PROLIFERATION RATE OF Moina sp.USING DIFFERENT ORGANIC MANURES

[1]Annalyn V. Anislag &[2] Marjohn V. Anislag

[1] BFAR-Provincial Fisheries Office, Peñaranda Street, Brgy. Taft, Surigao City, Surigao Del Norte &
[2]Surigao State College of Technology, Magpayang, Mainit,
Surigao Del Norte Philippines

IJASR 2020
VOLUME 3
ISSUE 3 MAY – JUNE **ISSN: 2581-7876**

Abstract – The importance of the fisheries sector in the economic development of the country cannot be under-rated. It plays a major role in sustainable livelihoods and poverty reduction in several households and communities. Moina sp. is a small freshwater cladoceran crustacean that belongs to the zooplankton has economic benefits and it is an important source of food for many species of fish and the most extensively utilized live food for fry and larvae of finfish and shellfish. The impact of this study is to minimize or lessen the cost of feed inputs in terms of commercial live food production for finfish and shellfish larvae.

This study was laid out in a Completely Randomized Design (CRD) consisting of four (4) treatments replicated three (3) times. Treatments were the following: T1 – No application (Control); T2 – 2.5 grams Vermicast + 2.5 grams Chicken Dung; T3 – 5 grams Chicken Dung and T4 – 5 grams Vermicast. Data on the proliferation rate of Moina sp.were counted and recorded through daily sampling from stocking up to the death stage. Data were analyzed using Analysis of Variance (ANOVA) to determine the significant differences among treatments.

Results showed that T2 – 2.5 grams Vermicast + 2.5 grams Chicken Dung; T3 – 5 grams Chicken Dung and T4 – 5 grams Vermicast were comparable with each other and significant higher over the Moina sp. without the application of organic manure.

This study concluded that the application of different organic manures favored the proliferation rate of Moina sp.

Keywords: Moina sp., Proliferation rate, Different Organic manures, Growth pattern, cladoceran& Completely Randomized Design.

I. Introduction

The fish larval/fry stage is the most sensitive phase in the life history of most of the species because mortality rate is high at this stage. Unfavorable temperature and feed are the main cause for high mortality and low growth. To gain a better growth and survival of fish fry suitable artificial feed is highly essential. However, to reduce dependency of farmers on suchcommercial feed is critical as it quality and supply sometime fluctuate (Hossainet al., 2017).

There is much diversity in the livelihood of the communities that depend on fisheries resources for a living (Sarpong et al., 2005**).** The Fisheries sector is estimated to contribute about 3% of the nation's gross domestic product (GDP) and 5% of the Agriculture GDP (Anon, 1995). The problems of the fish fry suitable feeds could be answered through promoting the *Moina sp.* because *Moina sp.* is a diverse and a major food for both young and adult freshwater fish and extensively utilized live food for fry and larvae of finfish and shellfish (Rottman, 2010).

Most of the *Moina sp.* has a short generation time, fast population growth and they are easy to keep in culture. There is an increasing interest in production of *Moinasp.* as a cheap and nutritionally valuable fish food for aquaculture (Alam et al., 1993 &Tamaru et al., 1997).

Chari, et al., (2011) stated that various organic waste and nutritional media able to grow zooplankton like the chicken litter, soya bean, fish meal, yeast, alfalfa, cow manure, horse manure and dog manure. Cow dung, goat dung and poultry dung waste are easily available animal waste. The consistent availability of sufficient quantities of food organism is of utmost importance in continuous hatchery production.

Related study was conducted by Kamrunnahar et al., 2019, entitled Mass Culture of *Moinamacrocopa*using Organic Waste and its Feeding Effects on the Performance of Pagrus major Larvae in Korea revealed that *M. macrocopa* cultured on food waste has an outstanding food potential and a probable substitute for Artemia.

In the Philippines and other countries in the world, no studies have been conducted about proliferation rate of *Moina sp*. using different organic manures hence this study was conducted.

II.OBJECTIVES

1. To determine the proliferation rate of *Moina sp.* fed mainly with chicken dung, vermicast and combination of both organic manures.
2. To describe the pattern of proliferation of *Moina sp.* fed mainly with chicken dung, vermicast and combination of both organic manures; and
3. To compare the proliferation rate of *Moina sp.* fed with chicken dung, vermicast and combination of both organic manures.

III. METHODOLOGY

Research Design and Treatment

Table1 presents the research treatments and figure 1 presents experimental lay out was used in the study.

