Growth, behaviour and survival of cultured juvenile teatfish (*Holothuria fuscogilva* and *H. whitmaei*) in French Polynesia

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Summary

Teatfish (subgenus *Microthele*) are a group of high-value sea cucumbers, with three of the species listed on CITES[3] Appendix II. Few studies have been made on juvenile teatfish, and their behaviour and rates of growth and natural mortality being critical knowledge gaps for aquaculture and fisheries. We present results of an aquaculture programme in French Polynesia on the white teatfish and black teatfish, *Holothuria fuscogilva* and *H. whitmaei*. The programme aims to develop commercial-scale aquaculture for this promising sector whose products are intended for international markets, particularly in Asia. From the hatchery, recently settled juveniles are grown to 1–3 g in bag nets in earthen ponds. They are then transferred to 500-m^2 sea pens in natural reef flat habitats. Survival of juvenile *H. fuscogilva* in the sea pens (>80%) has been encouraging, revealing relatively low rates of natural mortality (annually, $M = 0.31$ and 0.68 for pre-grow-out and $M = 0.15$ for grow-out) even at a juvenile stage. However, growth rates were slow, at 0.13–0.14 g/day/ind. White teatfish (*H. fuscogilva*) juveniles display camouflaging behaviour in the sea pens by attaching macroalgae and sand to their body, resulting in them resembling reef rocks. Black teatfish (*H. whitmaei*) broodstock spawned in winter and the juveniles were cultured using similar methods. They grew in sea pens at around 0.3 g/day – a rate eclipsing that of white teatfish. After three years of research and development, hatchery production increased tenfold and the grow-out phase offers promise for commercial-scale production. Although it took two years for white teatfish to reach average weights of 150 g, the aim of the programme is to improve growth rates at the different stages that would result in an economically viabile operation.

Keywords: aquaculture, Pacific, spawning, reproduction, *Holothuria fuscogilva, H. whitmaei*

Introduction

Sea cucumbers, called *rori* in French Polynesia, have been harvested in this territory for more than a century (Stein 2019). In French Polynesia, subsistence consumption of sea cucumbers occurs to a small extent (Kinch et al. 2008), while most of the exploitation is for export to Asian markets. At least 10 commercially important species are present in French Polynesian waters (Andréfouët et al. 2019), yet only five have been authorised for commercial fishing, which has been regulated since 2012 (Stein 2019). This artisanal yet lucrative activity can lead to overexploitation of natural stocks, which are fragile and subject to slow recruitment.

Teatfish are a group of at least four species of sea cucumbers that have lateral body projections, or "teats". They take a special place in Chinese cuisine, selling for USD100–400 per kg (Purcell et al. 2018), and are currently or previously harvested in at least 20 countries in the Indo-Pacific. The white and black teatfish, *Holothuria* (*Microthele*) *fuscogilva* and *H.* (*M.*) *whitmaei*, have been especially targeted by commercial artisanal fishers in French Polynesia (Stein 2019), where the back reef flats and atoll lagoons appear to be highly suitable habitats (Fig. 1). In the Polynesian language, the black teatfish is called *rori titi ʻere ʻere* while the white teatfish is *rori titi ʻuo ʻuo*. Fishing was closed in French Polynesia in 2018 over fears of overexploitation of teatfish and a few other species, although there is interest in potentially re-opening fisheries on some atolls. In recent surveys, densities of the black teatfish (*Holothuria whitmaei*) were found to be rare or absent from most sites (Andréfouët et al. 2019).

In 2019, both *Holothuria whitmaei* and *Holothuria fuscogiva* were included in Appendix II of CITES, at the request of the European Union, and endorsed by the United States of America, Seychelles, Kenya and Senegal (Di Simone et al. 2020). In this context, and in order to promote sustainable management of the resource, the Direction des Ressources Marines (DRM)[4] is undertaking initiatives on teatfish in French Polynesia. The initiatives aim to preserve wild stocks while establishing aquaculture that could promote the preservation of biodiversity and lead to more sustainable fisheries. Thus, an aquaculture sector was envisaged for the production of teatfish from hatcheries (i.e. management and reproduction of wild-caught broodstock, larval breeding and nursery rearing) up to the sea ranching phase in natural reef habitats. To do this, the mastery and output of the different stages of production had to be demonstrated.

