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# Ethnobiology of Snail Consumption in Côte d'Ivoire: Species Knowledge, Cultural Preferences, and Collection Practices in the Haut-Sassandra Region

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**Abstract** | **Original Research Article**

Edible land snails are a culturally important and nutritionally valuable food resource in West Africa, yet their consumption practices remain poorly documented in Côte d'Ivoire. This study investigated local knowledge, preferences, and collection practices in the Haut-Sassandra region, where declining populations of *Achatina achatina* raise concerns about sustainability and potential alternatives. A survey of 302 respondents revealed that snail consumption is strongly anchored in cultural traditions, with a predominance of female respondents (≈69%) and young adults (19–35 years). Knowledge of snail species was widespread, with *A. achatina* almost universally recognized (99.7%) and strongly preferred (91.8%) for its size and desirable texture. Although *Achatina fulica* is considered an invasive agricultural pest, it was recognized by 79.1% of respondents and consumed by some due to its ubiquity and resemblance to other species. Consumption frequency was moderate, with most respondents eating snails two to three times per month. Boiling was the dominant preparation method, followed by grilling and frying, reflecting both cultural preferences and food safety considerations. Collection practices varied significantly by locality, with field collection predominating, while markets ensured year-round availability despite seasonal peaks during the rainy season. These results highlight the entanglement of ecological knowledge, cultural practices, and livelihood strategies in snail consumption. They also point to the dual perception of *A. fulica* as both a pest and a potential food resource, illustrating local adaptive responses to ecological change. Overall, this study provides critical insights for ethnobiology, food security, and the development of sustainable snail farming initiatives in Côte d'Ivoire.

**Keywords:** *Achatina achatina*, *Achatina fulica*, Cultural food pratices, traditional knowledge, Sustainable use, Seasonality.



## INTRODUCTION

The consumption of edible land snails is an ancestral culinary practice in Côte d'Ivoire, deeply embedded in the country's gastronomic and cultural traditions. Valued for both their taste and nutritional quality, snails play an important role in local diets, particularly in rural and urban areas (Kouassi *et al*., 2007; Koffi *et al*., 2019). However, agricultural expansion including slash-and-burn cultivation, bushfires, and pesticide use combined with urbanization and intensive harvesting, has led to a marked decline in wild snail populations (Koffi *et al*., 2019).

In response to this decline and to meet the growing demand for snail meat, farming initiatives have emerged to rear the main species consumed and marketed, notably *Achatina achatina* and *Archachatina ventricosa* (Bouye *et al*., 2017; Kouassi *et al*., 2007; N'Guessan *et al*., 2022; Adou *et al*., 2011). Despite these advances, consumers often perceive farmed snails as having a less desirable taste compared to those collected from the wild, which continue to represent the preferred source for many households. This raises questions about the sustainability of relying solely on natural stocks. Interestingly, Achatina fulica, a ubiquitous species once disregarded by consumers, has recently attracted attention as a potential alternative. Studies have been conducted to evaluate its nutritional and sensory qualities, with mixed results (Sika-piba *et al*., 2014; Sea *et al*., 2008).

The Haut-Sassandra region of Côte d'Ivoire, known for its rich biodiversity and cultural diversity,

stands out for its significant level of snail consumption. Snails are commonly prepared for ceremonies, festive occasions, and daily meals, reflecting their deep cultural and symbolic significance. These dynamic raises important questions about how these traditions persist, the modes of collection and production that sustain them, and their broader socio-economic implications in terms of forest management, sustainability, and local development.

To address these issues, detailed ethnobiological knowledge on snail consumption is essential. The objective of this study is to document local practices and perceptions related to edible snails in the Haut-Sassandra region, focusing on consumption patterns, preparation methods, consumer habits, and sources of collection or supply.

## MATERIALS AND METHODS

### 1.1. Study area

This study was conducted in the Haut-Sassandra region, located in the central-western part of Côte d'Ivoire. The region comprises four administrative departments: Bédiala, Daloa, Issia, Vavoua, and Zoukougbeu (Figure 1). It covers an area of 15,200 km², representing approximately 5% of the national territory. The climate is tropical, with vegetation dominated by forest and wooded savannah. The soils are generally fertile, deep, and favorable to both perennial crops and food crops.

