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Terrestrial Mollusca in *The Legend of Luo Xiaohei*

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Since the beginning of 2019, the web cartoon and flash animation *The Legend of Luo Xiaohei*[1] (in short, *Luo Xiaohei*) has been viewed more than 72 million times on barrage video website Bilibili (https://www.bilibili.com/). It premiered on March 17, 2011, and has since been updated at a very slow pace. Currently, there are only 27 episodes, each lasting a little over five minutes, counting the ending and opening themes.

The low-updating cartoon has wonderful backgrounds and depicts many creatures, some of which are terrestrial Mollusca. The creators of *Luo Xiaohei* are Chinese, so the inspirations for the Mollusca in the cartoon are all from East Asia. The depictions are either directly based on a particular species, or freely created based on a wider group of species. Here I discuss the taxonomic and ecological characteristics of the mollusk species depicted in *Luo Xiaohei*.

TERRESTRIAL MOLLUSCA

Episode 9, 06:28 / Episode 10, 01:07

Taxonomy: Genus *Amphidromus* Albers, 1850.

In Episode 9, two snails can be seen on a tree covered with moss. Based on a recent study by Lok & Tan (2008), the diet of *Amphidromus* is similar to other tree snails such as *Achatinella* Swainson, 1828 and *Partula* Férussac, 1821 (Kobayashi & Hadfield,

Figure 1. Screen capture from Episode 9, 06:28; extracted from Bilibili.

[1] By MTJJ, China (2011–present). Original title: 罗小黑战记

1996). These snails are known to live among moss, their favorite food, and the enviroment depicted in the cartoon is indeed quite realistic.

In fact, the environment shown in this episode seems to be humid, and *Amphidromus* occurs in Northeast Asia (Sutcharit & Panha, 2006), a warm and humid region. Also, since this is a Chinese cartoon, it is worth mentioning that species in this genus are also known to occur in South China (Benson, 1851). These snails are usually found in tree holes (Inkhavilay et al., 2017) and when predators like birds are about, they won't move, which strongly fits the depiction in the cartoon. We can also see the same kind of shell in the background of Episode 10 (01:07 min). The cartoonists are probably hooked on these wonderful snails.

Figure 2. Screen capture from Episode 10, 01:07; extracted from Bilibili.

Figure 3. *Amphidromus roseolabiatus* on a tree trunk; extracted and modified from Wikimedia Commons (Inkhavilay et al., 2017).

Episode 10, 03:38

Taxonomy: Family Cyclophoridae Gray, 1847.

A juvenile shell can be seen on a leaf. Based on the shape of its expanded aperture, it may have an operculum. This is probably an extrapolation by the creator, because terrestrial snails actually do not expand and thicken their aperture when they are young. By the time they expand the shell's outer lip, they should have more whorls. The inspiration for this one may come from the genus *Platyrhaphe* Möllendorff, 1890.

