Dear Readers,

At the beginning of 2011 the French aquarium magazine ZebrasO'mag (N°16) published an interview with Bernard Bruguier, owner of Bali Blue International – an exporter based Bali. Shortly after, SAIA published an article about fisherman Made and his life in Serangan, Bali in several French, German and British magazines. Remember: Because Made doesn't own a moped, he cannot transport his catch to the exporter, but has to sell for a lower price to the local middleman.

The export station Made's local middleman supplies to is Bali Blue International.

SAIA was granted permission to translate the original French interview of Sabine Pension with Bernard Bruguier to present this other, sometimes contrary perspective to the English speaking audience. It shows how different the points of view are regarding fair compensation, work safety and conservation at the various levels of the supply chain and thus indicates how much effort will be involved in transforming the marine aquarium trade.

To achieve greater accuracy and clarification on the opposing statements, I have requested both parties to review their conclusions. I have therefore sent additional questions to Mr. Schmidt (author of the article „The fisherman and his wife – a true story from Serangan, Bali") and Mr. Bruguier. I hope the resulting comments bring more clarity to the interview and encourage further thought.

Christiane Schmidt, SAIA

A list of references on the touched topics, is appended.

Bernard, how was Bali Blue founded? I worked at Hippocampe, a French importer and wholesaler. I came to Bali in 1995, initially for a single year. We were tired of not finding trustworthy and well-stocked exporters, I was commissioned to build an exportation structure in the source country and return to France. But I soon realized the business was not running well by itself, so I stayed.

In 1995, it was hard to find good exporters, they were not well equipped, and fish mortality was very high because of poor catch and storage practices. I wanted to create a healthier, more stabile business chain to guarantee good quality, from the fisherman to the exporter.

Holding facility fish

The quality of the fish starts with the fishing methods and the first storage. A badly caught fish won't survive to the end of the distribution network. We export worldwide: to the US, Europe (especially Germany, England, Italy, France) and Asia. The US accounts for 60% of the market, then comes Europe, Japan and Singapore. The market has changed; we used to export a lot big fish. Now, the cost of transportation has doubled ($4 per kilo), so we don't export much large stock, except for special orders. At the end of the distribution line, the price of a fish travelling alone in 15 litres of water becomes too high for the average costumer. Large adult fish are ordered especially for museums, public aquariums. Asian people also continue to buy big sized fish, it's cultural, plus the shipping cost is lower, mortality almost non-existent over such small distances.

Why this strategic choice of Bali? We are very close to the Jimbaran International airport, it is perfect for export. Flight lines are regular here, unlike on the small islands. We are more or less in the centre of the Indonesian archipelago, Bali is an island well served by electricity and other infrastructure, so it was a very good settlement choice.

Stocking facility

Indonesia is the largest exporter in the world. But volumes melt very quickly. Here is really the hub of marine ornamental animals, 80% of the common species in the aquarium trade are in our waters and we export more than 2000 species.

What makes up your business? We have 60 employees at the greenhouse, and a fleet of 24 boats, each with 20 people aboard. These boats are 17m long and are the property of the company. We lend the boat to the fishermen, along with all the appropriate fishing equipment and they are paid by the catch, each species of fish have a fixed price, it goes from 20 cents for a *Chromis viridis* up to $10 for large angels, nice triggerfish etc... A *Paracanthurus hepatus* is worth around $4, an anglerfish between $3 and $5, a wrasse average is $1 to $2.

Comment F. Schmidt: If a simple collector would earn $10 for a single fish, he wouldn't need to live under such poor conditions. The average monthly income in Indonesia is $20 – $50. Moreover the

compensation per fish would then exceed the export price – a negative profit margin would be the result.

Comment B. Bruguier: The law requires us to pay a minimum of $150.

Where are the fish collected? Fishing areas are in northern Sumatra to Papua New Guinea, is therefore a radius of over 5.000km. It's forbidden to boat fish around Bali, the fishing area is at the nearest 300km from here. More and more areas are protected, we must go farther and farther to fish. Once the tourist hotels are built, the government bans the fishing on the nearby coasts.

Comment F. Schmidt: If this is true, my interview with Made, the fisherman in Serangan is taken ad absurdum. What about the MAC Certified collection sites and fishermen in North Bali then? Illegal?

Comment B. Bruguier: The proximity to hotels in the area forbids us to collect there. Moreover, in Seranagan and surrounding areas 90% of the reef is destroyed, thus nothing of interest is available. Many of the locals work in the coral farms now.

