

Review of PeerJ (#90934)- Numerical and biomass growth study of *Bulimulus bonariensis* under laboratory conditions

General Comments

I find the MS to be an important and timely contribution to the understanding of the general biology and life history of terrestrial gastropod mollusks, and specifically of a species that has become a serious concern as an agricultural pest in Argentina and in other countries. As such I believe the paper is worthy of publication.

I strongly recommend a detailed reading by a native English speaker, as there are enough small sentence-construction and grammar issues, such that they become distracting. I have offered suggestions in various places, some of which may be a matter of opinion, while others may certainly need to be improved.

Major issues

- 1- Taxonomic placement, and breadth of Bulimulidae is outdated, and needs to be corrected. (apparently, it is based mostly on Herbert & Mitchell, 2009).

Bulimulidae's natural distribution is restricted to the New World; records outside of the Americas likely all correspond to species now classified in either Bothriembryontidae (*Prestonella*), or Aillyidae (*Aillya*). Bothriembryontidae does have representatives in South America (*Plectostylus*, *Discoleus*). This is despite the statement in the introduction of Cabrera et al. (2021), where distributional data meant for Orthalicoidea (several families, including Bothriembryontidae) were incorrectly made in reference to one of the families contained therein (Bulimulidae).

I suggest updating taxonomy based on Breure & Romero (2012), and MolluscaBase (MolluscaBase eds. (2021). MolluscaBase. Bulimulidae Tryon, 1867. Accessed at: <https://www.molluscabase.org/aphia.php?p=taxdetails&id=549409> on 2023-10-31)

- 2- I suggest adding elements from the following study in various places throughout the MS, such as comparison table and text of discussion:

Nandy, G. & Aditya, G. (2022) Growth and reproduction in the land snail *Allopeas gracile* (Hutton 1834): a laboratory appraisal. Invertebrate Reproduction & Development, 66: 3-4, 174-196.

To link to this article: <https://doi.org/10.1080/07924259.2022.2115948>

This paper includes a discussion of growth models obtained for land snail species with different life spans and reproductive strategies, particularly the relationship of longevity and onset of, and total fecundity, and fit to various life history models. As such, it is directly relevant to several of the important arguments and comparisons addressed in the present MS.

Relatively Minor issues, suggestions to improve grammar & readability, and “Minutia”

Abstract

Lines 17-19 – Add verb to incomplete sentence; I suggest modifying sentence to....

“*Bulimulus bonariensis* [has been, or is considered] a species of interest in agribusiness....”

Introduction (and see also Discussion, regarding *Placostylus*)

Lines 41-42 – Taxonomic placement, and breadth of *Bulimulidae* – see comment above.

Line 43 – “... one of the most numerous families...”

Suggest changing to - ...one of the most diverse families (although perhaps is better to just say ‘a very diverse family’, as there are others ranking high up there as well.

Line 45 – “...and even arboreal habits,...”

Suggest deleting term EVEN: Makes it sound as if being arboreal is a relative rarity in the family; this is not the case: There are at least as many species with partly arboreal habits in this family, as there are species who use other substrata.

Lines 50-54 – Long sentence, also oddly constructed. Suggest breaking into 2-3 sentences, separated by semicolons or periods, each addressing the desired points- i) There are some studies on biology of *B. tenuissimus* from Brazil; ii) there are no equivalent studies from Argentina on other *Bulimulus*, iii) most of the Argentinian work has been taxonomic, not biological.

Line 53 – “...work in Argentine Republic, where current....”

Sounds odd. Suggest either - ...work in Argentina..., or ...work in the Republic of Argentina....

I prefer the former.

Lines 59-60 – “On the other hand, some native species have been favored...”

Suggest changing to - On the other hand, some native gastropod species have been favored...

Line 60 – “...as a consequence of a greater food supply due to crop production.”

Suggest changing to - ...as POSSIBLE consequences of greater food supply due to crop production, or other effects of habitat modifications.