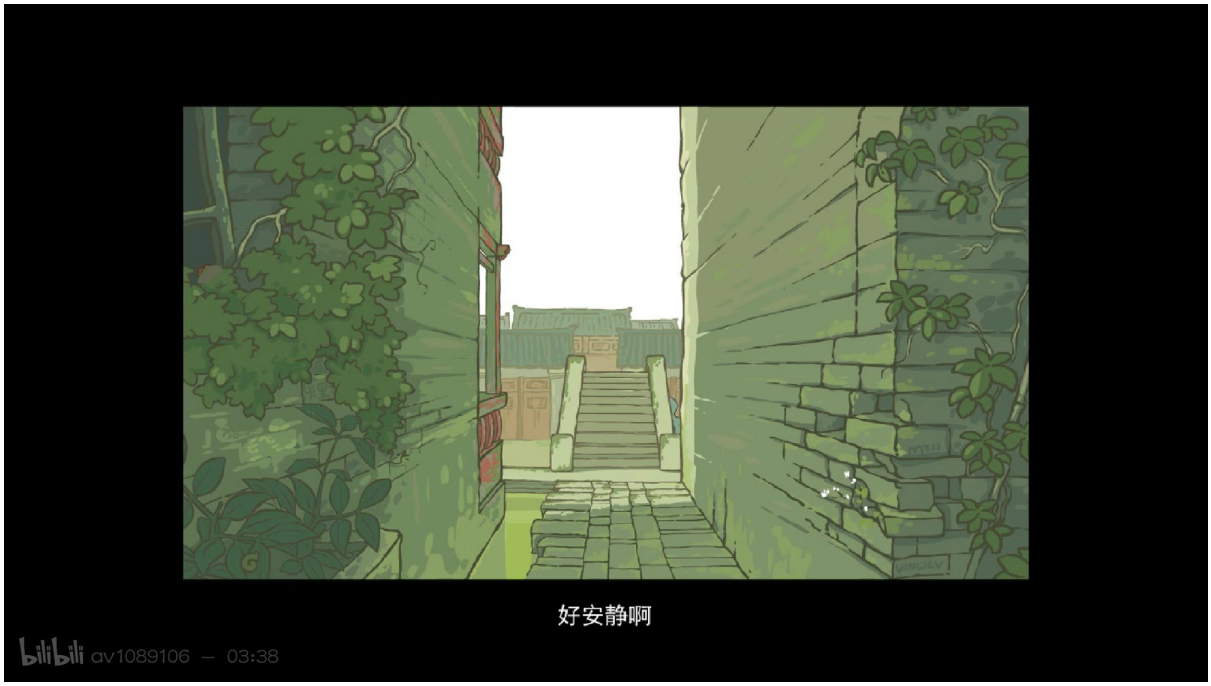

Figure 4. Screen capture from Episode 10, 03:38; extracted from Bilibili.

Figure 5. Holotype of *Platyrhaphe demangei*; extracted from Royal Belgian Institute of Natural Sciences (www.naturalsciences.be).

Episode 15, 02:05

Taxonomy: Genus *Camaena* Albers, 1850.

A broken shell lies on the ground over some moss. We can see the umbilicus directly, which shows that this shell is sinistral (that is, it has a "left-handed" coiling direction). Also, the environment shown is consistent with South China. According to the plot, Luo Xiaohei (the titular character in the cartoon) becomes smaller due to magic, so this is why the shell seems so large. However, in fact, *Camaena* is quite large for a terrestrial snail (Ding et al., 2016).

In China (where the cartoon was produced), the color of the sinistral *Camaena* species is usually brownish and reddish (Ding et al., 2016). In the cartoon, the color is yellowish, but this may be caused by the shell being long exposed to the weather. Usually, shells found in the wild are often weathered and discolored, and the characteristic bands disappear.

Figure 6. Screen capture from Episode 15, 02:05; extracted from Bilibili.

Figure 7. *Camaena cicatricosa*; extracted from Wikimedia Commons (Llez, 2013).

Episode 15, 04:29

Taxonomy: Genus *Meghimatium* Hasselt, 1823.

Identification of slugs depends on the proportional relationship between the mantle and the entire body and the location of the breathing pore (called pneumostome). In the cartoon slug, there is no visible boundary between the mantle and the entire body. Because the slug must match the background color but not lose its color, its body will add a lot of green to integrate to the overall atmosphere and environment and thus, be inconspicuous.

The continuous mantle limits the range of identification options to two slug families: Veronicellidae Gray, 1840 and Philomycidae Gary, 1847 (Wiktor et al., 2000). The mantle of veronicellids does not look so humid (they are called "leatherleaf slugs"), so naturally, it can only be Philomycidae.

In China, a very common genus of slugs belonging to Philomycidae is *Meghimatium*. Some members of this genus vary a lot in color pattern, such as *Meghimatium bilineatum* (Benson, 1842). The common color pattern of *M. bilineatum* is grey with two longitudinal black lines, but also orange individuals without lines can be found (Chen & Gao, 1987; Wiktor et al., 2000). I have also found grey-colored individuals lacking the black lines.