To provide context, we note that aquaculture technology has been well developed for only a few tropical species (Purcell et al. 2012). Although all four teatfish species found in the

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[3] Convention on International Trade in Endangered Species of Wild Fauna and Flora
[4] DRM is the government management authority responsible for fisheries in French Polynesia.

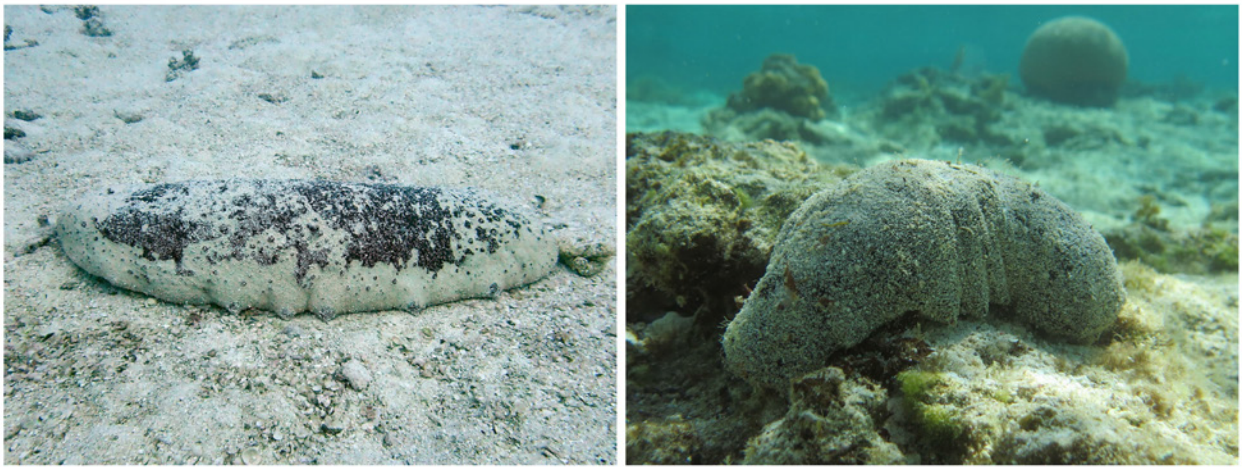

Figure 1. Left: a white teatfish, *Holothuria fuscogilva*, on lagoonal sand in French Polynesia. Image: ©S.W. Purcell
Right: a black teatfish, *Holothuria whitmaei*, on a reef flat platform in French Polynesia. Image: ©Mahanatea Garbutt

Indo-Pacific are valuable, there have been no reports of successful commercial-scale aquaculture of these species. The white teatfish, *Holothuria fuscogilva*, was cultured for several years in Kiribati, starting in the late 1990s, at an experimental scale with the assistance of Japanese aquaculturists (Friedman and Tekanene 2005). However, production numbers waned and the programme was mostly abandoned. In addition, the experience from Kiribati indicated that white teatfish were unsuitable to be grown in earthen ponds (Jimmy et al. 2012), an outcome repeated for black teatfish, *Holothuria whitmae*, in New Caledonia (Purcell et al. 2012). Thousands of hatchery-produced juvenile white teatfish were released into natural habitats in Kiribati but survival and growth monitoring was fruitless and trials to grow the animals in sea pens were thwarted by damaging storms (Jimmy et al. 2012). In New Caledonia, wild-caught black teatfish were induced to spawn in the hatchery by WorldFish in 2005 but the team was unable to get the larvae to survive through to settlement. So, the successful aquaculture and grow-out of teatfish has remained elusive.

In 2020, two years after a moratorium was set on sea cucumber fishing in French Polynesia, DRM solicited applications for collaborative research and development work on the feasibility of teatfish aquaculture. The selected company, Tahiti Marine Products (TMP), invested and launched a programme on the reproduction, breeding and sea ranching of teatfish. This work took place at the IFREMER Pacific Center, at the village of Vairao on Tahiti. This programme has been a collaboration between TMP, IFREMER and DRM. During the first couple of years, the aquaculture operation focused on white teatfish (*H. fuscogilva*) and later to also black teatfish (*H. whitmaei*). The results are, therefore, more advanced for *H. fuscogilva*.

White teatfish aquaculture development

TMP has conducted reproduction trials, larval rearing, nursery rearing, pre-grow-out and grow-out by using 50 *H. fuscogilva* broodstock that were collected under a fishery exemption permit. After three years, TMP has performed 16 reproduction trials, 8 of which resulted in the production of post-settlement juveniles.

