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Giant African Snail: a silent threat to public health and agriculture

Caracol Gigante Africano: amenaza silenciosa para la salud pública y la agricultura

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RESUMEN

El caracol gigante africano (*Lissachatina fulica*) está catalogado como una de las 100 especies exóticas invasoras más dañinas del mundo. Su rápida expansión en los últimos años, que incluye ya 13 provincias cubanas con focos activos en Villa Clara, Mayabeque y Holguín, constituye una preocupación creciente para la salud humana y la seguridad alimentaria. Este artículo de opinión analiza las principales características morfológicas que permiten identificar a esta especie, los riesgos epidemiológicos asociados a su manipulación y consumo, y las medidas de control más eficaces. Se enfatiza el papel de *L. fulica* como hospedero intermediario de nematodos del género *Angiostrongylus*, causantes de meningoencefalitis eosinofílica y angiostrongiliasis abdominal, así como su impacto en cultivos agrícolas con pérdidas que pueden alcanzar el 60% de la producción. Se concluye que la identificación temprana, el manejo adecuado y la educación poblacional son herramientas indispensables para mitigar los efectos de esta plaga, cuya erradicación requiere un enfoque integral que combine la recolección manual, el ahogamiento, el enterramiento profundo de los ejemplares y el uso complementario de metaldehído.

ABSTRACT

The giant African snail (*Lissachatina fulica*) is listed as one of the 100 most harmful invasive alien species in the world. Its rapid expansion in recent years, which now includes 13 Cuban provinces with active outbreaks in Villa Clara, Mayabeque, and Holguín, is a growing concern for human health and food security. This opinion piece analyzes the main morphological characteristics that allow for the identification of this species, the epidemiological risks associated with its handling and consumption, and the most effective control measures. It emphasizes the role of *L. fulica* as an intermediate host for nematodes of the genus *Angiostrongylus*, which cause eosinophilic meningoencephalitis and abdominal angiostrongyliasis, as well as their impact on agricultural crops, with losses that can reach 60% of production. It is concluded that early identification, proper management, and public education are essential tools for mitigating the effects of this pest, whose eradication requires a comprehensive approach that combines manual collection, drowning, deep burial of specimens, and the complementary use of metaldehyde.

The giant African snail, scientifically known as *Lissachatina fulica* (formerly *Achatina fulica*), is a terrestrial mollusk native to East Africa that has managed to colonize practically all continents, including America, Europe, Asia, and various islands of Oceania. The International Union for Conservation of Nature (IUCN) included it in the year 2000 among the 100 most harmful invasive alien species in the world ⁽¹⁾, and recent studies on its ecological niche confirm that its distribution will not be significantly reduced by climate change, which aggravates its condition as a persistent threat ^(2,3).

In Cuba, the species was first detected in 2014 and has currently been reported in 13 provinces, with active foci in Villa Clara, Mayabeque, Holguín, and other regions of the center and east of the country ^(4,5). By 2025, its expansion had reached alarming levels in the eastern and central provinces, requiring a coordinated response based on scientific evidence. In the Mesoamerican and Caribbean region, economic losses continue to be a constant concern, and countries such as Honduras and Panama have warned about the significant damage that the definitive establishment of the pest would cause in their territories ⁽⁶⁾. Although to date no confirmed human cases of angiostrongyliasis have been reported in Cuba, the presence of the vector and favorable epidemiological conditions make it imperative to establish active surveillance systems and health education, especially in communities where the species is abundant.

The objective of this article is to specify the morphological characteristics that allow the identification of *L. fulica*, expose the epidemiological risks associated with its handling and consumption, and provide updated recommendations for its control, with emphasis on the Cuban reality.

