

Welcome to BioNews

BioNews is a monthly newsletter produced by the Dutch Caribbean Nature Alliance (DCNA), which provides an update on the research and monitoring efforts currently underway on and around the six islands of the Dutch Caribbean as well as an overview of important events and meetings in the near future.

For any questions or feedback, or if you would like to make a contribution, please contact us at research@DCNAnature.org

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Editor's Notes

This month's issue focuses attention on the conservation efforts on the Windward side of the Dutch Caribbean. On St. Maarten, these days sharks are protected by law, largely due to the determination of the Nature Foundation. Their Shark Research Project is aimed at determining whether these protective measures have the desired effect and shark numbers are indeed

rising again. On Saba and St. Eustatius James Ackerman and Raymond Tremblay of the University of Puerto Rico have continued their long-term population viability study of two beautiful and rare orchid species in order to produce management recommendations to save these species from local extinction.

Small Island Survival: The Fate and Fortunes of a Fabulous Orchid

by James D. Ackerman and Raymond L. Tremblay (University of Puerto Rico)

One of the loveliest orchids of the Lesser Antilles is *Brassavola cucullata*, a species that grows on shaded boulders and tree trunks and each new shoot produces a single, nocturnally fragrant flower. Although geographically widespread, populations of these orchids may be suffering from habitat destruction, collecting, and invasive species.

In 2009, Jim Ackerman and Raymond Tremblay, orchid specialists and professors from the University of Puerto Rico, joined Hannah Madden of STENAPA to establish a monitoring program of the two known populations of *B. cucullata* on St. Eustatius. Every year since then, they gather demographic data, which will be used to assess population viability and make recommendations for management. **Continued on page 2...**



Brassavola cucullata.
Photo credit: James D. Ackerman



Continued from page 1: Small Island Survival: The Fate and Fortunes of a Fabulous Orchid

Reproductive effort and success are of course critical for population longevity. Fruit production in *B. cucullata* is very low, but typical of those tropical orchids that have nectarless flowers and attract pollinators by deceit. The late Stewart Chipka reported two pollinators on Saba: hawkmoths *Manduca sexta* and *Protambulix strigilis* (Sphingidae), both of which are widespread in the Neotropics and along with perhaps other sympatric species, may pollinate *B. cucullata* throughout its range.

Preliminary analyses of the Statia demographic data suggest that the populations may be stable, but are largely dependent on a few very large plants for reproduction, making the populations seemingly vulnerable. Furthermore, it appears that goats are having detrimental effects. Plants that are within easy reach of goats are 1) more likely to be eaten, and 2) those that are eaten are more likely to suffer mortality. The free-range goat populations on Statia have been increasing and are a cause for concern for the native flora and fauna to the extent that goat owners must tag their animals or expect them to be culled.

The monitoring program on Statia caught the attention of Saba nature enthusiasts, Michiel Boeken and Mike Bechtold. Consequently, a parallel monitoring program was set up in 2012, which provides an opportunity to compare the

health of populations across islands, with Saba perhaps having higher goat densities than Statia. A few more years of monitoring will be required to evaluate the demographic health status of *B. cucullata* on Saba.

If *B. cucullata* populations appear to be on the decline, then it becomes critical to understand the causes. We have already identified one possible issue: goats. Another cause might be a decline in the abundance of their sphingid pollinators. Adult moths feed on nectar and their larvae eat leaves. So if we are to protect these orchids we must also protect food plants of their pollinators, which requires us to also understand the life cycle of these insects.

Such plant-animal interactions are often not simple. For example, one possible scenario might be that goats actually facilitate orchid population growth, if their appetite for orchid leaves is compensated. The larval food plants of the two identified moth pollinators are from plant families that are loaded with toxic secondary compounds (e.g. Solanaceae and Anacardiaceae). If goats avoid them, but eat their potential competitors, larval food plant availability may actually increase providing more naive moth pollinators to be duped by deceitful orchids! Only field observations and experimentation will tell.



