Safeguarding our Tree Collections: Gardens coordinate to manage diversity.

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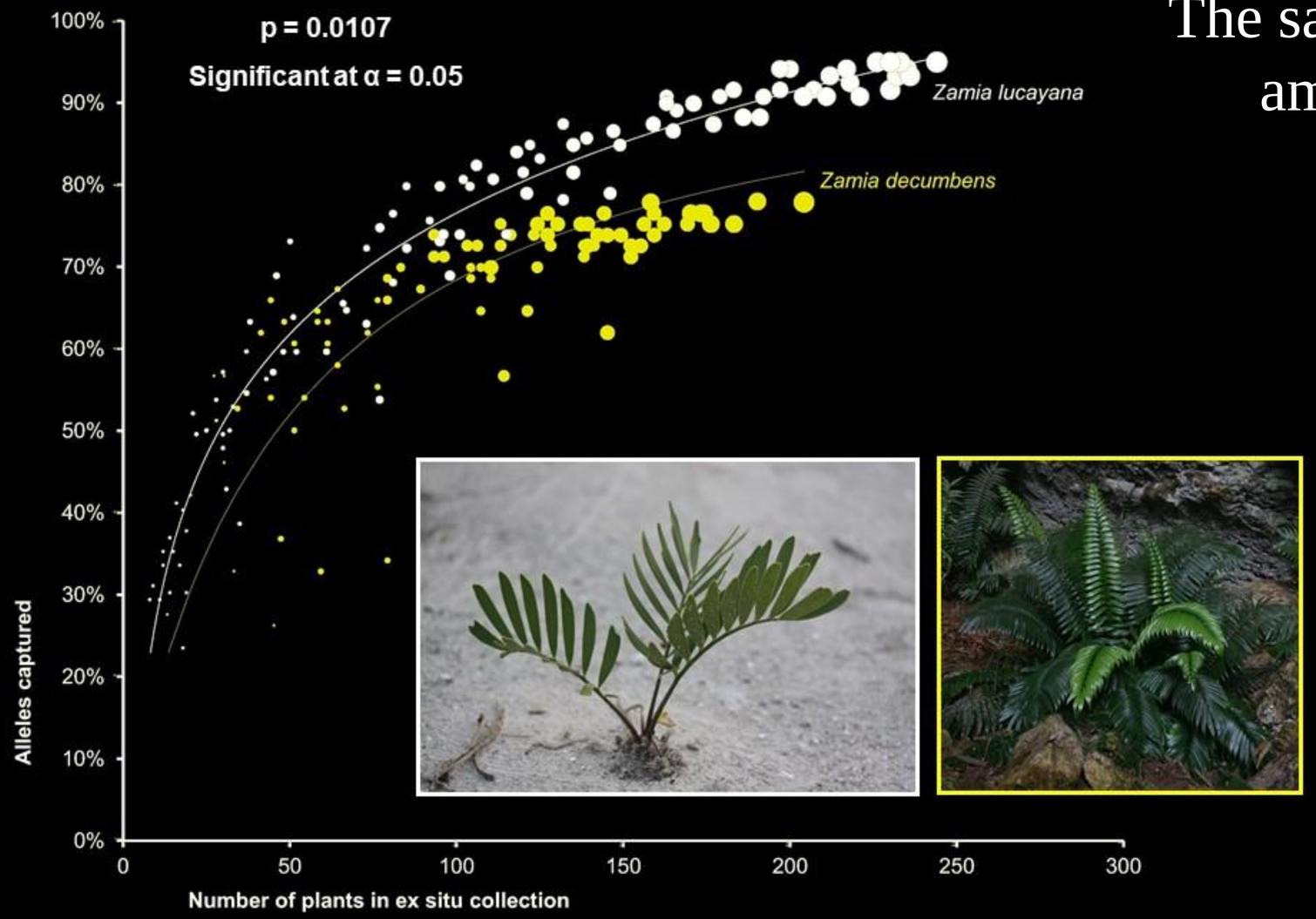
"I want to conserve this species in my garden . . ."

"Which plants should I grow, and how many?"

The IMLS National Leadership Project, Safeguarding our Tree Collections, seeks to answer this fundamental question. Through structured comparisons of genetic data among major groups of seed plants, management recommendations and their broadness can be determined. Results show that careful consideration of the target species is essential when planning for collections management; i.e. biology informs strategy. The application of novel zoo management software to our plant data allows management of "metacollections" at separate gardens, and illustrates the need for demographic considerations in *ex situ* collections. Integrating precise *ex situ* conservation assessment with *in situ* management, monitoring, and community outreach can "close the loop," ensuring our living treasures do not go extinct.

