**Nuts and Bolts of Backcross Chestnut Orchards**

Backcross Orchards are part of the scientific program of the American Chestnut Foundation for breeding regionally adapted American chestnut trees for eventual restoration of blight resistant tree. This is a managed volunteer program, and biological materials are subject to the TACF Germplasm agreement (see attached). Materials remain the property of the American chestnut foundation.

Sample Backcross Orchard: 2 or 3 Lines of ~100 15/16th KY Back cross nuts, and 20 controls (Chinese, Americans and F1s). The sample below is for 3 line orchard. (Simply reduce row length to ~210 ft and rows to 6 for a two line orchard.) Any orchard with rows longer than 300 ft is harder to manage!

Layout: 40 sites at 6 to 7 ft. apart (240 to 280 ft), with rows 15 ft. apart x 8 rows: 320 sites, with edges of 20 ft. along rows and 20 ft. either side at end of rows. Area for 6 ft.: layout: (274 x 145 ft.) 39730 sq. ft. or .92 acres.

For Solar Electric Fence with posts at corners, at gate and midway in all four sides: linear foot is ~300 x 150. Total 900 ft with (~10 posts). You must get a digital volt meter and use it – verify your fence is working.

There must be a water source. Plan for drip irrigation to 8 rows: 8 x 240 is ~ 2000 linear ft of drip emitter line. Buy high quality ‘permanent drip emitters” with 24” spacing. This allows use of Injectors for chemical treatments.

**Time line:**

Year 0: Fall: Stake rows and establish Deer Fence. If possible, establish rows with Glyphosate.

Year 1: March: Flag rows at 6 or 7 ft. interval, spray again with RoundUp.

April: Layout BlueXs and Bamboo stakes. Plant two lines in alternating rows 1, 2, 4, 5, 7. Plant controls, if available. Reserve rows 3, 6, 8 for Third line. Place permanent tags for sites planted.

May 15: Treat with Roundup, establish drip irrigation lines, fertilize with Osmocote, and mulch with composted bark. Assess germination.

June: Reassess germination.

July-August: Treat with Glyphosate for weed control approximately monthly and mow as needed. Hand weed BlueXs as needed.

September: Measure height and mortality.

Year 2: March: Flag, stake and tag rows 3, 6, 8 for Line 3.

April: Plant third line and fill in with controls. Prune existing rows for basal sprouts.

May: Treat with RoundUp, establish irrigation in three new rows. Fertilize all rows with Osmocote. Assess germination. Mulch new rows.

July-August: Continue Weed Control and Mowing.

September: Measure heights and mortality.

November (Dormancy): Corrective pruning.

Year 3: May 1: Assess bud flush and leafing out times weekly. RoundUp for weed control.

 Apply Osmocote. Remove BlueXs, if necessary and replace with alternative vole protection.

 June 1-15: Assess blooming in rows 1, 2, 4, 5, 7.

 June-August: Weed maintenance: Apply RoundUp and mow.

 September: Measure Heights & Mortality, add DBH to data.

 Dormancy: Corrective and Structural pruning

Year 4: Continue fertilizer, maintenance, weed control and assessments. Add DBH measurement to data.

Year 5: Continue fertilizer, maintenance, weed control and assessment. Evaluate trees for possible inoculation.

Year 6 & 7: Maintenance. Inoculation and Selection for resistance (1 in 8 trees).

Year 8 & 9: Remove non-selected trees. Intercross selected trees (4-6 per line).and move seeds to the

 seed orchard.

**Disease Management schedules for**

* **Ambrosia Beetle**
* **Phytophthora cinnamoni.**
* **Oriental Gall Wasp**
* **Yellow-necked caterpillars**
* **Japanese Beetles**