



*Palolo (Eunice
viridis) Rising Report*
2013

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Introduction

Palolo (*Eunice viridis*) is a species of invertebrate in the Eunicidae family. They live in tropical coral reefs and found in various regions including Indonesia, Vanuatu, Fiji, Samoa and American Samoa. Adults are about 12 inches (30cm) long, and they resemble spaghetti when viewed underwater. In preparation for spawning, they begin to generate a tail of sorts made up of segments containing eggs and sperm. This section of the worm is called the “epitoke”. The epitoke features an eyespot, which is able to detect light. When the lunar timing is right, all epitokes are released simultaneously and make their way to the surface. Those that are not quickly taken for consumption burst and create a mucous soup made up of eggs and sperm. The synchronized timing of the spawn puts eggs and sperm into close proximity to each other, so they can fertilize and develop into larvae. The larvae are formed within a day, and they drift off to settle on the ocean floor and develop into new adult worms. Meanwhile, the “atoke”, the head and body section of the adult palolo worm, remains attached to the ocean substrate. Each year it generates a new epitoke for the annual spawn. The atoke section of the palolo worm is about 30cm long (SeaPics, 2010). This event occurs twice a year on the neap tides of the last quarter moon in October and November for the Pacific species. (Shuker, 2001)



The flowering of the fragrant mosoo'i flower (*Canaga odorata*) is believed by the Samoans as a good indicator of the palolo worm spawning season and they tend to make leis (necklace) and wear during the harvest time of the palolo.

This annual event is eagerly awaited by the Samoan people. Palolo (*Eunice viridis*) species usually appear in October, but sometimes in November or during both months. The prediction of palolo rising correlate with the lunar cycle, when the third quarter moon appears in October and November every year. Palolo twirl around in the water in two colours, blue-green and brownish with a great numbers.

The Palolo rising was predicted to emerge on the 26th and 27th October and 24th – 25th November. This report will present the results of the palolo rising survey both in October and November, 2013.

Methodology of the Survey

Field Survey

Palolo rising survey was carried out by the Fisheries staff at 2 sites in Upolu (Paradise Beach-Matautu Lefaga and Salamumu) and one in Savaii (Satupaitea) (Figure.1) on the predicted dates of October and November. The coverage of the sites was too small due to the shortage of staff as well as the vehicles to cover other potential sites.



<u>Key of Sites:</u>
A: Salamumu
B: Matautu tai-Lefaga
C: Satupaitea

Figure 1: Map of Samoa indicating the palolo survey sites

A survey form (Figure.2) was used by the survey team to record and collect relevant information of the palolo rising and harvesting. The information collected include moon phase, tide and sun rise times, water, weather, wind conditions and the frequency of palolo appearance and the estimation of the catch.

Site:	Full moon Date:	Survey Team:	
Date:	3rd Quarter moon Date:		
Sunrise Time:	Palolo rising Time:	Tide time:	
<u>Tide Type:</u>			
Low <input type="checkbox"/>	Between <input type="checkbox"/>	High <input type="checkbox"/>	
<u>Weather Condition:</u>			
Heavy rain <input type="checkbox"/>	Small rain <input type="checkbox"/>	Cloudy <input type="checkbox"/>	Wind <input type="checkbox"/> Moderate <input type="checkbox"/>
Fine			
<u>Wind Condition:</u>			
S <input type="checkbox"/>	S <input type="checkbox"/>	SW <input type="checkbox"/>	NE <input type="checkbox"/> N <input type="checkbox"/>
N			

<u>Palolo Condition:</u>						
Small track	<input type="checkbox"/>	Medium	<input type="checkbox"/>	Heavy	<input type="checkbox"/>	Nil
<u>Water Condition:</u>						
Clear	<input type="checkbox"/>	Milky	<input type="checkbox"/>	Dirty	<input type="checkbox"/>	Choppy
<u>Reef Coverage:</u>						
0%	<input type="checkbox"/>	15%	<input type="checkbox"/>	25%	<input type="checkbox"/>	50%
100%	<input type="checkbox"/>					5%
<u>Palolo catch estimated:</u>						
More than 10 bundles	<input type="checkbox"/>					
Less than 10 bundles	<input type="checkbox"/>					
Others (basket/barrel/container)	<input type="checkbox"/> (mls)					
<u>Remarks:</u>						

Figure.2: The Palolo Rising Survey form

Survey teams

Matautu Team:

Sapeti Ti'iti'i
 Enoka Tavita
 Joe Tiatia
 Cathrine Esau
 Michael Forsyth

Salamumu Team:

Justin Aiafi
 Naoupu Faleao
 Moso Lesa
 Tualagi

Satupaitea Team:

Tauvae Su'a

Survey Results and Discussions

Data collected from Market outlets Landing Survey

Once of the core functions of the Coastal Fisheries Section is to conduct market landing statistics from the local market outlets on a weekly basis. This survey is conducted at 4 places such as Apia fish market, Fugalei market and the Salelologa fish market in 3 random days a week and once at the Roadside (Apia-Leulumoega). Therefore, we extracted palolo total values from the market landing database for the purpose of this report.

