



Aquaculture is one of the top development priorities of the Tongan government under the Ministry of Fisheries. The main role of the Aquaculture section is to increase Aquaculture Researches and Development throughout Tonga. This is done through activities that contributes to enhancing of aquaculture farming, provide support to aquaculture stakeholders and trial farming of new potential species. This is the first newsletter published by the aquaculture section which will reflect all the major activities done by this section quarterly.

ACTIVITY 1: SEA CUCUMBER

In 2018, The Ministry of Fisheries in collaboration with the Vast Ocean (Tonga) Aquaculture Company Limited, established a sea cucumber ranching farm here in the Kingdom of Tonga. The commencement of this project was intended to restock back the wild stock of the depleted sea cucumbers into the ocean by promoting of sea cucumber culturing. Through this collaboration, the Vast Ocean has the responsibility of culturing the species. The Aquaculture section under the Ministry of Fisheries is responsible for the extension of the sea cucumber trial farm to the SMA Communities. SMAs are great examples of farming grounds for these potential species due to their viable natural characteristics.

1.1 TRIAL FARMING (GOLDEN SANDFISH)

The aquaculture section with collective efforts from VO aim to engage SMA communities in trial farming with technical exchange. Through this collaboration, the Ministry of Fisheries extended the sea cucumber trial farm by installing sea cucumber cages, out to a total of **6 SMA communities** for trialling which are: **Kanokupolu, Nukuleka, Talafo'ou** and **Fangatapu** SMA in Tongatapu with 2 cages installed at Ha'apai Island: **Pangai & Hihifo** Communities. Juveniles are then released to the cages. The release is dependent on size and conditions of the juveniles with the correct procedures accordingly to avoid damages and future problems.

1.1.2 MONITORING

Prior to the installation of the cages and releasing of juveniles, the Ministry must carry out site selection together with the community, in order to identify the right site for the farm to thrive. In close collaboration with VO, juveniles were able to be transferred into these cages for the grow out trial. Close monitoring of these cages was carried out by the aquaculture section every 7-10 days. Prior to the releasing of juveniles, the length and the body weight were measured and used to compared with the monitoring data to capture its growth rate.