According to research done on reproductive seasonality, white teatfish in New Caledonia spawn primarily in the summer months (Conand 1993). However, Ramofafia et al. (2000) found that this species spawned in late winter and early spring (August to October) in Solomon Islands, implying that the spawning season is not uniform across localities. During the early summer season, *H. fuscogilva* broodstock in French Polynesia were kept in sea pens and were monitored twice weekly. Since the first reproduction trials in October 2020, no mortality of broodstock has been observed.

The larval cycle follows several stages, as reported for other sea cucumbers (Fig. 2). The results of producing sea cucumber juveniles in hatcheries are highly variable. This heterogeneity in success is not due to the quality of the eggs or the broodstock; egg development is uniform, the hatching rates are excellent and the first feeding by larvae is consistent. Problems arrive later, around days 9 to 14 of the larval cycle. This could be linked to factors such as bacterial load, food type, food supply rate and human influence (e.g. different techniques or levels of hygiene). Despite this, the culture success with teatfish in French Polynesia is becoming more predictable.

The production of early-stage juveniles in French Polynesia over the last three years has increased tenfold (Fig. 3), yet there is still room for improvement. For instance, we reflect on the progress that was made by the Aquacole de la Ouenghi aquaculture company in Boulouparis, New Caledonia, in which survival rates from egg to juvenile stage increased from 1–2% to 6–8% between 2011 and 2020. In that programme, much of the improvement in the hatchery results was attributed to the careful selection of broodstock. The modest numbers of juveniles produced in 2022 related to problems of water quality and flow rate.

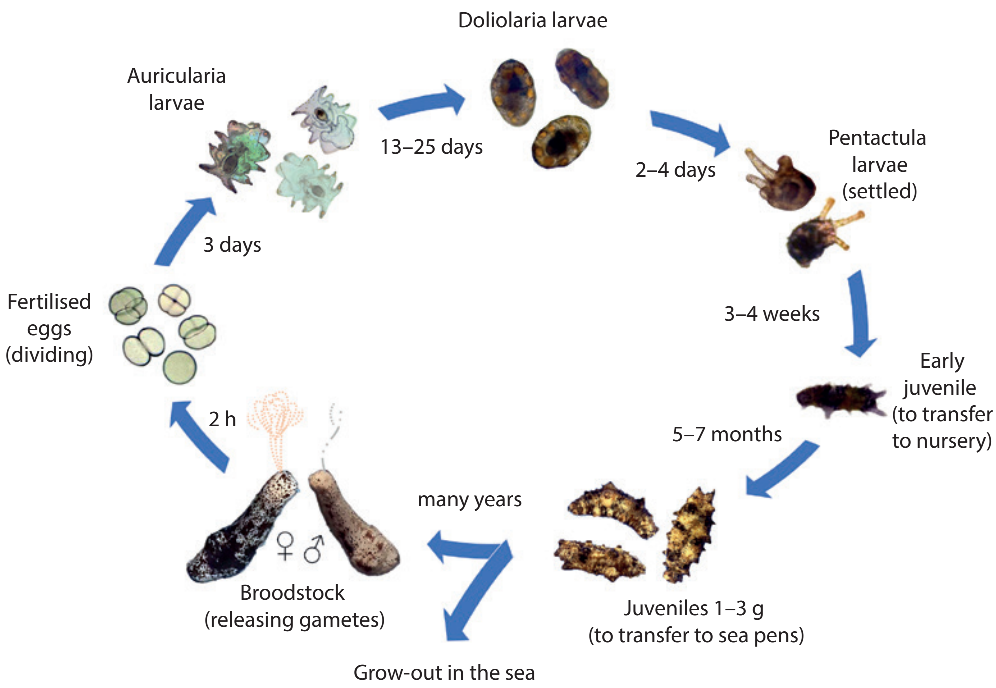

Figure 2. The life cycle of cultured white teatfish, *H. fuscogilva*, in French Polynesia.