Line 73 – “...Peralta (2016) catalogued this specie as pest with indirect damage.”

Suggest changing to - ...Peralta (2016) catalogued this specieS as a pest causing indirect damage.

Lines 75-76 – “In addition, *Ilex paraguariensis* producers in Misiones reported that a population invaded plantations...”

Suggest changing to - In addition, producers of yerba mate (*Ilex paraguariensis*) in Misiones reported that a population of *Bulimulus* invaded plantations....

Most people don’t know what is *Ilex paraguariensis*, and all other plant species thus far mentioned have been referred to by common names.

Lines 78-79 – “Because they can consume up to 50% of their weight in one night, causing serious damage to leaves, petioles and shoots.” [And follows onto a new, related sentence] Sentence is incomplete.

I suggest combining it with the next sentence (Lines 79-81) to make:

Because they can consume up to 50% of their weight in one night, causing serious damage to leaves, petioles and shoots, which reduces photosynthetic activity, affecting the growth, yield and quality of the crop, and can even lead to the total loss of the plant (Vaca, 2021).

Lines 83-84 – “...to explore basic population aspects such as survival, mortality and to estimate the age and size at first reproduction.” Suggest changing to,

... to explore basic population aspects such as survival and mortality, and to estimate the age and size at first reproduction.

Materials and Methods

Line 95 – “Were maintained under controlled...” Suggest changing to.
THE SNAILS were maintained under controlled...

Line 98 – “...recreate their natural habitat, with a folder of dry leaves and vegetation.”
Not everybody will know what is a FOLDER (is that term being used here as a synonym of substratum (medium)?, or simply meaning a layer?, or does it include soil?, etc.). It should be unambiguous.

Lines 155-156 – “...were calculated by means of a linear regression analysis.”
Suggest changing to,
...were calculated by means of a linear regression analyses.

Line 174 – “...Smith & Smith, 2007), the day on which individuals were born...”
Suggest changing to,
...Smith & Smith, 2007). The day on which individuals were born...

Lines 177-178 – “...mortality rate and life expectancy were obtained. Where:”
Suggest changing to,
...mortality rate and life expectancy were obtained, where... [followed by the parameters explained]

Results

Figure 2, and associated text – I just want to make sure that the lines and dots will be sufficiently evident so as to be fully visible in the final publication. They are visible enough now, but border on too small/faint.

Lines 257-260 – “Because all five clutches hatched within a few days of each other (every 8-9 days) and this happened within a month, all specimens together were considered as a cohort and the start of the 5 groups took away to time zero.” Two separate issues:

- a) If all hatchings occurred by intervals of 8-day intervals (or more), then the five batches reported here took more like a month and a half (~40 days), perhaps longer.
- b) "...the start of the 5 groups took away to time zero." I believe I understand what this means, but it needs to be reworded to improve grammar and attain full clarity.

Lines 263-264, and Fig. 3 Legend – Is there more to the figure legend? ("Walford Graphical Method"). Generally, it is recommended that figures (with their legends) are self-standing (i.e., contain all information to be understood without requiring going back to the text). Perhaps at least indicating that this is for groups 1-5 combined? I may be in error on this RE- PeerJ policy.

Lines 271 – "The growth equation for this model was reflected by the following equation:" Suggest rewording so as not repeating the word EQUATION.

Lines 291-298 – The two statements (first on Lines 291-293, and second on Lines 294-298) should be together in a single paragraph, not on two separate paragraphs.

Lines 294-295 – "...growth models were compared in a possible scenario of *B. bonariensis* presence with *L. fulica*, *R. decollata* or *C. aspersum*."

Two issues:

- a) Although clearly growth parameters obtained from separate laboratory studies (different times, different authors) with different species are being compared, the statement above is unclear and confusing. Unless I am missing completely the intent, "...presence with..." suggests growth comparisons of multispecies groups, which is not what this study did. I suggest rewording.
- b) This is the first mention of these genera & species in the text (*Lissachatina*, *Rumina*, *Cornu*). Genera names should be spelled out here. They can of course be abbreviated later in the text.