1.1.3 MONITORING OUTCOMES

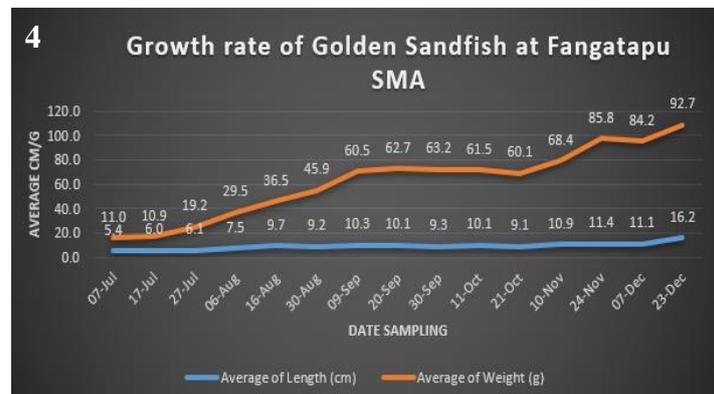
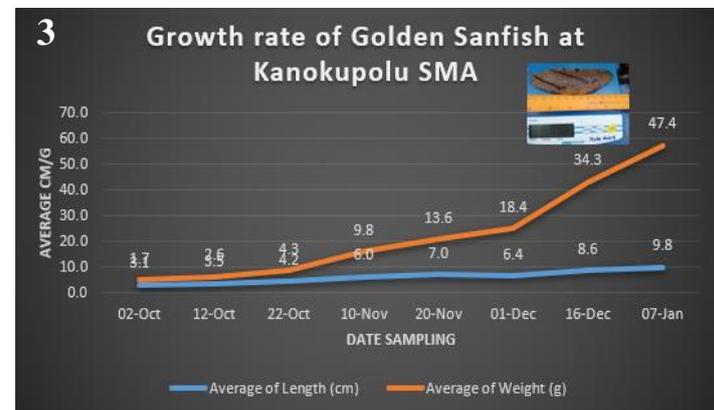
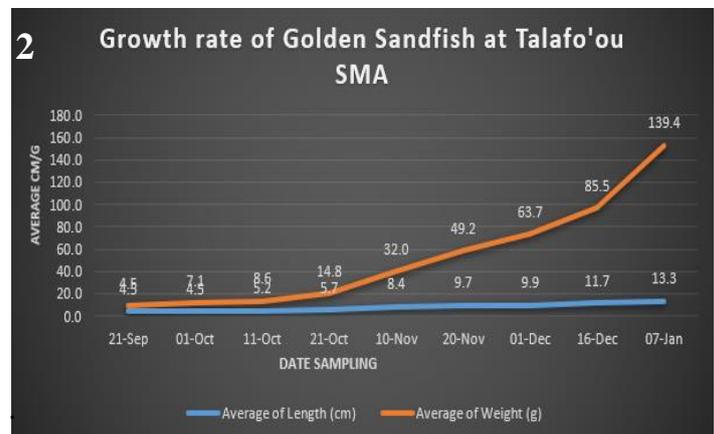
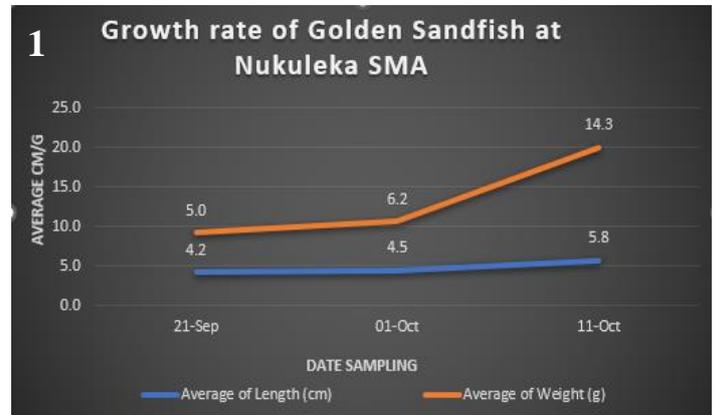
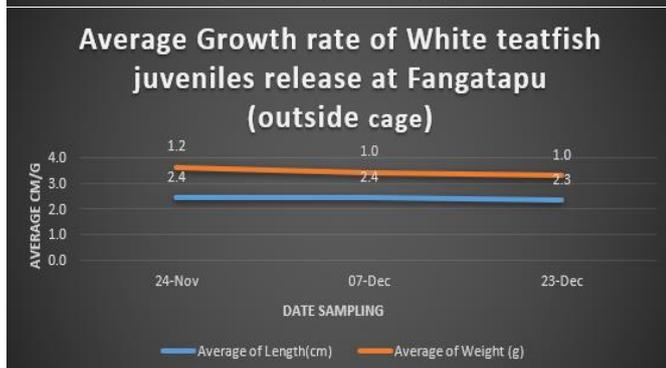
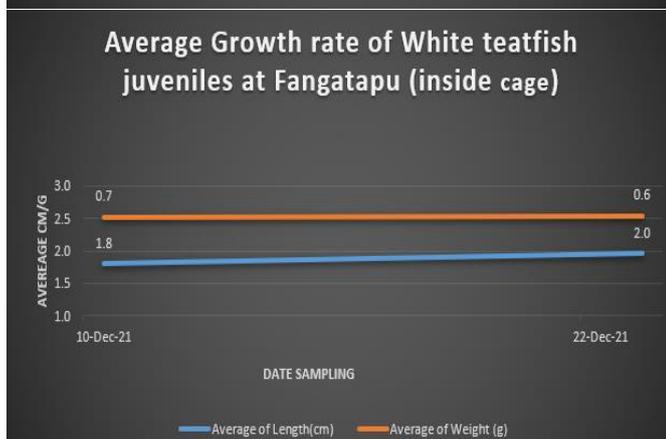
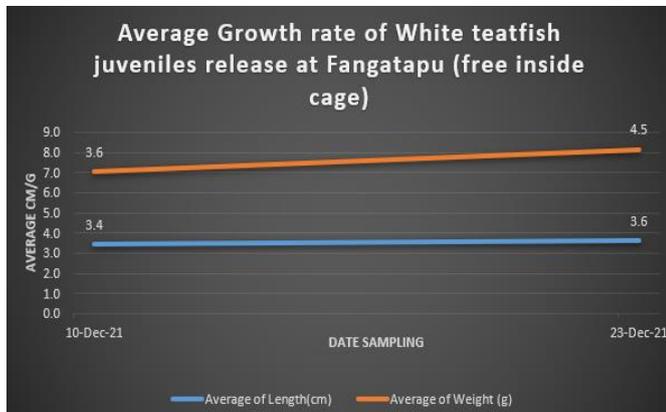
Monitoring at 4 different sites in Tongatapu show on graphs Figure 1 – 4 that there is an increasing growth rate. All Graphs suggests that all sites are suitable for sea cucumber farming. However, at the different sites, Talafo'ou (Figure 2) seem to be the most suitable site for a sea cucumber farming with its growth rate increasing at a much faster rate than the rest of the sites. Fangatapu site (Figure 4) show a degree of a fast increase with its growth rate suggesting it is also viable for sea cucumber farming. Trial farming at Ha'apai Island did suggest that at some areas, it is suitable for sea cucumber farming, however, during monitoring, the issue of lesser number of sea cucumbers were being identified during for proper measurement and recording.