Do you market to post-larvae fish? No, I tried, but the big problem is that you collect anything, and especially not ornamental! It requires too much knowledge and time to sort collections. In addition, to grow larvae until a suitable size for export is far too expensive. The electricity here is very expensive compared to the average standard of living, and it often takes hard work to bring it to the facility, few places are served in small islands. Honestly, I see no real visible depletion of fish stocks. The fish reproduce quickly, thousands of eggs per month for many species. Much more than the aquarium industry (takes), it would be more pollution and environmental degradation that would undermine the natural resources. But here in Indonesia, we are still well preserved.

Comment F. Schmidt: It is an exaggeration pulled out of a hat to say nature in Indonesia is still preserved. Several scientific publications give evidence of the effects of ocean acidification, pollution, but also destructive fishing methods like cyanide – an on-going issue of the aquarium fishery in South East Asia.

Comment B. Bruguier: Marine aquarium collection has practically now effect on reefs and fish stocks. More important causes are pollution and global warming.

What kind of problems do you face in your business every day? Education, we need to train fishermen to ensure good maintenance techniques in the boats and the warehouse. The deleterious effects of poor maintenance cannot be seen until later, when the fisherman is not here

anymore to see the result of his bad handling, and that's the problem. The fishermen are reluctant to perform all the recommendations we give them for proper fish care, because for them it is extra work, and they do not see the effect. It is also difficult to ask them to make efforts to preserve the natural environment, be careful not to break the corals when they fish, for example. These are concerns of educated people, people who have time to think. For them, the only goal is to earn money to feed their families. They have no entertainment, no free time; it is a very hard life.

What is the process of fishing? The ride to the fishing zone may take up to 8 days, one way. Collectors spend two days diving, and then return. To the most distant area a fishing trip can take 18 days for only two days of collection! Divers working with the hookah (a compressor on the boat sends air to the diver through a hose), dive twice in the morning, twice in the afternoon and go 40 to 50 meters deep. At 50m, they remain 15 minutes to fish, it's very exhausting! The two collection days are enough to bring home 2.000 to 3.000 fishes (2 tons, with water). The fish are stored in individual plastic bags, as for export, but the water must be changed twice daily. Open bag, remove fish, drain the water, return water, put the fish back ... it takes them a lot of time during the voyage to the warehouse, but that guarantee the quality of fish. A boat that follows all the rules arrives with 98% of healthy fish. In those fish with less water changes, it does not show right away, but once they go into quarantine, they stay very still, and often die ... The treatment of animals on the boat heavily influences the state of fish for export: it is a crucial step. There are fewer and fewer accidents concerning the fish, mainly air bladder problems, but collectors have really learned to handle the animals and take the proper care. But, in humans, there are many diving accidents. Not deadly ones, but paralysis, ear problems, and the fishermen often drink too much alcohol, and then they dive and the accident happens. It's right to explain how to decompress but they don't really listen; they descend and ascend right away. Once they have witnessed an accident, they listen and are more cautious (at first), but generally they do not understand, because the decompression symptoms are often invisible, if it's not bad enough to cause a severe effect. The divers on the boat start to dive when they are 15 or 16 years old, they stop diving at 30 years. At this age they are washed out. It's a job that is very life consuming.

©SAIA air bladder puncture

Comment F. Schmidt: Most fishermen, also on Bali, are Muslims and refuse alcohol. More likely dive accidents are caused by a lack of adequate equipment and training, especially in dive safety.

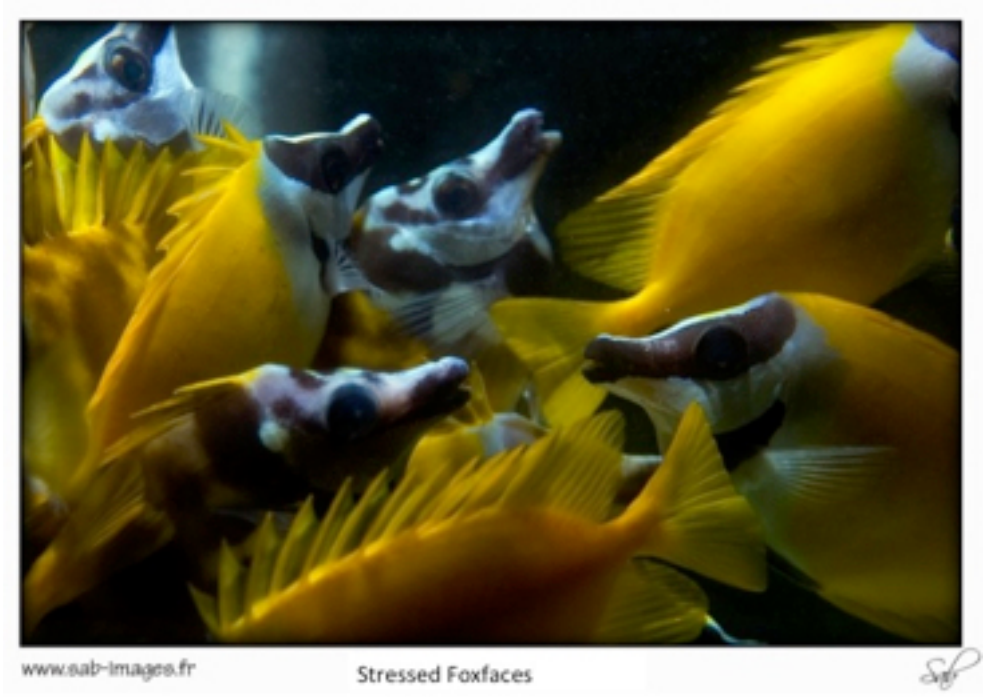
Comment B. Bruguier: We employ around 30 workers in Bali Blue, who are Muslims. All drink beer and Arak every day. Dive accidents are caused by alcohol abuse.

