Background

Who Is Evolutionary Genomics?

Evolutionary Genomics (EG) is a Colorado biotechnology company that was founded in 2000 to develop and commercialize a faster and more cost-effective methodology for identifying and validating commercially valuable genes. Agricultural and pharmaceutical companies have spent billions of dollars to identify genes of commercial value that control agricultural crop yields or to use as targets for novel therapeutics. The prevailing broad-scale gene identification approaches involve identifying and validating thousands of genes. These approaches, resulting in volumes of data, have failed to overcome the challenge of finding the most useful genes among thousands of potential candidates. EG's Adapted Traits Platform, on the other hand, acts as a powerful data filter that overcomes this challenge by dramatically narrowing the search for commercially valuable genes - quickly, efficiently and cost-effectively – without costly validation of each gene.

How does EG identify rice yield genes?

Generally, random changes (mutations) in genes harm the plant or animal in which they occur. Genes that have incorporated numerous changes as they adapted, due to a strong selection pressure, stand out as decidedly different from the norm. The EG technology rapidly identifies such adapted genes and the specific adaptations that have produced a desired trait – essentially, the "before" (ancestral) and the "after" (modern) versions of key trait genes.

As humans domesticated crop plants, such as rice, over thousands of years, they exerted strong selection pressure on those genes that controlled desirable traits, such as the tremendously improved yields of modern crops compared with their wild ancestors. The constant, intense selection pressure of domestication of agricultural plants by humans has resulted in the incorporation of genetic changes in the important genes. Each gene that fixed changes in response to domestication by humans has a characteristic pattern of sequence change recognized by EG's Adapted Traits Platform.

EG aligns equivalent genes of modern rice and its ancestor (which still grows wild in Asia) and identifies genes with the characteristic pattern of adaptation using custom software.

What is EG's corporate strategy regarding yield genes?

EG validates identified genes to the point of clearly associating the gene with control of a particular trait. We then will partner with agricultural companies to commercialize validated crop genes in improved crops. Rice is the world's largest crop and is grown in 89 countries. Rice yield genes will have value throughout the world. However, corn is by far the largest cereal crop in the US.

From rice to corn, wheat, and other cereals. Rice, corn, wheat, sorghum, millet, barley, and sugar cane are all grasses derived from a common ancestor and have essentially the same gene set. It is estimated that only 15 to 20 genes in each of these species control yield parameters, such as grain/kernel weight, number of grains/kernels per panicle/ear, and number of panicles/ears per plant. Rice has all of the genes found in other cereals, but the rice genome is about six-times smaller than the corn genome and 37-times smaller than the wheat genome, due to the extensive amount of repetitive DNA and duplication of genes and chromosomes in these other cereals. Yet, several research groups have shown that yield is associated with equivalent genes in each of the cereals. EG identifies adapted genes rapidly in rice, then uses the rice data to identify the equivalent genes in corn, wheat, and other crops with more complex genomes.

Our strategy is to enter into specific strategic alliances with respect to each crop, starting with this alliance specific to application of the genes we identify in rice. Subsequently, alliances will follow specific to homologous genes in corn, wheat, other monocots, and certain dicots.

What is the value of identifying crop yield genes?

Genes that could be used to improve yields of the most important crops are estimated to have a potential value of over $8 billion worldwide. Thus, finding yield genes has been a primary goal of agricultural biotechnology research.

Will these genes be used to make genetically modified organisms (GMOs)?

EG's discoveries will be natural food crop genes, encoding proteins that have been found in food crops for millennia. Such genes will make conventional crop breeding much more precise and directed, without relying on inserting genes from other species.

Is there a human healthcare application of EG's technology?

EG's Adapted Traits Platform also identifies useful human genes. Several intractable human diseases are non-existent or far less severe in some of our closest primate relatives. These diseases include AIDS, hepatitis C, Type I diabetes, sepsis, and hormone-dependent cancers.

Current AIDS treatment involves multiple drug combinations (cocktails), which are very expensive and require demanding treatment schedules, making them impractical for widespread use. A critical barrier to the development of more effective and cheaper therapeutics is the extreme mutability of HIV. In fact, HIV has been described as a "quasi species" because of the rampant mutations.