STENAPA Park Ranger Hannah Madden examining orchid during field work.
Photo credit: James D. Ackerman

Monitoring Overview

Below you will find an overview of the monitoring programmes that took place on the islands in August 2013. Please check our website for a complete overview of all long-term monitoring programmes that are in place in the Dutch Caribbean: www.dcnanature.org/resources/research-monitoring

Category	Subject	Islands	Organisation: Lead Scientist
Mammals	Marine mammal sightings	SAB, EUX, SXM	SCF: Kai Wulf STENAPA: Steve Piontek Nature Foundation: Tadzio Bervoets
Mammals	Bat abundance, distribution, reproduction and behaviour	ARU, BON	FPNA: Indra Zaandam STINAPA Bonaire: Fernando Simal IVIC: Jafet Nassar
Birds	Flamingo abundance monitoring (monthly counts)	BON	DRO: Frank van Slobbe STINAPA Bonaire: Fernando Simal
Birds	Bridled Quail-dove	EUX	STENAPA: Hannah Madden
Reptiles	Sea turtle monitoring, including: - foraging grounds monitoring - in-water surveys - capture-mark-recapture - Hawksbill project at Lac Cai - Netting surveys in Lac Bay	BON	STCB: Mabel Nava
Reptiles	Sea turtle nesting and beach patrol	ARU, BON, EUX, SXM	Turtugaruba: E. & R. van der Wal STCB: Mabel Nava STENAPA: Jessica Berkel Nature Foundation: Tadzio Bervoets
Reptiles	Sea turtle sightings	BON, EUX, SXM	STCB: Mabel Nava STENAPA: Jessica Berkel Nature Foundation: Tadzio Bervoets
Fish	Fisheries landings	SAB, EUX	SCF: Brooke Rodgers LVV: Erik Boman (St. Eustatius) IMARES: Martin de Graaf
Fish	Shark tagging and migration	SXM	Nature Foundation: Tadzio Bervoets
Fish	Fish abundance and distribution in the MWSMP	SXM	Nature Foundation: Tadzio Bervoets
Fish	Fish surveys using stereo baited remote video	SAB, EUX	IMARES: M. de Graaf & D. Debrot WUR: Jelmer Pander (Saba) WUR: Tiedo van Kuijk (St. Eustatius)
Mollusks	Queen Conch reproduction, distribution & abundance on Saba Bank	SAB, EUX	IMARES: Martin de Graaf WUR: Sanne Koenen LVV: Erik Boman (St. Eustatius)
Crustaceans	Lobster reproduction, distribution & abundance	EUX	IMARES: Martin de Graaf WUR: Suzanne Poiesz
Crustaceans	Lobster larvae abundance	SAB, EUX	SCF: Kai Wulf LVV: Erik Boman
Plants	Phenology study of cyclic activity columnar cacti and agave (associated with ongoing bat monitoring programme)	ARU, BON	FPNA: Indra Zaandam STINAPA Bonaire: Fernando Simal
Plants	Phenology study of columnar cacti and native tree species on Bonaire	BON	STINAPA Bonaire: Paulo Bertuol & Fernando Simal
Plants	Ongoing study of flora of Aruba, Bonaire and Curaçao	ARU, BON, CUR	Naturalis/WUR: André van Proosdij
Plants	Ongoing study to produce a checklist of the flora of St. Eustatius	EUX	UPR: Franklin Axelrod
Plants	Ongoing study of orchids on Saba	SAB	UPR: James Ackerman
Invasives	Invasive seagrass in Lac Bay	BON	STINAPA Bonaire: Sabine Engel VU: Tineke van Bussel
Invasives	Lionfish abundance	ARU, BON, CUR, EUX, SAB, SXM	STINAPA Bonaire: Ramon de Leon CARMABI: Mark Vermeij STENAPA SCF: Brooke Rogers Nature Foundation: Tadzio Bervoets
Environmental	Water quality testing in Simpson Bay Lagoon and Great Bay	SXM	Nature Foundation: Tadzio Bervoets with SLAC
Geomorphological	Beach profile change	SAB	Jennifer Rahn
Human impact	Diver visitation	BON, SAB, EUX, SXM	STINAPA Bonaire: Ramon de Leon SCF: Kai Wulf STENAPA Nature Foundation: Tadzio Bervoets

Don't see your monitoring programme on this list? Email us: research@DCNAnature.org

Would you like secure storage and dynamic analysis for your research and monitoring data? Work with us and Alterra to develop a user-friendly process for data input, management and basic analysis, including statistics, graphics and maps, within the Dutch Caribbean Biodiversity Database (www.dcbd.nl).