Introduction



The same protocols capture different amounts of genetic diversity!

Even among closely related species.

So, how can we plan for genetic capture?

Can we truly conserve species in garden collections?

Introduction

What about species extinct in the wild!?

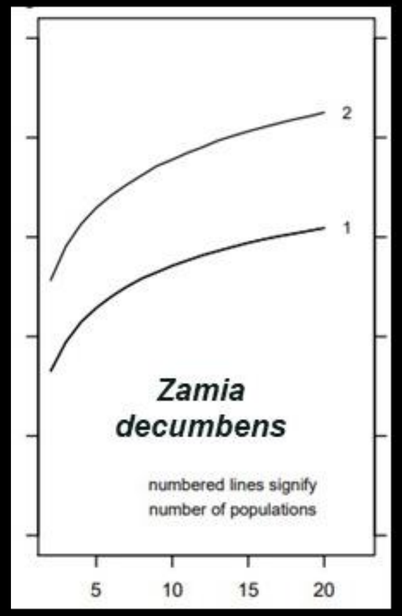
Like this *Brighamia insignis* . . .

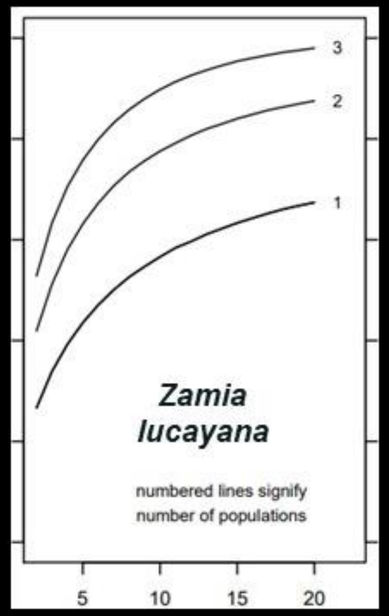
Whatever we have in gardens <u>today</u> is the entire diversity left to conserve

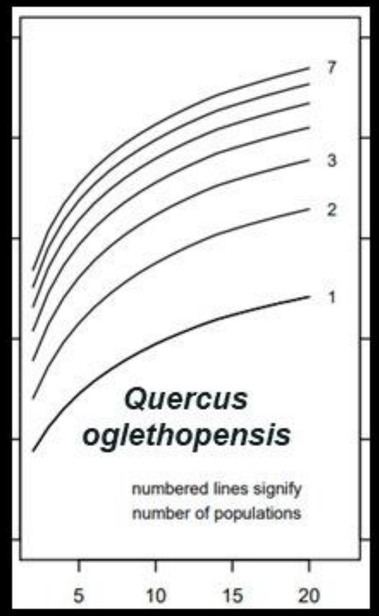
Perhaps Zoos can teach Gardens how to preserve these lineages.

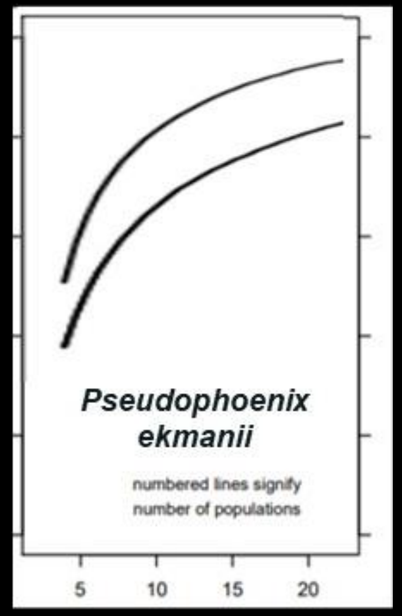
Results

Data show similarities and differences!









Different species require different sampling protocols!

Biology informs strategy

Consider population genetics in your collections planning.

Method: genetic diversity data compared between collection and wild population, graphed with R.

