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I. Basic Information

Project Title : Temporal Occurrence of Sea Urchin (*T. gratilla*)
Wildstocks in Balaoan Waters, La Union

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Abstract

A one-year monitoring of sea urchin (*T. gratilla*) along Balaoan waters was conducted to determine temporal occurrence of its wildstock population. A two 50m x 2m transect monthly sampling strategy was employed.

Results showed that the sea urchin wildstock population occurs year-round, and relatively young or at immature stage. Population density indicates two (2) modes suggesting semi-annually strength of spawning activity.

Size regulation on catching and marketing of the organism is recommended to sustain resource utilization and management efforts.

Introduction

Sea urchin particularly *T. gratilla* is now one among the valuable commodities in Philippine exports. It commands high price both local consumption and the foreign market. Its gonad or roe is a high valued fishery commodity which can be sold for \$58 – \$160/kg of fresh roe in central wholesale market, Tokyo, Japan (Juinio-Meñez, 2000). Its market demand is even increasing due to rising popularity of Japanese cuisine to other countries.

Coastal farming of this resource boosted marginal fishermen's productivity and economic status in Bolinao, Pangasinan, Balaoan & San Fernando, La Union and other provinces in the Ilocos region. As one exotic commodities of the country, it generated million of pesos per annum in Pangasinan (Talaue-McManus and Kesner, 1995). However, the decline of sea urchin fisheries because of over-exploitation coupled with other factors in mid-1993, and unregulated harvesting has resulted in the loss of the multimillion pesos fisheries which affected numerous coastal families who were depending with the commodity for livelihood(Juinio- Meñez et al, 2000).



There were efforts to develop alternative management schemes to sustain the resource. Strategies such as resource enhancement were spearheaded by UP Marine Science Institute through the support of Department of Agriculture's Bureau of Agricultural Research. Reseeding of sea urchin in known areas where this resource abound were undertaken. In Balaoan alone, sea urchin breeders were transported from Nalvo, Santa Maria, Ilocos Sur and stocked in steel cages sometime in 2002. This was a joint undertaking between DMMMSU and the Local Government Unit of Balaoan, La Union purposely done to serve as a "reproductive reserve" in the area, and considered one of the initial steps to rehabilitate and enhance wildstock population of sea urchin. It is essential to note here that prior to such initiative, there was no record of juvenile recruitment and spawning population along Balaoan waters.

With these strategies, positive cues to recover the resource are imminent. The occurrence of juvenile population gave hope and livelihood opportunities to some coastal dwellers at present. However, the sustainability of the wildstock population depends much on the **basic information on the status of the resource in question**. Establishing the occurrence of the juvenile population or recruits in Balaoan waters, and, in other areas (see Bangi et al in this proceeding) is one relevant activity in strengthening current utilization and management effort in the area. Such is also critical in developing a community –based resource management and enhancement strategy for all stakeholders, hence this study.

Objectives

The study sought to determine the temporal occurrence of sea urchin wildstock population in Balaoan waters.

Specifically, it aimed to establish size distribution and density of *Tripneustes gratilla* along Balaoan waters.

Methodology

A. Site

Sampling stations were set at the shoreline of Almeida, Balaoan, La Union. The area is near Barangay Paraoir which is known for sea urchin culture in the province, and served as experimental site for growth out of DMMMSU-NLUC-FRTI (Prado and Tepait, 2006). Balaoan coastline had been earlier noted to have several variety of seaweed species (Prado, 2002; Galvez and Lantion, 2005), and six species of sea grass (DMMMSU-DENR PCRA initial report).

B. Materials

Materials used in the on-site sea urchin population monitoring were net bags, record slate with pencils, facemasks and snorkels, transect line and a caliper.

C. Sampling

A once-a-month sampling frequency was adopted employing two 2m x 50m transect. Here, the 50m transect line was laid and both sides of the transect were read by two observers occupying a space of 1m each. Hence, sea urchin population within the transect was gathered and measured for its test diameter by a caliper. The distance between transects is about 100m.

C. Treatment of Data

In each transect, the total number of urchin individuals was obtained. Individual measurement was conducted using a caliper at its nearest 1mm size. Data on the total number and corresponding sizes were lumped into monthly basis, hence these data represent a sample for that month; and correspondingly analyzed to complete a 1 year data cycle.

Monthly size frequencies were obtained and tabulated. Density was established on an individual per area basis (# of individual/m²).

Results and Discussion

Size distribution

Fig. 1 reflects the annual trend of sea urchin in the locality. The figure is skewed to the left suggesting that younger population is more dominant whole year round. Percent composition of size 6cm and above, which are considered mature individuals (Juinio-Meñez, 2000; Juinio- Meñez and Bangi, 2005) consisted only about 1% of the wildstock population. Such finding is not unusual because young and immature individuals are collected for cage culture purposes in the area. It is common that collected juveniles are sold at Php 1 to Php 2 to other places for mariculture hence the low density of large individuals.