It is known that HIV originated in chimpanzees, and virus and chimpanzee co-evolved for many generations. When HIV first entered chimpanzee populations, susceptible chimpanzees died, while resistant chimpanzees lived. The virus has remained in chimpanzee populations as a continuous selection pressure, enriching for more and more resistant members of the population. Chimpanzees developed an ironclad means of holding the virus at bay in nature, in spite of the astonishing ability of the virus to mutate around the best therapies modern medicine can deliver. EG applies its Adapted Traits Platform technology to locate and characterize chimpanzee adaptations evolved over thousands of generations, in order to identify new targets for the development of more effective AIDS drugs.

Humans and non-human primates share a common ancestor and are over 90% identical at the DNA sequence level (chimpanzees and humans are 99% identical). Humans are estimated to have at least 30,000 genes, so it is a daunting task to find the few genetic differences between non-human primates and humans that confer AIDS resistance. EG's approach rapidly screens out most of the genes and identifies the rare genes that have the characteristic pattern indicating change under strong selection pressure. The EG Adapted Traits Platform is the most rapid and most cost-effective method to determine why chimpanzees are AIDS-resistant.

How is EG different that other genomics companies?

EG's proprietary approach for identifying and validating important genes gives the Company significant competitive advantages. EG's approach to discover and validate commercially significant genes is better, cheaper, and faster than other approaches.

- **Better:** EG zeroes in on genes with a track record of successful intervention by nature – thus are likely to be useful for crop improvement or as a therapeutic target – without the costly validation of every gene required by broad genomics/bioinformatics approaches. Nature adapts organisms while taking into account their full complexity.

- **Cheaper:** EG's platform takes advantage of the work **already done** by nature to find highly effective points for intervention. EG's approach allows validation resources to be applied specifically and efficiently.

- **Faster:** EG's approach provides both the "before" (ancestral) and "after" (modern) versions of key genes. The specific changes imposed by nature can be used to jump start crop improvement and small molecule therapeutics development.

Management

Ginny P. Orndorff (President, CEO, and Founder)
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- 25 years' experience in technology development, business development, and executive management in the biotechnology industry
- Founded EG in May 2000
- President and CEO of GenoPlex in Denver, CO (succeeding Ken Collins, below)
- Director of Business Development with NeXstar Pharmaceuticals, Inc., 1993-1997
- Director of Biotechnology Programs at the Colorado Advanced Technology Institute (CATI), Denver, created several programs, including the Colorado Biomedical Venture Center
- Manager of Technology Development, Genex Corporation

Walter Messier, Ph.D. (Chief Technology Officer and Founder)
(720) 859-4084 wmessier@evolgen.com

- MS, State University of New York at New Paltz
- Ph.D., University of Albany (State University of New York)
- Published in prestigious scientific journals (Nature, Current Biology, and Science)
- Recognized authority on use and interpretation of Ka/Ks algorithms, research on detection of molecular-level positive selection in the primates

Stephen Stetz (Director)
- President and Managing Partner, Matterhorn Strategic Partners, LLC
- VP of M/A and Licensing and Corporate Officer, Monsanto Company; member of elected "Core Management" group; responsible for over 500 licensing transactions
- CFO of Monsanto's Agriculture Company

Kenneth J. Collins (Director)
- President and CEO, Replidyne (Louisville, CO)
- President and CEO, Pegasus Technology Ventures (Boulder, CO).
- CFO, Synergen, Inc.; spearheaded private and public offerings that raised approximately $500 million; structured strategic alliances with major pharmaceutical companies

Kinney Johnson (Director)
- General Partner, Sequel Venture Partners, Boulder, CO
- General Partner, Capital Health Management.
- Co-founder, President, COO, Fisher Imaging Corporation

Paul L. Ray (Director)
- Life Sciences Partner with McKim & Co.
- President, CEO and Chairman of Image Guided Technologies (NASDAQ: IGTI), until it was acquired by Stryker Corp. (NYSE: SYK)
- CEO and Chairman of Springfield Surgical Instruments