'Research of the Month': Shark and Ray Research in St. Maarten's Territorial Waters

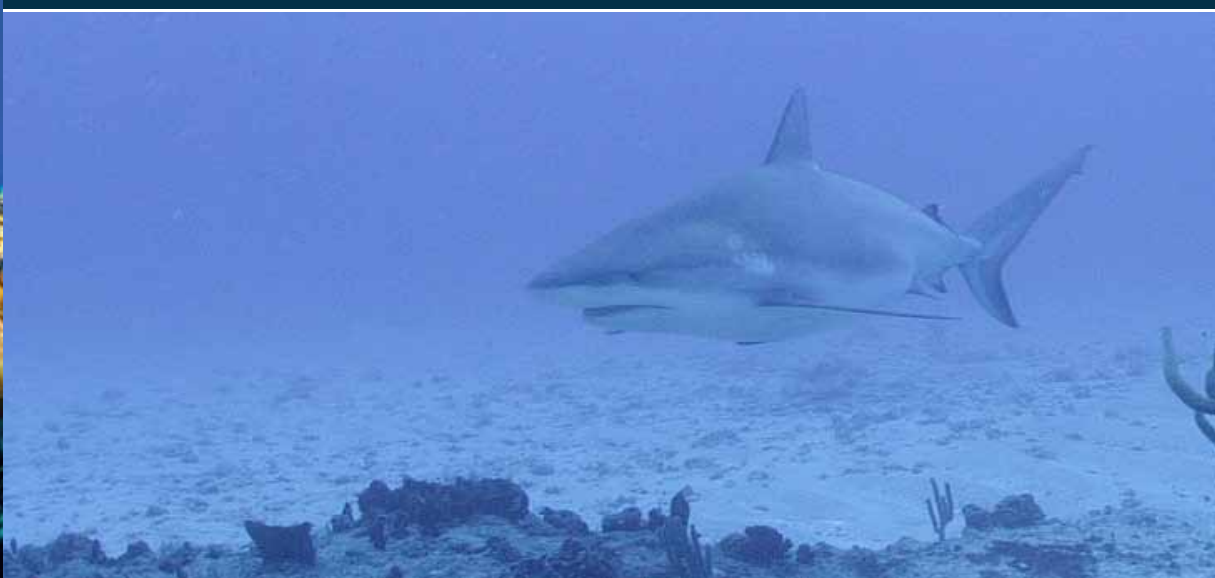
by Tadzio Bervoets (Manager St. Maarten Nature Foundation)

In October 2011 an important step was taken by the St. Maarten government for shark conservation in Dutch Caribbean waters by prohibiting the targeted fishing for and killing of sharks in the territorial waters around St. Maarten. In order to find out whether this legislation proves to be effective and shark populations around St. Maarten are actually rising again, the Nature Foundation, assisted by the island's dive operators, started a Shark Research Project, tagging individual sharks on a regular basis. An integral part of this project is the creation of awareness among the local population about this legislation and the ecological importance of sharks for the coral reef. Two recent reports about a shark caught and killed on the boardwalk of downtown Philipsburg and a number of people spearing baby rays in Mullet Bay illustrate that there is still room for improvement when it comes to awareness about the importance of these species and about the legislation itself.

Sharks are apex predators, placing them at the top of the food chain, and are essential to the health of coral reef ecosystems. Without sharks, our coral reef ecosystems would be in a much worse shape, since sharks help keep the ecosystem in balance by cleaning the reefs of unhealthy fish. Equally important, the majority of visiting dive tourists that come to see our coral reefs pay top dollar to see sharks in their natural environment as well. The majority of these tourist divers also rent cars, stay in hotels and eat and drink at restaurants and bars, which brings in money to the local economy. A valuation study in 2011 on the value of sharks around Palau, an island state in the Pacific, caused a revolution in shark protection when it calculated that a single shark in Palau waters is worth US\$ 1.9 million over its lifetime, in contrast to a mere US\$ 108 if it is caught and sold for its meat. A similar study on sharks in St. Maarten waters conducted by the Nature Foundation showed that a single live shark is worth up to US\$ 884,000 to the economy of St. Maarten over its lifetime.