RESULTS

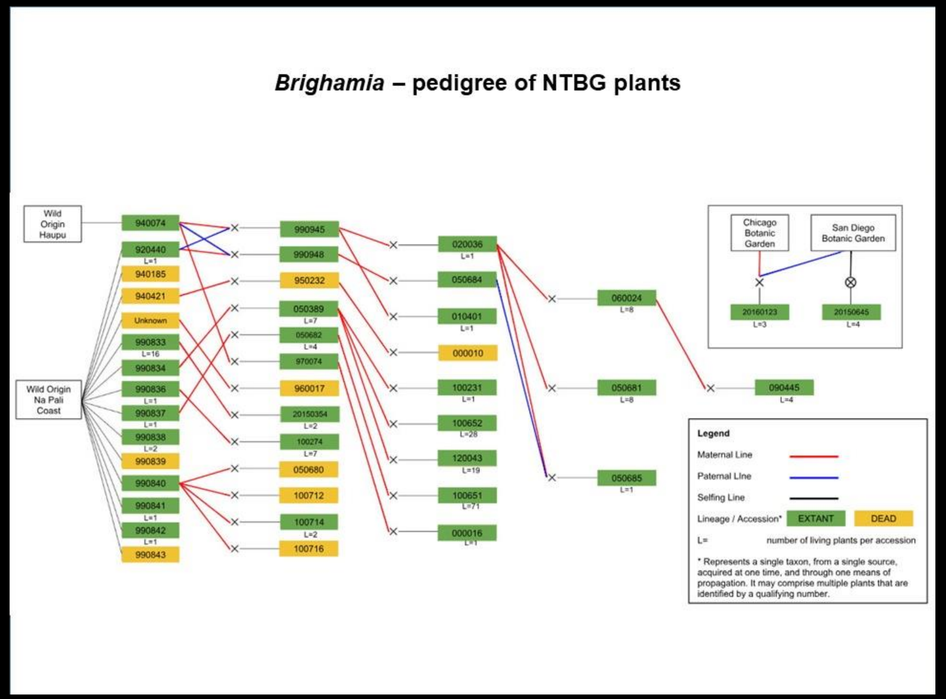
Compare these two collections!

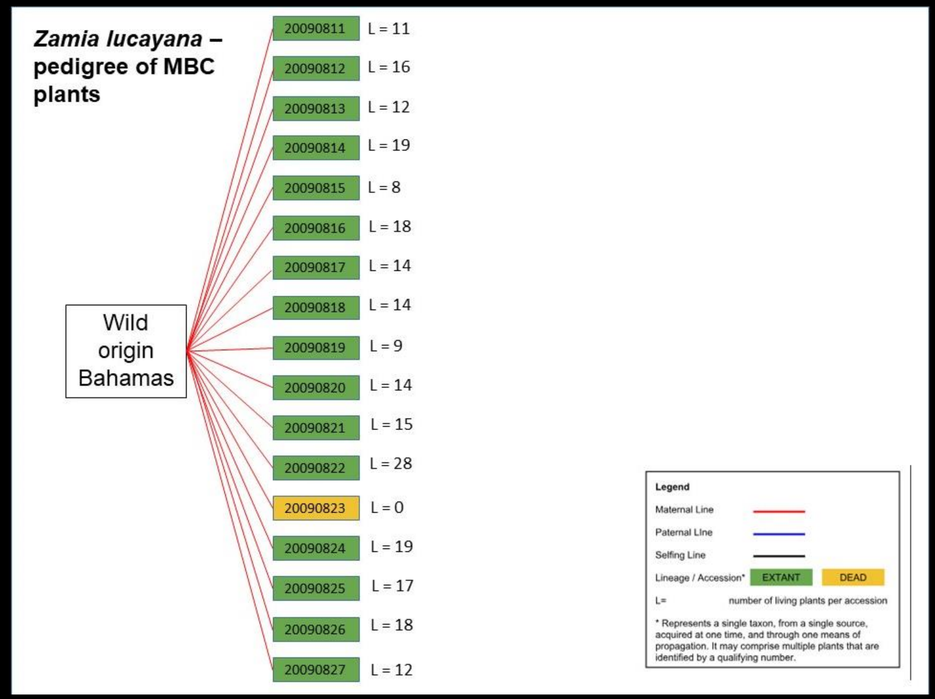
One has good “demographic depth,” but the other has none!

