

AquaTechnica

NOTES OR SHORT COMMUNICATIONS PREPARATION TEMPLATE

General considerations

To submit a manuscript for evaluation you must be registered in the journal here: <https://revistas.utm.edu.ec/index.php/aquatechnica/user/register> and carry out the entire process through the platform; if you have problems, write to revistaaquatechnica@gmail.com.

Notes are short communications on a specific topic, sometimes reporting on the partial results of an investigation, or an invention or technical improvement. They should not exceed 10 pages and should be structured like an article.

Manuscript in A4 size (no more than 30 pages) with side, top and bottom margins of 2.5 cm. The entire manuscript in Times New Roman 12, without indentation, without formats and with single spacing. All pages and lines of the document must be numbered from the beginning to the end of the manuscript.

Use a quote with the name of the author or authors and then the year in parentheses to present your findings, methodologies, arguments, etc., in a personalized way. Example: Rodríguez (2019) discovered... Rodríguez and Hernández (2020) concluded... or Rodríguez et al. (2019) determined that... (when there are more than 2 authors, indicate *et al.* in italics). Do not use “&”, but instead use “y” (Spanish), “e” (Portuguese) or “and” (English).

To present non-personalized findings, methodologies, arguments, etc., indicate the author and year at the end of the sentence; if the sentence is supported by several quotes, put them all in chronological order, separated by a comma (.). Example: High concentrations of polyunsaturated fatty acids have been determined in marine microalgae (Rodríguez 2019); or (Rodríguez 2019, Sánchez and Rodríguez 2020, Sánchez et al. 2021).

Use personal communication exposing the source: name, institution and month and year of the personal communication in parentheses, example: (Personal communication: Carlos Rodríguez, Instituto del Mar, Ecuador, July 2018).

To reference a figure, use the full word when referring to the description, example: In figure 1 we find..., or its abbreviation in parentheses when it precedes a description, example: The organisms cultured at 2 m reached the largest size (Fig. 1).

Figures and images must be no less than 300 dpi. In tables, avoid line spacing. The legends (tables above and figures below) must be in the original language of the manuscript when it is Spanish or Portuguese, with its translation into English, using Arabic numerals. They should be included in the appropriate place in the body of the manuscript text, after being named for the first time.

Do not abbreviate scientific names, always complete and all in italics. Use commas to delimit decimals when text is in Spanish or Portuguese: example 3,23. Use point to delimit decimals when the text is in English: example 3.23.

The writing must be in the third person and in the past tense, referring to the research carried out.

To write the body of the manuscript, **replace the text of the guide, maintaining the style, font size, indentation and other formats, following the steps and indications in each of the sections of the manuscript.**

After finishing, delete the comments that are on the right side, as well as all types of text and figures in the example. In the description, use hierarchy of titles in the following order: **Subtitle, *Subtitle*, subtitle, subtitle.**

FOLLOW THE EXAMPLE

Title:

Presumptive *Perkinsus* sp. hyphospores in the clam *Megapitaria squalida* from the Gulf of California

Presuntas hipnosporas de *Perkinsus* sp. en la almeja *Megapitaria squalida* del golfo de California

Short title:

Perkinsus sp. in *Megapitaria squalida*

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ABSTRACT: Presumptive *Perkinsus* sp. hyphospores were detected in a wild population of the callista clam *Megapitaria squalida* (January-December 2013) from the north of the state of Sinaloa, Mexico, using the thio-glicolate staining technique (MFTR). Thirty clams were collected each month (64.08 ± 4.75 mm shell height and 68.76 ± 14.34 g weight). The physicochemical parameters of the water (temperature, salinity, pH, dissolved oxygen, depth, and transparency) were obtained. The MFTR test detected spherical cells of dark color every sampling month, except in December, indicating the presence of presumptive *Perkinsus* sp.

hypnospores. The intensity of infection fluctuated from negative to light, while the maximum prevalence was 70% observed in May. The parasitic load showed correlation with the metric indicators of the clam. No correlation was obtained between the prevalence of the pathogen with all the parameters studied. The results suggest that *M. squalida* is little susceptible to the infection of *Perkinsus* sp.

Keywords:

Parasitology; clam; prevalence; infection; Sinaloa

INTRODUCTION

Protozoans of the genus *Perkinsus* spp. (Alveolata: Myzozoa: Perkinsea) have been associated with the mortality of several species of bivalve mollusks of commercial importance, and are sometimes mentioned as directly responsible for collapses in production, among which reports stand out for various species of oysters and clams in different countries. In wild populations, for example, Sanil *et al.* (2012) recorded for the first time the presence of *Perkinsus beihaiensis* in natural beds of the oyster *Crassostrea madrasensis* on the southern coast of India, while the same parasite was detected by Pinho Ferreira *et al.* (2015) in specimens from a wild community of the clam *Anomalocardia brasiliana* in Brazil. Different species of *Perkinsus* spp. (*P. atlanticus* and *P. olseni*) were found in clams within the Mediterranean Sea and on northwest coasts of the northeast Atlantic (Murrel *et al.* 2002, Ruano *et al.* 2015). *Perkinsus marinus* was reported to be responsible for mortalities in the eastern oyster *Crassostrea virginica* on the US Atlantic coastline during the last century (Ray 1996).