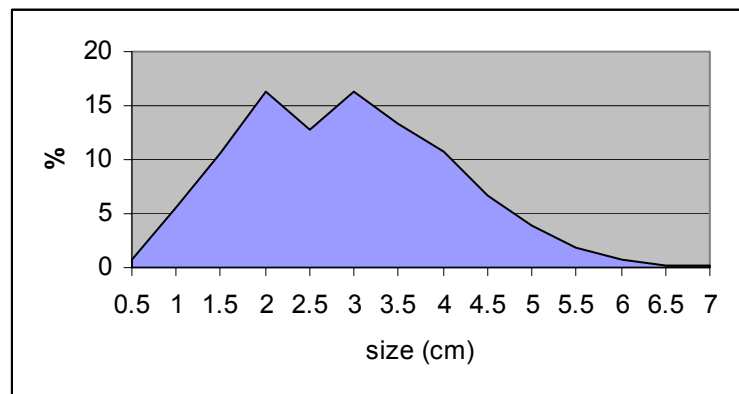


Figure 1. Size distribution of sea urchin (*T.gratilla*) along Balaoan waters, 2006-2007.

The above figure also indicate two (2) modes; at 2 cm and 3 cm sizes. The presence of a bimodal size frequencies would indicate that sea urchin spawns in the wild at least two times, such that spawning is on a protracted basis as reflected in table 1 where smallest individuals were found sometime in November and in April-May period.

Table 1. Average size (cm) of Sea Urchin (*T. gratilla*) Along Balaoan Waters, 2006-2007

Month	Number	Size		
		Smallest	Largest	Mean
N	119	0.80	5.10	1.31
D	40	2.10	6.60	3.38
J	4	1.80	5.30	3.65
F	16	1.30	5.60	2.91
M	1	4.10	4.10	4.25
A	81	0.60	5.20	2.33
M	35	0.70	4.60	2.56
J	23	1.10	4.10	2.82
J	9	3.30	4.70	3.86
A	10	4.10	5.50	2.60
S	6	2.80	5.00	4.33
O	4	3.0	6.20	4.50
Mean		2.14	5.17	3.21

Juinio- Meñez, et al (2005) suggested that the 3-5cm modal classes found in Bolinao were recruits previously spawned 3 to 4 months ago. In Balaoan samples, individuals of this size were found from March to July, hence may have come from the cohorts of November and December spawning (Table 1). Smaller mean size of sea urchin is reflected in November and in April. The over-all mean size of the wildstock organism in question is 3.21 cm or about 2-3 months old. Largest individual are found in October and December period.

Density

Table 2 indicates the average density of sea urchin in the locality. Lesser occurrence of the organism in the wild is in March where density is at its lowest of 0.01 individual per square meter (m^2). This value however is higher than the value obtained at San Fernando, La Union of .007 urchin/ m^2 (Prof. Prado, pers.com.). Higher densities were reflected in November (0.60), and in April (0.41). Notably, smaller mean size of individuals were reflected, hence the dominance of juvenile populations in these months (Table 1)

Table 2. Average Density of Sea Urchin (*T. gratilla*) Along Balaoan Waters, 2006-2007.

Month	Density (# of individual/m²)
N	0.60
D	0.20
J	0.05
F	0.08
M	0.01
A	0.41
M	0.18
J	0.12
J	0.04
A	0.05
S	0.03
O	0.02
Total Mean	0.15

The occurrence of higher densities of juvenile populations in November and April suggests at least two recruitment pulses or spawning in this area. And, these identified occurrences of two pulses possibly indicate higher recruits than other months of spawning.

Nevertheless, the above densities were much lower than the Bolinao population of sea urchin (Juinio- Meñez et al 2005), and some areas in Ilocos Norte (see Bangi et al, this proceeding). Lower densities were found after November and also after April (Table 2) over time.

Summary/ Conclusions/ Recommendations

Summary

A one-year monthly sampling from November, 2006 to October, 2007 was conducted on the occurrence of sea urchin (*T. gratilla*) wildstock population along Balaoan waters. A two-50 x 2m transect was employed to establish size structure and density of the organism in question.

Results of the study indicated the following:

1. The annual trend on the size distribution of the wildstock population of sea urchin (*T. gratilla*) was skewed to the left indicating that greater number of population belongs to younger individuals.
2. Only 1% of the population is sexually matured (6cm and above in size).
3. The one year size structure of sea urchin showed two (2) modes indicating dominance of two peak sizes (2 and 3 cm respectively).
4. Temporal distribution of mean sizes indicated that smaller sea urchin occurred in November, and in April.
5. Higher densities of sea urchin occurred in November and April, with a decreasing trend overtime after these periods.

Conclusions

In the light of the above findings, the following conclusions were drawn:

1. sea urchin wildstock population is dominated by juvenile or young individuals, and,
2. at least two spawning peak is discernable, and this resulted to almost whole year round occurrence of sea urchin in this coastline.

Recommendations

The following management regulation/ initiatives are recommended to sustain the wildstock population along Balaoan waters.

1. Size regulation e. g. 7 cm test diameter should be made as local community policy in catching and/ or marketing of sea urchin. This is either from the wild or from the cage culture livelihood activity in the area so as to ensure the sustainability of sea urchin occurrence in the area.
2. Local awareness Initiatives (IEC) should be an integral component of any activity in the locality. (Better yet if an holistic approach to CRM is employed, with stakeholders moving as a whole).

References

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Table 3. Trend on SGR of Sea Urchin (*T. gratilla*) Along Balaoan, Waters, 2006-2007

Month	SGR
N	0.043
D	-0.013
J	0.027
F	0.058
M	0.052
A	0.078
M	0.006
J	0.037
J	-0.035
A	-0.056
S	0.006