The Nature Foundation's Shark Research Project was launched due to concern for the survival of St. Maarten's sharks. There is a lively recreational shark fishing industry on St. Maarten and practices were far from sustainable. Thanks to the Nature Foundation, the practice of targeted fishing and harming of sharks has been prohibited since October 12th 2011, when the St. Maarten Ministry of Economic Affairs banned the practice of poaching sharks in the territorial waters of St. Maarten. The law states that the act of trying to catch a shark by tracking, stalking, baiting, chasing, trapping, hooking, netting, shooting or otherwise hunting for sharks, rays and skates is prohibited and therefore the animals also may not be wounded or killed. In the case of catching a shark accidentally, all steps should be taken to release the animal with as little harm as possible. In recent years, shark population numbers seem to have been going down. Fewer and fewer sharks are being spotted and in the locations where they are known to be frequent and where

Caribbean Reef Shark in the waters of St. Maarten.
Photo credit: Mauricio Handler



previously around twenty individuals could be seen, now only two or three are found. Whether this is due to decreasing shark stocks or a (temporary) displacement is one of the things the Shark Research Project aims to find out. Removing the top predator not only endangers the health of the ecosystem, it would also cause a major financial blow to the tourism industry if this important tourism product were lost. That is why this step, taken by the St. Maarten government is a true milestone in marine conservation and one that will hopefully be followed by governments on other islands, allowing the shark populations in the region to return to numbers needed to sustain a healthy population.

In the rest of the world, people are also starting to realise that we need to protect our sharks. Nearly two years after the historic decision to legally protect sharks and rays on St. Maarten, in March 2013, five shark species and two manta ray species have received international protection, becoming the latest additions to the Convention on the International Trade in Endangered Species (CITES). Practically, this means that these species can now only be traded if they are caught in a legal, sustainable and traceable manner. These listings mark yet another milestone in marine conservation.

To date, four sharks have been tagged; three Caribbean Reef Sharks and one Nurse Shark. The tagged reef sharks are spotted regularly around the island. The goal is to tag as many sharks as possible to get an idea of their population dy-

namics, distribution and possible migration between the islands. Local knowledge suggests that there is at least some migration of reef sharks to Anguilla and St. Barthelemy, but scientific evidence has yet to support that.

The Shark Research Project will produce further information on shark abundance, migratory patterns and home range in the marine park and near coastal waters. This information will allow the decision makers to continuously fine-tune and enforce the decree for protection of sharks and rays on St. Maarten.

Additionally, the Nature Foundation will also be re-launching an island wide outreach programme soon. There is still a lack of awareness with regards not only to the importance of sharks and rays to the marine ecosystem and to the economy of St. Maarten, but also to the still existent belief that sharks are inherently dangerous to humans. Outreach will, amongst others, feature public service announcements in the local media, presentations and featured speakers.

Hopefully, the protection sharks have received in St. Maarten's territorial waters will form part of a wider Caribbean basin initiative, which will protect these magnificent creatures throughout the region.

"The reputation of sharks as blood thirsty creatures is largely exaggerated by sensationalist reports and all started with the movie Jaws in 1975. Countries all over the world have since recognised the importance of these animals and on St. Maarten we will continue to put shark conservation as a top priority."



Tadzio
Bervoets -
Manager

Nature Foundation



Conservation Organisations of the Dutch Caribbean



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Research Overview

Below you will find an overview of the research work, taking place in the Dutch Caribbean in August 2013.