Lines 297-298 – "The source from which the information was extracted is indicated." This may not be necessary here (results), as it is included in the table, and later used in the discussion. Suggest deleting.

Lines 305-306 – "...in the life table (Table 5) of 1020 days, 2.79 years."

Suggest changing to ... in the life table (Table 5) of 1020 days, AND 2.79 years.

Discussion

Lines 317-319 – "In Argentina, within exotic species such as *Deroceras reticulatum* an average of 3 eggs was recorded, *D. laeve* was recorded ovipositing around 6 eggs (Clemente et al., 2007) and in *R. decollata*...."

I suggest several small changes, something like,

In Argentina, AMONG exotic species such as *Deroceras reticulatum*, [ADDED COMMA] an average of 3 eggs was recorded, WHILE *D. laeve* was recorded AS ovipositing around 6 eggs (Clemente et al., 2007), [ADDED COMMA] and in *R. decollata*....

Line 323-324 – “Within the Bulimulidae family, although studies on life cycles, growth and reproduction are scarce, there are some studies on neotropical representatives.”

Suggest changing to,

Within the family Bulimulidae, studies on life cycles, growth and reproduction are scarce, BUT there are some studies on neotropical representatives.

Line 327 – “In another Bulimulidae such as *Bostryx conspersus*, Ramirez (1988)...”

Suggest changing to, In *Bostryx conspersus*, Ramirez (1988)....

(Since the paragraph will be about various species of the family Bulimulidae)

Lines 328-329 – “However, in other larger Bulimulidae such as *Placostylus*, clutches vary between 25 and 450 eggs with an average of 205 (Brescia et al., 2008).”

Suggest changing to,

However, in other larger ORTHALICOID snails, such as *Placostylus*,.....

This because *Placostylus* is not a Bulimulid, but a Bothriembryontid.

Lines 331-332 – “...for *B. conspersus* a longer incubation time was also observed (19.56) (Ramirez, 1988) and in *Placostylus* the interval is 22 days on average...”

Suggest changing to, ...for *B. conspersus*, [COMMA ADDED] a longer incubation time was also observed (19.56) (Ramirez, 1988) and in *Placostylus* the interval is 22 days on average...

Lines 334 – “...2008) and 53 % (Silva et al., 2013), *B. bonariensis* is found with 41.82 % between these values.”

Suggest changing to,

...2008) and 53 % (Silva et al., 2013), WHEREAS THAT OF *B. bonariensis* WAS INTERMEDIATE BETWEEN THESE VALUES, AT 41.82 %.

Lines 341-342 – “...such as *Deroceras* with 16 days of incubation (Clemente et al., 2007)...”

Suggest saying what species of *Deroceras* is meant (if a single one), or spp. if more than one.

I believe that Clemente et al reported on *D. laeve* and *D. reticulatum* only.

Lines 347-348 – “Garcia et al. (2006) for *C. aspersum* also observed a good fit to several models such as...”

Suggest changing to,

Garcia et al. (2006) also observed a good fit to several models for *C. aspersum*, such as...

Line 368 – “...only group 4 showed a value within a real length.”

I am unclear what is meant by this, but it seems that it needs to be clarified.

Line 369 – “The logistic model was the one that predicted the lowest asymptotic lengths and the Gompertz model not only has a good fit but also the values of the maximum length parameter were close to the real ones observed both in the field and in collection material.”

a) Suggest changing to,

The logistic model predicted the lowest asymptotic lengths...., and

b) ... the Gompertz model not only resulted in a good fit but also...

Line 372-375 – “...implies a sigmoidal growth with three phases an initial slow growth, a rise to an inflection point and a further increase until reaching an asymptote, similar to a logistic model and differentiable from the latter by the location of the inflection point located between 35-40 % in the Gompertz one and at 50 % in the logistic one (Mínguez, 2016).”