### 1.2. Ethical considerations

This study was conducted in accordance with ethical research principles governing human subjects. Prior to data collection, the objectives of the survey were clearly explained to all participants, and verbal informed consent was obtained. Participation was entirely voluntary, and respondents were informed that they could withdraw at any time without any consequence. Anonymity and confidentiality of the information provided were strictly guaranteed; no personal identifiers were recorded in the dataset. The survey focused only on ethnobiological knowledge and consumption practices, and no sensitive or biomedical data were collected. The study protocol was reviewed and approved by the institutional research committee of Université Jean Lorougnon Guédé (Côte d'Ivoire), ensuring compliance with both local and international standards for ethical research in ethnobiology.

### 1.3. Data collection

Data were collected through a survey carried out from March to May 2024 among the population of the Haut-Sassandra region. The survey consisted of direct interviews with residents in several localities on snails consumption (Figure 2).

### 1.4. Data processing

The collected data were processed using Sphinx Lexica software and Microsoft Excel. Sphinx Lexica was employed for coding and analyzing the survey responses, while Microsoft Excel was used for generating graphs and tables.

### 1.5. Statistical analyses

Descriptive statistics (frequencies and percentages) were computed to summarize sociodemographic characteristics, knowledge, preferences, and practices related to snail consumption. Associations between categorical variables (e.g., sex × knowledge of snails, age group × consumption frequency, locality × collection site) were tested using Chi-square ($\chi^2$) tests. Statistical significance was set at $p < 0.05$. Graphical representations (bar charts, stacked plots, and combined figures) were generated using R software (version 4.3.2, R Core Team) with the packages tidyverse, forcats, and patchwork.

## RESULTS

### Sociodemographic characteristics of respondents

The survey included 302 respondents, with a predominance of females (≈69%) compared to males (≈31%). Most participants were young adults, particularly in the 26–35 age group, followed by 16–25 years. Educational attainment was generally low, with nearly half of respondents being illiterate, while only a small minority had higher education. Occupations were mainly housekeepers, merchants, and artisans, and most respondents were married or in a relationship (Figure 3).

### Knowledge and recognition of snail species

Almost all respondents reported knowing snails ($p < 0.001$, Chi-square test for sex × knowledge). The most frequently recognized species was *Achatina achatina,* which was also the most preferred type for consumption. A smaller proportion mentioned *Achatina fulica,* despite its recognition as an agricultural pest. Consumption of *A. fulica* was justified by its particular taste (Figure 4).

### Culinary practices and consumption frequency

Regarding culinary practices, boiled preparation was the most common, followed by fried. Grilled snails were less frequently cited. The majority consumed snails about two to three times per month, while only a minority reported higher or lower frequencies. Chi-square analysis indicated no significant association between age group and frequency of consumption ($p = 0.979$) (Figure 5).

### Collection practices and locality differences

Snails were mainly collected from the fields, followed by purchase at the market and occasional collection in neighborhoods or streets. A highly significant association was observed between locality and collection site ($p < 0.001$), highlighting strong regional variation in sourcing practices (Figure 6).

**Seasonality of availability**

Most respondents indicated that snails are available during the rainy season (April to August), although some reported availability throughout the year. This reflects both natural ecological cycles and access to markets where snails are traded beyond the collection season (Figure 7).

