Conceptual Overview of FHI Biotechnology Research

Genomics

Genome Sequence

- FHI provides a complete genetic "parts list" for the American chestnut genome and for hybrids between American chestnut and other species

Germplasm

Collection/ Coordination

- FHI provides platform to integrate several biotechnology activities including genomics, mapping, propagation and early clonal testing for blight resistance
- Shared resources foster coordination and efficiency

Population Genotyping

- FHI enables examination of breeding lines to determine the origins of blight resistance
- The precision afforded by a genome sequence will make future breeding faster and more precise, since the trees carrying blight resistance genes can be identified

Clonal Testing

Early Screen

- FHI enables early clonal screening for blight resistance to save time and $ (current method requires >5 yrs)

Transgenic Technology

- FHI enables identification, introduction and evaluation of transgenes to accelerate recovery of blight resistant American chestnut
- Engages the Social/ Environmental and Policy/Regulatoory arms of FHI

Veg Prop Technology

- FHI enables micropropagation of the best genetic materials available for clonal testing
- Propagation in the South can enhance year-round growth potential

FHI Biotechnology Research Workflow by Year

	Genomics	Germplasm		Clonal Testing		
	Genome Sequence	**Collection/ Coordination**	**Population Genotyping**	**Early Screen**	**Transgenic Technology**	**Veg Prop Technology**
Yr 1	CC Genome	Cloned Embryos	Improved Markers	Pilot Test	Ramp-up to Testing Scale	Ramp-Up to Testing Scale
Yr 2	ID All Genes, Incl. QTL	Cloned Embryos	Integrated Mapping	Validate	New Candidate Transgenes	Greenhouse/ Field Tests
Yr 3	Web Portal	Cloned Embryos	Marker-Aided Breeding	Apply Screen	Greenhouse/ Field Tests	Greenhouse/ Field Tests