



CO-OCCURRENCE OF MOINA MICRURA WITH OTHER SPECIES OF CLADOCERANS IN KANYAKUMARI DISTRICT, TAMILNADU

Environmental Science

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ABSTRACT

Different patterns of co-occurrence of biological species are widely used to assess the fit of ecological neutral models to empirical patterns. The study of species co-occurrences leads to revealing interactions of a wide range of biological and ecological processes. It plays an important role in to measure and assess the association between species in all dimensions. The distribution of organisms and the interspecific interactions among species in the communities can be investigated using the approach of species co-occurrence. A total of five temple tanks were selected during the period from May 2020 to April 2022. Samples were collected from five temple tanks namely Kulasekaram, Mandaikkadu, Neyyoor, Eraniel and Thiruvithancode of Kanyakumari District, Tamil Nadu, India. Known quantity of water was collected in a clean plastic bucket and was filtered through a plankton net made of fine bolting silk having 135µ mesh size and with 30cm mouth diameter to collect the plankton. After the collection, samples were concentrated to 150-250ml and preserved in 4% formaldehyde immediately. Full samples were analyzed for the separation and identification of *Moina micrura* and for other related works. The percentage of co-occurrence was calculated following the method adapted by Green (1971). The first dominant species was *Moina micrura* followed by other species of cladocerans. So *Moina micrura* was compared with all the other species collected together. Details of temple tanks surveyed and co-occurrence were given in detail.

KEYWORDS

Cladocerans, *Moina micrura*, co-occurrence, dominant species, community ecology.

INTRODUCTION

Cladoceran have been reported from all over the world. While it is true that several genera and some species are cosmopolitan, certain species are endemic. In view of the cosmopolitan nature of this group particularly at the higher taxonomic categories, treatises from different part of the world are of importance for any detailed work. In this context, general compilations of Baird (1850), Lilljeborg (1900), Keilhack (1909), Birge (1918), Henry (1922) Wagler (1937), Benning (1941), Herbst (1962), Sharma (1987, Koro V Chinsky, (1997), Rizo (2019) and De-Souza, (2021) are relevant. Species co-occurrences can have profound effects on the habitat use of species, and therefore habitat structure alone cannot fully explain observed abundances. The study of species co-occurrences has been central in community ecology since the foundation of the discipline. Co-occurrence data are, nevertheless, a neglected source of information to model species distributions and biogeographers and are still debating about the impact of biotic interactions on species distributions across geographical scales. Co-occurrence analysis is the study of interactions between species distributions, and as such, it has been at the centre of community ecology for more than 200 years. Population explosion and continuously expanding use of land induced mankind for better use of aquatic resources. Bulk of the agricultural produce is of protein rich pulses. Hence in the years to come man has to depend more and more on the aquatic system for the production of protein through fish.

Today aquaculture is practiced to some extent in every country of the world, including the Antarctic continent. Aquaculture is the production, processing and marketing of biological organisms from aquatic systems. Major increase in fish production can be brought about by giving greater importance for the management of large waterbodies and introducing aquaculture on scientific lines in smaller waterbodies. Aquaculture can help in the better utilization of freshwater, brackishwater and coastal areas to increase production (Santhanakumar, 1995). *Moina micrura* from different fresh waterbodies were collected to study their co-occurrence.

MATERIALS AND METHODS

Samples were collected from five temple tanks (Kulasekaram, Mandaikkadu, Neyyoor, Eraniel and Thiruvithancode) of Kanyakumari District, Tamil Nadu, India. Known quantity of water was collected in a clean plastic bucket and was filtered through a plankton net made of fine bolting silk having 135µ mesh size and with 30cm mouth diameter to collect the plankton. After the collection, samples were concentrated to 150-250ml and preserved in 4% formaldehyde immediately. Sorting and counting of cladocerans were done using a binocular microscope in the laboratory. Full samples were analyzed for the separation and identification of *Moina micrura* and for the co-occurrence work.

