

# The American Chestnut Foundation's Breeding Program, Restoration on Mined Lands

F. V. Hebard  
Research Farms  
Meadowview, VA  
Fred@acf.org  
[www.acffarms.org](http://www.acffarms.org)

F-521729

Figure 1.—Natural range of American chestnut.

# Chestnut & ARRI

- Why chestnuts?
- Timeline
- Prospects

# Chestnut & ARRI

- **Why chestnuts?** A lot of open land will be needed for serious chestnut restoration. Appalachian coal country is in the heart of the range of American chestnut. Mine operators will already be restoring their land to forest. Chestnut formerly grew on soils similar to those on mined lands.

# Chestnut & ARRI

- Why chestnuts?
- **Timeline** When will we have good trees for planting?
- Prospects

Our oldest seed orchard: we're still 5-10 years away from serious nut production



# Backcrossing

Expected  
Proportion  
Chinese

1/2

C x A  
↓

1/4

F<sub>1</sub> x A  
↓

1/8

B<sub>1</sub> x A  
↓

1/16

B<sub>2</sub> x A  
↓

1/16

B<sub>3</sub> x B<sub>3</sub>  
↓

1/16

B<sub>3</sub>-F<sub>2</sub> x B<sub>3</sub>-F<sub>2</sub>  
↓

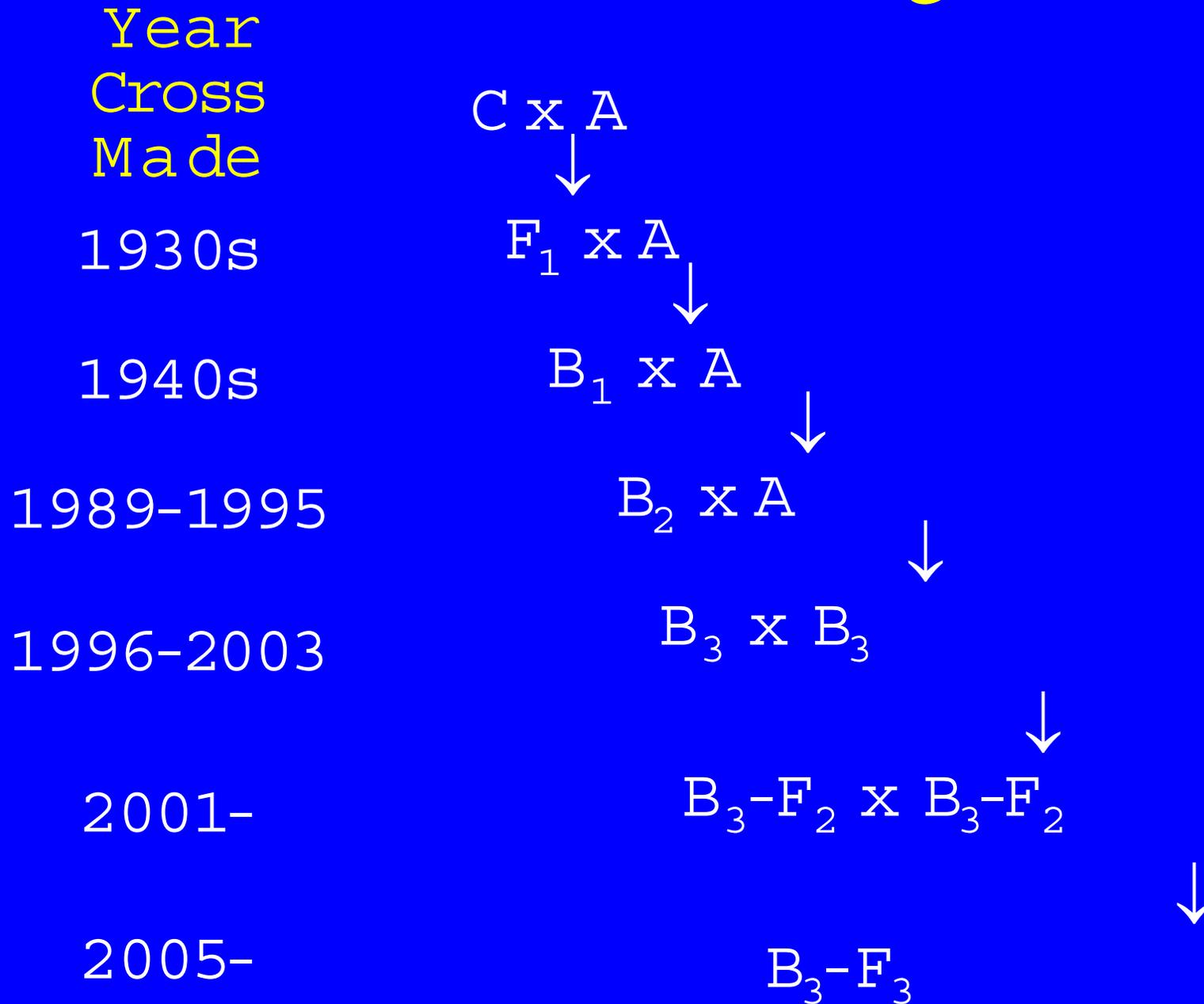
B<sub>3</sub>-F<sub>3</sub>  
↓

Blight-resistant  
Chinese to  
American  $B_3-F_2$ .

Nuts from this  
generation will be  
planted back into  
the forest and onto  
mined land.



# Backcrossing



# Backcrossing

Need more than one American parent

C x A1



F<sub>1</sub> x A2



B<sub>1</sub> x A3



B<sub>2</sub> x A4



B<sub>3</sub>

# Backcrossing

Need more than one American chestnut line