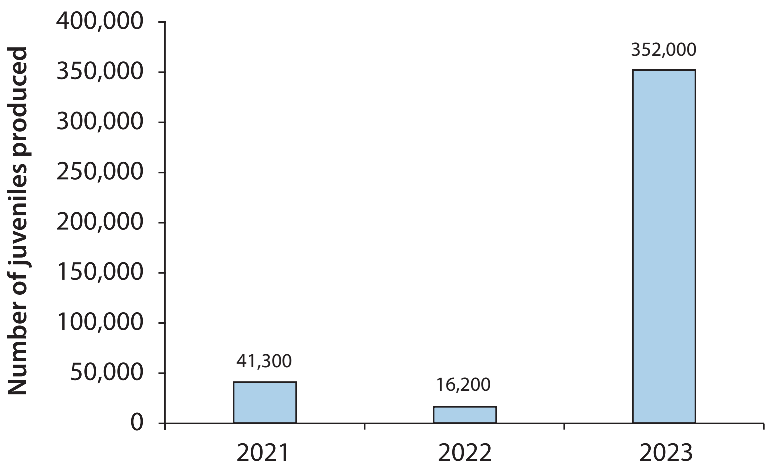

Figure 3. Recent evolution (2021–2023) of production quantities of post-settlement juveniles of white teatfish, *H. fuscogilva*, produced at the TMP hatchery in French Polynesia.

In French Polynesia, the selection of cultured *H. fuscogilva* to serve as future broodstock started with 126 animals weighing over 350 g from two different hatchery productions. Previous studies report the first sexual maturity of *H. fuscogilva* in New Caledonia to occur at around 900–950 g, with some individuals at 800 g showing mature gonads (Conand 1990). The TMP team hopes to begin the first reproduction with these selected cultured animals in 2026 when a new facility is expected to be ready at Faratea, on the east coast of Tahiti.

Nursery rearing of white teatfish

The nursery phase occurs after the hatchery phase, when sea cucumbers are at a tiny juvenile stage of 1–2 mm. Juveniles are put in bag nets (700–1000 µm mesh) that are set up in earthen ponds (Fig. 4). The preparation of these bag nets seems essential – in fact, a lack of conditioning of the bag nets and preparation of pond conditions when setting up the nursery can lead to a survival rate of less than 10%. All parameters must be considered: salinity, predation and competition, condition of the bag nets, age of the bag nets, and initial stocking density of juveniles. Juveniles stocked in the bag nets grow from <0.1 g to 2.0 g in a period of five to seven months.

Figure 4. Nursery system in earthen ponds in French Polynesia showing the bag nets supported by metal stakes in the seawater. Image: ©L. Burgy

Pre-grow-out trials of white teatfish

Pre-grow-out is the stage following the nursery, after the *H. fuscogilva* juveniles have reached 1–3 g in weight in the earthen ponds. At this stage, the juvenile white teatfish are quite spikey, with prominent papillae on the dorsal and dorso-lateral margins. The papillae tend to be dark brown in colour, with the tip being beige. The background body colour is beige and there are dark brown blotches over the body. Soon after they are transferred to the sea pens, they naturally tend to gather some macroalgae pieces and sand to adhere to their bodies, which camouflage them to the reef substratum (Fig. 5).

The pre-grow-out sea pens are located on an emergent reef flat on the western side of the Taiarapu lagoon on the western coast of Tahiti (Fig. 6). The reef sand in this habitat tends to be covered with a biofilm of organic matter and there is a scattered presence of corals (e.g. *Pocillopora* spp., *Porites* spp., and encrusting corals) and macroalgae (e.g. *Halimeda* spp., *Padina* spp. and *Dictyota* spp.). The sea pens (of varying dimensions) were made of plastic mesh (5 mm) supported upright by metal stakes. The reef habitat inside the pen is preserved in its natural state as much as possible.

Figure 5. A juvenile of *Holothuria fuscogilva*, the white teatfish, only a few grams in weight after being released in the sea pen. Notice the prominent papillae (dorsal and latero-dorsal) and the sand and macroalgae adhered to their bodies. Images: ©Matangi Moeroa

Figure 6. A 500-m² sea pen used for pre-grow-out of teatfish on a reef flat in Tahiti. Image: ©S.W. Purcell

The weights of white teatfish in the pre-grow-out sea pens were recorded on a monthly basis for culture production runs 6 and 8 of the programme. The pre-grow-out for these two production runs was done at two different sites: Toarahiri and Toahotu. The habitats are similar, being sandy reef flats with scattered presence of living corals. No feed was added to the sea pens, so the juveniles had only natural detritus to consume. Pooling the monthly data of the two production runs provides an average pattern of growth over nine months at the two sites (Fig. 7). After starting at 1–3 g body weight, the animals attained an average weight of around 29 g in nine months. This reveals a growth rate of 3.0 g per month, or 0.1 g per day for the pre-grow-out phase.