Identification and biology of the species

Lissachatina fulica belongs to the phylum Mollusca and the class Gastropoda. It can reach a length of up to 30 cm when its shell is fully developed, although the most common specimens measure between 5 and 10 cm ⁽⁷⁾. Its shell presents a brown coloration with dark and light longitudinal stripes, a distinctive feature that facilitates its identification in the field. To differentiate it from other mollusk species present in Cuba, such as those of the genus *Zachrysia* (native terrestrial snails of smaller size and more globose shell), the combination of the following characters must be observed: elongated and conical shell, banded coloration, and adult size greater than 10 cm. These characteristics allow non-specialized personnel to perform a preliminary identification in the field.

It is a hermaphroditic and highly prolific organism: each specimen can lay approximately 500 eggs per clutch, with a hatching effectiveness close to 90 %, and perform up to six ovipositions per year. Its longevity ranges between 5 and 7 years under normal conditions, although it can extend up to 11 years in favorable environments ^(8,9).

Distribution and expansion

The ability of *L. fulica* to adapt to diverse climates and ecosystems has facilitated its global dispersion. Recent research on the dynamics of its ecological niche indicates that, unlike other native species whose distribution areas could be reduced by global warming, the distribution of *L. fulica* will not vary significantly in the near future, consolidating it as a structural threat ^(2,3). A correlation has also been documented between the expansion of this species and the decline of native mollusks in South America, due to habitat alteration caused by climate change and direct competition ⁽¹⁰⁾.

In Latin America, the new foci are concerning: in Venezuela, 1,371 specimens were collected in urban areas of Maracaibo and San Francisco ⁽¹¹⁾; in Argentina, it was detected for the first time in the locality of El Soberbio, Guaraní department ⁽¹²⁾; and in Colombia, Corpoboyacá is joining efforts to counteract the increase of foci in multiple provinces of Boyacá ⁽⁶⁾. Panama, since 2021, has maintained strict phytosanitary measures to prevent the entry of the pest from neighboring countries ⁽⁶⁾.

Economic and agricultural impact

The giant African snail causes significant damage to agriculture by voraciously feeding on a wide variety of crops. It has been reported as a polyphagous pest that affects bananas, papaya, citrus, vegetables, coffee, cocoa, avocado, corn, and beans, among others. In India, field studies conducted between 2021 and 2025 revealed yield losses of 40 % to 60 % in cardamom crops due to the mollusk's feeding on flower buds, leaves, and young fruits ⁽¹³⁾.

In the Cuban context, the impact on urban and suburban agriculture is increasingly evident. The provinces of Villa Clara and Mayabeque report growing damage in organoponic gardens and cultivation yards, which has motivated the activation of epidemiological and phytosanitary surveillance groups ^(4,5). Mexico, for its part, eradicated foci in 2021 at a cost exceeding 23 million dollars, which evidences the magnitude of the resources necessary for the control of this pest ^(6,14).

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Epidemiological risks for human health

The greatest danger that *L. fulica* represents is its role as an intermediate host of nematodes of the genus *Angiostrongylus*, particularly *A. cantonensis* and *A. costaricensis* ⁽¹⁴⁾. The first is the causative agent of eosinophilic meningoencephalitis, while the second produces abdominal angiostrongyliasis, whose symptoms can be confused with appendicitis ⁽¹⁵⁾. The transmission chain is completed when rats (definitive hosts) eliminate the parasite larvae in their feces, the mollusks ingest them while feeding, and humans become infected by consuming the poorly cooked snail or vegetables contaminated with its slime.

Recent studies confirm the active presence of *Angiostrongylus cantonensis* in *L. fulica* populations in various regions of the world. In Banda Aceh (Indonesia), 13,4 % of the analyzed specimens tested positive, with higher prevalence in densely populated urban areas ⁽¹⁶⁾. In Brazil, *Achatina fulica* (synonym of *Lissachatina fulica*) was the most frequent species and with the highest number of infected specimens among the terrestrial mollusks evaluated, with natural infection rates reaching 9,7 % ⁽¹⁷⁾. Additionally, studies in the State of Rio de Janeiro have identified risk areas for the transmission of zoonotic eosinophilic meningoencephalitis, underscoring the need for active surveillance systems ⁽¹⁷⁾.