Table 1. Treatments were used in the study

Treatments	Different Organic Manures
T_1	No application (Control)
T_2	2.5 grams Vermicast + 2.5 grams Chicken Dung
T_3	5 grams Chicken Dung
T_4	5 grams Vermicast

Table 2. Lay – out of single factorial experiment

$T_1 R_2$	T_4R_2	T_2R_1
$T_3 R_1$	T_3R_3	T_1R_3
T_4R_1	T_1R_2	T_2R_3
T_1R_1	T_2R_2	T_4R_5

Legend: T – treatment R = replicate

Experimental Set – Up

The test *Moinasp* were cultured in twelve circular plastic container tank. All tanks were positioned in four rows and three columns at 20 centimeters interval between tanks.

Cultural Management of test Moina sp.

Procurement and Preparation

Dried organic manures were prepared for the study. Vermicastand chicken dung were procured at SSCT – Mainit Campus through its vermiculture and poultry projects.*Moina sp.* were collected from wallows in Upper Libas, Tagana-an, Surigao Del Norte and were stocked in a conditioning tank.

After washing and disinfecting, twelve liter circular plastic tanks were placed in the study area and each was filled with one liter of water with moderate aeration.

Collection and Stocking of the Test Organisms

Stockingwas done after preparation of plastic container tanks. Test *Moina sp.* were scoped from conditioning tank using scope net and stocked to all container tanks at fifty individuals per tank. Glass pipette or dropper was used to count test *Moina sp.* from a plastic container tank. Stocking was done early in the morning.

Feed of Test Organisms

Organic manures were used as diet for the test organisms. Feeding was done once for the whole experimental period by providing each container tank with five grams chicken dung for treatment 3, five grams vermicast for treatment 4 and five grams a combination of chicken dung and vermicast for treatment 2 except the treatment 1 which was the control. Prior to feeding, organic manure was wrapped with a piece of cloth and allowed to suspend in the rearing water.

Maintenance of Culture Operation

The study was monitored twice a day during the implementation. Loose hoses and flow of air in the experimental set up were fixed and regulated.

Sampling of Test Organisms

Growth of test organism was measured every day from stocking until the death stage. Sampling was done by three aliquot sampling in each container tank using glass pipette and the water samples were placed into the petri dish for counting water flea using glass dropper. Samples of the test organism were returned to container tank after sampling. All data were recorded for future consolidation and analysis.

Termination of the study

The study was terminated seven days from stocking or after the growth of *Moina sp.* collapsed in all container tanks within the period of the study. All container tanks, equipment and tools were cleaned and kept safe for the future use.

Determination of Proliferation Rate

Proliferation rate was calculated using the formula as follows by (parker, 2002).

$$PR = \frac{(FC - IC) \times 100}{IC} \Big/ \text{Number of Hour}$$

Where:

PR = Proliferation Rate
FC = Final Count; and
IC = Initial Count

Data Analysis

All the data gathered were summarized, presented and subjected for analysis of variance (ANOVA) in CRD. Treatment means were compared using the Least Significant Difference Test (LSD).

IV. RESULTS AND DISCUSSION

Figure 1 presents the proliferation rate of *Moina sp.* fed with different organic manures. The peak of proliferation rate of *Moina sp.*fed with three organic manures such as chicken dung, vermicast and combinations of these two organic manures were evaluated. Result showed that combinations of chicken dung and vermicast attained the highest proliferation rate which was 81.11%/liter/hour followed by vermicast with 71.94%/liter/hour, chicken

dung with 51.94 %/liter/hour while the lowest proliferation rate were observed from the *Moina sp.* with no application of organic manure (control) with 32.78%/liter/hour.