Category	Subject	Islands	Organisation: Lead Scientist
Mammals	Bat ecology	CUR	USA: Sophie Petit
Birds	Pilot study of post-fledging survival of Yellow-shouldered Amazon Parrots	BON	Echo: Sam Williams UoS: Isabelle Dean
Birds	Determining density of suitable Yellow-shouldered Amazon nesting cavities in dry-forest	BON	Echo: Sam Williams
Birds	Radio telemetry study determining home range and location in non-breeding Yellow-shouldered Amazon	BON	Echo: Sam Williams
Fish	Fish genetics	CUR	CAS: Michelle Gaither
Corals	Coral bleaching surveys in the Man of War Shoal Marine Park	SXM	Nature Foundation: Tadzio Bervoets
Corals	Collection of coral gametes for coral restoration project	CUR	CARMABI & SECORE: Valérie Chamberland
Corals	Bathymetric mapping of shallow reefs using GPS and sonar	SAB	Jennifer Rahn
Plants	Phenology study of Yellow-shouldered Amazon food tree species	BON	Echo: Sam Williams
Invasives	Lionfish stomach content	BON	CIEE: Fadilah Ali
Geomorphological	Benthic habitat mapping	EUX	IMARES
Socio-economic	TEEB (The Economics of Ecosystems and Biodiversity) study for Saba and St. Eustatius	SAB, EUX	VU: Pieter van Beukering WKICS: Esther Wolfs

Don't see your research on this list? Email us: research@DCNAnature.org



Areal view across the northern hills of St. Eustatius.
Photo credit: Mauricio Handler



Reports and Publications

Below you will find an overview of the reports and publications on biodiversity related subjects in the Dutch Caribbean that came out in or around August 2013. The listed publications can be downloaded from the Dutch Caribbean Biodiversity Database (DCBD) - www.dcbd.nl/resources

Filatov, M.V.; Frade, P.R.; Bak, R.P.M.; Vermeij, M.J.A.; Kaandorp, J.A. (2013)

Comparison between Colony Morphology and Molecular Phylogeny in the Caribbean Scleractinian Coral Genus *Madracis*. PLoS ONE 8(8): e71287. doi:10.1371/journal.pone.0071287

Kirkbride-Smith, A.E.; Wheeler, P.M.; Johnson, M.L. (2013)

The Relationship between Diver Experience Levels and Perceptions of Attractiveness of Artificial Reefs - Examination of a Potential Management Tool. PLoS ONE 8(7): e68899. doi:10.1371/journal.pone.0068899

Madden, H.; Ellis, A. (2013)

Assessment of the Breeding Success of Red-billed Tropicbirds on St. Eustatius. St. Eustatius National Parks (STENAPA), p. 11

Mumby, P.J.; Brumbaugh, D.R.; Harborne, A.R.; Roff, G. (2013)

On the relationship between native grouper and invasive lionfish in the Caribbean. PeerJ PrePrints 1:e45v1. doi: 10.7287/peerj.preprints.45v1

Scheffers, A.M.; Engel, M.; May, S.M.; Scheffers, S.R.; Joannes-Boyau, R.; Hänssler, E.; Kennedy, K.; Kelletat, D.; Brückner, H.; Vött, A.; Schellmann, G.; Schäbitz, F.; Radtke, U.; Sommer, B.; Willershäuser, T.; Felis, T. (2013)

Potential and limits of combining studies of coarse- and fine-grained sediments for the coastal event history of a Caribbean carbonate environment. Geological Society of London, Special Publications v.388. doi: 10.1144/SP388.4

Strik, S. (2013)

Nederlandse vlinders op een tropisch eiland. Vlinders 3: 10 - 12.

Wirshing, H.H.; Feldheim, K.A.; Baker, A.C. (2013)

Vectored dispersal of Symbiodinium by larvae of a Caribbean gorgonian octocoral. Molecular Ecology 22(17): 4413 - 4432. doi: 10.1111/mec.12405

