

SCTLD In the Turks & Caicos Islands - A Case Study

SCTLD en las Islas Turks y Caicos: un estudio de caso

SCTLD aux Îles Turks & Caicos - Une Étude de cas

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EXTENDED ABSTRACT

SCTLD arrived in the Turks and Caicos Islands (TCI) in January 2019. This presentation reviews how the Turks & Caicos Reef fund (TCRF) has worked to document, track and manage the disease. We present monitoring findings about the spread of the disease and species affected. Through a network of volunteers conducting Roving Diver Surveys, we were able to track the spread of SCTLD eastward along the north shore of the Caicos islands as well as south-eastward on the Turks Bank. SCTLD invaded forereefs in all areas of the TCI in approximately two years. The 32 species of stony corals recorded with tissue loss during these surveys currently give the TCI the highest record for affected taxa in the region. We present the results of various treatment trials conducted using Ocean Alchemists products; namely Base2B with Amoxicillin and the non-antibiotic Coral Cure D (CCD). 250+ colonies were treated with B2B/Amoxicillin and monitored over 8 months resulting in 90% success rate. In May 2021 TCRF began conducting test trials of CCD and we present the findings from 3+ months. We describe public engagement and outreach efforts via Zoom sessions, talks and events that have generated volunteers and funding. We also comment on long-term restoration plans including the potential role for a land-based stony coral nursery to help preserve the genetic diversity of the TCI's reefs.

INTRODUCTION AND RESULTS

Hello everyone, my name is Alizee Zimmermann and I'm the Executive Director of the Turks & Caicos Reef Fund in the Turks & Caicos Islands (TCI). We are a Nonprofit NGO that was established in 2010 to help preserve and protect the environment of the TCI through research, education and advocacy. Since 2019 we have been on the frontlines of the fight against Stony Coral Tissue Loss Disease (SCTLD) in the TCI and have become increasingly involved in the regional effort as well. Although there is now 1 official employee in the organization, yours truly, we are otherwise solely reliant on volunteers, fundraising and private donations. This Case Study is a little bit about what we've accomplished over 2.5 years of dealing with SCTLD in the TCI and how we've been able to do so against the odds.

SCTLD was first observed by the School for Field Studies (SFS) in South Caicos in Jan 2019, it was not observed again until April 2019 when it was seen off the reefs of West Caicos on the opposite end of the archipelago, it then made its way through the various islands along the Caicos Bank and then in December 2019 it made the jump across the Turks passage to Grand Turk and Salt Cay.

To Note is that in Sep 2019 there was a nationwide bleaching event that saw a slowing down if not stopping of disease progression both on a colony and reef level in Grace Bay, on the north shore of Providenciales. It wasn't until September 2020, a year later, that a second invasion and outbreak happened on the reefs of Grace Bay and Pine Cay, since then, it has been full outbreak.

Fast forward to 2021, in January we were given a treatment expansion permit which was based on the efficacy results of our test trials which you'll see in a moment, with this we have been able to go out and tag and treat large priority colonies. In March of 2021, photographic evidence shows that SCTLD is present on the reefs of the uninhabited island of East Caicos. This summer TCRF has begun conversations about creating a land based facility for coral research and propagation and we launched our first ever RumPowered Research™ expedition which just got back about 3 weeks ago (October 2021), where we able to collect incredible data on the anthropogenically unaffected reefs of East Caicos.

This list (of species affected by SCTLD) is just to give you a visual representation of just how many species we've seen as affected by SCTLD here in the TCI. The list is alphabetical not by susceptibility. Here is a visual representation of just a fraction of those species.

We need hope – so we started speaking with the experts about how we could treat these colonies. Ocean Alchemists created an ointment called Base2B which is combined with amoxicillin and we found an up to 90% success rate over 250 colonies that were treated in the space of 8 months of monitoring. Here you can see some montages where we were even able to save a small patch of *Dendrogyra* tissue, you can see the exact shape of the treatment margin on the photograph, it is quite incredible.

This gave us hope and it also convinced our government to give TCRF a treatment expansion permit which allowed us to tag treat and monitor large reproductive colonies and in the 8 months since we've had this permit, we have treated 200+ large colonies and we're increasing our efforts with engaging divers so that we can get those opportunistic monitoring photos submitted to the TC Reef Fund.

However, antibiotics are no ones first choice. Saying that, this is a very time-sensitive disease and we have seen a huge

reduction in hard coral cover. A paper published by the School for Field Studies in South Caicos shows a 62% hard coral cover loss in two years attributed to SCTL D. The search for non-antibiotic treatment remains and we've been testing the new formula by Ocean Alchemists; Coral Cure D (CCD) which is non-antibiotic. The formula remains proprietary but there is a heavy cinnamon component to the product and it smells a like Christmas.

We were only able to apply one treatment so our results are based on a single application with 5 months of efficacy rates. On one of the sites, we tested 34 lesions and after 5 months the lowest success rate was 68% for the braided hemp ropes imbued with CCD and stapled directly into the coral itself. The CCD paste had a 69% success rate and the Amoxicillin still showed to be the most successful treatment with 80% of lesion progression halted. Here you can see one of our genetic comparison studies where we applied both the antibiotic and the CCD treatment to the same colony. 5 months later, both lesions have been halted.

Our results are incredibly positive and with a little bit of funding we would be able to bolster these efficacy results and hopefully add another treatment to the toolbelt for territories that are now facing this disease to consider using.

One of our biggest successes over the past several years has been with our education and outreach efforts. From information sessions with local dive operators to training local volunteers on coral ID, diagnostic differentiation and SCTL D treatment protocol, to interviews and informational sessions with the local news and media outlets.

We also partnered with MPACConnect and NOAA to help in the creation of training videos by providing footage and in the field expertise. One of our most successful projects has been the use of liveboards to allow researchers to spend full weeks out at sea while also engaging visitors and giving them something new to look at and a different way of engaging with the reef and marine environment. Due to time limitations, I'm going to stick to the most recent one which was just 1 month ago on the Turks & Caicos Explorer and sailed under the banner of Rum-Powered research. We were able to secure funding from 3 different rum companies in order to make this expedition a reality and a group of 11 dedicated volunteers, some of whom paid to join the team and gain valuable knowledge and experience, joined forces with an amazing crew and we spent a week out at one of the region's last wild places. It is an incredible resource of genetic diversity and apparent resilience to SCTL D. We look forward to being able to work through the data so that we can share some of the comparative information we've collected to show how perhaps, a non-visited, non-inhabited island might fare differently to our more visited reefs.

Thank you for your time and please feel free to reach out if you would like to connect.

KEYWORDS: SCTL D, intervention, treatment, volunteers, Turks & Caicos Islands

LITERATURE CITED

Heres et al. 2021, Ecological consequences of Stony Coral Tissue Loss Disease in the Turks & Caicos Islands