Do you give them a wish lists to indicate which fish to collect? No. They try to bring back the most expensive fishes. They know the price of each fish, thus target the biggest income possible. We try to ask them for particular fishes, but it is never guaranteed. They will not spend time under water looking for a particular fish, as they may end with nothing as the dive time elapses. Taking time to find some small and not that expensive fish, who lives in inaccessible areas, such as small wrasses, the Pseudochromidae, some gobies, or deep water fish, it too restrictive for what it's worth, it's a waste of time in the mind of the collector, and that's why you don't find many of these on stock-lists.

Comment F. Schmidt: Usually it is demand determining supply. I cannot imagine that the collector determines the assortment of the exporter. Otherwise it will be difficult for Bali Blue to receive e.g. damselfish and hermit crabs, which still make the bread and butter of every export business.

Comment B. Bruguier: I cannot influence what my collectors bring home from their voyages to Sumba, Sumbawa, Flores, Sulawesi or Irian Jaya. Most of them target expensive fish like angelfish rather than damsels or wrasses.

Do you try to collect small species, whether fish or invertebrates? I'm thinking Nano reef market target. We do have some species, Gobiosoma sp, Gobiodon sp.There's some Doryrhamphus sp., a less common genus, which can be requested, but it's hard to convince the fishermen to get them. It's so small, it will hide, it's not easy to take compared to what the collector earns for it! We are aware that the market for Nano reef is growing tremendously, part of the reason is the economic crisis and the soaring cost of electricity. However on our end of the business, these are not "common species" yet. Concerning the demand and exports, France is not really a big customer yet, unlike Germany and England who are much bigger ones. But it's definitely a market for the future, we must take it into account.



Is there a special season for fishing? For us, the ideal is July and August, the waters teem with fish, the sea is calm, collectors can fish a lot more. But it's at this time that import countries buy less, because of the heat and risk of transportation.

Stocking of juv. angelfish

What are the techniques of fishing? Is fishing with cyanide or dynamite still occurring? The collectors set a barrier net at some strategic place, and then they drive the fishes towards it, until they are trapped. Food fish are no longer caught in Indonesia over the past fifteen years, but it still exists elsewhere in the archipelago of course. The dynamite fishing is almost exclusively used for food fish. As for cyanide, we cannot say that it is no longer used, that would be wrong. But a kilo of potassium cyanide costs $50, the collectors will not use it on 20 cents fish. They will use it only on very expensive fish, and for those hiding in caves and very hard to collect. Before they mastered efficient fishing techniques, the collectors were using small scoop nets, and without cyanide, wouldn't be able to catch anything. Now, after they were taught barrier net techniques and were provided with the proper gear, there is no longer a widespread use of cyanide. Moreover, as we must go farther and farther to collect the fish, the collector runs the risk of a fish dying during the return trip, if he uses poorly dosed cyanide.

Comment F. Schmidt: The questionable success of reduced cyanide use in marine aquarium collection is rather a result of the price increase of cyanide in the past years. Cyanide use is forbidden by law in Indonesia since 1985 (Fisheries Law N° 9, signed on 19/6 1985 by the President of Indonesia). However, enforcement of this law is lacking and cyanide use difficult to control and prove.

Comment B. Bruguier: I can guarantee for my collectors that they fish without cyanide. Clearly I cannot speak for other divers.

