Dissection of Research Article

Name

Institution

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**1. Show how you would cite the article in a bibliography presented in a scientific paper**

This article cited in the APA citation styles as follows:

Sison-Mangus, M. P., Mushegian, A. A. & Ebert, D. (2015). Water fleas require microbiota for survival, growth and reproduction. *The ISME Journal*, 9, 59–67.

**2. What are the major sections (and subsections) included in this paper?**

It is a quantitative research study having experimental research design. The main sections include abstract, introduction, materials and methods (animal, daphnia from parthenogenesis eggs, daphnia from resting eggs, mortality and fecundity experiment), statistical analysis, results, discussion, conclusion, conflict of interest, acknowledgements and references. These sections encapsulate the purpose of research, strong literature support of the subject matter, detailed methodological description, findings and in-depth analysis of the obtained results.

**3. Outline the general information presented in the introduction and describes at least two main ideas about the study presented by the authors in the introduction**

Authors presented various studies in the introduction section in order to make the reader realize the significance of current topic within the biological world. They presented valuable information about the benefit of micro-organisms like bacteria and parasites for the survival and appropriate functioning of eukaryotes. They called the surrounding micro-organisms as micro-biota. Authors suggested that micro-biota carries immense importance for the eukaryotic community because some eukaryotes require micro-organisms to catalyze their cellular or organic functions for example, bacteria-free drosophila larvae has higher chances of death and developmental arrest; bacteria-free adult flies have been observed to have reduced life-spans as compared to the other counterparts; post fertilization observation of zebra-fish demonstrates a clear degeneration of intestinal tissues in the 100% absence of bacteria and various fatal interruptions in the gastrointestinal and immune- development have been observed when mice and rats were deprived of the bacteria within their gut track. Hence, introduction section highlights the three main points of host-parasite relationship; symbiotic, mutualism and parasitic. In the pre-existing literature, a considerable attention was paid to the negative effects of micro-biota on the associated host organisms however this article countered the trend and attempted to highlight the symbiotic relationship between these two counter-stones of eco-system.

**4. The introduction presented background information about the research system. The information came from a literature review of relevant scientific articles. How many articles were cited in the introduction? How many of the articles do you think were peer-reviewed?**

Aristotle suggested that we can make our message impactful and persuade others dexterously using three techniques; *ethos, pathos* and *logos*. Here, logos is what authors utilized in this research article; they used logical (research based) explanation and references from the credible literature sources to make their words more acceptable for all. Approximately 30 literature articles were added in the study out of which 20 studies were used in the introduction section in order to settle the arguments on the logical grounds of pre-existing literature. After deliberate painstaking analysis, it was found that nearly all the studies included in introduction section appeared to be peer-reviewed because they were picked from the journals that offer only peer-reviewed articles with greater number of citations worldwide such as *Biology Bulletin*, *Genetics, journal of gerontology, biology and medicine* and so on.

**5. What were the goals or objectives of the study, and where were they presented?**

This study intends to explore the biological effects of micro-biota such as growth, reproduction and survival on the daphnia—a miniature crustaceans present in the water, also known as common water flea. Researchers selected daphnia for experimentation because it is a widely-acknowledged model animal in ecology, quantitative genetics, environmental genomics, evolution of sex and host-parasitic interaction and eco-toxicology. These goals and objective were presented in the end of introduction section where daphnia was introduced.

**6. What were the research questions and hypothesis questions presented in the paper?**

Research questions included

1. Are daphnia survival rates different in the presence and absence of bacteria?
2. Are daphnia reproduction rates different in the presence and absence of bacteria?
3. Are daphnia growth rates different in the presence and absence of bacteria?

Hypothesis included

1. In the parthenogenesis eggs of daphnia the *growth* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
2. In the resting eggs of daphnia the *growth* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
3. *Growth* rate in the parthenogenesis eggs is higher than the resting eggs of bacteria supply solution
4. In the parthenogenesis eggs of daphnia the *survival* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
5. In the resting eggs of daphnia the *survival* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
6. *Survival* rate in the parthenogenesis eggs is higher than the resting eggs of bacteria supply solution
7. In the parthenogenesis eggs of daphnia the *reproduction* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
8. In the resting eggs of daphnia the *reproduction* rates are higher in the bacterial supply solution as compared to the untreated and bacteria absent solutions
9. *Reproduction* rate in the parthenogenesis eggs is higher than the resting eggs of bacteria supply solution.

**7. What were the types of variables recorded during the research? Which variables were explanatory VS responses?**

Three types of variables were recorded during the research; *growth rate* in millimeters, *survival rates* in the number of eggs survived after ten days and *reproduction rate* in the number of eggs hatched in ten days.

**8. The methods section presents information on the procedures used during the research. List the types of information described about the study and the main approach to gather data.**

It was an experimental study in which three conditions were manipulated; details are presented in the tabular form:

|  |  |  |
| --- | --- | --- |
| Sr# | Parthenogenesis  | Resting eggs  |
| 1 | Bacteria supply solution | Bacteria supply solution |
| 2 | Bacteria-free solution  | Bacteria-free solution |
| 3 | Untreated solution  | Untreated solution |

After PCR screening of bacteria 16srDNA from daphnia, a close observation was put to examine the growth, survival and reproductive changes of daphnia.

**9. What statistical analyses were conducted during the study?**

PCR screening of bacteria at different sampling points was used and rest of the work was done through systematic observation and t-test and percentile analysis command in the SPSS version 21 software.

**10. Outline the presented outcomes of the study**

Bacterial presence has significant impact on the survival, growth and reproduction of daphnia. Growth, survival and reproduction rates were higher in the parthenogenesis eggs of bacterial solution as compared to the resting egg solution.

**11. What types of information were presented in the discussion section?**

Discussion section presented the findings thoroughly defining the acceptance or rejection of each hypothesis and how these results contributed to the existing knowledge about micro-biota.

**12. How did information presented differ between the results and the discussion sections?**

In the result section, information was presented in graphs and statistical language that was difficult to understand for a common individual however discussion section attempted to interpret the information and made it understandable for all. Result section had more formal language whereas discussions section was quite informal and detailed.

**13. An important requirement of scientific articles is that claims made in the article must be based on data presented, or references citing other scientific articles. How well did the authors meet this criteria?**

Both in-text and end-text citation styles were appropriate and followed the AMA conventions.

**14. Scientific conclusions must be based on the results of the study; not speculation or hidden agendas. How well do you think the article's conclusions matched the results presented in the paper?**

It matched well because an objective meaning was derived from the findings as we all knew hypotheses were accepted and results confirmed the importance of bacteria for daphnia. Same was defined in the conclusion section.

References

Sison-Mangus, M. P., Mushegian, A. A. & Ebert, D. (2015). Water flea require micro-biota for survival, growth and reproduction. *The ISME Journal*, 9, 59–67.