RESULT

A total of five temple tanks were selected during the period from May 2020 to April 2022. A total of 28 cladoceran species were identified along with *Moina micrura*. The percentage of co-occurrence was calculated following the method adapted by Green (1971) and is given below.

$$PC = \frac{c}{a+b-c} \times 100 \text{ (PC- Percentage of co-occurrence)}$$

c = Number of samples containing both species (A+B)

a = Number of samples containing species A

b = Number of samples containing species B

The first dominant species was *Moina micrura* followed by other species of cladocerans. So *Moina micrura* was compared with all the other species collected together. Details of temple tanks surveyed were given in Table 1. The common and dominant species is *M. micrura*. So the percentage of co-occurrence with other species is given in Table 2. A total of three species were identified with varying densities in the first station (Kulasekaram). Highest concentration (700) was recorded for the species *M. micrura*. The concentration of *M. micrura* was recorded in the second station (Mandaikkadu) was 649. The percentage compositions of (station 2) *M. micrura* was 37%. In the third station (Neyyoor), the concentration of *M. micrura* (491) was recorded. The percentage composition of (station 3) *M. micrura* (83.50%) was recorded. Percentage composition of *M. micrura* was given in Table 2.

DISCUSSION

Over the last 30 years there has been a great deal of interest in investigating patterns of species co-occurrence across a number of locations, which has led to the development of numerous methods to determine whether there is evidence that a particular pattern may not have occurred by random chance. The present survey, in general has revealed that Kanyakumari district has the topography and physico-chemistry conducive to a reasonably rich cladoceran fauna. Of late Asian countries have become world's greatest producers and exporters of tropical aquarium fishes. A major difficulty faced by this expanding industry is the supply of live food, specifically *Moina* sp. However, the result of the study on species co-occurrence and the relevant pH and dissolved oxygen pave the way to mass cultivation of Cladocerans and thus provide a steady supply of these live food for the successful breeding and larval management of many aquarium fishes.

Table 1. Detail of temple tanks surveyed

No	Name	Area	Depth	Colour	Nature of water storage
1	Kulasekaram	0.25	06	Green	Perennial
2	Mandaikkadu	1.00	12	Green	Perennial
3	Neyyoor	0.50	08	Green	Perennial
4	Eraniel	0.50	10	Green	Perennial
5	Thiruvithancode	0.20	05	Green	Perennial

Table 2. Percentage Composition of *Moina micrura* with other species

Number	Dominant species	Species co-occurrence	Percentage
1.	<i>Moina micrura</i>	<i>Diaphanosoma excisum</i>	53.57%
2	<i>Moina micrura</i>	<i>Ceriodaphnia cornuta</i>	40.00%
3	<i>Moina micrura</i>	<i>Macrothrix laticornis</i>	17.39%
4	<i>Moina micrura</i>	<i>Bosminopsis deitersi</i>	16.67%
5	<i>Moina micrura</i>	<i>Bosmina longirostris</i>	16.67%
6	<i>Moina micrura</i>	<i>Chydorus sphaericus</i>	13.34%
7	<i>Moina micrura</i>	<i>Chydorus barroisi</i>	12.00%
8	<i>Moina micrura</i>	<i>Evadne tergestina</i>	8.00%
9	<i>Moina micrura</i>	<i>Daphnia lumholtzi</i>	8.00%
10	<i>Moina micrura</i>	<i>Ilyocryptus spinifer</i>	7.69%
11	<i>Moina micrura</i>	<i>Biapterura verucosa</i>	7.69%
12	<i>Moina micrura</i>	<i>Alonadavidi punctata</i>	4.00%
13	<i>Moina micrura</i>	<i>Penilia avirostris</i>	4.00%
14	<i>Moina micrura</i>	<i>Pseudochydorus globosus</i>	4.00%
15	<i>Moina micrura</i>	<i>Daphnia pulex</i>	0.09%
16	<i>Moina micrura</i>	<i>Oxyurella singalensis</i>	0.09%

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