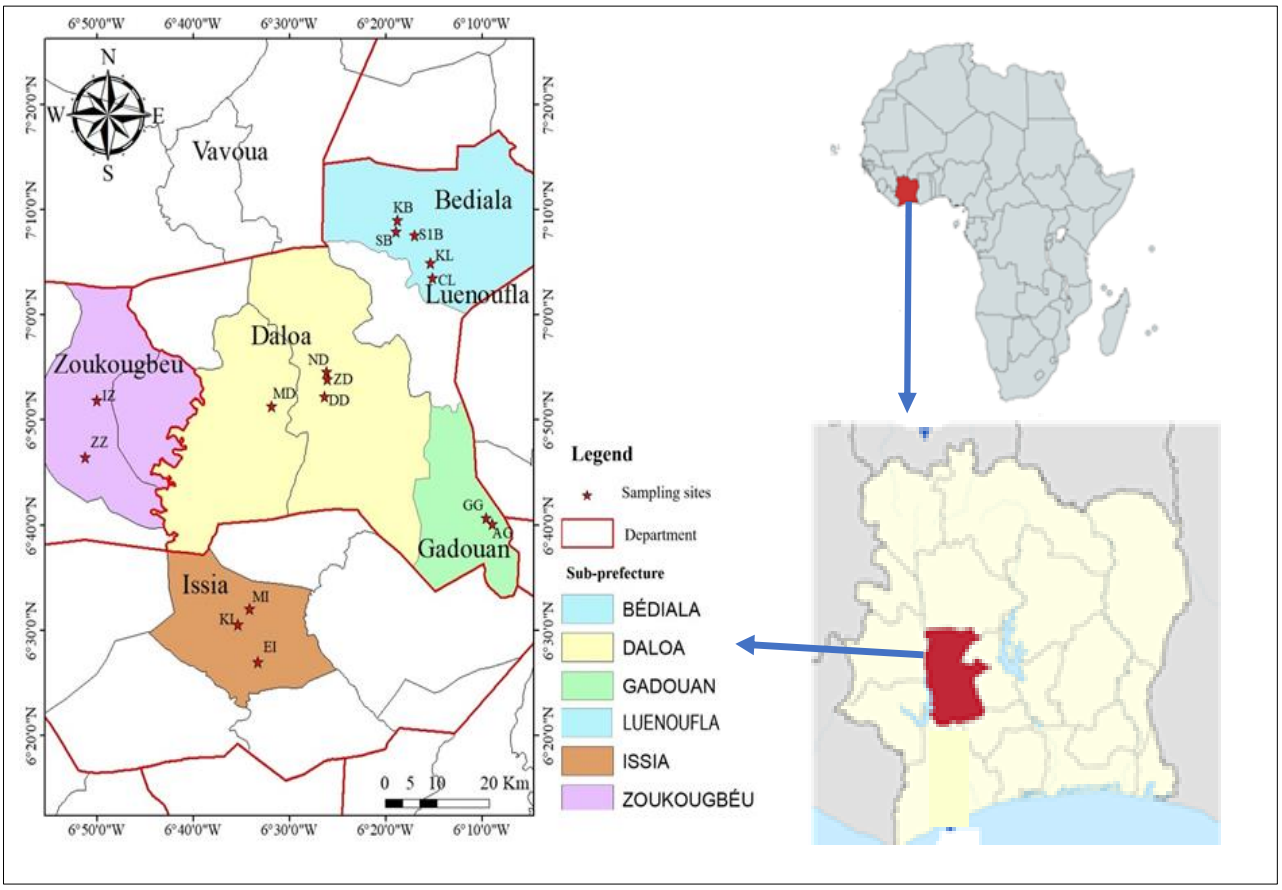


**Figure 1: Study area and sampling sites in the Haut-Sassandra region, Côte d'Ivoire.**

The upper panel shows the location of Côte d'Ivoire in Africa (in red). The middle panel highlights the Haut-Sassandra region within Côte d'Ivoire. The lower panel presents the detailed map of the study area, including the sub-prefectures of Bédiala, Daloa, Gadouan, Luenoufla, Issia, and Zoukougbéu, with different colors. Red stars indicate the sampling sites.