We have noticed in the data landed at the market that palolo was only exposed for sale at the Salelologa market in October, 2013. However, in Apia, palolo was also exposed for sale at the market but by the time surveyors reached the market they were all sold. This was because; we were out in the field early morning to conduct the field survey.

The total estimated value of palolo recorded from Salelologa fish market, in the month of October 2013 generated about \$1,100, sold at an average price of \$250/kilogram. This was a huge drop as compared to 2012 which generated \$18,461.67. The main sellers in Savaii were from the village of Satupaitea selling their palolo in containers (Sky flakes - 1124 mls/bottle of mayonnaise 443g). Overall, the years 2008 and 2010 were predominantly generated highest values of palolo, next was 2012 then the rest were below \$10,000.

Table 1: Values of palolo recorded from surveyed sites.

Year	Est_Value (ST\$) Containers	Est_Value (ST\$) Ofu	Total Est_Value (ST\$)
2007	\$ -	\$ 6,600.00	\$ 6,600.00
2008	\$ 10,450.00	\$ 21,024.11	\$ 31,474.11
2009	\$ 1,050.00	\$ -	\$ 1,050.00
2010	\$ 19,477.78	\$ 16,811.11	\$ 36,288.89
2011	\$ 2,750.00	\$ 4,541.67	\$ 7,291.67
2012	\$ 6,094.00	\$ 12,367.67	\$ 18,461.67
2013	\$ 750.00	\$ -	\$ 1,100.00
	\$ 40,571.78	\$ 61,344.56	\$ 102,266.34

(Source: Inshore market landings database)

Data collected from the Palolo Field survey

The quantitative information collected from the field during the harvesting of the palolo were tabulated and analysed to determine conditions of various parameters such as tide, moon, wind, weather, water and the estimation of catch. The predicted dates for the palolo rising were the 25th – 26th October and 24th – 25th November 2013. However, in order to be more accurate in our predictions, we took into considerations the uncertainties and started

our field survey on the day before and after the predicted dates. This is also important in terms of information collected on the stages and phases of palolo rising.

On the first day (25th October) surveyors observed and recorded small traces which confirmed a strong emergence of palolo for the next day. On the 26th October, the emergence of palolo at the Paradise Beach-Matautu tai Lefaga was very heavy, where people caught 5-10 bundles each. The people started scooping around 5:30am – 7:30am, in a very cloudy morning during low tide. Again on the 27th Oct, people caught about 3-5 bundles of palolo.

In November, the same procedures of carrying out the field survey; however, all the sites in Upolu (Salamumu and Matautu Lefaga) had no traces or signs of emergence for both the predicted dates. There were also no sales of palolo exposed at the local markets both in Upolu and Savaii. However, palolo were caught at some sites in Savaii, as announced on the radio. But according to our field survey team, there were no traces of palolo at their survey sites during this month.

Table 2: Summary of different sites where the survey carried out in October & November 2013

Site	Survey Date	FullMoon Date	ThirdQuarter MoonDate	Weather Condition	Palolo Condition	Water Condition	Reef Coverage
Satufia-Satupaitea	26/10/13	19-Oct-13	27-Oct-13	Fine	Medium	Clear	75%
Salamumu	25/10/13	19-Oct-13	27-Oct-13	Fine	Nil	Clear	50%
Matautu tai-Lefaga	25/10/13	19-Oct-13	27-Oct-13	Fine	Small trace	Clear	75%
	26/10/13			Cloudy	Heavy	Clear	100%
	27/10/13			Fine	Medium	Clear	75%
	24-Nov-13	18-Nov-13	26-Nov-13	S/rain	Nil	Clear	0%
	25-Nov-13			Fine	Small trace	Clear	25%
	26-Nov-13			Fine	Nil	Clear	50%

Conclusion and Recommendations

The palolo rising were caught as predicted that strong emergence would be in the month of October, and weak or no catch for the month of November. The relationship between the phase of the moon and the emergence of the epitokous segments of the palolo worm has been known to the Samoans for centuries and scientifically it occurs at the third quarter of the moon in October and November. Palolo is one of their delicacy and the Samoans made their own predictions of the date and time of the day when the emergence occurs so that they can be ready on the site to catch palolo. This phenomenon is one of the best known examples of lunar periodicity.

There are also gaps in collecting the data, as the field survey witnessed the heavy and strong emergence of palolo worm in October, however, it didn't reflect in the data collected from the market landings. There are many factors that contributed to this gap, one of it, the fact that the palolo were sold on the sites and not to the market for sale. Nevertheless, the coverage of the harvest sites was not enough to give an overall total catch of the palolo each year.

Therefore, it is recommended to cover all these factors in the coming up year so that the total catch and generated income would be determined from the data collected both from the field and the market landings.

References

SeaPics, 2010. Palolo worm photos showing this sea worm with a unique spawning behavior. Marine Wildlife Photography. Accessed by <http://www.seapics.com>

Shuker, KPN. 2001. The Hidden Powers of Animals: Uncovering the Secrets of Nature. London: Marshall Editions Ltd. 240 p.