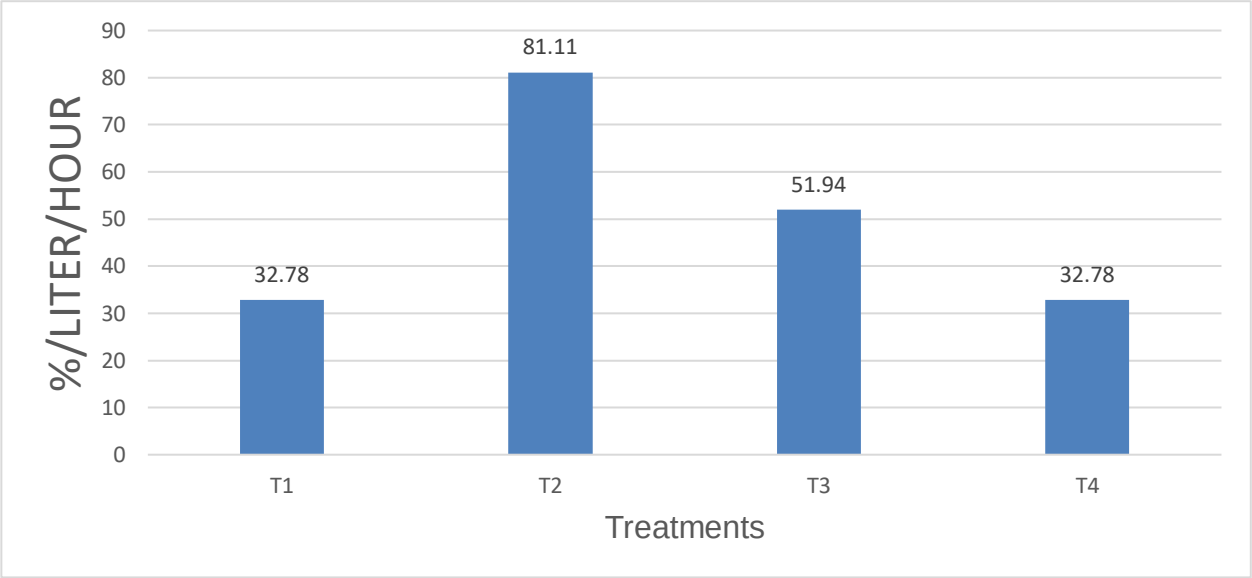

Fig.1. Bar graph showing the Proliferation Rate of *Moina sp.*fed with different Organic Manures

Figure 2 presents the pattern of proliferation rate of *Moina sp.* per day fed with different organic manures was described. The period of culture for all treatments generally ranged from 3 to 7 days. From the day of stocking, treatments 2, 3 & 4 reached their peak growth on the second day except treatment 1 with peak at first day and growth declined on the rest of the days. Treatment 4 (5 grams vermicast) had the longest day of culture in which proliferation rate lasted for seven days and followed by the treatment 2 (combination of 2.5 grams vermicast + 2.5 grams chicken dung) lasted six days, treatment 3 (5 grams chicken dung) lasted 5 days while the shortest proliferation rate were observedfrom the *Moina sp.* with no fed of organic manures they only lasted three days. This implies that *Moina sp.* could be prolonged its proliferation rate if they fed 5 grams Vermicast. However, *Moina sp.*have life span of 4 – 7 days only (Rootman, 2004&Petrusek, 2002).

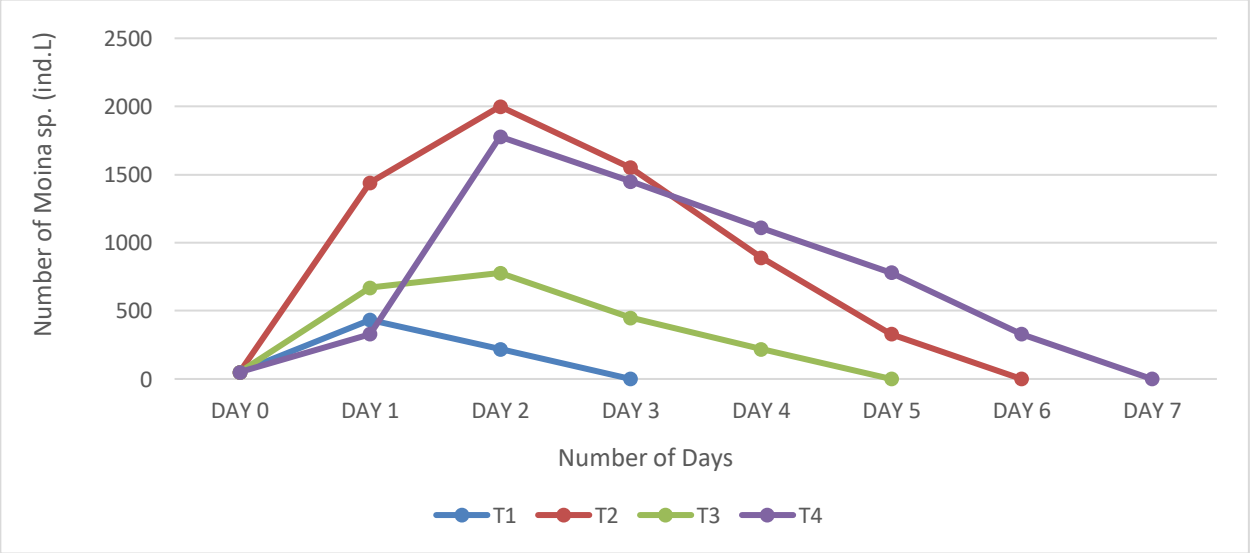

Figure 2. Presents the Pattern of Proliferation Rate of *Moina sp.* per day using the different Organic Manures

Table 3 and figure 3 present the comparison of means of the proliferation rate of *Moina sp.*fed with chicken dung, vermicast and combination of both organic manures. The highest mean were observed from the *Moina sp.* fed with 2.5 grams of vermicast + 2.5 grams of chicken dung with a mean of 81.00 individual per liter, followed by the *Moina sp.*fed with 5 grams of vermicast with a mean of 72.00 individual per liter and *Moina sp.* fed with 5 grams chicken dung with a mean of 52.00 individual per liter. While the lowest mean were observed from the *Moina sp.*with no fed of organic manure (control) with a mean of 23.00 individual per litter.