Suggest changing to,

... implies a sigmoidal growth with three phases, [ADDED COMMA] an initial slow growth, a rise to an inflection point, [ADDED COMMA], [ADDED COMMA] and a further increase until reaching an asymptote. [PERIOD AND NEW SENTENCE] This is similar to a logistic model BUT differentiable [DISTINCT?] from the latter by the location of the inflection point located between 35-40 % in the Gompertz MODEL and at 50 % in the logistic MODEL (Mínguez, 2016).

Lines 389-390 – “Díaz et al. (2023) using logistic regression analysis, calculated gonadic maturity size at 12 mm total shell length...”

Suggest changing to,

Díaz et al. (2023) using logistic regression analysis, calculated gonadic maturity size OF B. BONARIENSIS at 12 Mm total shell length...

Lines 391-393 – “Thus, it can be inferred that gonadal maturity, when they reach a length of 12 mm and the growth rate decreases slightly, is reached after 200 days of life.”

Suggest changing to,

Thus, it can be inferred that gonadal maturity is reached after 200 days, when they reach a length of 12 mm, [ADDED COMMA] and the growth rate decreases slightly.

Line 393-394 – “Therefore, the individuals that are born are not able to reproduce until the following year after birth.”

Suggest changing to,

Therefore, newly-born individuals are not able to reproduce until the following year.

Lines 394-395 – “The approximation of the size of the first reproduction is 16.68 mm, TL average at one year of life, at which time there is a second decrease in the growth rate, although milder.”

Suggest changing to,

The approximation of the size of the first reproduction is 16.68 mm [DELETE COMMA AND ADD PARENTHESIS] (TL) ON THE average, [ADD COMMA] at one year of life, WHEN there is a second (LESSER) decrease in growth rate.

Line 398 – “Therefore, in this species the size of the first reproduction...”

Suggest changing to,

Therefore, in THAT species the size of the first reproduction...

Line 399 – “Unlike *C. aspersum*, which reaches sexual maturity...”

Suggest changing to,

IN CONTRAST, *C. aspersum* reaches sexual maturity...

Lines 409-412 – “...: those with a short life span, species that live less than two years, where he mentions the genus *Bulimulus*; and those with a long life span, those that live more than two years and reproduce in at least two seasons.”

Suggest modifying to,

...: those with a short life span (less than two years, where he includes the genus *Bulimulus*), and those with a long life span (livING more than two years and reproducING in at least two seasons).

Lines 417-420 – “During the experiment carried out by the authors in 2008, the population was maintained until the last specimen perished with an average TL of 20.6 mm; the same as in *B. bonariensis* since during the same time the individuals reached an average length of 20.24 mm. In a second experiment, Silva et al. (2013) achieved that specimens of *B. tenuissimus*, kept in groups,...” Suggest changing to,

During the experiment carried out by THOSE authors in 2008, the population was maintained until the last specimen perished with an average TL of 20.6 mm; THAT IS VIRTUALLY the same SIZE as in *B. bonariensis* (PRESENT STUDY) since during the same time the individuals reached an average length of 20.24 mm. In a second experiment, Silva et al. (2013) FOUND that specimens of *B. tenuissimus*, kept in groups,...

Lines 427-428 – “...for some time thereafter; as opposed to indeterminate growth, which is defined as a continuation of growth after maturity is reached.” Suggest changing to, ... for some time thereafter. THIS IS IN CONTRAST to indeterminate growth, which is defined as a continuation of growth after maturity is reached.

Lines 434-435 – “After the above, we can reflect on the mathematical models that are being implemented at present and have been implemented for some time. Suggest changing to, UPON THIS BASIS, we can reflect on the mathematical models that are being implemented at present and have been implemented for some time.

Lines 436-437 – “...expressed the need to reconsider the use of growth models mainly in fish, crustaceans and mollusks. In addition to the need to implement new models.”

Sugggest changing to, ...expressed the need OF reconsiderING the use of growth models mainly in fish, crustaceans and mollusks, AND the need to implement new models.

