

Diseases of Ferns of Dominica

By Karen Price

Abstract

Diseased ferns were selected for study from the trail on Mt. Joy and Emerald Pool. Wax and armored scales insects were found on the ferns selected as well as Psocoptera and fungus. Disease was not found on all types of ferns and there was not clear evidence that the insects or fungus caused the decline in the sampled ferns overall vigor. Armored scale appeared to prefer locating near the spores on the fern, but the exact relationship was not clear.

Introduction

While ferns grown in the home are usually diseased by the owners inability to provide the proper moisture levels, I wanted to know if there were any diseases on ferns grown in their natural environment. Most ferns in Dominica that I observed, grew in the moist rainforest environment with a high amount of shade cover. This environment should limit the type of diseases to those that also require this environment. This paper's purpose in to identify if there are any insect pest or diseases on ferns.

Materials & Methods

Samples were taken of ferns that looked diseased and/or had insect pest visible on them. Two locations were used: the mountain trail on Mt. Joy and Emerald Pool. All samples were placed in Ziploc bags to keep the fern and its insects or diseases intact during transport to the lab.

Mt. Joy Samples:

Collected 5 fern samples that had a diseased appearance (evidence of tissue damage, leaf senescence or insects).

Emerald Pool:

Collected 5 fern samples on the Emerald Pool trail that had a diseased appearance (evidence of tissue damage, leaf senescence or insects).

Results

Mt. Joy Samples:

Three of the ferns sampled were *Thelypteris clypeolutata*. Two of these had wax scales, *Ceroplastes* sp. (f. Coccidae) in various stages of development. The wax scales were located primarily along the midvein of the top of the leaves or on the stems. On one of the ferns with wax scale, I found a Psocoptera (booklouse) curled up in a leaf of one of the ferns.

The other two ferns that were sampled are *Diplazium striatum*. I found armored scales (f. Diaspididae) located around the spores on the underside of the fern leaves. I extracted several specimens from thier waxy homes. One winged adult (male scale) was attacked and partially eaten by a tiny ant before we could save it in a specimen jar.

Emerald Pool:

One small fern, *Saccoloma inaequale*, has a whitish-yellow fungal mass growing on the top and bottom of the leaves. The stem had one old wax scale on it also.

The second fern sample was a medium sized fern called *Pteris arborea*. This fern has a 'christmas tree' shape. All of the wax scale insects found on this fern were located along the main vein of the leaf. Damage on the leaves does not occur at or near the point of attachment of the scales.

The third fern leaf was from a large frond belonging to *Cyathea caribaea*. A small relative of the tree fern. I found a mature wax scale insect on the midvein of the leaf.

The fourth fern sample was also a medium sized fern leaf called *Diplazium striatum*. This fern also had the whitish-yellow fungal growth on the leaves and wax scale insects on the midveins.

On the fifth leaf, which is a large three pointed woody type of fern called *Tecaria trifoliata*. This fern has clear-orangish spores with a circular orange crown. These spores were found primarily on the outer portion of the underside of the leaf. Near the basal vein branch are soft scales (f. Chalcoididae).

Discussion

Overall the wax scales were located on the top side of the leaves and the armored scales were located on the underside near the spores. The armored scale frequently was positioned perpendicular to the spores. I did not see any of the armored scales hatch, so I am not sure what their relationship is to the spores. Most of the wax scales did not exhibit any damage to the leaf in the general vicinity of the point of attachment, but most of the ferns that had the wax scale on them also had a lot of the leaves turning brown. Since scale insects are sessile in the later instars and in the adult stage, I expected to find leaf damage at the point of attachment. I did not find any conclusive evidence that the wax scale was causing the damage to the leaves. The armored scale is also sessile throughout most of its life cycles. Again, I did not notice any direct damage to the leaves and I am unclear about the relationship of the armored scale to the spores. I do not know if the small ants regularly attack the scales as they hatch or if my observation was a matter of convenience. The source of the ant may have been the lab and may not have originally been on the fern.

The Psocoptera may be a regular resident of the fern because their feeding habits include molds and dead insect parts (Borror, 260). Both of these food sources were found on the ferns that I collected. I was unable to determine the species of the Psocoptera because the microscope was not strong enough to see the identifying features.

Another group did their research on the fern species located around the Archibold Tropical Research Center and collected a total of six species of ferns on Mt. Joy. I found disease/insects on only two of these species. It is unclear whether the other species are more resistant to the scale insects or if the time of year is a factor.

Areas of Further Study

- Focus on one species and determine if the wax scale is really causing the decline in the overall vigor of the fern.
- Determine the relationship of the armored scale to the spores on *Diplazium striatum*.
- Determine if Psocoptera are commonly found on ferns, diseased or otherwise and determine the species, if possible.
- Determine if ants are regular predators of armored scale.

Works Cited

Borror, Donald J., et al. An Introduction to the Study of Insects. Saunders College Publishing, Philadelphia. 1989.