In the world of genomics, survival of the fittest is a reinforced practice. The weak do not advance. Scientists at Gainesville-based RAPiD Genomics have established a valuable business using that very Darwinian theory. By developing genotyping methods to characterize DNA in plants and animals, they can determine what contributes to breeding better plants and animals.

Since discovering the DNA double helix as we know it today, scientists have worked toward creating methods to best characterize a species down to the exact arrangement of its nucleic acids. Through funding from the Florida High Tech Corridor Council’s Matching Grants Research Program (MGRP), RAPiD Genomics has partnered with University of Florida (UF) scientists to develop more efficient methods.

“The number of plant and animal species to be characterized far outweighs the funds available to do it all, which is why our collaboration with UF has been incredibly beneficial in sharing resources and expertise,” said John McGuire, CEO of RAPiD Genomics.
for analyzing the thousands of data points within individual species’ genes.

“Genotyping helps us understand what genes are important,” said Dr. Matias Kirst, UF genetics professor and lead researcher on the project. “We can predict the performance of a seedling or a young animal based on the DNA alone, determining whether it will be more productive, more tolerant to disease or a number of other variables.”

Characterized DNA is the foundation for an infinite amount of uses by other researchers or companies, which makes RAPiD Genomics’ cost-efficient genotyping method invaluable. The company hosts an ever-expanding library of data for various agricultural crops and animal species.

Until now, genotyping methods were expensive, could only handle a low volume and were perceived as difficult within the scientific community. Unlike the current methods, RAPiD Genomics’ process allows for a large volume of plants or animals to be characterized quickly. RAPiD Genomics aims to characterize at least 1,000 individual plants or animals per week. Specifically, the team characterizes 10,000 to 50,000 genome positions within each plant or animal. Thanks to the funds from the Matching Grants Research Program, Kirst’s team is looking to increase their complete characterizations from five species to 10 or more.

“The MGRP funds allow us to do even more for this community in characterizing more species,” said Kirst. “Scientists and DNA breeders can effectively use our work to ease the process. I am excited that our research can lead to the reality of DNA breeding – accelerating current programs and creating efficiency.”

Kirst points to the many industry applications for characterization data such as finding the genes that control biofuel production, disease resistance or biomass yields. His team is looking at two plants in particular, sugarcane and eucalyptus, which have important roles in bioenergy and pulp/paper production respectively. “DNA breeding programs can use UF’s research to improve the development of both,” said Kirst.

“What we are really doing through genome characterization is increasing the efficiency of our natural resources,” said John McGuire, CEO of RAPiD Genomics. “However, the number of plant and animal species to be characterized far outweighs the funds available to do it all, which is why our collaboration with UF has been incredibly beneficial in sharing resources and expertise. I look forward to even greater things to come.”