MATERIALS AND METHODS

Organisms and culture conditions

Dunaliella salina (Peru strain) was cultured for 14 days at 23±1°C in filtered seawater (200 ‰; Whatman GF/C filters), autoclaved (120°C/15 min/15 psi) and enriched with f/2 medium (Guillard 1975) with a nitrate concentration of 0.5 mM. The cultures (in triplicate) received constant aeration at 200 mL.min⁻¹ and were subjected to an irradiance of 15,000 lux with a photoperiod of 12:12 (Romero *et al.* 2008)...

Preparation of oil

Samples of 100 mL (in triplicate) of *D. salina* (Peru strain) cultures were vacuum filtered in Millipore equipment, using glass fiber filters of 47 mm diameter and 1.2 µm pore size. The retained microalgae biomass was crushed together with 50 mL of oil...

RESULTS

After visual analysis of the shucked clams, no deformations, unusual coloration, or physical damage were observed to suggest an infectious effect of the parasite. Table 1 shows the summary of all the factors studied during the 12 months of sampling.

Table 1. Descriptive statistics of the environmental parameters (temperature, salinity, dissolved oxygen, pH, depth and transparency), metrics of *Megapitaria squalida* (height, length and width of the shell, total weight) and infectious parameters (prevalence and parasite load of *Perkinsus* sp.), in the Bacorehuis estuary, Sinaloa, Mexico.

	Temperature (°C)	Salinity (‰)	Dissolved Oxygen (mg/L)	pH	Depth (m)	Transparency (m)	Height (mm)	Length (mm)	Width (mm)	Weight (g)	Prevalence (%)	*Parasitic load
Average	26.68	35.16	5.70	8.15	1.07	0.96	64.08	51.56	30.20	68.76	29.66	0.36
SD [§]	5.55	2.97	1.86	0.18	0.37	0.3	4.75	3.77	1.98	14.34	19.82	0.35
Minimum	16.9	29	2.72	7.85	0.5	0.5	56.17	44.5	26.29	46.95	0	0
Maximum	34	40	10.17	8.45	1.95	1.5	70.86	52.29	33.66	91.25	70	1
CV	20.66	8.44	32.63	2.20	34.57	31.25	7.41	7.31	6.55	20.85	66.82	97.22

[§]Hypnospores/g of tissue transformed to 1/Y. [§]SD = Standard deviation; CV = Coefficient of variation

DISCUSSION

Considering the easy transmission capacity of the genus *Perkinsus* spp. (Villalba *et al.* 2004) among its known hosts, reports of its infection in oysters (Enríquez-Espinoza *et al.* 2010, Cáceres-Martínez and Vázquez-Yeomans 2008) and other bivalves (Enríquez-Espinoza *et al.* 2015, Góngora-Gómez *et al.* 2016) within the Gulf of California, and the present detection of the parasite in the chocolata clam *M. squalida* on the northern coast of Sinaloa, it is possible to indicate that the genus *Perkinsus* continues to find new bivalve mollusks, to which it can potentially infect.

Although the MFTR staining technique does not discriminate among species of the genus *Perkinsus*, it is cheap, simple (OIE 2009), more sensitive when compared to histology (McLaughlin and Faisal 1999) and the infection data collected can be counted (Auderman *et al.*, 2008) and categorized on a scale (Mackin 1962, Bushek *et al.* 1994). The detection and microscopic observation of dark-colored spheres in the soft tissue of the chocolate clam *M. squalida* from the Bacorehuis estuary, Sinaloa, analyzed with MFTR, confirmed the diagnosis for the presence of presumed hypnospores of *Perkinsus* sp., with a degree of infection which ranged from not infected to mild. Although the prevalence of *Perkinsus* sp. in *M. squalida* was recorded in almost all sampling months of 2013, the degree of infection was slight, which suggests that the clam is not very susceptible to being infected by the parasite.

CONCLUSIONS

The presence of presumed hypnospores of *Perkinsus* sp. was detected in a wild population of the Mexican chocolate clam *Megapitaria squalida*, north of the Sinaloa coast, in Mexico, using the MFTR technique, with a degree of light infection, suggesting little susceptibility of the clam to the infectious effect of this protozoan.

Declaration of conflict of interest of the authors

The authors declare that they have no conflicts of interest related to this work.

Declaration of good practices in the use of living beings

The authors declare that they have followed all applicable international, national or institutional guidelines for the care and use of animals in the performance of this work, following XXXXX protocols.

Authorship contribution statement

Author 1: xxxxx; author 2 xxxxxx, Author 3: xxxxxx etc

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REFERENCES

Examples:

Serial journals:

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Caña P., Aponte A., Chung K., Lemus M. (2015). ARN/ADN en juveniles de *Cathorops spixii* (Pisces: Ariidae) en el Golfo de Paria, Edo Sucre, Venezuela. Foro Iberoam. Rec. Mar. Acui. VII: 519-529.

Reference on line (only for institutional cases):

FAO (2022). Programa de información de especies acuáticas *Crassostrea gigas*. https://firms.fao.org/fi/website/FIRetrieveAction.do?dom=culturespecies&xml=Crassostrea_gigas.xml&lang=es