Mass Loss of American Chestnut Leaf Litter: No Differences Among Transgenic, Hybrid and Wild Type

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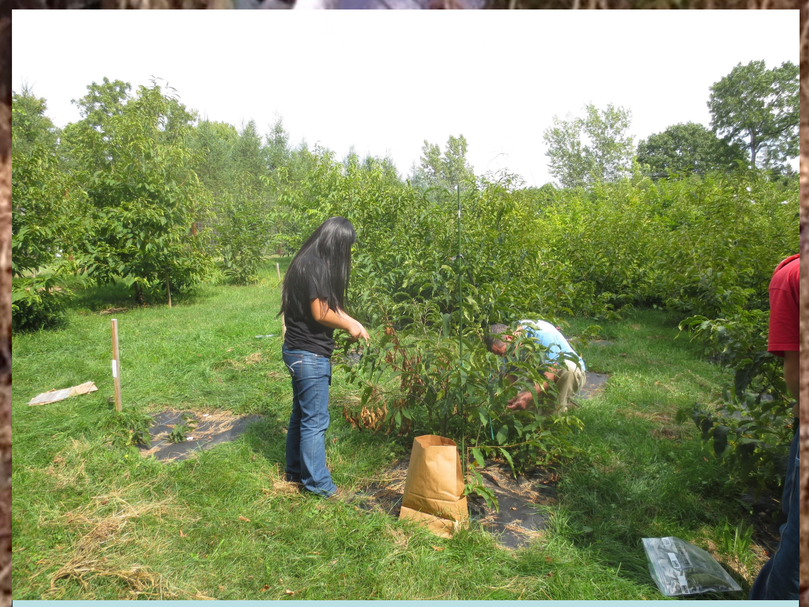
1 INTRODUCTION

After chestnut blight nearly eradicated American chestnut (*Castanea dentata* (Marsh.) Borkh.) from its native range, disease-resistant transgenic American chestnut trees were developed for the purpose of reintroducing this economically and ecologically important species into the wild. Before releasing genetically engineered plants into the environment, federal regulations require equivalent (to wild type) ecological function.

2 OBJECTIVE

Compare *in situ* mass loss of confined leaf litter for 2 transgenic, 1 hybrid, and 1 wild type American chestnut



3a METHODS

Foliage of four types harvested Sept. 2012, Lafayette Road Experiment Station Orchard, Syracuse, NY.

3b METHODS

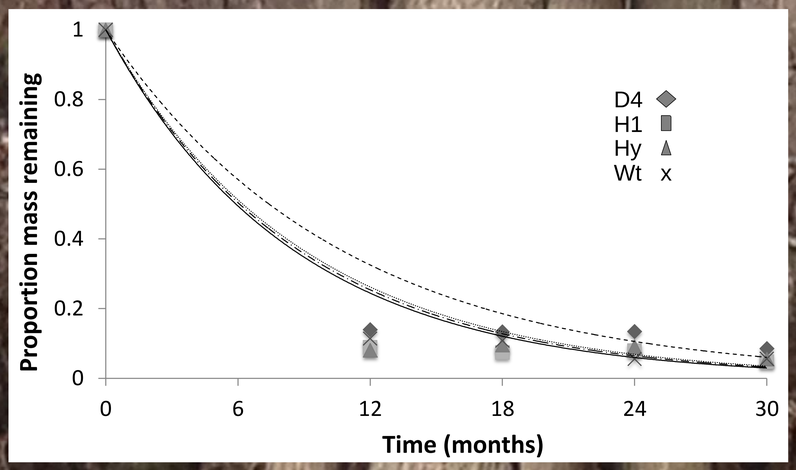
Foliage (≈10 g dried @ 60°C) from four types was confined in litterbags (2mm mesh) :

i. Wt = Wild-type (Zoar)
ii. Hy = Hybrid Backcrossed ¾ American-Chinese hybrids (GR68-B1 and K-L-BC1)
iii. D4 = Transgenic event Darling 4
iv. H1 = Transgenic event Hinchee 1

4 Litterbags each containing a different type were deployed at each of 30 points (120 bags) on 0/19/12
6 points randomly harvested at 12, 18, and 24 months; remaining 12 points harvested at 30 months.

3c METHODS

Proportion ash-free mass (y) at time t (12, 18, 30 mo) = [ash-free mass$_t$ / initial ash-free mass].
ANOVA tests Ho: $y_{WT} = y_{HY} = y_{D4} = y_{H1}$ at each time (t).
The exponential decay function ($y = e^{-kt}$) was fit for ash-free mass remaining over time for each type.



4 RESULTS

- Mass loss was much more rapid than anticipated based on previous experiences with red maple in ME; we should have collected at 6 months.
- The exponential model , while convenient, poorly represented the pattern of mass loss over time.
- Mass remaining did not differ among litter types after 12, 18, 24 and 30 months of incubation ($p > 0.05$).
- Foliage decomposition rates of transgenic chestnut (D4, H1) do not differ from hybrid (Hy) or wild type (Wt) or American chestnut.

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