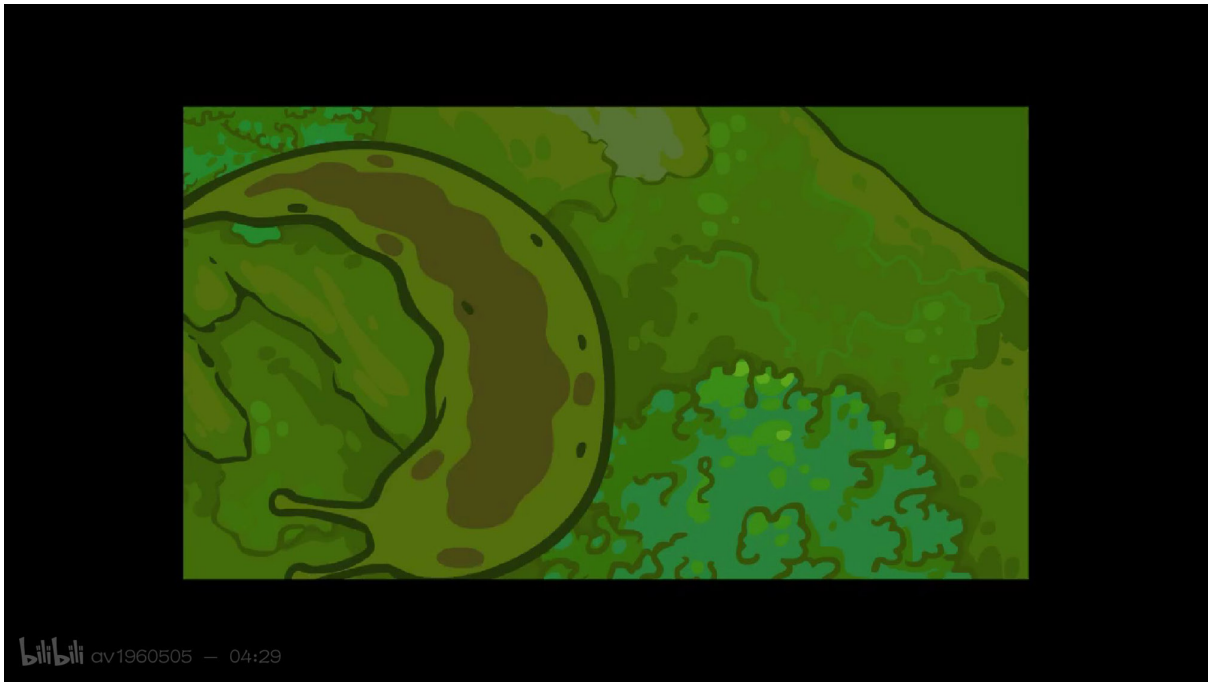

Figure 8. Screen capture from Episode 15, 04:29; extracted from Bilibili.

Figure 9. *Meghimatium bilineatum* from Rizhao, Shandong, China; photo by the author.

Episode 16, 07:55

Taxonomy: Genus *Achatina* Lamarck, 1799.

A shell used as a flower pot seems to have been inspired by snails in the genus *Achatina*. Shells in this genus are very large and have a tall spire. The species kown as African giant snail, *Achatina fulica* (Férussac, 1821), has been introduced to South China before the 1930s (Jarrett, 1931). But the shell in the cartoon has a lower spire and more inflated whorls.

Figure 10. Screen capture from Episode 16, 07:55; extracted from Bilibili.

Figure 11. *Achatina fulica*; extracted from Wikimedia Commons (Eric Guinther, 2004).

CONCLUSION

The terrestrial mollusks in *Luo Xiaohei* are accurately depicted regarding their real-world ecology, habitat, and diet (*e.g.*, Episode 9, 06:28). Some of the depictions show real morphological features of the species they seem to be based on (*e.g.*, Episode 15, 04:29). Nevertheless, terrestrial mollusks are an essential part of natural environments. Much like in nature, they also play an important role in *Luo Xiaohei*, especially in Episode 15, 02:05, when the shell indirectly reflects the fact that Luo Xiaohei has become smaller. In fact, the mollusks depicted in the cartoon may actually help in transmitting the atmosphere of the humid, lush environment where the story takes place.

REFERENCES

Benson, W.H. (1842) Mollusca. Annals and Magazine of Natural History 1(9): 486–489.

Benson, W.H. (1851) Description of new land shells from St. Helens, Ceylon, and China. Annals and Magazine of Natural History 2(7): 262–265.

Chen, D.N. & Gao, J.X. (1987) Economic Fauna Sinica of China, Terrestria Mollusca. Science Press, Beijing.

Ding, H.L.; Wang, P.; Qian Z.X.; Lin, J.H.; Zhou W.C.; Hwang, C.C.; Ai, H.M. (2016) Revision of sinistral land snails of the genus *Camaena* (Stylommatophora, Camaenidae) from China based on morphological and molecular data, with description of a new species from Guangxi, China. Zookeys 584: 25–48.

Inkhavilay, K.; Sutcharit, C.; Panha, S. (2017) Taxonomic review of the tree snail genus *Amphidromus* Albers, 1850 (Pulmonata: Camaenidae) in Laos, with the description of two new species. European Journal of Taxonomy 330: 1–40.

Jarrett, V.H.C. (1931) The spread of the snail *Achatina fulica* to south China. Hong Kong Naturalist 2(4): 262–264.

Kobayashi, S.R. & Hadfield, M.G. (1996) An experimental study of growth and reproduction in the hawaiian tree snails *Achatinella mustelina* and *Partulina redfieldii* (Achatinellinae). Pacific Science 50(4): 339–354.

Lok, A.S.F.L. & Tan, S.K. (2008) A review of the Singapore status of the green tree snail, *Amphidromus atricallosus perakensis* Fulton, 1901 and its biology. Nature in Singapore 1: 225–230.

Sutcharit, C. & Panha, S. (2006) Taxonomic review of the tree snail *Amphidromus* Albers, 1850 (Pulmonata: Camaenidae) in Thailand and adjacent areas: subgenus *Amphidromus*. Journal of Molluscan Studies 72: 1–30.

Wiktor, A.; Chen, D.N.; Wu, M. (2000) Stylommatophoran slugs of China (Gastropoda: Pulmonata) – Prodromus. Folia Malacologica 8(1): 3–35.

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About the author

Guoyi Zhang is a student and taxonomist working on the Camaenidae of China. Land snails are Zhang's favorites in life. Zhang also enjoys watching *Luo Xiaohei* and other cartoons on Bilibili as a hobby.