Caicos Pine and the Pine Tortoise Scale Insect

A Case Study in Invasive Species in the Turks and Caicos Islands

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Caicos Pine

- Caribbean pine *Pinus caribaea* var. *bahamensis* (locally called Caicos Pine) is TCI’s National Tree.
- It is the foundation species of two habitats locally called pine yard: The globally imperilled pine rockland and the unique sandy pine yard.
- Pine yard is a fire-dependent ecosystem, requiring low-level fires every 5-15 years to reduce broadleaf competition and renew pine growth.
- It was historically the single most important terrestrial natural resource for the Turks and Caicos Islands (prior to 1960) providing all lumber, pitch, and fuel, and its habitat providing food, medicine, and livestock fodder.
Pine rockland
Sandy pineyard
*Pinus caribaea* var. *bahamensis* disjunct distribution: Northern Bahamas (Grand Bahama, Abaco, Andros, and New Providence) and about 400 miles southeast, on Pine Cay, Middle Caicos, and North Caicos.

Turks and Caicos population is genetically significantly different from Bahamas population.
Pine Cay population is also genetically significantly different from North and Middle Caicos populations.
Pine Tortoise Scale Invasion

• 2005, an introduced scale insect *Toumeyella parvicornis* was observed on Caicos pine causing significant tree mortality.

• Pine tortoise scale is native to North America where it is a low-impact pest on *Pinus* species. It arrived to Turks and Caicos Islands on cut live Christmas trees possibly around the 1990s. It spread quickly from 2005-2010 killing 90% of pine trees.
Devastating wildfires (due to dead trees), hurricane sea surges, and the introduced Mediterranean black aphid have contributed to pine decline.
Pine tortoise scale is usually in its slow-reproductive bark dwelling phase in its natural range, but in TCI only the constantly reproducing needle dwelling phase exists.

Scale subjects trees to water and food stress, and its honeydew causes sooty mould to grow on needles, slowing photosynthesis.

Scale attacks most severely on branch tips and new growth. Trees die from the top down over the course of a year.
Healthy pine yard
Pine yard killed by scale insects
Between 2005-2012, the population of Caicos pine was reduced by 97.3% causing an apparently permanent altered state in its ecosystem.
Conservation and Future for Caicos Pine

- The Caicos Pine Recovery Project addresses pine conservation through ex-situ, in-situ, and research practices.
- In 2010, DECR & Royal Botanic Gardens, Kew were awarded a grant from the UK Overseas Territories Environment Programme (OTEP) “Building Capacity & Awareness to Save the National Tree of TCI,” to carry on the Caicos Pine Recovery Project initiated by the Turks & Caicos National Trust in 2008.
- In 2014, DECR & Royal Botanic Gardens, Kew were awarded a grant from the UK Government’s DarwinPlus Overseas Territories Environment & Climate Fund “Caicos Pine Forests: Mitigation for Climate Change and Invasive Species” which resulted in a species recovery and habitat restoration strategy for the Caicos pine.
- Project is managed by DECR with no regular funding.
- Ex-situ: Rescue of seedlings from flood zones; collection of seeds for banking and propagation; nursery growth of trees, seed-farming, outreach and education
• In-situ: Setup of permanent monitoring plots for treatment trials; mapping extent of pine and scale infestation; initiation of controlled burn programme; establishment of recovery plots for planting out nursery trees
• Research: Volatile chemicals, fire history, mycorrhizal fungi, propagation techniques, water potential and stress, entomology, habitat restoration, germination, seed longevity, and comparative genetics of TCI populations and Bahamas trees
Eradication of pine tortoise scale is not feasible. Some predatory insects (lacewings, ladybirds, and a parasitoid wasp) are attacking the scale.

It is predicted that even with Caicos Pine Recovery Project efforts:

- North Caicos population will reach functional extinction.
- Middle Caicos population and habitat will be greatly reduced and survive in a highly altered state.
- Pine Cay population will fare best, but they are most susceptible to sea level rise.
Thank you!

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