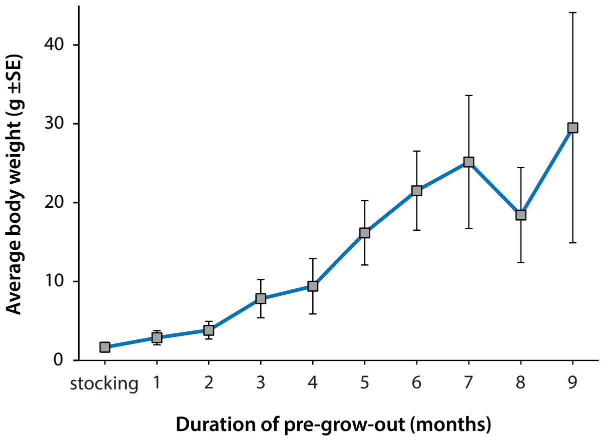

Figure 7. *Holothuria fuscogilva* (white teatfish) growth over nine months in the pre-grow-out phase in sea pens based on data from production runs 6 and 8 at Toarahiri and Toahotu, Tahiti. *n* = 30 individuals per sea pen

The results show that growth was relatively slow for the first two months in the sea pens, then increased and remained at a faster rate of around 3 g per month. Production run 6 was between June 2022 and January 2023, and production run 8 was between December 2022 and October 2023. The drop in average weight at month 8 seems to be linked to the vagaries of sampling. These pre-growing trials on comparable sites and at comparable densities showed similar growth rates (Fig. 8). This gives greater confidence that these growth rate findings were not just reflective of a particular batch of animals, or due to a particular season or site.

Survival of sea cucumbers in sea pens can be a major concern for commercial aquaculture operations (Purcell et al. 2012). While the walls of the sea pens in French Polynesia are not covered by water at high tide because the tidal flux is relatively small, animals could still be taken by some predators, die of natural causes, escape or not be found. Despite the TMP team's efforts to maintain the sea pens, some juveniles might have escaped at gaps that appeared after storms or large swells. In French Polynesia, the TMP team conducted some pilot studies using small sea pens measuring 12 m^2 in surface area. Using a stocking density of 1 animal per m^2, an average recapture rate of 86% was obtained. In the large-scale trials using the 500-m^2 sea pens, slightly lower recapture rates were obtained.

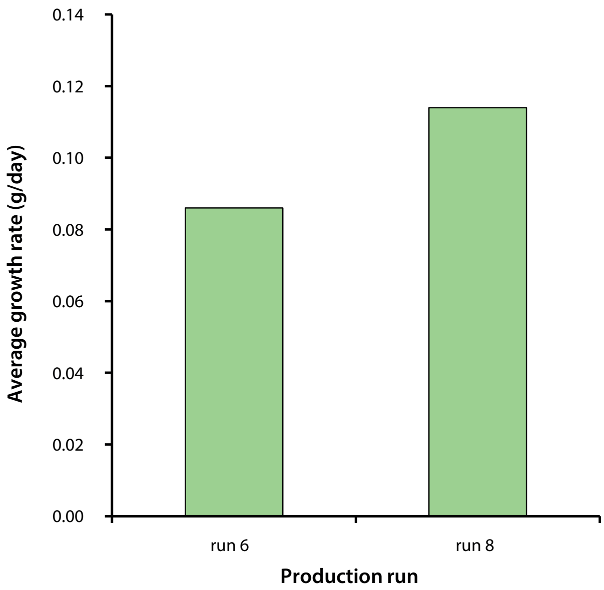

Figure 8. Average growth of juvenile teatfish in pre-grow-out phase for production runs 6 and 8.

For production run 6, the recapture rate was 60%, while the rate for production run 8 was 79%, equating to annual rates of natural mortality (M) of 0.68 and 0.31, respectively. These are still relatively high ('effective') survival rates compared to those in New Caledonia using sea pens with shorter mesh walls that are covered by water at high tide, allowing predators to enter (Purcell and Simutoga 2008). This slightly lower recapture rate in the larger sea pens compared to the 12-m^2 pens used in the pilot study might be partly explained by some animals not being found in the larger sea pens. Thus, the term "recapture rate" then takes on its full meaning.

Grow-out trials of white teatfish

After the pre-grow-out phase, *H. fuscogilva* juveniles weighting 25–40 g were transferred to grow-out sea pens of 10 mm mesh. A number of sea cucumbers in the grow-out pens were measured each month and a complete search of sea cucumbers in the pens was done at 15 months. Some enclosures were dismantled because of their poor location, particularly due to strong currents, which led to breakage. Data are presented from the remaining enclosures.

