



# **The Role of Snails in Human Existence**

**Research project**

**submitted to the department of (biology) in partial fulfillment of the requirements for the  
Bachelor degree in Biology science**

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بِسْمِ الرَّحْمَنِ الرَّحِيمِ

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ \* خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ \* اقْرَأْ وَرَبُّكَ الْأَكْرَمُ \*  
الَّذِي عَلَّمَ بِالْقَلَمِ \* عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ.

صدق الله العظيم

## **SUPERVISOR CERTIFICATE**

This research project has been written under my supervision and has been submitted for the award of the degree of BSc. in General Science with my approval as a supervisor.

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## **DEDICATION**

### **This work is dedicated to:**

The sake of Allah, my Creator, and my Master, my great teacher and messenger, Mohammed (May Allah bless and grant him), who taught us the purpose of life.

My great parents, who never stop giving of themselves in countless ways, my beloved brother and sisters, to all my family, the symbol of love and giving.

My friends who encourage and support me, all the people in my life who touch my heart, I dedicate this research.

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## **SUMMARY**

Snails have considerable human relevance, including as food items, as pests, and as vectors of disease, and their shells are used as decorative objects and are incorporated into jewelry. The snail has also had some cultural significance, tending to be associated with lethargy.

However, they have a tremendous health and veterinary importance they act as vectors of diseases of humans and livestock, serves as obligatorily intermediate hosts for a number of infections caused by digenetic trematodes such as schistosomiasis, fascioliasis and many other trematode infections in the world.

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## INTRODUCTION

Snails are mollusks belonging to the Gastropod family, whose members make up 80 percent of all mollusks, slugs and snails. A snail have a coiled shell that is wide enough for the specimen to totally retract into the molluscan class. Snails that naturally lack a shell or have only an internal shell are often referred to as slugs, and ground snails with only a very small shell are often referred to as semi-slugs (which they cannot withdraw into).(Wang et al., 2006)

Snails are one of the most diverse groups in freshwater and are definitely among the public's easiest to identify these soft-bodied, unsegmented, univalve, calcareous shell, coelomates, that consist of a head, foot, visceral mass, and mantle (Pyron and Brown, 2015). Snails are the most widespread species on the margins of lakes and streams and possess a file such as radula which feed on detritus, graze on macrophyte or cobble periphyton, or even float upside down on the surface of the water assisted by surface tension (Dey, 2007, Brown and Lydeard, 2009).

Most gastropods have a single, normally spiral-coiled shell in which the body can be withdrawn, but the shell is lost or some essential groups are reduced; most gastropods have a well-developed head that includes eyes, 1-2 pairs of tentacles, and a concentration of nervous tissue (ganglion). Food habits are extremely varied, whereas most species use radula in some aspects of their feeding behavior; they are dioecious and some types hermaphroditic; they have a muscular foot that is used to "creep" locomotion in most species; while in other, adapted to swim or burrow (Hickman et al., 2002). Many snails are hermaphrodites, which means that a woman and a male may be both. Although some hermaphrodite snails will also require another snail to replicate, some may do so by asexual reproduction on their own (Le Gall and Tooker, 2017)

Snails have important human importance, such as food sources, as rodents, and as disease vectors, and their shells are used as decorative artifacts and integrated into jewelry. There has also been some cultural importance of the snail, tending to be related

to patience. "The snail was often used as a metaphor: "slow as a snail is someone that is not going quickly enough." The snail is the same or identical shape as the Cochlea (Wang et al., 2006).

However, they have a tremendous health and veterinary importance they act as vectors of diseases of humans and livestock, serves as obligatorily intermediate hosts for a number of infections caused by digenetic trematodes such as schistosomiasis, fascioliasis and many other trematode infections in the world (Sharma et al., 2013, Barkia et al., 2014, Al-Waaly et al., 2014).

The snails are infected by ingesting a free-swimming miracidia which penetrates the snail directly, develop to sporocyst, redia stages and produce free-swimming cercaria which emerge from snails (Esch et al., 1997). The cercariae escape and find the appropriate secondary intermediate host or definitive host (human and animals) (Farahnak et al., 2005). However, ecological or behavioral changes also occur in the infected intermediate host, making parasitized prey more vulnerable to predation by final host predators or encysts on aquatic plants waiting to be consumed directly by a suitable definitive host (Shinagawa et al., 2001, Selbach, 2016).

