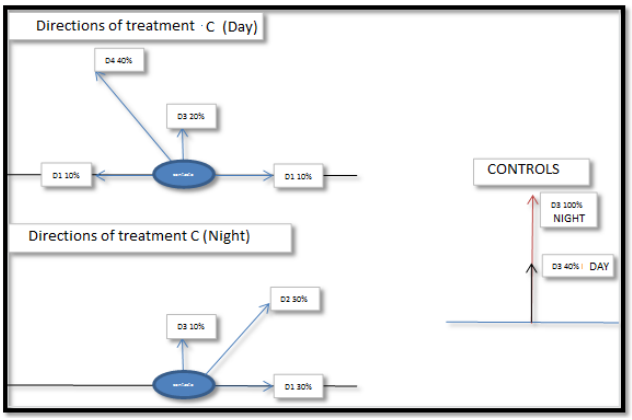
As for the snails that were in the controls (without contact with the mucosa) both in the day and at night their behavior is similar, the direction that predominates is the direction 3, it is necessary to emphasize that this treatment in the night is significant and it may be argued that it is the best treatment to demonstrate that chemo-steering exists between individuals.



Fuente: (Navarrete, 2016)

Fig. 1. The ten repetitions of the treatments C, D, H in relation to the first direction that the snails took during the day were observed.

The treatments C, D, H. It was decided to take into account the determined behavior that a snail percentage receivers of the mentioned treatments choose the direction 1 (figure 3) which made them suitable for the realization of the repetitions in the nights, Treatment A (figure 1) vs Control (figure 4) shows a varied behavior of molluscs, in relation to contact with the traces, where 40% of individuals that are within the treatment take the direction, while 50% of the individuals respond to control.



Fuente: (Navarrete, 2016)

Fig. 2 shows the behavior of the snails receiving treatment C (juvenile versus juvenile) in terms of the directions they took during the day, night and controls.

Figure 1 shows the disparate behavior of treatment C, since the directions taken by individuals treated during the day versus treated at night are opposite. It can be assumed that there is a factor to analyze that affects, so that the snails of the day dislike the trail, because during the day the snails take the direction 4 and 5, while during the night the individuals take the direction 2 and 1, Being very significant, since there is a percentage of snails that follow the trail, reason why it can be affirmed that causes some effect the trail of the sending snail so that the mentioned addresses take the individuals.

4. Conclusions

Of the nine treatments proposed for the day, only three treatments (C, D, H) were chosen based on the statistical significance and the directions they took after being in contact with the marker snail trail. It was concluded that in treatment C (juvenile snails nourished vs. juvenile snails nourished), the snails, when in contact with the trail both in the day and at night, take opposite directions; However during the night 30% of the individuals follow the trail of the snail, concluding that it is the best treatment that exists. The treatment D (mature snail nourished vs. mature snail hungry) from an ecological point of view can be asserted that there is a chemical communication between the individuals of this species during the night.

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Author Contributions

All authors have the same contribution.

Conflicts of Interest

There is no conflict of interest of the authors.

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