Monitoring the white teatfish in the grow-out sea pens shows fairly linear growth during the 15-month period (Fig. 9). There was an indication that growth might have slowed in the last three months, but this could be due to sampling precision. Overall, the growth rate was 8 g/ind/month, or 0.26 g/ind/day. After the 15-month grow-out period, the sea cucumbers averaged 150 g body weight, with a few being much larger (Fig. 10). Note that at this growth rate, the white teatfish would be 9–10 years old by the time they reached first sexual maturity, although it is possible that growth rates could increase later in life as pre-adults once they are a few hundred grams in weight.

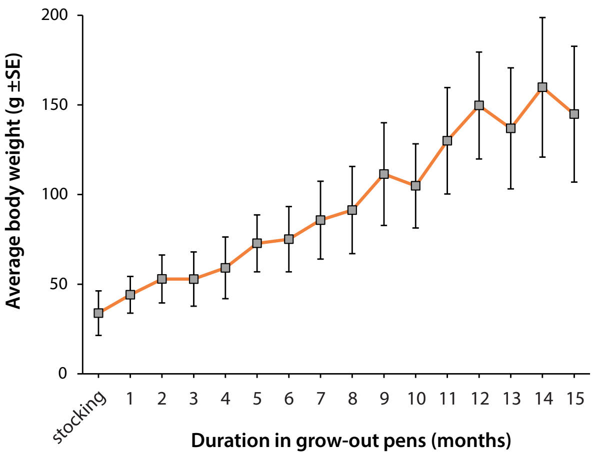

Figure 9. Growth trajectory of white teatfish over 15 months in the grow-out phase in sea pens. *n* = 30 individuals per sea pen

Figure 10. A large juvenile white teatfish, *H. fuscogilva*, that had been cultured in the hatchery and grown to around 250 g in weight in grow-out sea pens in French Polynesia. Image: ©S.W. Purcell

Much higher rates of growth have been found with other sea cucumber species grown in earthen ponds, where sediments are rich in nutrients (e.g. Bell et al. 2007). However, as mentioned earlier, earthen ponds seem unsuitable for the grow-out of teatfish. In sea pens, sandfish (*Holothuria scabra*) have been known to grow at up to 40–50 g/month in Madagascar, but only 9–19 g/month in New Caledonia (Purcell et al. 2012). Therefore, in comparison, white teatfish appear to have much slower growth rates in natural habitats as juveniles.

In production run 4, in which white teatfish were first stocked into sea pens in May and June 2022, the final stocking biomass after 15 months of rearing averaged 147 g/m^2 (Table 1). This appears to be under the carrying capacity limits reported for sea cucumbers in other studies (Purcell et al. 2012). At the final collection of all animals that could be found, the average recapture rate among sea pens was 83%. This outcome further reinforced the earlier finding about a relatively low natural mortality rate (M = 0.15, annually) of these larger juveniles, although we must remember that large predators were excluded from the sea pens.

The development phase of the programme ended in October 2023. Between the end of August and mid-October 2023, all white teatfish juveniles were collected from the sea pens to finalise these first production trials. A summary of results over the two years from 2021 to 2023 is given in Table 2. Considering the period of nursery rearing, pre-grow-out and grow-out, the average growth rate of the animals over the whole cycle was 0.13 g/day and 0.14 g/day. At the end of this development stage, 2801 animals had been cultured to average weights of between 95 g and 137 g.

Behaviour of white teatfish in sea pens

At the start of the pre-grow-out phase in the circular sea pens, white teatfish juveniles from 1 g to 3 g average body

Table 1. Summary of data from grow-out trials of white teatfish, *Holothuria fuscogilva*, in sea pens in French Polynesia. Spawning dates for production runs 4 and 6 were 10 February 2021 and 6 October 2021, respectively.