The aims of this report that showing the advantages and disadvantages of snails that surrounding us and present in human existence.

## TAXONOMY OF SNAILS:

Traditionally this class were divided into three Subclasses: Prosobranchia, Pulmonata and Opithobranchia.

They are classified into ground snails, sea snails, and freshwater snails of around 43,000 species. Snails can live for between one to three years, or even up to 25 years, depending on their environment and species as shown in Fig.1.

The first snail lived on the seafloor about 550 million years ago and evolved into land snails about 286 million years ago when they migrated to land and developed breathing lungs.

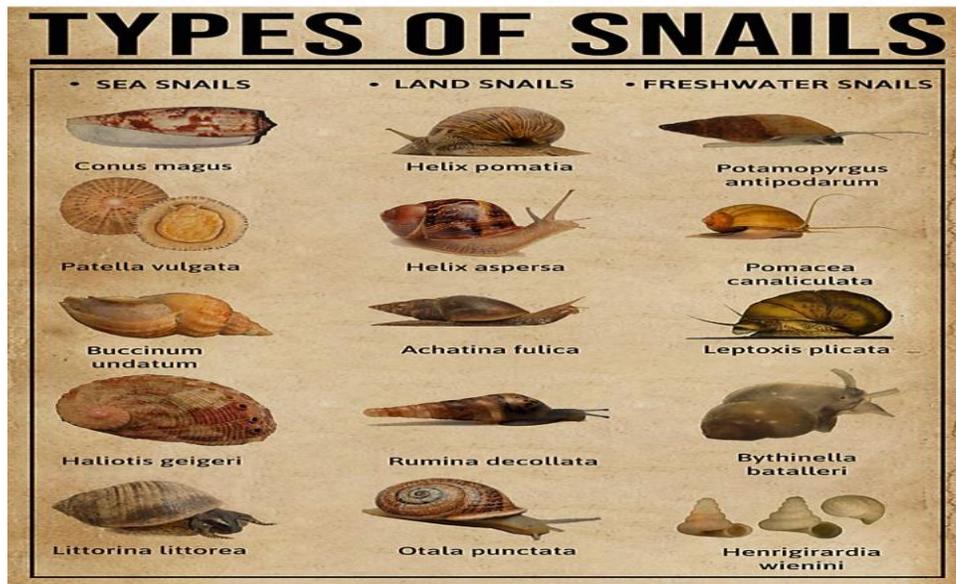


Fig.1 Types of Snails

## WHERE DOES SNAILS LIVE?

Gastropods exist all over the globe, from the Arctic and Antarctic seas to the equatorial zones. Some animals also have adaptations on land to live in the sea and some others.

Land snails, for their part, are among the most commonly dispersed invertebrates across the globe. They can be found on five continents, and also in the sub-Antarctic zone, with very low temperatures. More than 500 native species occur in North America

alone, and these coexist with other species introduced or come from other areas (Baker et al., 2012).

They live in different environments. Some of them, while others remain in ditches and colder temperatures, are happy in the desert. That include regions of mountains and also marshes. Some people believe that there are no snails living in the desert, but that's not true. The only mollusks that have adapted to all of the Earth's environments are terrestrial gastropods. They live-in high-altitude zones, mountain regions, hot and cold locations. On the ground and not in the sea or bodies of fresh water, land snails survive and perform their essential functions. The line between marine and terrestrial animals, though, is often thin since some prefer humid places and some are almost amphibious.

In both natural and urban settings, and in uninhabited conditions, they may thrive. Gardens, farms, rural areas, river banks or lakes, suburbs, swamps, villages, jungles, and forests are typical sites that ground snails visit. House gardens are also home to many snails, and some people hold them as if they were farm animals because they are easy to manage, although this practice is usually (Tomiyama, 1992).

## **WHAT DOES SNAILS EAT?**

They are carnivorous, omnivorous, detritivores, and herbivorous (eating decaying waste from plants and other animals). Forms that consume worms, vegetation, decaying vegetation, animal waste, fungi, and other snails are specialist and generalist species. Thousands of microscopic teeth with a flexible band, called a radula. (Jones et al, 1990).