**Figure 2:** ***Representative snail species consumed in the Haut-Sassandra region, Côte d'Ivoire.***
**(A)** ***Achatina achatina*** **(giant tiger snail), showing its characteristic yellow and black marbled shell patterns; (B)** ***Archachatina ventricosa*****, recognized by its thick, globular, uniformly brown shell with a short spire; (C)** ***Lissachatina fulica*** **(giant African land snail), distinguished by its elongated fusiform shell with longitudinal brown and yellow stripes**

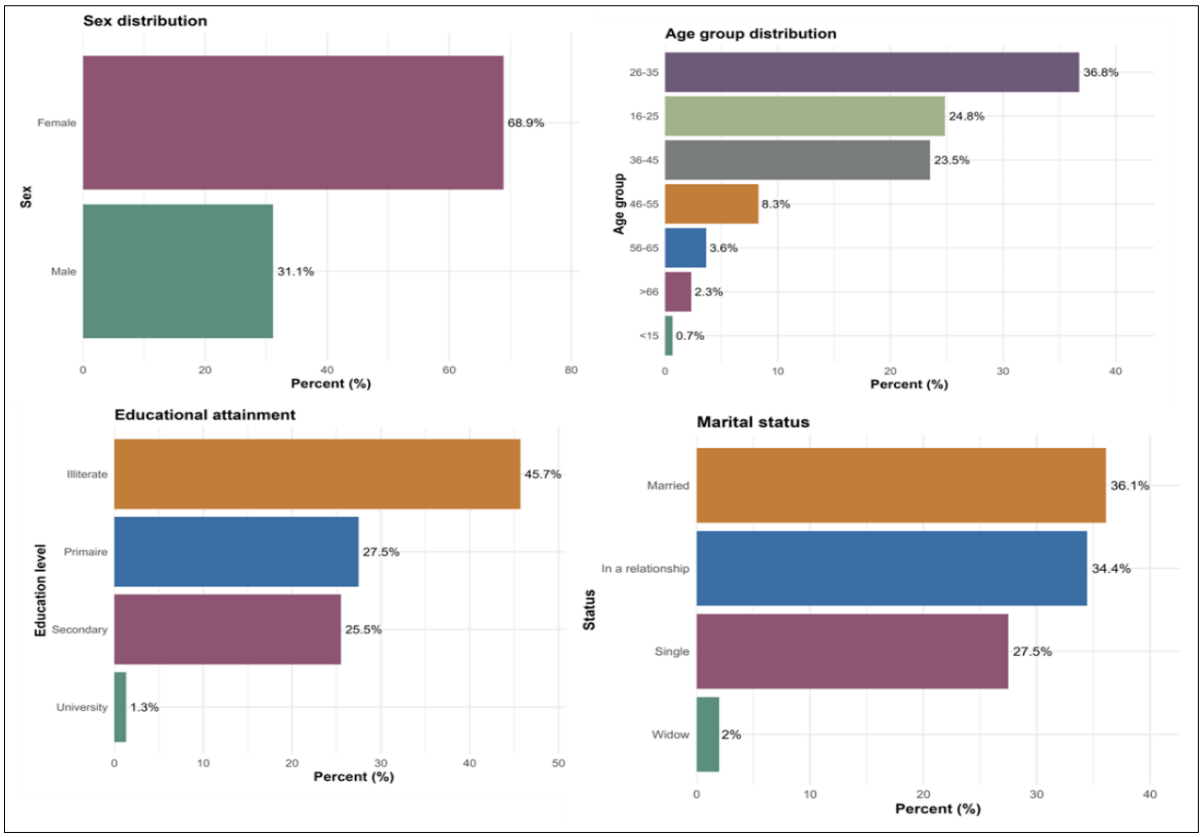


**Figure 3: Sociodemographic characteristics of respondents in the Haut-Sassandra region, Côte d'Ivoire (sex, age group, educational attainment, and marital status)**