Statistical analysis revealed significant effect of organic manures on the proliferation rate of *Moina sp.*Comparison among means showed that T_2 –2.5 grams vermicast + 2.5 chicken dung, T_3– 5 grams chicken dung and T_4– 5 grams vermicast were comparable with each other and significant higher over the *Moina sp.*with no fed with different organic manures.However, T_3– 5 grams Chicken dung and T_1 – No application (Control) were comparable with each other and significant lower over the other treatments were used in the study.This implies that different organic manures were used in the study favored on the proliferation rate of *Moina sp.*

Table 3. Proliferation rate of *Moina sp.* as affected by the different Organic Manure 7 DAS

Treatments	Mean*
T_1- No application (Control)	23.00[b]
T_2- 2.5 grams Vermicast + 2.5 grams Chicken Dung	81.00[a]
T_3- 5 grams Chicken Dung	52.00 [ab]
T_4- 5 grams Vermicast	72.00 [a]

*Means with the same letter are not significantly different at 0.05 (LSD)

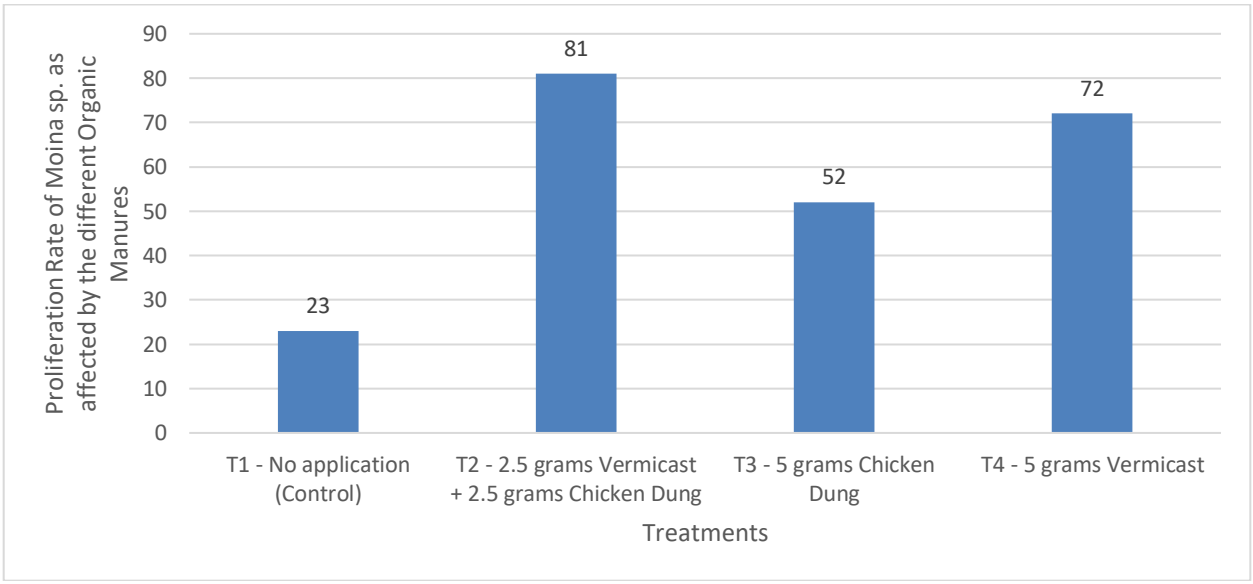

Table 3. Proliferation Rate of *Moina sp.* as affected by the different Organic Manure 7 DAS

V. CONCLUSION

This study concluded that the application of different organic manures favored the proliferation rate of *Moina sp.*

VI. RECOMMENDATION

This study is recommended to conduct related studies about culture of *Moina sp.*using different level of organic manures, higher density upon stocking to shorten culture period, stocking *Moina sp.*3-5 days after application of organic manure giving much time to grow bacteria and micro algae as available food and procuring *Moina sp.* from different sources.

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