### **A. THE BENEFIT OF SNAILS (ADVANTAGES):**

#### **1. SNAILS AS FOOD**

Snails are eaten all over the world and are a very good food to eat, despite being repulsive to many people. Roasted snail shells discovered in archaeological excavations suggest that people have eaten them since ancient times, and by feeding them special diets to maximize their taste, the Romans cultivated snails (Le Gall and Tooker, 2017).

And also, land snails are part of the cuisine of Europe. As an appetizer or as a main course, it is no mystery that many people find snails to be tasty. For cooking them, there are plenty of common recipes out there, and many people prepare them at home. In many elite restaurants as well, such dishes are common. Snails with the French term "Escargot" are popular and favored in France. When fried, snails are prepared with garlic and parsley butter, added for seasoning, and served in their shell. Since they are considered a delicacy, they are very pricey fig. 2.

Snails are sometimes consumed in a variety of meals in Greece and Italy, and are often used in sauces and poured over different forms of pasta. People from other countries like Spain, Portugal, and Germany also consume them.

There is a large demand for Escargots in the US, typically supplied from many nations. In some restaurants, many of the recipes used are identical to those used in European restaurants (Hwang et al., 2002). When served for a dinner, **Escargot** is the common word for snails. Millions of snails are eaten annually worldwide. There is, in truth, also a day to celebrate it! The National Escargot Day is May 24th.(Kurata et al., 2001).



**Fig.2 Snails as a food**

## **There are some reasons should be eating Snails**

### **A. Contains the Ideal Form of Protein**

If your body goals include growing and maintaining a perfect body structure, with an improved immune system, then you need the ideal form of protein, which makes up to 12-15% of the snail meat.

Unlike other sources of animal protein, that comes along with a high content of fat and calories, which when consumed consistently over time, increases the level of cholesterol in the body, leading to some health complications like stroke and heart diseases, the snail meat contains close to zero fat making it one of the healthiest sources of protein (Gu et al., 2020).

### **B. Low Level of Cholesterol**

The snail meat is recommended for people passionate about watching their weight while eating healthy, and also for people managing health complications like high blood pressure and diabetes because it has relatively a low level of cholesterol.

### **C. A Rich Source of Vitamins**

Not only are the snail meat rich in proteins, but it is also one of the richest sources of vitamins A, E, K, and B12. The world is going almost completely digital, and there are increasing reasons to be more exposed to screen activities on laptops and phones, it's only healthy you take care of your eyes, by feeding on a diet such as a lump of snail meat, rich in vitamin A, responsible for improving vision. The other vitamins present in the snail meat function to improve your body's immune system against infection and diseases, give you smooth and healthy skin, and help in the circulation of more oxygen to your body tissues and organs.

#### **D. Contains Tryptophan and Selenium**

You may not be familiar with Tryptophan but trust me it plays a vital role in your body's regulation of sleep, impulse, appetite, and even an improved mood, or Selenium that has anti-cancer properties, boosting the body's immune system to fight against cancerous cells. But these are more reasons you should eat snail meat because as much as your body needs them to function, it cannot produce them (Selenium and Tryptophan), you only get them from foods such as the snail meat (Müller et al., 2005).

#### **E. Improves Blood Count**

Snails are also a strong source of iron, important for building red blood cells and transmitting energy across the body, Hobson says. A lack of iron may contribute to severe anaemia and fatigue. You definitely should include the snail meat in your next meal as it has a high Iron content, a major component of the red blood cell your body needs. The deficiency of iron causes anaemia and extreme fatigue, so if you get stressed out quite easily then perhaps, you should be eating more snail meat (Müller et al., 2005).

Childbirth, on the other hand, is something of a muscular operation. Muscle fatigue, elevated nervous irritability, emotional disorientation, and heart abnormalities are all symptoms of potassium deficiency. Another explanation why traditional people use snail meat to treat convulsions (Engmann et al., 2013).