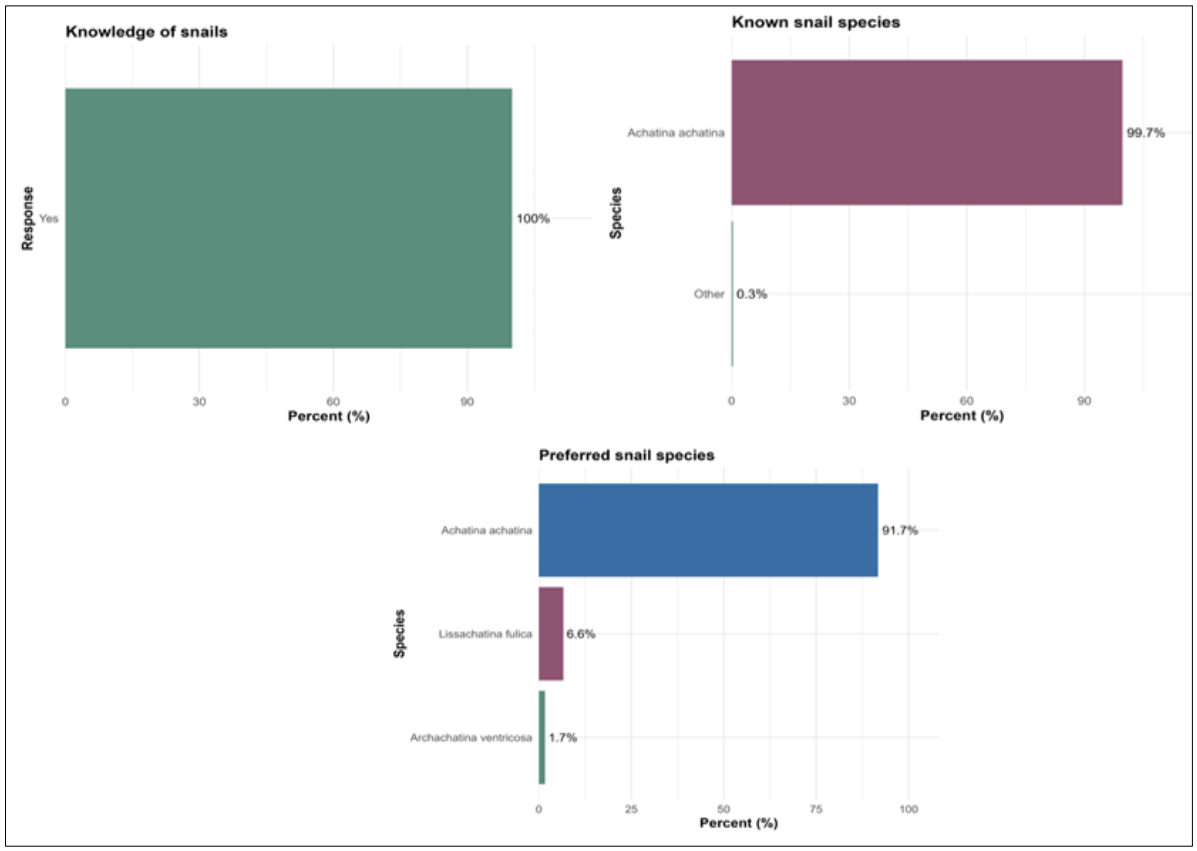


**Figure 4: Knowledge and recognition of snail species among respondents, including known species and preferred species for consumption**