In addition to nematodes, *L. fulica* can carry other helminths, protozoa, and bacteria that cause various gastrointestinal and dermatological disorders. Transmission can occur through direct contact with the animal's slime through microabrasions in the skin, through ingestion of contaminated vegetables and fruits that have not been properly washed, or through consumption of the mollusk's meat, a practice that persists in some populations due to religious rituals of African origin or the use of the animal as bait by fishermen, which has spread the species across different islands and coastal territories ⁽¹⁵⁾.

Evidence-based prevention and control measures

Given the expansion of *L. fulica* in Cuba and other countries of the region, it is imperative to adopt prevention and control measures based on scientific evidence. The Cuban Institute of Plant Health has issued clear indications that must be reinforced ⁽¹⁶⁾:

1) Avoid direct contact with the animal, using gloves and a face mask during any handling, and maximizing hand hygiene with water and

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disinfectant soap in case of accidental contact. It is essential to avoid bringing the mollusk close to the visual and olfactory organs.

2) Carefully wash with abundant potable water all vegetables, fruits, and greens that are consumed, especially those that grow at ground level.

3) Physical elimination methods: manual collection of specimens must be carried out with adequate protections, followed by immersion in water for a period of no less than 30 minutes to cause death by pulmonary asphyxiation (since these mollusks perform gas exchange at the pulmonary level). Subsequently, the specimens must be buried in excavations of at least 0,4 meters deep, as spread out as possible, so that soil microbiology acts to decompose their tissues. Alternatively, the shell can be submerged in a 3 % salt or lime solution (three tablespoons per liter of water) for 24 hours before burial ⁽¹⁶⁾.

4) Chemical control: metaldehyde has proven to be significantly effective in eliminating snails of all ages. Recent studies (2026) indicate that the combination of metaldehyde with commercial food essences improves its efficacy, and it can be integrated with manual collection as part of an integrated pest management strategy ⁽¹⁸⁾.

5) New lines of research: biological alternatives such as the use of *Bacillus thuringiensis* for the control of *L. fulica* are being explored ⁽¹⁹⁾, as well as collection strategies targeting individuals larger than 50 mm in length during the early rainy season, which is when greater capture effectiveness has been identified ^(12,17). The development of new biological control strategies and the prediction of risk areas through ecological models represent promising lines for the sustainable management of this emerging threat ^(20,21).

Role of primary health care

The family physician and nurse, as well as epidemiology personnel in the municipalities, play a fundamental role in the prevention of diseases associated with *L. fulica*. Their work should include: the identification and early notification of pest foci in their work areas; health education for the population about the risks of contact with the mollusk and the correct handling of food; and clinical surveillance of suspected cases of eosinophilic meningoencephalitis or abdominal angiostrongyliasis. The articulation between the health sector and the agricultural sector (Plant Health) is essential for a comprehensive approach to the problem.

Lissachatina fulica is an invasive alien species that causes serious damage to the economy, agriculture, and human health. Its early identification based on the described morphological traits—brown shell with longitudinal stripes, size of up to 30 cm, and differentiation from native species—is fundamental for its control and surveillance in Cuban territory.

The handling of *L. fulica* must be carried out with extreme care, avoiding direct contact and using gloves and a face mask, to prevent the serious diseases it can transmit, among them eosinophilic meningoencephalitis and abdominal angiostrongyliasis.

The most effective method to reduce the presence of this mollusk combines manual collection, drowning of the specimens, and their subsequent burial in deep excavations, which allows soil microorganisms to decompose their bodies. Population education, active epidemiological surveillance, and the application of complementary chemical methods such as metaldehyde are indispensable tools to contain a pest whose expansion, as demonstrated by the Cuban experience of recent years, gives no respite. Coordinated work between primary health care teams and phytosanitary authorities constitutes a strategic pillar for the prevention and control of this emerging threat.

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AUTHOR CONTRIBUTIONS

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ERSR: conceptualization, formal analysis, methodology, project administration, writing – original draft, writing – review and editing.

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