1.2 TRIAL FARMING (WHITE TEAT SANDFISH)

White teatfish was also trialled at the Fangatapu SMA with close monitoring of the cages. However, in comparison to the Golden sandfish, growth rate of the white teatfish is significantly slower than that of the Golden sandfish. White teatfish juvenile that was let free inside the cage, seemed to grow slightly faster than the juveniles that are inside the cage within the first cage.





ACTIVITY 2: TRIAL FARMING OF MULLET

The Ministry of Fisheries wishes to expand its farming strategies from spawning and hatchery activities into trial farming of marine potential species in cages and pond culture system for stock enhancement and food security. The purpose is to focus on the development of trial farming to support implementation of the Tonga Fisheries Sector Plan and increase targeted and focused aquaculture research and development that meets the needs of emerging industries.

Stock Density for Mullet

564 juveniles

Average stocking size

125mm



ACTIVITY 3: TRIAL FARMING OF PRAWNS

As part of the expanding farming strategies, the Aquaculture section also looks at trialing shrimp/prawns farming as a potential species that would contribute to the food security.

Stock Density for Shrimp

15/11/2021 - 573 juveniles

28/12/2021 – 58 juveniles

Average size on release

Length: 6.33cm; weight: 0.3g





ACTIVITY 4: PEARLY OYSTER SPAWNING (HATCHERY RUN #16)

4.1 SPAWNING

30th November 2021, the aquaculture section managed to collect 56 pearl oyster broodstock altogether from their Pearl Line for spawning. Thermal shock process began at 1330. However, release of eggs and sperms didn't occur until the 01/12/21 during sun dry process at 1547 – 1630. Sperms & eggs were then transferred to buckets to collect in order to begin the fertilization process.

4.2 FERTILIZATION & TRANSFER

Fertilization process began with adding of sperm to bin A, B & C at 1714. The process requires a minimum of 1 hour in order for the fertilized eggs to reach the final stage of fertilization D Stage. When the process is complete, the larvae are then transferred to the tanks in the hatchery for rearing and continued monitoring and observation

4.3 MONITORING

Ongoing monitor and observation (continuous water exchange on all tanks), counting of larvae and settlement done by the team until all settled tanks were transferred to the Ministry's nursery pearl lines at Sopu New with the density below

Tanks	Date of Transfer	Density
B1	Day 48 (18.01.22)	1,000,000
B2	Day 57 (27.01.22)	1,430,000
B3	Day 48 (18.01.22)	500,000
B6	25.01.22	225,000

Total Density transferred to Sopu New nursery:
3,155,000

4.4 GROWTH RATE

A strong significant increase in larvae growth is shown on the graph throughout the days during spawning indicating a successful growth from the larvae. Days recorded were only when full water exchange occurred labelled on the x-axis on the graph. Other factors were also recorded for observation and to help with assumptions and theories should a problem arise throughout the spawning period. Factors such as the room temperature, the larval tank temperatures and the salinity of the seawater to make sure that the larvae are growing at a suitable environment in order to avoid increase in mortality rate.

4.5 SETTLEMENT

A slight drop is visible in larvae growth at day 28. This due to the larvae bigger in size transferred to B1 for settlement. Settlement for the rest of the tanks took place day 30, 33 & 35. The significant drop shown in day 35 indicates that all larvae size 316um and above have been transferred to settlement tanks, larvae smaller in size was left in tank B6 for settlement, hence the sudden decrease in size of larvae growth.

However, a significant historical event occurred in the country on January the 15th. Hunga Tonga Hunga Ha'apai volcanic eruption, followed by a tsunami that hit the islands, causing a lot of damages to the coastal communities (SMAs). The communities with the sea cucumber trials were part of the affected communities from the disaster, damaging the cages along with the sea cucumbers stocked inside. The pond and cage culture were also completely damaged. However, the Ministry will move to provide assistance to these SMA communities in rebuilding their farms, reconstruct and re-install cages, accordingly to the recovery phase of the country.





Hatchery run #16