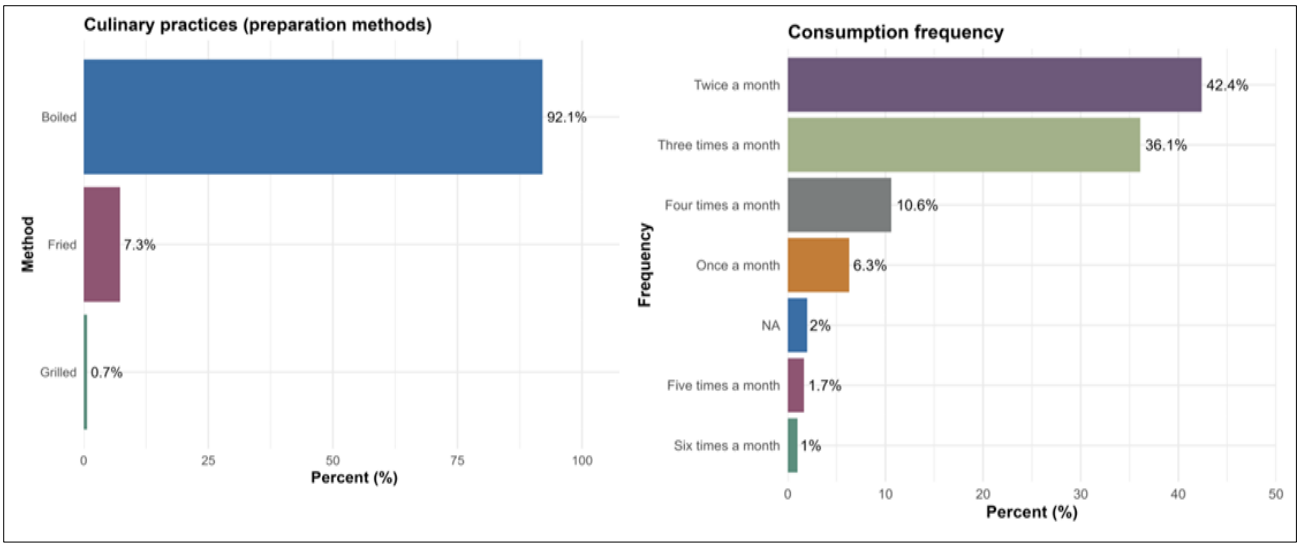


**Figure 5: Culinary practices and consumption frequency of snails among respondents**

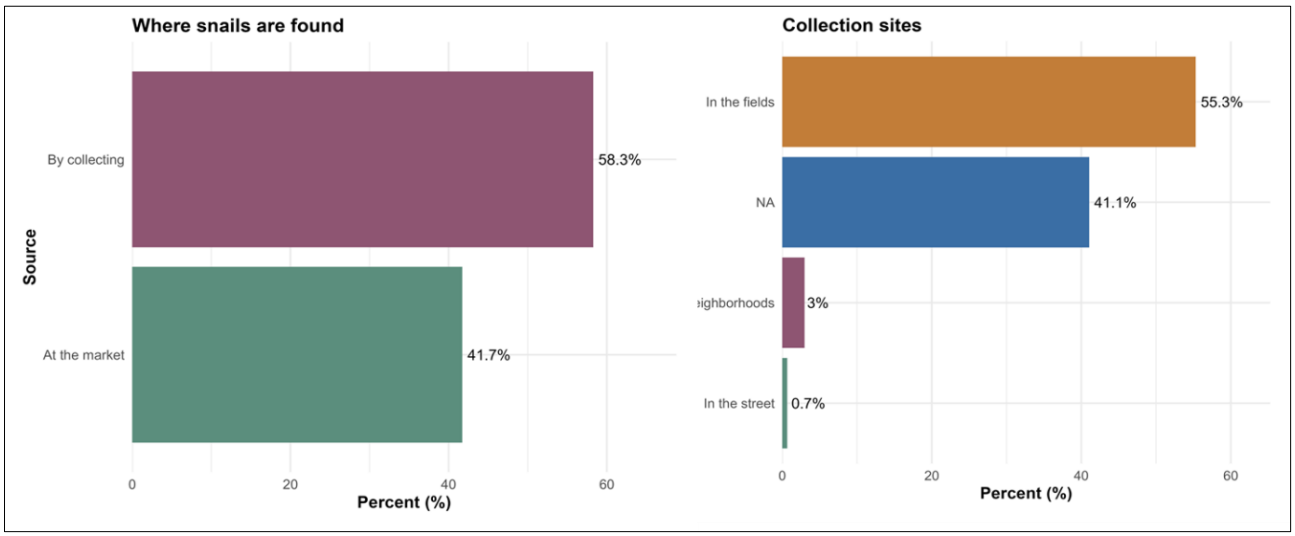


**Figure 6: Sources of snails and collection practices**

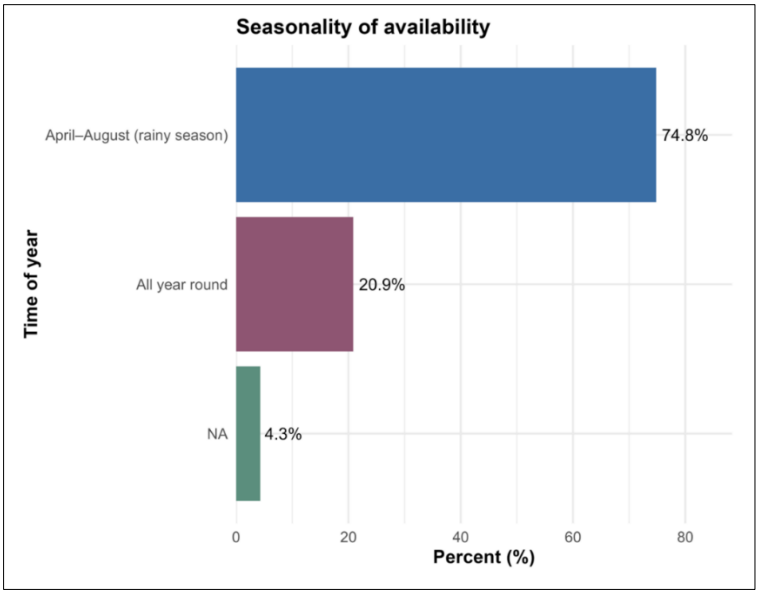


**Figure 7: Seasonality of snail availability as reported by respondents.**

**Table 1: Results of Chi-square tests showing significant associations between locality and collection practices, and between sex and knowledge of snails**

| Comparison | $\chi^2$ | df | p-value | Interpretation |
|---|---|---|---|---|
| Sex × Knowledge of snails | 43.03 | 1 | <0.001 | Strong association |
| Sex × Preferred species | 0.77 | 3 | 0.856 | Not significant |
| Age × Consumption frequency | 16.39 | 30 | 0.979 | Not significant |
| Locality × Collection site | 41.35 | 8 | <0.001 | Strong regional differences |
| Education × Known species | 1.19 | 3 | 0.755 | Not significant |

**Statistical associations**

Chi-square analyses revealed a highly significant association between sex and knowledge of snails ($\chi^2 = 43.03$, df = 1, $p < 0.001$), indicating that awareness of snail species differed according to sex. No significant association was observed between sex and preferred species ($\chi^2 = 0.77$, df = 3, $p = 0.856$), nor between age group and consumption frequency ($\chi^2 = 16.39$, df = 30, $p = 0.979$). A strong regional variation was detected between locality and collection site ($\chi^2 = 41.35$, df = 8, $p < 0.001$). Conversely, no significant relationship was found between education level and knowledge of snail species ($\chi^2 = 1.19$, df = 3, $p = 0.755$, Table 1).

## DISCUSSION

The predominance of women (≈69%) and young adults (19–35 years) among respondents highlights the strong cultural anchoring of snail consumption in Côte d'Ivoire. Women often play a central role in both the preparation and trade of snails, a pattern consistent with other studies in West Africa where women are key actors in the management of edible invertebrates (Kouassi *et al*., 2007; Koffi *et al*., 2019). This gendered dimension of knowledge and practice underlines the socio-cultural significance of snail consumption in local food systems.

Respondents demonstrated high familiarity with three species: Achatina achatina, Archachatina ventricosa, and Achatina fulica. A. achatina was almost universally recognized (99.7%), confirming its longstanding importance as a protein source and cultural delicacy. A. ventricosa and A. fulica, though less frequently cited, were also widely known (86.8% and 79.1%, respectively). These results are consistent with Kouassi *et al*., (2007) and Koffi *et al*., (2019), who emphasized the economic and gastronomic dominance of A. achatina. The relatively lower recognition and acceptance of A. fulica may reflect lingering perceptions of its inferior quality, as previously noted (Sika-Piba *et al*., 2014; Sea *et al*., 2008).