What happens once the boat arrives at the harbour? When the fishes arrive they are sorted by species, but also screened for quality: ill or injured specimens, too thin or small ones, in short unmarketable ones are discarded to be released. They are kept 4-5 days in our greenhouse, prior to export, time to make deworming and deparasiting treatment, with the UV and copper sulphate. Once a month, we treat the entire water system with a drug called Praziquantel, which is a highly effective dewormer to rid the fish of parasites. It is expensive ($350 per kilo) but it's worth. The fishes are not fed, otherwise they could not travel (if they polluted their bag with their faeces, the rise of ammonia would kill them). They are not fed

Acclimation facility

either during the boat ride for the same reasons, but a marine fish can easily stay 15 days without eating. The most sensitive fish (e.g. Anthias, or other small fish that doesn't have fat stock in their body) are collected on fishing spots close, around 300 to 500km from here, to reduce travel time. The greenhouse holds always from 50 to 100.000 fish, we export 400.000 fish per month. We don't really "store" animals, because to obtain the most beautiful fish, it must still 4 to 5 days of quarantine and treatment, and then be shipped immediately. The longer it remains in stock, the more he's depleted, it loses its colours, it is less beautiful.

Comment F. Schmidt: When studying the stock lists of Bali Blue, we will find an endless stock of whatever reefs in Indonesia have to offer to the aquarium hobbyist. It seems impossible to be able to offer such diversity without passing on demand to the collectors and only buy what is requested from customers. If Mr. Bruguier would buy any fish his collectors bring to him, he would need to stock some undesired fish for longer, blocking valuable space for demanded species.
Moreover I have concerns over the practice of releasing unmarketable specimens in the vicinity of the warehouse, especially when these are species endemic to other areas.

How is the stocking / quarantine structured? The 120,000 litres holding facility contains rows of 100 litres tanks, separated in three large filters systems, all connected to UV. We do big water changes, so we don't need skimmers. We change 20,000l per day, tanker trucks will collect water 5 times per day in Nusa Dua, where water is the cleanest around. Small species are placed in the same tank, classified by species and separated into individual plastic containers, to not being able to fight and get hurt. The tanks where fish are not in jars are covered to prevent jumps in the night. Wild fish are very stressed, have very strong reactions. Then gradually they calm down and acclimatize.

How about Coral collection? We don't make wild collection, we have mariculture tables on a small island near here. We grow twenty genera of hard and soft corals, especially pretty and colored Acropora sp. (Thirty species) and Euphyllia sp, which are so beautiful as cultured corals. They grow so well, we won't ever go breaking the reef to take some! We start from 2cm fragments, and within 4 month, we get a nice sized colony ready to market.
Hard corals do not spend a long time at the warehouse, they are collected, then placed in well oxygenated tanks for a day or two, to stir out the mucus secreted by the stress of the collection, and then they are placed in the boxes and shipped.
Soft corals stays a little more, at least three days, while they are closely inspected several times, to remove a maximum of parasites, as they are much more infected than hard corals by worms, nudibranch, snails, crustaceans. We also remove all encrusted sponges, because these do not travel well and would pollute the water in transport. They require more work than hard corals. We also export a wide variety of mobile invertebrates, shrimp, seastars, sea urchins, all the common species, and even "rarities" such as nudibranchs and crinoids, but we try not to over collect these animals, because we know that these species have a very poor survival rate in captivity, even if they are still requested from our importers. We must keep a balance between the commercial profit and ethics. We try to do our job the cleanest way possible.

Sabine Penisson
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Christiane Schmidt/Sabine Penisson
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References

L. Burke, K. Reytar, M. Spalding, A. Perry; Reefs at Risk Revisited, 2011. World Resources Institute Washington D.C.

Tom Galley; State of the art review of captive breeding ornamental marine and tropical freshhwater fish, February 2010. Center of Applied Marine Sciences, Bangor University, UK

A.W. Bruckner, G.G. Roberts; Proceedings of the International Cyanide Detection Testing Workshop; 2008. NOAA Technical Memorandum NMFS- OPR-40, Silver Spring, MD 164 pp.

Reksodihardjo-Lilley, Lilley; SPC Live Reef Fish Information Bulletin 2007. Towards a sustainable marine aquarium trade: An Indonesian perspective.

C. Schmidt, A. Kunzmann; SPC Live Reef Fish Information Bulletin January 2005. Post-harvest mortality in the marine aquarium trade: A case study of an Indonesian export facility

P.J. Rubec, F.P. Cruz.; SPC Live Reef Fish Information Bulletin 2005. Monitoring the chain of custody to reduce delayed mortality of net-caught fish in the aquarium trade.

C. Wabnitz, M. Taylor, E. Green, T. Razak; From Ocean to Aquarium, 2003. UNEP-WCMC, Cambridge, UK

Conservation and Community Investment Forum; Analysis of Destructive Reef Fishing Practices in the Indo-Pacific, October 2001. CCIF, San Francisco, CA