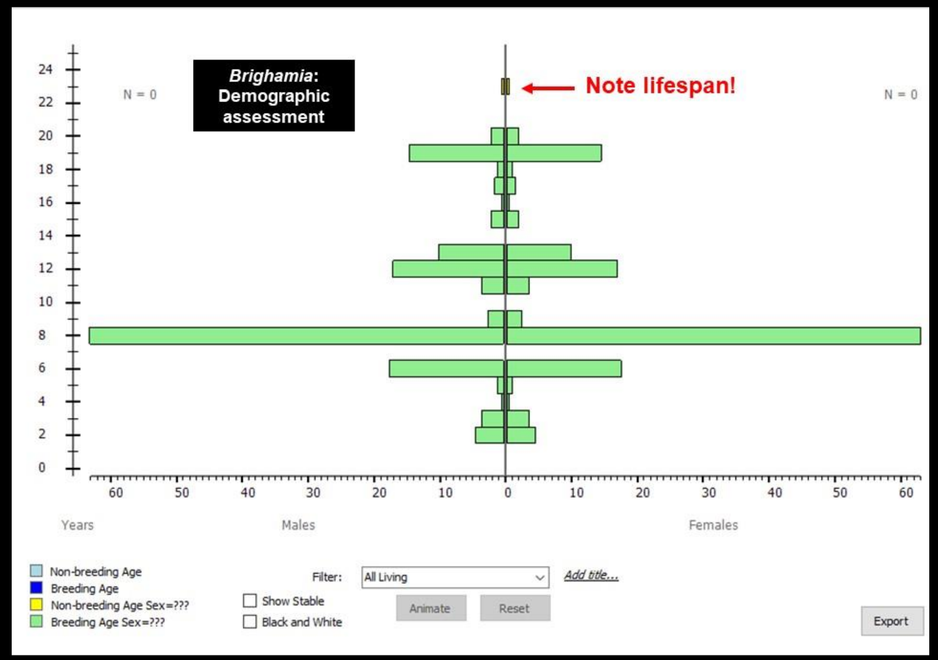
A lesson from the Zoos: genetic capture is not enough; demographic sustainability is crucial.

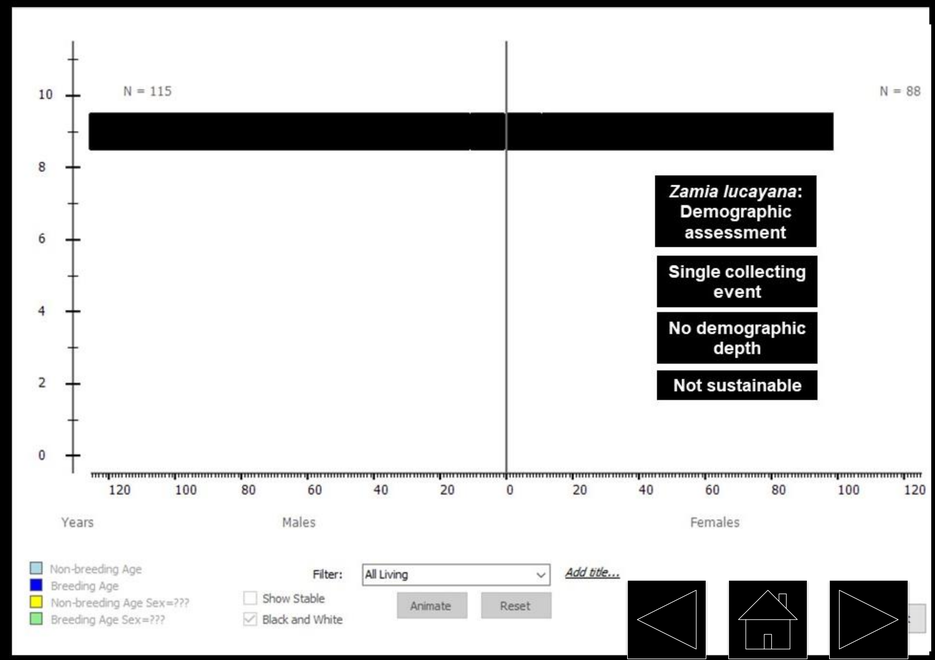
Let’s think of our plants as “Pandas” or “Rhinos.”

Method: plant collections data imported into PMx (zoo management) software.









Results

Gardens need to coordinate diversity!

Look at the data from these palms: One garden alone can’t capture enough diversity.

But two gardens working together can!

Method: genetic diversity data of multiple garden collections compared to genetic diversity of wild population; PCA of genetic distance. Software: GenAlEx

Path Forward

1. Find patterns and principles.

2. Improve protocols

3. Reach our community.

4. COORDINATE DIVERSITY

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