C x A1



F<sub>1</sub> x A2



B<sub>1</sub> x A3



B<sub>2</sub> x A4



B<sub>3</sub> x



B<sub>3</sub>-F<sub>2</sub>

C x A5



F<sub>1</sub> x A6



B<sub>1</sub> x A7



B<sub>2</sub> x A8



B<sub>3</sub> x

B<sub>3</sub>-F<sub>2</sub>

C x A9



F<sub>1</sub> x A10



B<sub>1</sub> x A11



B<sub>2</sub> x A12



B<sub>3</sub> x



C x A13



F<sub>1</sub> x A14



B<sub>1</sub> x A15



B<sub>2</sub> x A16



B<sub>3</sub>

# Number of Trees at Meadowview in 2007

Type of Tree	Number of		
	Nuts or Trees	Sources of Resistance	American Lines
American	2161		222
Chinese	3404	53	
F <sub>1</sub>	511	20	83
B <sub>1</sub>	582	16	40
B <sub>2</sub>	1683	11	95
B <sub>3</sub>	1683	9	78
B <sub>4</sub>	30	3	3
B <sub>1</sub> -F <sub>2</sub>	471	4	6
B <sub>2</sub> -F <sub>2</sub>	223	5	7
B <sub>3</sub> -F <sub>2</sub>	18169	2	35
B <sub>3</sub> -F <sub>3</sub>	217	1	5
F <sub>2</sub>	253	5	9
F <sub>3</sub>	6	1	1
Other	4063	73	116
Total	33456		

# Chestnut & ARRI

- Why chestnuts?
- Timeline
- **Prospects** We will have trees more resistant than American chestnut. Whether or not they are resistant enough or American enough to dominate our forests is not clear yet.

Blight-resistant  
Chinese to  
American B<sub>1</sub>-F<sub>2</sub>,  
'Clapper' x  
'Graves.'

Obtaining trees like  
this suggests it  
should be possible  
to backcross the  
blight resistance of  
Chinese into  
American chestnut.



Old-timey American chestnut trees. This is the goal. We're not there yet.