#### **F. Supplements of Calcium and Magnesium**

You should also add the snail meat to your diet because it is rich in Calcium that functions in the body to build you stronger and healthier bones. Also, the snail meat contains a substantial amount of Magnesium recommended by both the Department of Health and Human Services of the United States, for different age categories that the body needs to maintain normal blood pressure and keep regular heartbeat.

### **G. Effective against certain forms of Cancer and Cough**

Recent studies have shown that anti-bacterial substances white rock sea snails secrete onto their eggs to protect them from the bacteria-rich marine environment contain a compound called 6-Br, which has been known to reduce certain forms of prostate tumours without any form of toxicity to the human body. It is well known amongst certain tribes in West Africa of the medicinal value of edible snails in the treatment of whooping cough.

### **H. A Healthy Source of Omega-3**

Omega-3 is another nutrient your body benefits when you eat snail meats, and it helps to not only protect you from a heart attack but it is also very good for the brain. The snail meat contains essential and vital nutrients for healthy skin and body, hence, you must get your snail meat, be it the freshly processed or the grilled snail meat from a snail farm you trust, as what the live snails are fed with before they are fully grown and processed, plays a vital role in determining the taste and the nutritional value of the snail meat (Naylor, 1996).

## **2. SNAIL AS MEDECAL TREATMENTS**

In Ghana, snails form an essential part of the total animal protein source for the population. It contributes about 1 % of food. Townsend is one of the scintistic though that the snails have been acclaimed to be a rich source of protein and other essential nutrients required for good Health, they are not regularly consumed in the diet of many Ghanaians.

Study pointed out: caused by skin photo aging phenomenon subject irradiated light, after treatment of the SCA in the first 30 days of treatment can be clearly observed yellow-gray spots reduced by 50%, 90 more days by 75%, while the degree of shrinkage and skin elasticity are given a significant improvement.

The most eaten species are *Thebe Pisano*, *Otaola lacteal*, and *Helix asperse*. They have anti-cancer properties and, because of their antioxidants and anti-inflammatory activity, improve the immune system.(Marshall et al., 2018).

Research studies confirm that land snail parts (flesh and haemolymph) are useful in the treatment of diseases like anemia, hypertension, labor pain and constipation. Shells were similarly used as a source of calcium supplements for lactating cows.

### **3. SNAIL SHELL AS DECORATE AND COMMERCIAL OBJECTIVES**

Snails, both land and aquatic types, have a single shell in which the animal lives. The exterior surfaces of most snail shells are compact, shiny, and smooth. They may be one color or have various patterns. All shells consist of a matrix of calcium carbonate covered with a noncalcareous membrane called the periostracum, which is similar to the periosteum on the outer surfaces of bones.

Seashells are commonly found in beach drift, which is natural detritus deposited along strandlines on beaches by the waves and the tides. Shells are very often washed up onto a beach empty and clean, the animal having already died.

Empty seashells are often picked up by beachcombers. However, the majority of seashells which are offered for sale commercially have been collected alive (often in bulk) and then killed and cleaned, specifically for the commercial trade. This type of large-scale exploitation can sometimes have a strong negative impact on local ecosystems, and sometimes can significantly reduce the distribution of rare species (Deines, 2018).

### **4. SNAILS AS RAW MATERIALS**

They are very useful raw materials in the treatment of waste water and the purification. Of aqueous solutions. They can also be used in the production of naturally based materials and for the preparation of calcium for medicinal purposes. Snail shells

can be used as fillers in the paper industry to improve the paper capacity or in the cosmetic industries as face powder.

Snail shells are suitable reinforcement materials for the production of composites applicable in the automotive components such as pistons, connecting rods and brake pads. Where flexural strength, hardness and impact strength are of paramount importance such as automobile (Kehinde O et al., 2015).

## **B. DISADVANTAGES OF SNAILS RELATED HUMAN**

### **1. SNAILS AS INREMEDIATE HOSTS FOR PARASITES**

Digenetic trematodes have a complicated life cycle that is initiated in their first intermediate hosts, such as freshwater snails, which are widespread in water sources in most geographical regions; the larval stages, such as sporocysts, rediae, and cercariae, develop within snails (Dodangeh et al., 2019). Therefore, the extent of human infections is primarily related to the rate of exposure to infective larvae.