Production No.	Sea pen	Pen size (m²)	Stocking date	Number of sea cucumbers stocked	Mean weight at stocking (g) (± SD)	Initial stocking density (ind m⁻²)	Initial stocking biomass (g m⁻²)	Mean end weight (g ind⁻¹)	Number of individuals recaptured	Recapture rate (%)	End biomass (g m⁻²)	Total days of rearing	Growth rate (g ind⁻¹ day⁻¹)
4	Papehere 1	450	15 June 2022	518	28	1.2	32.1	98	493	95%	108	468	0.15
	Papehere 2	450	15 June 2022	518	28	1.2	32.1	140	495	96%	154	462	0.24
	Toarahiri 2	450	16 May 2022	566	45 (± 17)	1.0	47.4	177	421	74%	166	485	0.27
	Toarahiri 3	450	16 May 2022	614	45 (± 17)	1.0	47.5	151	483	79%	163	490	0.22
6	Toahotu 2	1700	23 Jan. 2023	1430	34 (± 8)	0.8	28.9	96	1052	74%	59	252	0.24

Table 2. Summary of aquaculture trials of white teatfish, *Holothuria fuscogilva*, in French Polynesia from spawning to final collection.

Production No.	Spawning date	Completion date	Toral duration from spawning (days)	Number of animals at completion	Mean ind. weight at completion (g)	Total weight at completion (kg)	Mean growth rate since spawning (g day⁻¹ ind⁻¹)
4	10 February 2021	15 September 2023	947	1792	137.3	246.1	0.14
6	6 October 2021	15 September 2023	709	1009	94.6	95.5	0.13

weight were released at the centre of the pen. The majority of these animals move very slowly. Only a small proportion of them were observed to move away quickly from the central release area, with no indication of those individuals being different from the others. Thus, there is a wide variation in potential or realised movement among individuals.

Soon after being released into the sea pens, the juvenile white teatfish appeared to be foraging on the biofilm present on the sediment. They also quickly covered themselves with sand and macroalgae, rendering them indistinguishable from overgrown reef rocks apart from their shape (Fig. 11). Only the faeces of the animals were noticeable at first glance. All of the juveniles in sea pens displayed this behaviour. This observation of camouflaging behaviour by white teatfish juveniles helps to explain why they are so seldomly found and recorded in population surveys. The TMP team also noticed that dark-coloured individuals (dark brown and dark orange) seemed to cover their bodies with dark sediments, whereas light-coloured individuals covered their bodies with light-coloured sediments, although this observation needs further investigation. Months after release, most of the animals remain in the central areas of the sea pens. Juvenile white teatfish were rarely seen climbing on the mesh walls of the sea pens.

Figure 11. One of the cultured large juvenile individual white teatfish, *Holothuria fuscogilva*, in the sea pen, well camouflaged with macroalgae attached to its body. Image: ©Mahanatea Garbutt

Black teatfish aquaculture development

Broodstock collection

From the programme's inception, the goal of TMP and DRM was to test the feasibility of producing both white teatfish and black teatfish in French Polynesia. The rarity of black teatfish (*H. whitmaei*) around Tahiti hampered the progress of this objective. Indeed, searches for *H. whitmaei* around Tahiti and the Leeward Islands (western Society Islands) were unsuccessful. Consequently, the programme sought broodstock from a distant archipelago.

A risk analysis was requested from the Pacific Community to guide the responsible translocation of black teatfish from the Austral Islands archipelago. Biosecurity protocols proposed by the Pacific Community were used to limit the risks of introducing pests and disease. In 2023, TMP obtained approval to acquire 50 *H. whitmaei* broodstock from Rimatara Island in the Austral Islands (Fig. 12).

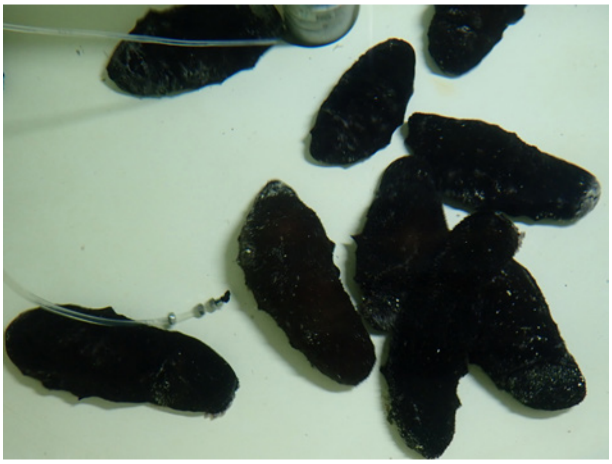

Figure 12. Some of the black teatfish (*Holothuria whitmaei*) broodstock in a tank at the IFREMER aquaculture facility at Vairao, eastern Tahiti. Image: ©S.W. Purcell

During the voyage to Tahiti, the adult black teatfish broodstock were kept in PVC tubes with shade cloth fitted to the ends to allow fresh seawater to enter. The animals survived the trip well, but the outer body wall of the animals was partly abraded by the shade cloth. This experience highlighted the need for better housing of sea cucumbers for future translocations.