Lines 437-439 – “Knowing basic aspects of life history, such as having indeterminate growth, we must begin to apply other growth curves that are most likely more explanatory, such as...”

Suggest changing to, Knowing basic aspects of life history, such as having DETERMINATE OR indeterminate growth, we must begin to apply other growth curves that MAY BE more explanatory, such as...

Lines 441-442 – “On the other hand, *B. bonariensis* showed a type III survival curve typical of r-strategists with high mortality in the first month of life.” Suggest modifying to, *B. bonariensis* showed a type III survival curve, [COMMA ADDED] typical of r-strategists with high mortality in the first month of life. [A reference is needed here. There are several choices among the refs already included in the MS]

Lines 444-445 – “Staikou (1998) also observed in *Cepaea vindobonensis* a similar survival and a high mortality rate during the first year of life.” Suggest modifying to,

Staikou (1998) also observed a similar survival and a high mortality rate during the first year of life in *Cepaea vindobonensis*.

Line 446 – “*B. similaris* (Carvalho et al., 2008) and *C. aspersum*...” Two items:

- a) This is the first mention of *Bradybaena similaris* in the text. The genus name should be spelled out.
- b) The abbreviation *B. + species name* is used in the text for 3 genera thus far: *Bulimulus*, *Bostryx* and *Bradybaena*. This is a bit of an issue. I suggest considering a manner to avoid confusion.

Lines 447-449 – “In *B. tenuissimus*, mortality during the study period ranged from 35 % in the group that was wetted daily (Silva et al., 2009) to 60 % in the group reared on a combined diet (Meireles et al., 2008).” Suggest modifying to,

In *B. tenuissimus*, mortality during the study period ranged from 35 % in A group that was wetted daily (Silva et al., 2009), [COMMA ADDED] to 60 % in A group reared on a combined diet (Meireles et al., 2008).

Lines 450-452 – “The above is in contrast to what happens in other terrestrial gastropods with a k-strategy such as *Leptinaria unilamellata* (Carvalho et al., 2009) and which have shown a high survival rate such as...” Suggest changing to,

The above is in contrast to what HAS BEEN REPORTED FOR other terrestrial gastropods with a k-strategy, [COMMA ADDED] such as *Leptinaria unilamellata* (Carvalho et al., 2009) and which have shown a high survival rate such as...

Line 457 – “Knowing, for example, the mortality rate allows us to understand how it shapes life history...” Suggest changing to,

Knowing, for example, the mortality rate, [COMMA ADDED] allows us to understand how THIS PARAMETER shapes life history...

Lines 463-464 – “In South America, there are few studies related to life cycles, growth and reproduction of *Bulimulus* species (Meireles et al., 2008, 2010; Silva et al. 2008, 2009, 2013).”

Suggest adding,

In South America, there are few studies related to life cycles, growth, [ADD COMMA] and reproduction of

Bulimulus species (Meireles et al., 2008, 2010; Silva et al. 2008, 2009, 2013; PRESENT STUDY).

Lines 466-470 – “...because they are pest species (Clemente et al., 2007), of sanitary and economic importance (Silva et al., 2013) or of commercial cultivation (Daguzan et al., 1981; Rengifo Vásquez et al., 2004) but also because of their ecological (Staikou, 1998) and conservation relevance (Brescia et al., 2008; James et al., 2013; Rodríguez-Potrony et al., 2020), since invasive species threaten the loss of native biodiversity (Carvalho da Silva & Omena, 2014).” Suggest modifying to,

...because they CAN BECOME pest species (Clemente et al., 2007) [DELETE COMMA] of sanitary and economic importance (Silva et al., 2013) or of commercial cultivation (Daguzan et al., 1981; Rengifo Vásquez et al., 2004), [ADD COMMA] but also because of their ecological (Staikou, 1998) and conservation relevance (Brescia et al., 2008; James et al., 2013; Rodríguez-

Potrony et al., 2020). IN ADDITION, invasive species MAY threaten native biodiversity (Carvalho da Silva & Omena, 2014).