Conservation Organisations of the Dutch Caribbean



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St. Maarten

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St. Maarten

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List of Acronyms

ARU	Aruba	IUCN	International Union for the Conservation of Nature
BON	Bonaire	IVIC	Venezuelan Institute for Scientific Research
CUR	Curaçao	LVV	Department of Agriculture, Animal Husbandry and Fisheries
BON	Bonaire	Min EZ	Ministry of Economic Affairs
SAB	Saba	NIOZ	Royal Netherlands Institute for Sea Research, The Netherlands
EUX	St. Eustatius (Statia)	SCF	Saba Conservation Foundation
SXM	St. Maarten	SLAC	Simpson Bay Lagoon Authority Corporation, St. Maarten
CaMPAM	Caribbean Marine Protected Areas Management	SPA-WRAC	Specially Protected Areas and Wildlife - Regional Activity Centre
CARMABI	Caribbean Research and Management of Biodiversity Foundation	STCB	Sea Turtle Conservation Bonaire
CAS	California Academy of Sciences, USA	STENAPA	St. Eustatius National Parks
CBD	Convention of biological diversity	STINAPA	Stichting Nationale Parken Bonaire
CIEE	Council on International Educational Exchange	TEEB	The Economics of Ecosystems and Biodiversity
DCBD	Dutch Caribbean Biodiversity Database	UoS	University of Sheffield, UK
DCNA	Dutch Caribbean Nature Alliance	UPR	University of Puerto Rico
DOC	Dissolved Organic Carbon	USA	University of South Australia
DRO	Directorate of Spatial Planning and Development, Bonaire	VU	Amsterdam University, the Netherlands
EPIC	Environmental Protection In Caribbean	WIDECAST	Wider Caribbean Sea Turtle Network
EEZ	Exclusive Economic Zone	WKICS	WolfsKater International Consultancy Services B.V.
FPNA	Fundacion Parke Nacional Arikok	WSNP	Washington Slagbaai National Park
IMARES	Institute for Marine Resources and Ecosystem Studies	WUR	Wageningen University and Research Center, the Netherlands



Calendar

BioNews provides you with an overview of nature conservation and management related events coming up in the next months.

October

29 - 1	Meeting	EEZ Committee meeting - Bonaire
2 - 4	Meeting	19 th DCNA Board Meeting on Bonaire
9 - 11	Conference	'Green Aruba' and Caribbean Renewable Energy Forum (CREF) conference - Aruba
14 - 17	Meeting	28th General meeting of the International Coral Reef Initiative (ICRI) - Belize City, Belize
14 - 18	Workshop	Global Coral Reef Monitoring Network (GCRMN) Caribbean workshop - Belize
14 - 18	Meeting	Convention of Biological Diversity (CBD) Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) meeting - Montreal, Canada
19 - 26	Fieldwork	Saba Bank monitoring (corals, fish, genetics, nutrients and DOC studies) – Erik Meesters (IMARES)
21 - 25	Congress	Third International Marine Protected Areas Congress (IMPAC3) - organised by IUCN - Marseille, France

November

TBA	Fieldwork	Marine mammal survey for Aruba, Bonaire and Curaçao – Meike Scheidat, IMARES
4 - 7	Meeting	Latin American and Caribbean Network of Environmental Funds (RedLAC) Assembly - San José, Costa Rica
4 - 8	Meeting	66 th Gulf and Caribbean Fisheries Institute (GCFI) meeting - Corpus Christi, TX, USA
7	Workshop	Maritime Incident Response strategic workshop – organised by Rijkswaterstaat Zee & Delta - Saba/St. Eustatius
10 - 21	Fieldwork	Coral reef monitoring on Curaçao and Bonaire – Erik Meesters, Rolf Bak and Maggy Nugues
28 - 29	Workshop	Marine Protected Areas and Climate Change - organised by IUCN EU Oversees Programme, SPAW-RAC and CaMPAM - Saint Martin

December

3 - 5	Workshop	Caribbean Iguana Conservation Workshop: Exploring a Region-Wide Approach to Recovery – San Juan, Puerto Rico
6 - 8	Workshop	25 th Turtle Hospital / Florida Keys Sea Turtle Workshop - Marathon FL, USA

January

29 - 1	Congress	Eighth Caribbean Biodiversity Congress - Santo Domingo, Dominican Republic
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April

8 - 9	Meeting	Wider Caribbean Sea Turtle Network (WIDECAST) annual meeting
10 - 17	Meeting	34 th Annual International Symposium on Sea Turtle Biology and Conservation - New Orleans, Louisiana (USA)

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If you do not wish to receive future issues of BioNews, or if you have suggestions of colleagues you would like us to add to our mailing list, please contact us at research@DCNAnature.org

More events to add to this calendar? Please contact us at research@DCNAnature.org and we will include them in the next issue.