Preferences were overwhelmingly in favor of A. achatina (91.8%), while A. fulica accounted for only 6.6% of responses. The strong dominance of A. achatina is corroborated by other studies (Koffi *et al*., 2019; Kouassi *et al*., 2007), which attribute this preference to its large size, desirable texture, and cultural symbolism. Conversely, limited appreciation of A. fulica reflects consumer skepticism, despite its ubiquity. Similar observations have been made in other contexts where taste and texture are major determinants of consumer choice (Ouédraogo 2020). This ambivalence highlights the challenges of promoting A. fulica as an alternative protein resource, despite its potential ecological and economic advantages.

Most respondents consumed snails two to three times per month, indicating that snails are integrated into diets as complementary rather than staple foods. These findings are in line with Bouye *et al*., (2017), who described snail consumption as supplementary to other protein sources. By contrast, Karamoko (2009) reported higher frequencies in urban areas, with up to half of respondents consuming snails weekly. Such differences suggest that snail consumption is context-dependent, varying across rural and urban settings as well as between socio-economic groups.

Boiling was the predominant preparation method, followed by grilling ("braising") and frying. The preference for boiling reflects its practicality and role in reducing microbial risks, while grilling is associated with festive and commercial settings. These findings are consistent with observations in other West African countries, where similar preparation methods are reported (Kouassi *et al*., 2007; Koffi *et al*., 2019). The choice of cooking method thus reflects both cultural traditions and practical considerations related to safety and taste.

Collection practices varied significantly by locality, with fields representing the primary site, followed by markets and neighborhoods. The strong association between locality and collection site ($\chi^2$, $p < 0.001$) highlights how ecological availability and land-use patterns shape harvesting strategies. Seasonality also emerged as a key factor, with most respondents indicating peak availability during the rainy season (April–August). However, some reported year-round access through markets, suggesting that trade networks extend the availability of snails beyond their natural ecological cycle (Adou *et al*., 2011; N'Guessan *et al*., 2022).

Overall, the results illustrate the entanglement of ecological knowledge, cultural preferences, and livelihood strategies in snail consumption. Women appear as key knowledge holders and traders, reinforcing the gendered dimensions of snail ethnobiology. The dual perception of A. fulica as both an invasive pest and a

potential food resource exemplifies the adaptive strategies through which local communities negotiate between ecological constraints and dietary needs. These findings resonate with broader ethnobiological research emphasizing the dynamic interplay between biodiversity use, cultural identity, and food security (Bouye *et al*., 2017; Ouédraogo, 2020).

## CONCLUSION

This study provides new ethnobiological insights into the cultural and ecological role of edible snails in Côte d'Ivoire. The results highlight the predominance of *Achatina achatina* as the most recognized and preferred species, the dual perception of *Lissachatina. fulica* as both pest and food resource, and the central role of women in consumption and trade. Boiling was the most common preparation method, while field collection remained the primary sourcing strategy, strongly influenced by locality. Seasonality was evident, with peak availability during the rainy season, though markets extend access year-round.

These results align with ethnobiological studies in other African contexts, where snails serve as a vital source of nutrition, cultural identity, and livelihood. They also underscore potential risks linked to microbial contamination, reinforcing the importance of safe preparation practices. From an applied perspective, documenting these practices offers pathways to promote sustainable snail farming (heliciculture) and valorize local knowledge while addressing ecological and food security challenges.

Ultimately, the ethnobiology of snail consumption in Côte d'Ivoire reflects a dynamic interplay of cultural preferences, ecological adaptation, and socio-economic strategies. By situating local practices within broader regional and global debates, this study contributes to ongoing discussions on food sovereignty, biodiversity use, and sustainable rural livelihoods.

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Contribution: Djeneba Pahoba TRAORE conducted the study, collected data, wrote the manuscript.
**Edi Jean Fréjus EHUI**
Contribution: Edi Jean Fréjus EHUI helped with data collection, read and approved the manuscript
**Ano Guy Serge EHOUMAN**
Contribution: Ano Guy Serge EHOUMAN supervised the study and then read and approved the manuscript.
**Djédoux Maxime ANGAMAN**
Contribution: Djédoux Maxime ANGAMAN did statistical analyses and helped with interpretation. He also read and approved the manuscript

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