Spawning of black teatfish

Aquaculture trials in Tahiti showed that *H. whitmaei* broodstock respond to similar spawning induction stress as *Holothuria fuscogilva*. This was promising for producing gametes. The larval rearing protocols developed for *H. fuscogilva* also appeared to be transferrable to *H. whitmaei* and the growth and development times of eggs and larvae are approximately the same (see Fig. 2).

Research done by Conand (1993) in New Caledonia indicate that black teatfish (*Holothuria whitmaei*) spawn primarily in winter, and this was generally corroborated by Shiell and Uthicke (2006) for black teatfish in western and eastern Australia. The first spawning of *Holothuria whitmaei* by the TMP team occurred immediately after the translocation of the broodstock to Tahiti, which was in the cool season (June). The majority of animals that spawned were male and more than 11 million eggs were produced by three females (Table 3). A second spawning was induced three months later, when the animals had

Table 3. Summary results of spawning and early juvenile production of black teatfish, *Holothuria whitmaei*, in French Polynesia.

Production No.	Spawning date	Number of broodstock used	Number of spawning males	Number of spawning females	Total number of eggs (millions)	Fertilisation rate (%)	Number of juveniles produced	Survival rate (egg to end of hatchery phase)
1	9 June 2023	50	9	3	11.2	95	210,000	1.88
2	30 Sep. 2023	49	7	3	15.0	95	50,000	0.33

again been stressed by transport and a change of environment. Induced spawning attempts will be made in 2024 to examine seasonality of reproduction.

Nursery rearing of black teatfish

Holothuria whitmaei juveniles produced from the culture trials were transferred to bag nets in two earthen ponds at the aquaculture facility at Vairao. This nursery rearing trial was in progress at the time of writing this article, so few data were available. Nonetheless, it appeared that juvenile *H. whitmaei* grow faster than *H. fuscogilva* juveniles. Indeed,

Figure 13. Black teatfish (*Holothuria whitmaei*) juveniles after three months of nursery rearing in bag nets in an earthen pond at Vairao, eastern Tahiti. Image: ©L. Burgy

after three months in the nursery, *H. whitmaei* juveniles weighed, on average, 1.8 g (Fig. 13). By comparison, to reach this same body weight, *H. fuscogilva* juveniles took, on average, four to six months in the nursery.

Black teatfish (*H. whitmaei*) juveniles weighing 1–10 g are orange-beige with irregular black spots and blotches over the dorsal surface of the body (Fig. 14). The young black teatfish juveniles have numerous papillae dorsally and on the dorsolateral margins of the body but these tend to be smaller and lighter in colour compared to white teatfish juveniles of the

Figure 14. Small juvenile black teatfish (*Holothuria whitmaei*) juveniles weighing 4–6 g, cultured at the TMP hatchery in French Polynesia. Image: ©L. Burgy

same size. Presumably, the black blotches on the body of black teatfish juveniles spread across the dorsal surface as they age and the dorsal papillae become smaller relative to the body size.

Conclusions

After more than three years of research and development, TMP and its partners (DRM and IFREMER) have succeeded in demonstrating the technical feasibility of producing teatfish in hatcheries in French Polynesia. The foundations of new and sustainable aquaculture in Polynesia have been laid with major technical advances.

The first years of technology development in French Polynesia yielded hatchery survival rates (from egg to juveniles of 1–3 g) of 1–3%. The objective of the programme is to achieve 5% survival and produce several million juveniles per year. Growth rates in the pre-grow-out and grow-out phases in sea pens were rather slow, especially for *H. fuscogilva*. These growth rates should approximate natural rates of wild animals since no feed was put in pens and stocking densities were not high. More trials and research are needed on habitats that will yield consistently good survival but higher growth rates. Lessons obtained from the different phases provide hope to reducing the whole culture cycle to 24 months for obtaining large juvenile teatfish, which would make for a compelling business model.

The launch of the country aquaculture project on Faratea, Tahiti, will allow the programme to scale-up production with the construction of a new commercial hatchery and new nursery ponds. The programme is striving to optimise production protocols to offer a new aquaculture sector for French Polynesia. The production model could ultimately be transferred to other Pacific Island countries.

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