Freshwater gastropods and human health some freshwater snails are vectors of disease, serving as the intermediate hosts for a number of infections for which humans or their livestock are definitive hosts. The most significant are snail-transmitted helminthiasis caused by trematodes (flukes). At least 40 million people are infected with liver (*Opisthorchis*) and lung flukes (*Paragonimus*) and over 200 million people with schistosomiasis.

Liver fluke can affect cattle, sheep and goats as well as a host of other animal species, and Fascioliasis is an economically relevant and possibly lethal sheer disease that can be traced to unique regions specifically linked to the habitat of an underwater mud snail worldwide (Ng et al., 2013).

Primarily in Africa, Southeast Asia and South America—often with devastating socio-economic consequences. The principal vectors are pomatiopsids and planor bids (schistosomiasis), as well as pachychilids, pleurocerids, thiarids, bithyniids and

lymnaeids (liver and lung flukes). Humans are also affected by a number of other infections for which they are accidental hosts, such as angiostrongyliases (nematode infections of rodents and other mammals) which pass through ampullariid intermediate hosts. Ampullariids and pachychilids are often locally harvested as a food resource in Southeast Asia, Philippines and Indonesia furthering the spread of angiostrongyliasis and paragonimiasis, respectively.

Freshwater snails are commonly released accidentally into aquariums in conjunction with aquatic plants and freshwater fish.

Accidental introductions may also happen in aquaculture, as fouling animals on ships and vessels, and by canals or other changes to natural waterways. Pulmonates have been the most effective colonizers (Physodine, Lymnaeidae, and Planorbidae) (Strong et al., 2007).

Most importantly, cook them; certain snails bear a deadly parasite called rat lungworm, but you will be healthy as long as you heat them for several minutes to at least 165 ° F. Since daring to eat raw snails, a startling amount of kids ended up in the hospital.(Radwan and El-Zemity, 2007).

## **2. ARE SNAILS GOOD OR BAD FOR YOUR GARDEN?**

Snails and slugs are among the most destructive pests found in gardens and landscapes. The brown garden snail, *Cornu aspersum* (formerly *Helix aspersa*), is the most common snail causing problems in California gardens.

One positive aspect of having snails in one's lawn or garden is that they are great cleaners. Common snails prefer eating dead garden debris. In addition to being great cleaners, their waste is rich in nitrogen and mineral's meaning that any grass or plants will have increased nutrition.

There's no doubt that slugs and snails help to clean up garden debris. Almost all common garden snails and slugs (except the uniquely destructive Field Slug *Deroceras*

*reticulatum*), prefer dead garden detritus to living plants. Their feces make a nitrogen-rich, mineral-laden fertilizer that enhances plant nutrition.

Of course, there are many ways snails and slugs are bad for your lawn and garden. Snails don't do a lot of damage at ground level, but they are strong climbers. They find their way up flowering plants to eat flower buds. They climb fruit trees and feast on fruit just as it is turning ripe. They strip bark off young trees and chew smooth, irregular holes through leaves. Or they just live underground and eat the roots like the Keel Slug. snails can be even more destructive. They may devour bulbs while they are still in the ground. They mow down seedlings as soon as they emerge from the ground. They leave a slimy trail everywhere they go that attracts other slugs. While snail and slug damage to garden plants is bad, some things about slugs and snails in your garden are *very* bad. There is one very good reason every gardener needs to minimize contact with slugs and snails.

## **CONCLUSION**

Snails are an excellent source of minerals, according to the findings of the mineral content of snail meat, and are therefore recommended for developing infants, juveniles, breastfeeding, and lactating mothers. It is also prescribed for individuals with diabetes and asthma, as well as those who wish to promote good health in general. Snail meat may also be used to create complementary diets for children under the age of five to avoid rickets, anemia, and protein energy malnutrition. Snail meat consumption can help to reduce postpartum hemorrhage, night blindness, osteoporosis, hypophosphatemia, and raise high density lipoprotein levels. The findings of this research support the majority of common people's food and wellbeing arguments.

In contrast, there are many ways snails is bad for your lawn and garden. Snails act as intermediate hosts for various types of trematode parasites.

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